

ATTACHMENT 5

MNES TERRESTRIAL VERTEBRATE FAUNA SPECIES ASSESSMENT:

Table 1. EPBC Act Critically Endangered, Endangered and Vulnerable terrestrial vertebrate fauna species that are known or predicted to occur in Main Range National Park and are expected to occur in the Project area

Table 2. Critically Endangered, Endangered and Vulnerable terrestrial vertebrate fauna species that are known or predicted to occur in Main Range National Park and its immediate environs but are not expected to occur in the Project area

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References

Table 1. EPBC Act Critically Endangered, Endangered and Vulnerable terrestrial vertebrate fauna species that are known¹ or predicted² to occur in Main Range National Park and are expected to occur in the Project area.

Species	EPBC Act Status ¹	Comments ²
Mammals		
Spotted-tailed Quoll <i>Dasyurus maculatus maculatus</i> (SE mainland)	E	18 Atlas of Living Australia (ALA) records, the most recent is a Queensland Museum (QM) specimen from 1993. 19 WN records. Occurs in Rainforest and wet and dry Sclerophyll Forest (Van Dyck <i>et al.</i> 2013). The field survey confirmed that habitats throughout the project area are suitable for the species.
Koala <i>Phascolarctos cinereus</i>	V	9 ALA records. 37 WildNet (WN) records. Occurs in Eucalypt Forest and Woodland (Van Dyck <i>et al.</i> 2013). No signs of Koala (tree-trunk scratches, scats, grunting calls) were detected during the field survey despite targeted searching in suitable eucalypt habitats. Nevertheless, potentially suitable habitat for Koala includes all eucalypt forests in the project area.
Greater Glider <i>Petauroides volans</i>	V	22 ALA records. 31 WN records. Occurs in Eucalypt Open Forest and Woodland (Van Dyck <i>et al.</i> 2013). The species was not detected during the field survey. Nevertheless, potentially suitable habitat for Greater Glider includes all eucalypt forests in the project area.
Long-nosed Potoroo <i>Potorous tridactylus tridactylus</i>	V	3 ALA records, the most recent is a DEHP 1998 record. 6 WN records. Occurs in wet Sclerophyll Forest with thick groundcover (Van Dyck <i>et al.</i> 2013). The field survey confirmed the occurrence of Long-nosed Potoroo in eucalypt forest/rainforest ecotone habitats with dense groundcover in the project area.
Brush-tailed Rock-wallaby <i>Petrogale penicillata</i>	V	12 ALA records, all DEHP or QPWS and the most recent from 2006. 55 WN records. Occurs in rocky environments in Rainforest and Eucalypt Forest and Woodland (Van Dyck <i>et al.</i> 2013). The species was observed in the northern portion of the project area during the field survey, and suitable habitat occurs in the vicinity of steep, rocky escarpment slopes and cliffs throughout the project area.
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	V	2 WN records and 2 ALA records. 1 ALA is a QPWS record from 2003. The other is a 2007 recording of a call. The co-ordinates place the latter record in Main Range NP but the location is given as Black Horse Creek Road via Kyogle (presumably incorrect). Occurs in a wide variety of habitats including Rainforest and Open Forest (Van Dyck <i>et al.</i> 2013). The project area is unlikely to be an important area for the species.
Corben's (Eastern) Long-eared Bat <i>Nyctophilus corbeni</i>	V	Predicted by the Protected Matters Search Tool (PMST). No ALA or WN records. Most common in Box/Ironbark/Cypress Pine Woodland on sandy soils, though it occurs in Bull Oak <i>Allocasuarina luehmannii</i> , Brigalow and Belah communities (Turbill <i>et al.</i> 2008), and Semi-evergreen Vine Thickets (Churchill 2008). Not expected to occur in or near the project area.
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	V	3 WN records. Occurs in a variety of habitats including Open Forest and Rainforest edges (Van Dyck <i>et al.</i> 2013).
New Holland Mouse <i>Pseudomys novaehollandiae</i>	V	1 WN record and 2 ALA records (which probably include the WN record). All are 1997 records from Glenrock, a property to the west of Main Range NP. One of the records is within 3 km of the project area. Occurs in Open Forest and Woodland on sandy, loamy or rocky soils (Van Dyck <i>et al.</i> 2013). The species was not detected during the field survey.
Hastings River Mouse <i>Pseudomys oralis</i>	E	5 ALA records, the most recent is a DEHP 2007 record. 48 WN records. Occurs in Eucalypt Open Forest with dense groundcover of grasses, ferns or mat-rushes (Van Dyck <i>et al.</i> 2013). The field survey confirmed that potentially suitable habitat in the project area occurs in eucalypt forest within the northern section of Main Range National Park and between Manna Gum Campground and the proposed Woodcutters Ecocamp. One individual was trapped on the hillside 30 m upslope from the proposed Woodcutters site.
Birds		
Australasian Bittern <i>Botaurus poiciloptilus</i>	E	1 BirdLife Australia record with no date and very imprecise co-ordinates, decimal degrees -28, 152.4. 1 WN record, possibly the same record. No detail is provided. DEHP (2016a) provides co-ordinates for all known Qld records and none is in the vicinity of the project area. No habitat for the species in the project area - not expected to occur.
Red Goshawk <i>Erythrotriorchis radiatus</i>	V	1 WN record and 2 ALA records. One ALA record is listed as DNPSR and is probably the WN record. Both ALA records have imprecise co-ordinates, - decimal degrees 27.9, 152.3, and are likely to be west of the project area. Occurs in woodlands and forests, particularly tall forests in areas of high rainfall (Woinarski 2007), and ideally with intact forest or woodland, a mosaic

Species	EPBC Act Status ¹	Comments ²
		of vegetation types and permanent water, particularly riverine forests, avoiding both very dense and very open habitats (Marchant & Higgins 1993; DERM 2009). In partly cleared habitats in eastern Australia it occurs in areas with gorges and escarpments (Czechura & Hobson 2000). Main Range NP is the centre of a recognised territory (DNPRSR 2013). However, the species was not detected during extensive surveys in 2013/14 focused on the vicinity of historical breeding records of the species, including Main Range National Park, and there have been no recent records of the species in the region (Seaton 2014). Consequently, the southerly range of Red Goshawk appears to have undergone a significant retraction over the past several decades and the species may no longer be breeding in the South-East Queensland region (Seaton 2014). The species was not detected during the field survey.
Black-breasted Button-quail <i>Turnix melanogaster</i>	V	2 DEHP records, both dated 1/1/93. 4 WN records. No detail is provided. Occurs in dry Rainforest and Vine-thickets with abundant leaf-litter. Also recorded in Eucalypt Forests with a dense understorey including <i>Lantana camara</i> (Marchant & Higgins 1993). There is no mention of a Main Range population in the national recovery plan (Mathieson & Smith 2009). The closest identified population is at Mt. French, c. 20 km to the east. The species was not detected during the field survey.
Australian Painted Snipe <i>Rostratula australis</i>	E	1 Historical Bird Atlas record with no date and very imprecise co-ordinates, decimal degrees -28, 152.4 (ALA 2016). Occurs in terrestrial shallow vegetated wetlands, usually freshwater but occasionally brackish, including temporarily inundated woodlands and grasslands, swamps, saltmarsh and artificial wetlands such as dams, rice crops, sewage farms and bore drains (Pringle 1987; Marchant & Higgins 1993; Garnett & Crowley 2000). No suitable habitat for the species in the project area - not expected to occur.
Squatter Pigeon <i>Geophaps scripta scripta</i>	V	Predicted by the PMST. No ALA or WN record. Mostly occurs on sandy sites near permanent water (Blakers <i>et al.</i> 1984), in dry grassy Eucalypt Woodlands, Open Forests (Frith 1982; Crome & Shields 1992) and Cypress Pine <i>Callitris</i> spp. and acacia woodlands (Frith 1982). No suitable habitat - not expected to occur.
Swift Parrot <i>Lathamus discolor</i>	CE	1 WN record. No detail is provided. Breeds in Tasmania, dispersing across south-eastern Australia during winter (NPWS 2003). Movements on the mainland are little understood and the species is considered nomadic and irruptive, moving in response to food resources (Higgins 1999). It is infrequently, though possibly annually, recorded in SE Qld. At best, a very rare and irregular visitor to the area.
(Coxen's) Double-eyed Fig-parrot <i>Cyclopsitta diophthalma coxeni</i>	E	8 DEHP records, the most recent is 1994. 10 WN records. Occurs in Rainforests, riparian corridors in Woodland and Open Woodland (Garnett & Crowley 2000). The species was reliably recorded from Main Range NP in 1997 (Coxen's Fig-Parrot Recovery Team 2001).
Rufous Scrub-bird <i>Atrichornis rufescens</i>	E	17 ALA records, most recent 2007. 19 WN records. Occurs in rainforest and adjacent Open Eucalypt Forest with a Rainforest understorey (Higgins <i>et al.</i> 2001). The species was not detected during the field survey.
Eastern Bristlebird <i>Dasyornis brachypterus</i>	E	122 ALA records. 86 WN records. Occurs in tall dense grassy groundcover in Open Eucalypt Forest and Woodland, often at ecotones with Rainforest (Higgins & Peter 2002). Northern regional population estimated to comprise < 50 birds following rapid decline toward the end of the 20th century. Population now appears to be in gradual decline in SE Qld (DoE 2016b). The species was not detected during the field survey and habitats within the project area are generally unsuitable north of Cunningham's Gap. A population was known south of Cunningham's Gap; however, no Eastern Bristlebirds have been recorded from this location in over 20 years, apparently as a result of a fire event (Gregory, 2007).
Regent Honeyeater <i>Anthochaera phrygia</i>	CE	Predicted by the PMST. No WN record. 1 ALA record which has imprecise co-ordinates, decimal degrees -27.9, 152.3, and is likely to be west of the project area. Occurs mainly in dry Box-Ironbark Eucalypt Woodland and dry sclerophyll Forest (Higgins <i>et al.</i> 2001), preferring the wettest, most fertile sites (Garnett & Crowley 2000). No suitable habitat for the species in the project area - not expected to occur.
Painted Honeyeater <i>Grantiella picta</i>	V	Predicted by the PMST. No ALA or WN record. Occurs mainly in dry open Woodlands and Forests with a strong association with mistletoe (Higgins <i>et al.</i> 2001). Woodlands dominated by acacias are particularly favoured, but the species also occurs in Belah <i>C. cristata</i> , Bulloak <i>A. luehmannii</i> , White Cypress Pine <i>C. glaucophylla</i> and Riparian Woodland of <i>E. camaldulensis</i> (Barea & Watson 2007; Garnett <i>et al.</i> 2011; Watson 2012). No suitable habitat for the species in the project area - not expected to occur.

Appendix 5: MNES Terrestrial Vertebrate Fauna Species Assessment

Species	EPBC Act Status ¹	Comments ²
Black-throated Finch <i>Poephila cincta cincta</i>	E	Predicted by the PMST. No ALA or WN record. Occurs in dry Open Woodlands and Forests with seeding grasses and free-standing water (Higgins <i>et al.</i> 2006b). It is now possibly extinct in New South Wales and there were only six Atlas of Australian Bird records in southern Queensland for the period 1977 to 1981 and none for <i>Atlas of Australian Birds 2</i> (Higgins <i>et al.</i> 2006b). The southern subspecies is now considered to extend southwards only as far as the upper Burdekin River basin (Payne 2010). The species is not expected to occur.
Reptiles		
Collared Delma <i>Delma torquata</i>	V	Predicted by the PMST. No ALA or WN record. Has a highly fragmented distribution and occurs in Eucalypt Woodlands and Open Forests in Queensland Regional Ecosystem Land Zones 3 - Alluvium (river and creek flats), 9 - Undulating country on fine-grained sedimentary rocks & 10 - Sandstone ranges (Brigalow Belt Reptiles Workshop 2010). The species was not detected during the field survey.
Five-clawed (Long-legged) Worm-skink <i>Anomalopus mackayi</i>	V	Predicted by the PMST. No ALA or WN record. Occurs in open Grasslands on heavy cracking soil (Wilson 2015) in areas with closely spaced tussock grass that are prone to inundation (Ehmann 1992). Also occurs in Eucalypt Open Woodland, Cypress Pine <i>Callitris</i> spp. Woodland with a grassy groundcover and in Grassland on loam or sandy soils (Hobson 2012). In Queensland the Five-clawed Worm-Skink is now largely confined to relict roadside verges (Wilson 2015). No suitable habitat - not expected to occur.
Three-toed Snake-tooth Skink <i>Coeranoscincus reticulatus</i>	V	7 ALA records, including two QM specimens, 12 WN records. Occurs in Rainforest (Wilson 2015). The species was not detected during the field survey, but potentially suitable habitat occurs in rainforest throughout the project area.
Condamine Earless Dragon <i>Tympanocryptis condaminensis</i>	E	Predicted by the PMST. No ALA or WN record. Occurs on road verges of remnant Grassland and mixed crops (Wilson 2015). No suitable habitat for the species in the project area - not expected to occur.
Dunmall's Snake <i>Furina dunmalli</i>	V	Predicted by the PMST. No ALA or WN record. Poorly known, occurs in Open Forests and Woodlands, particularly Brigalow and Woodlands growing on cracking black clay and clay loams (Cogger <i>et al.</i> 1993). No suitable habitat for the species in the project area - not expected to occur.
Frogs		
Fleay's Barred Frog <i>Mixophyes fleayi</i>	E	646 ALA records. 4001 WN records. Occurs on permanent and semi-permanent freshwater streams in Rainforest and other forest communities (Hines & SEQTFRT 2002). Main Range NP is a stronghold for the species (DNPRSR 2013), particularly the Goomburra area. During the targeted field survey, individual males were heard calling at intervals of 20-30 m along the perennial stream on the proposed new trail between the Winder track and the proposed Amphitheatre Ecocamp.
Giant Barred Frog <i>Mixophyes iteratus</i>	E	1 WN record. No detail is provided. Occurs in Rainforest and wet sclerophyll, especially along streams (Vanderduys 2012). Cunningham's Gap previously supported the species but targeted surveys and intensive monitoring in the late 1990s failed to locate the species (Hines <i>et al.</i> 1999). The species was not detected during the field survey.

1. Status: CE = Critically Endangered, E = Endangered, LC = Least Concern (Common), NT = Near Threatened, V = Vulnerable.
2. Comments about habitat either refer to habitats present within the project area or are intended to indicate that the species is unlikely to occur due to a lack of suitable habitat.

Table 2. Critically Endangered, Endangered and Vulnerable terrestrial invertebrate fauna species that are known¹ or predicted² to occur in Main Range National Park and its immediate environs but are not expected to occur in the Project area

Species & EPBC Act status	Distribution and Habitat	Likelihood
Corben's Long-eared Bat <i>Nyctophilus corbeni</i> Vulnerable	<p>Previously considered a form of <i>Nyctophilus timoriensis</i>, South-eastern Long-eared Bat, and protected under legislation as <i>N. timoriensis sensu lato</i> (south-eastern form). (Parnaby 2009). Predicted by the Protected Matters Search Tool (PMST) (DoE 2016c): <i>Species or species habitat may occur within area</i>. There is no <i>Atlas of Living Australia</i> (ALA 2016) or WildNet record (DEHP 2016) in or near Main Range National Park. The closest record in the ALA is near Millmerran, approximately 103 km to the west of the Project area.</p> <p>Corben's Long-eared Bat is largely restricted to the Murray-Darling Basin (Churchill 2008; Turbill <i>et al.</i> 2008), with its stronghold in the Pilliga forests of central New South Wales (Turbill & Ellis 2006). In Queensland the species is mainly recorded in the Brigalow Belt (South) bioregion, with records from less than 30 locations (Reardon 2012). Corben's Long-eared Bat is most common in box/ironbark/cypress pine woodland on sandy soils (Turbill & Ellis 2006; Churchill 2008; Turbill <i>et al.</i> 2008), though it also occurs in Bulloak <i>Allocasuarina luehmannii</i>, Brigalow <i>Acacia harpophylla</i> and Belah <i>Casuarina cristata</i> communities (Turbill <i>et al.</i> 2008), dry sclerophyll forests with <i>Corymbia citriodora</i>, and semi-evergreen vine thickets. The species prefers areas with a distinct canopy and a dense understorey (Churchill 2008). Most records are from large tracts of vegetation of approximately 5000+ha (e.g., Southwood National Park) (EPA 2008), such data suggest that large, intact remnants of suitable habitat are required to support populations (Turbill & Ellis 2006; Turbill <i>et al.</i> 2008).</p>	There is no suitable habitat in the Project area and the species is not expected to occur.
Australasian Bittern <i>Botaurus poiciloptilus</i> Endangered	<p>Predicted by the Protected Matters Search Tool (PMST) (DoE 2016c): <i>Species or species habitat known to occur within area</i>. There is a single BirdLife Australia record with no date and very imprecise co-ordinates, decimal degrees -28, 152.4 (ALA 2016). There is one WildNet record (DEHP 2016), possibly the same record. No detail is provided. DEHP (2016a) provides co-ordinates for all known Queensland records and none is in the vicinity of the Project area.</p> <p>Australasian Bittern occurs in southeastern Australia, Tasmania and southwest Western Australia. It extends north into southern Queensland (Marchant & Higgins 1990), where it is probably confined to a few coastal swamps. It is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions (DoE 2016d). In 2009-2010, Birds Australia estimated there were 3-16 adult birds in Queensland (Garnett <i>et al.</i> 2011). The species inhabits terrestrial wetlands, favouring wetlands with tall dense vegetation, particularly those dominated by sedges, rushes, reeds or cutting grass. Also occurs in tidal wetlands, swamps, lakes, rivers and channels lined with lignum (Marchant & Higgins 1990) and in rice fields (Garnett <i>et al.</i> 2011).</p>	There is no suitable habitat in the Project area and the species is not expected to occur.
Australian Painted Snipe <i>Rostratula australis</i> Endangered	<p>Predicted by the Protected Matters Search Tool (PMST) (DoE 2016c): <i>Species or species habitat likely to occur within area</i>. There is a single Historical Bird Atlas record with no date and very imprecise co-ordinates, decimal degrees -28, 152.4 (ALA 2016).</p> <p>The Australian Painted Snipe occurs in terrestrial shallow vegetated wetlands, usually freshwater but occasionally brackish, including temporarily inundated woodlands and grasslands, swamps, saltmarsh and artificial wetlands such as dams, rice crops, sewage farms and bore drains (Pringle 1987; Marchant & Higgins 1993; Garnett & Crowley 2000). The species is crepuscular and is generally inactive by day. This activity pattern, combined with its cryptic plumage and secretive nature (Pringle 1987; Marchant & Higgins 1993), means that its presence or absence can be difficult to</p>	There is no suitable habitat in the Project area and the species is not expected to occur.

Species & EPBC Act status	Distribution and Habitat	Likelihood
	determine. Its occurrence in a location is also often erratic, with the bird absent some years and common in others (Marchant & Higgins 1993). Breeding occurs mainly in the Murray-Darling region and the species requires shallow wetlands with patches of bare mud, dense low cover and sometimes tall dense cover (Rogers <i>et al.</i> 2005).	
Squatter Pigeon <i>Geophaps scripta scripta</i> Vulnerable	<p>Predicted by the Protected Matters Search Tool (PMST) (DoE 2016c): <i>Species or species habitat likely to occur within area.</i> There is no <i>Atlas of Living Australia</i> (ALA 2016) or WildNet record (DEHP 2016) in or near Main Range National Park.</p> <p>The southern subspecies of the Squatter Pigeon occurs mainly in dry grassy eucalypt woodlands and open forests (Frith 1982; Crome & Shields 1992) and also inhabits Cypress Pine <i>Callitris</i> spp. and acacia woodlands (Frith 1982). It mostly occurs on sandy sites near permanent water (Blakers <i>et al.</i> 1984). Squatter Pigeons dust-bathe and are frequently encountered on dirt tracks and in areas of bare soil denuded of ground cover by livestock (Frith 1982; Higgins & Davies 1996). The Squatter Pigeon is now largely, if not wholly, restricted to Queensland. The species formerly occurred as far south as 34°S (Blakers <i>et al.</i> 1984) but there has been no confirmed record in New South Wales since the 1970s (NSW NPWS 2003). In Queensland, the southern subspecies occurs north to the Burdekin River (Frith 1982) with an intergrade zone with the northern subspecies <i>G. s. peninsulae</i> around the Burdekin-Lynd Divide (Schodde & Mason 1997). The species extends west to Longreach, Barcaldine and Charleville and east to Townsville, Proserpine, Warwick and Esk (Storr 1973; Frith 1982; Schodde & Mason 1997). It is now very localised in southern Queensland but is still recorded in low numbers around Inglewood, Warwick and Esk ((Reis 2012).</p>	There is no suitable habitat in the Project area and the species is not expected to occur.
Regent Honeyeater <i>Anthochaera phrygia</i> Critically Endangered	<p>Predicted by the PMST (DoE 2016c): <i>Species or species habitat known to occur within area.</i> There is a single <i>Atlas of Living Australia</i> record with imprecise co-ordinates, decimal degrees -27.9, 152.3 (ALA 2016).</p> <p>The Regent Honeyeater is restricted to south-eastern Australia where it is widespread but extremely patchy in occurrence (Garnett <i>et al.</i> 2011). Historically, the species was distributed from Adelaide in South Australia north to Rockhampton in Queensland. However, their range has contracted considerably (Higgins <i>et al.</i> 2001). The species have not been recorded in South Australia or western Victoria since the 1970s (Garnett <i>et al.</i> 2011). Most records now occur north of the Great Divide in Victoria and south of Pomona in Queensland. They may still be observed within their historical distribution in New South Wales, extending inland to Narrabri, Parkes and Warrumbungle National Park. However, reporting frequency and numbers have declined significantly since the 1940s (Garnett & Crowley 2000; Higgins <i>et al.</i> 2001). In Queensland, the Regent Honeyeater has been recorded from 15 sites, primarily south of a line between Chinchilla and the Sunshine Coast. There are records on Bribie Island, from the Granite Belt between Warwick in the east, Gore in the west and Sundown NP in the south (DoE 2016a). Breeding occurs regularly west of Warwick, though only by small numbers of birds (Geering 2012).</p> <p>Although occasionally found in agricultural land with only partial tree cover or in city parks and gardens, the Regent Honeyeater occurs mainly in dry box-ironbark eucalypt woodland and dry sclerophyll forest (Higgins <i>et al.</i> 2001). They are particularly fond of vegetation associations that reliably produce nectar such as Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), Yellow Box (<i>E. melliodora</i>), White Box (<i>E. albens</i>) and Yellow Gum (<i>E. leucoxylon</i>). However, when nectar is scarce they can</p>	There is no suitable habitat in the Project area and the species is not expected to occur.

Species & EPBC Act status	Distribution and Habitat	Likelihood
	<p>also be observed in association with Grey Box (<i>E. microcarpa</i>), Red Box (<i>E. polyanthemus</i>), Blakely's Red Gum (<i>E. blakelyi</i>), River Red Gum (<i>E. camaldulensis</i>), Silver-leafed Ironbark (<i>E. melanophloia</i>), Caley's Ironbark (<i>E. caleyi</i>) and Swamp Mahogany (<i>E. robusta</i>) (Franklin <i>et al.</i> 1989; Geering & French 1998). Within these vegetation associations they are most regularly recorded from the wettest, most fertile sites with high nectar flows, such as creek flats, river valleys and lower slopes (Garnett & Crowley 2000; Geering 2012).</p>	
<p>Painted Honeyeater <i>Grantiella picta</i></p> <p>Vulnerable</p>	<p>Predicted by the PMST (DoE 2016c): <i>Species or species habitat known to occur within area</i>. There is no <i>Atlas of Living Australia</i> (ALA 2016) or WildNet record (DEHP 2016) in or near Main Range National Park.</p> <p>The Painted Honeyeater occurs from south-eastern Australia to north-western Queensland and the eastern Northern Territory (Higgins <i>et al.</i> 2001). Almost all breeding records and the greatest concentrations of individuals occur south of 26°S, i.e. south of the Roma area in Queensland (Higgins <i>et al.</i> 2001; Barrett <i>et al.</i> 2003). Breeding and north-south movements are closely aligned with fruiting mistletoes (Barea and Watson 2007). Diet consists primarily of mistletoe fruit (mostly <i>Amyema</i> species), the species being the most specialised of Australia's honeyeaters (Garnett <i>et al.</i> 2011). However, in the absence of mistletoe fruit, nectar and insects are regularly taken (Higgins <i>et al.</i> 2001, Oliver <i>et al.</i> 2003). The Painted Honeyeater is highly mobile and thinly spread over large areas (Watson 2012).</p> <p>The Painted Honeyeater occur mainly in dry open woodlands and forests with a strong association with mistletoe (Higgins <i>et al.</i> 2001). The species prefers woodlands with many mature trees, as these host more mistletoes (Oliver <i>et al.</i> 2003). Woodlands dominated by acacias (e.g., Brigalow <i>Acacia harpophylla</i>, Weeping Myall <i>A. pendula</i>, Mulga <i>A. aneura</i>) are particularly favoured, but the species also occurs in Belah <i>Casuarina cristata</i>, Bulloak <i>Allocasuarina luehmannii</i>, White Cypress Pine <i>Callitris glaucophylla</i> and riparian woodland of River Red Gum <i>Eucalyptus camaldulensis</i> (Barea & Watson 2007; Garnett <i>et al.</i> 2011; Watson 2012). They also occur on plains with scattered eucalypts and in remnant trees on farmland (Higgins <i>et al.</i> 2001, Oliver <i>et al.</i> 2003) and in narrow linear strips such as roadsides (Bowen <i>et al.</i> 2009), where mistletoes can be abundant due to increases water as run-off from roads (Norton <i>et al.</i> 1995).</p>	<p>There is no suitable habitat in the Project area and the species is not expected to occur.</p>
<p>Black-throated Finch <i>Poephila cincta cincta</i></p> <p>Endangered</p>	<p>Predicted by the PMST (DoE 2016c): <i>Species or species habitat may occur within area</i>. There is no <i>Atlas of Living Australia</i> (ALA 2016) or WildNet record (DEHP 2016) in or near Main Range National Park.</p> <p>The Black-throated Finch formerly occurred from far north Queensland south to the Northern Tablelands of New South Wales and as far west as Cunnamulla, Queensland. It is now possibly extinct in New South Wales and there were only six <i>Atlas of Australian Bird</i> records in southern Queensland for the period 1977 to 1981 and none for <i>Atlas of Australian Birds 2</i> (Higgins <i>et al.</i> 2006). There have been only nine records south of 23°S since 1980 (Vanderduys <i>et al.</i> 2016). The southern subspecies is extinct in most places south of the Burdekin River (Higgins <i>et al.</i> 2006) and is now considered to extend southwards only as far as the upper Burdekin River basin (Payne 2010). Since 1998 known records of the southern subspecies in the Brigalow Belt North Bioregion have been restricted to south of Ross River Dam, on the Bohle floodplain, and at Serpentine Lagoon, Giru and Strathalbyn (BTF Recovery Team 2007).</p>	<p>There is no suitable habitat in the Project area and the species is not expected to occur.</p>

Species & EPBC Act status	Distribution and Habitat	Likelihood
	Black-throated Finches occur in dry open woodlands and forests with seeding grasses and free-standing water. They are often along watercourses and probably require a mosaic of different habitats (Higgins <i>et al.</i> 2006). The woodlands and forests are typically dominated by <i>Eucalyptus</i> , <i>Corymbia</i> and <i>Melaleuca</i> species. The Black-throated Finch occasionally occurs in tussock grasslands and freshwater wetlands, and is often found along or near watercourses or in the vicinity of other waterbodies (BTF Recovery Team 2007).	
Five-clawed Worm-skink <i>Anomalopus mackayi</i> Vulnerable	Predicted by the PMST (DoE 2016c): <i>Species or species habitat likely to occur within area</i> . There is no <i>Atlas of Living Australia</i> (ALA 2016) or WildNet record (DEHP 2016) in or near Main Range National Park. The Five-clawed Worm-Skink has a small distribution, being confined to the eastern Darling Downs region of the southern Brigalow Belt in Queensland and the western slopes of the Great Dividing Range in northeast New South Wales (Richardson 2006; Hobson 2012b). Its range appears to have contracted eastwards (Cogger <i>et al.</i> 1993). The species is found in open grasslands on heavy cracking soil (Wilson 2015) in areas with closely spaced tussock grass that are prone to inundation (Ehmann 1992). Scattered eucalypts may be present or adjacent (Ehmann 1992; Cogger <i>et al.</i> 1993). It also occurs in open eucalypt woodland, Cypress Pine <i>Callitris</i> spp. woodland with a grassy groundcover and in grassland on loam or sandy soils (Hobson 2012b). In Queensland the Five-clawed Worm-Skink is now largely confined to relict roadside verges (Wilson 2015). It lives under logs, rocks and in loose soil (Hobson 2012) and presumably in soil cracks (Ehmann 1992).	There is no suitable habitat in the Project area and the species is not expected to occur.
Condamine Earless Dragon <i>Tympanocryptis condaminensis</i> Endangered	Predicted by the PMST (DoE 2016c): <i>Species or species habitat may occur within area</i> . There is no <i>Atlas of Living Australia</i> (ALA 2016) or WildNet record (DEHP 2016) in or near Main Range National Park. The Condamine Earless Dragon has only very recently been described following taxonomic revision of the genus (Melville <i>et al.</i> 2014). The species is found on the Condamine River floodplain and is confined to small fragmented area in the eastern Darling Downs, from the western outskirts of Toowoomba to the Dalby area, north to Jimbour and south to Clifton. It occurs on black cracking clay soils and is found in remnant grasslands, roadside verges and intensely farmed crops of cotton, maize and sorghum (Melville <i>et al.</i> 2014; Wilson 2015).	There is no suitable habitat in the Project area and the species is not expected to occur.
Dunmall's Snake <i>Furina dunmali</i> Vulnerable	Predicted by the PMST (DoE 2016c): <i>Species or species habitat may occur within area</i> . There is no <i>Atlas of Living Australia</i> (ALA 2016) or WildNet record (DEHP 2016) in or near Main Range National Park. Dunmall's Snake is confined to the Brigalow Belt bioregion of south-eastern Queensland and north-eastern New South Wales, occurring north to Clermont and near Rockhampton. Most records are from the Dalby-Tara area of the Darling Downs (Hobson 2012a). The species has been found in a wide range of habitats, including forests and woodlands dominated by Brigalow (<i>Acacia harpophylla</i>) and other acacias (<i>A. burowii</i> , <i>A. deanii</i> , <i>A. leioclyx</i>), Cypress (<i>Callitris</i> spp.) or Bulloak (<i>Allocasuarina luehmannii</i>) on black alluvial cracking clay and clay loams (Covacevich <i>et al.</i> 1988; Stephenson & Schmida 2008; Brigalow Belt Reptiles Workshop 2010; Hobson 2012a). It also occurs in Spotted Gum (<i>Corymbia citriodora</i>), ironbark (<i>Eucalyptus crebra</i> and <i>E. melanophloia</i>), White Cypress Pine (<i>Callitris glaucophylla</i>) and Bulloak open forest and woodland on sandstone-derived soils and there is a record from the edge of dry vine scrub (Stephenson & Schmida 2008, TSN 2008; Brigalow Belt	There is no suitable habitat in the Project area and the species is not expected to occur.

Species & EPBC Act status	Distribution and Habitat	Likelihood
	<p>Reptiles Workshop 2010). However, preferred habitat appears to be brigalow growing on cracking black clay and clay loams (Cogger <i>et al.</i> 1993), with the majority of records from 200-500 m a.s.l. (Hobson 2012a).</p> <p>Dunmall's snake is a nocturnal, cryptic, secretive species that is very rarely encountered (Wilson 2015; Hobson 2012a). The species has been found sheltering under fallen timber and ground litter (Cogger <i>et al.</i> 1993; Brigalow Belt Reptiles Workshop 2010) and may use cracks in alluvial clay soils (Ehmann 1992). Little is known of its ecology, but it reportedly preys on lizards and geckos (Gow & Swanson 1977; Shine 1981).</p>	
<p>Giant Barred Frog <i>Mixophyes iteratus</i> Endangered</p>	<p>The species was not predicted to occur by the PMST (DoE 2016c). There is one WildNet (DEHP 2016) and no <i>Atlas of Living Australia</i> (ALA 2016) database record for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. Cunningham's Gap previously supported the species but targeted surveys and intensive monitoring in the late 1990s failed to locate the species (Hines <i>et al.</i> 1999). The Main Range population is thought to be extinct (Hines 2012).</p>	<p>The species is not expected to occur. Should the species still be present any potential impacts of the proposed Project on the species have been addressed under Fleay's Barred Frog <i>Mixophyes fleayi</i>.</p>

1. Atlas of Living Australia and/or WildNet database record.
2. Predicted by the Protected Matters Search Tool (PMST).

Table 3 provides the results of a qualitative risk assessment process whereby documented threats to those EPBC Act threatened fauna species that are known or likely to be present are assessed against the relevant aspects of the Project. This process has been undertaken to identify potential impacts and enable appropriate avoidance, mitigation and management measures to inform project design where moderate or higher impacts were predicted. This has been an iterative process involving project modification throughout the planning stages and the adoption of management measures resulting in a “low” risk assessment for all potential threat/impacts, as shown in Table 3.

Risks are assessed by identifying potential impacts, determining the likelihood of those impacts occurring, and describing the consequences of those impacts should they occur, applying the categories shown in the table below.

Qualitative Risk Matrix

Likelihood Level	Consequence Level					Risk Rating
	Insignificant	Minor	Moderate	Major	Catastrophic	
Almost certain	Orange	Orange	Red	Red	Red	Extreme
Likely	Yellow	Orange	Orange	Red	Red	High
Possible	Light Yellow	Yellow	Orange	Red	Red	Moderate
Unlikely	Light Yellow	Light Yellow	Yellow	Orange	Red	Low
Very Unlikely	Light Yellow	Light Yellow	Yellow	Orange	Orange	Low

The consequence of each impact is categorised as ‘catastrophic’, ‘major’, ‘moderate’, ‘minor’ or ‘insignificant’ in terms of its effect on the element in question. Briefly put,

- ‘catastrophic’ impacts would result in the extinction of a species
- ‘major’ impacts may be notably detrimental to the species on a population scale
- ‘moderate’ impacts may result in a substantial change to a local population
- ‘minor’ impacts may result in small decreases to a local population that would be overcome without mitigation, and
- ‘insignificant’ impacts are those that are likely to be undetectable.

Table 3. Risk Assessment for the Potential impacts¹ of the Project on EPBC Act threatened terrestrial vertebrate fauna species known or considered likely to occur in Main Range National Park and its immediate environs

Risk rating code:

Extreme High Moderate Low

Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
Spotted-tailed Quoll <i>Dasyurus maculatus maculatus</i>	Increased access for feral predators.	Increased predation. Increased competition for prey.	Tracks increase access for feral Dog <i>Canis lupus familiaris</i> , Cat <i>Felis catus</i> and Red Fox <i>Vulpes vulpes</i> . These species already occur in the national park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented which is expected to have a net positive impact.	Unlikely	Minor
	Increased access for Cane Toads.	Poisoning, potentially fatally, by attempted ingestion.	Tracks facilitate the spread of Cane Toads. Cane Toad is already present in the national park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. Cane Toads may be a threat (Burnett & Meyer-Gleaves 2012), though this is uncertain (Woinarski <i>et al.</i> 2014).	Unlikely	Insignificant
	Altered fire regime.	Reduced number of refuge sites. Reduced prey abundance.	Human activity potentially increases the likelihood of accidental fire. The likelihood of accidental fires started by walkers/campers is considered very low. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.	Unlikely	Minor
Koala <i>Phascolarctos cinereus</i>	Increased access for feral predators.	Predation.	Tracks increase access for feral Dog. The species is already present in the national park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. Koalas are present in the more open areas. A Feral Animal Management Plan will be implemented which is expected to have a net positive impact.	Unlikely	Minor
Greater Glider <i>Petauroides volans</i>	Altered fire regime.	Loss of hollow-bearing trees for shelter. Loss of food trees.	Greater Glider is most abundant in forests that are infrequently burnt. Human activity potentially increases the likelihood of accidental fire. The likelihood of accidental fires started by walkers/campers is considered very low.	Unlikely	Minor

Appendix 5: MNES Terrestrial Vertebrate Fauna Species Assessment

Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
			Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.		
	Fragmentation of habitat.	Decreased dispersal.	Greater Gliders disperse poorly across non-native vegetation. The 0.6 m unformed trail would be insufficient to act as a barrier to movement.	Unlikely	Insignificant
	Introduction or spread of <i>Phytophthora</i> root fungus.	Loss of food trees.	Affects the health of eucalypts. Causes dieback. Construction mitigation measures and operation procedures will minimise any likelihood.	Unlikely	Minor
Long-nosed Potoroo <i>Potorous tridactylus tridactylus</i>	Increased access for feral predators.	Predation.	Tracks increase access for Cat and Red Fox. These species already occur in the national park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Minor
Brush-tailed Rock-wallaby <i>Petrogale penicillata</i>	Increased access for feral predators.	Predation.	Predation by Red Fox. Predation by feral Dog (low risk due to lack of agility). Juveniles are possibly subject to predation by Cats. These predators are already present in the national park and there is an existing road to the location on the proposed trail route where Rock-wallabies have been sighted previously. Furthermore, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Minor
	Increased access for feral herbivores.	Competition for food. Loss of food species.	Feral herbivores, e.g. Pigs and deer species, compete with native herbivores, spread weed species and disturb waterbodies. These species are already present in the park, and feral pigs are particularly abundant in the northern section of the project area. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Minor

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Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
	Weed invasion.	Loss of food species due to replacement.	Pest plants are most likely to become established in areas that are disturbed through grazing by feral animals, track construction or fire. Invasion by Lantana alters habitat structure and reduces habitat quality. A weed management plan will be implemented with a focus on monitoring and removing weeds at the entry points.	Unlikely	Minor
	Introduction or spread of pathogens.	Reduced fitness.	Possibly susceptible to toxoplasmosis and hydatidosis infection, carried by Cats. Cats are already present in the park.	Unlikely	Minor
	Fragmentation of habitat.	Decreased dispersal.	The 0.6 m trail is insufficient to act as a barrier to movement. Improved foraging opportunities, albeit limited, may be created at Ecocamps. Any disruption to the natural process of low level gene flow resulting from recent human induced change would be in no way assisted by the Project.	Unlikely	Insignificant
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	Increased access for feral herbivores.	Reduced breeding success.	Maternity sites are subject to disturbance by feral Goat <i>Capra hircus</i> . Goat is not known to occur in the park. No maternity site for <i>C. dwyeri</i> is known in the national park.	Very unlikely	Insignificant
	Disturbance by humans in maternity caves.	Reduced breeding success.	No maternity site is known in the national park.	Very unlikely	Insignificant
New Holland Mouse <i>Pseudomys novaehollandiae</i> Hastings River Mouse <i>P. oralis</i>	Increased access for feral predators.	Predation.	Tracks increase access for feral Dog, Cat and Red Fox. These predators are already present in the national park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. Removal of regrowth along the existing road and creation of a trail, albeit with minimal vegetation disturbance, will facilitate movement to a minor extent. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Minor
	Noise and lighting disturbance at Woodcutters Ecocamp	Reduced occupancy of habitat	Noise and lighting disturbance may affect a very small area of known habitat for Hastings River Mouse. Design of the Ecocamp is to focus common areas away from this habitat, with the location of the sleeping cabins shielding the habitat from the low levels of intermittent light and noise that would be generated.	Possible	Insignificant
	Weed invasion.	Replacement of food species.	Pest plants are most likely to become established in areas that are disturbed through grazing by feral animals, track construction or fire. A weed management plan will be implemented with a focus on monitoring and removing weeds at the entry points and controlling weeds at Ecocamp sites.	Unlikely	Minor

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Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
	Altered fire regime.	Loss of habitat.	Lack of habitat patches of suitable successional age. Human activity potentially increases the likelihood of accidental fire. The likelihood of accidental fires started by walkers/campers is considered very low. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.	Unlikely	Minor
	Introduction or spread of <i>Phytophthora</i> root fungus.		Affects the health of eucalypts. Causes dieback. Construction mitigation measures and operation procedures will minimise any likelihood.	Unlikely	Minor
Red Goshawk <i>Erythrotriorchis radiatus</i>	Disturbance at nest by birdwatchers.	Reduced breeding success.	Main Range NP is the centre of a recognised territory historically but the likelihood of an active nest visible from the proposed trail is very low, particularly since the species may no longer breed in South East Queensland. Eco-guides will be aware of such a possibility.	Very unlikely	Insignificant
	Egg-collecting.	Failed breeding.	There is expected to be no increased risk of egg-collecting resulting from the Project. Ecoguides will be instructed to prevent any egg-collecting.	Very unlikely	Insignificant
	Increase in fire frequency.	Reduced number of potential breeding sites. Reduced prey abundance.	Human activity potentially increases the likelihood of accidental fire. The likelihood of accidental fires started by walkers/campers is considered very low. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.	Unlikely	Minor
Black-breasted Button-quail <i>Turnix melanogaster</i>	Increased access for feral herbivores.	Reduced food abundance.	Grazing and trampling may degrade habitat. There is no mention of a Main Range population in the national recovery plan. The closest identified population is at Mount French, c. 20 km to the east.	Unlikely	Insignificant
	Increase in fire frequency.	Reduced food abundance. Habitat loss.	Too frequent burning of leaf litter. Human activity potentially increases the likelihood of accidental fire. The likelihood of accidental fires started by walkers/campers is considered very low. The closest identified population is at Mount French, c. 20 km to the east. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.	Unlikely	Insignificant

Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
	Increased access for feral predators.	Predation.	Ground-nesting bird. Tracks increase access for Cat, Red Fox and feral Pig <i>Sus scrofa</i> . These species are already present in the park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact. Closest identified population of Black-breasted Button-quail is at Mt. French, c. 20 km to the east.	Possible	Insignificant
Swift Parrot <i>Lathamus discolor</i>	Increased access for feral predators.	Predation.	Occasionally preyed on by Cats, though the impact is low. Tracks increase access for Cats, though the species is already present in the park. A Feral Animal Management Plan will be implemented.	Very unlikely	Insignificant
	Collisions with windows.	Death.	This is recognised as a threat in the breeding season, when the species is in Tasmania. Collision with windows in the eco-camps is a very remote possibility.	Very unlikely	Insignificant
	Increased competition with aggressive and invasive native species due to habitat fragmentation.	Reduced foraging.	Noisy Miner <i>Manorina melanocephala</i> , Bell Miner <i>M. melanophrys</i> and Red Wattlebird <i>Anthochaera carunculata</i> are all present and common in the National Park. The nature and extent of the proposal should not cause an increase in these species.	Very unlikely	Insignificant
Coxen's Fig-parrot <i>Cyclopsitta diophthalma coxeni</i>	Weed invasion.	Degradation of habitat.	A weed management plan will be implemented with a focus on monitoring and removing weeds at the entry points.	Unlikely	Insignificant
	Loss of isolated fig trees.	Reduced food resources.	The construction phase will not include the loss of any such trees.	Very unlikely	Insignificant
	Egg and chick collecting.	Reduced or failed breeding success.	Nest site surveys detected evidence of breeding activity in only 11 instances. The likelihood of a nest visible from the proposed trail is very low.	Very unlikely	Insignificant
Rufous Scrub-bird <i>Atrichornis rufescens</i>	Increase in fire intensity (Garnett <i>et al.</i> 2011).	Loss or degradation of habitat.	The Project is not expected to increase fire intensity in any way. Fire may also restore habitat suitability as ground cover declines with habitat maturation.	Unlikely	Insignificant
Eastern Bristlebird <i>Dasyornis brachypterus</i>	Altered fire regimes.	Loss or degradation of habitat. Mortality due to poor mobility.	Intense and/or extensive fires can remove suitable habitat. Frequent fires may prevent vegetation from becoming sufficiently dense for the species. Infrequent fires can allow vegetation to become too dense to be inhabited. Human activity potentially increases the likelihood of accidental fire. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.	Unlikely	Minor

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Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
	Increased access for feral herbivores.	Degradation of habitat.	Feral Pigs degrade habitat. This species is already present in the park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Insignificant
	Increased access for feral predators.	Predation.	Predation by Cat and Red Fox. These predators are already present in the national park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor.. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Very unlikely	Minor
	Weed invasion.	Degradation of habitat.	Lantana reduces habitat suitability. A weed management plan will be implemented with a focus on monitoring and removing weeds at the entry points.	Unlikely	Minor
	Introduction or spread of <i>Phytophthora</i> root fungus.	Degradation of habitat.	Construction mitigation measures and operation procedures will minimise any likelihood.	Unlikely	Minor
	Disturbance by humans.	Reduced or failed breeding success.	The presence of humans can result in nest abandonment. No known Eastern Bristlebird population occurs in proximity to the proposed trails other than a portion of the Mt Mitchell trail. In this portion there are no recent records. There are historical records (over 20 years old) in close proximity to the proposed trail in this area, and the habitat is thought to be abandoned following a fire event. The trail in this section follows existing tracks that are currently in use and no further possible disturbance is predicted from small, guided walking parties along these existing tracks.	Unlikely	Minor
Collared Delma <i>Delma torquata</i>	Removal or fallen timber and rocks.	Loss of shelter sites.	There is no database record of these species and the likelihood of its occurrence is unknown. There will be minimal disturbance to fallen timber and rocks as a result of the proposed trail and Ecocamps.	Very unlikely	Minor

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Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
	Increased access for feral predators.	Predation.	Predation by Cat and Red Fox. These species are already present in the park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. Collared Delma occurs in open habitats. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Very unlikely	Minor
	Altered fire regimes.	Loss or degradation of habitat. Mortality due to poor mobility.	Threat is uncertain. Human activity potentially increases the likelihood of accidental fire. The likelihood of accidental fires started by walkers/campers is considered very low. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.	Very unlikely	Minor
	Weed invasion.	Degradation of habitat.	Lantana reduces habitat suitability. A weed management plan will be implemented with a focus on monitoring and removing weeds at the entry points.	Unlikely	Minor
Three-toed Snake-tooth Skink <i>Coeranoscincus reticulatus</i>	Increase in fire frequency.	Loss of shelter and foraging habitat.	Loss of fallen logs and leaf litter. Human activity potentially increases the likelihood of accidental fire. The likelihood of accidental fires started by walkers/campers is considered very low. Fire penetration is only likely during very dry conditions. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.	Very unlikely	Minor
	Increased access for feral herbivores.	Degradation of habitat.	Feral Pigs degrade habitat. The species is already present in the park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Minor
	Increased access for feral predators.	Predation.	Cat and Red Fox are known to kill skinks. These predators are already present in the national park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Minor

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Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
Fleay's Barred Frog <i>Mixophyes fleayi</i>	Spread of pathogens.	Reduced population.	Chytridiomycosis affects this species. The fungus is widespread in the park. Humans are not the only vectors. Operation procedures such as footbaths will minimise any likelihood.	Unlikely	Minor
	Increased access for feral Pigs.	Degradation of habitat through siltation. Predation.	Feral Pigs degrade habitat. The species is already present in the park, the hiking trail will follow existing trails for a large portion of the route and sections of new trail typically follow existing animal tracks along sections that follow the contour on the escarpment rim, meaning that the potential for increased access is minor. A Feral Animal Management Plan will be implemented, which is expected to have a net positive impact.	Unlikely	Minor
	Habitat disturbance at stream crossing	Degradation of habitat through trampling and siltation	Construction involving a walkway or stepping stones at a stream crossing has the potential to degrade habitat and human access to pools may degrade habitat. The crossing point will be selected to ensure there are no nearby pools potentially suitable as swimming holes and limited potential for soil erosion causing siltation. Crossing design and construction undertaken in consultation with QPWS will ensure there is no disturbance to the stream riffle zone and adjacent moist banks, and no soil disturbance that might result in sediment runoff.	Unlikely	Minor
	Weed invasion.	Degradation of habitat.	Mistflower <i>Ageratina riparia</i> and Crofton Weed <i>A. adenophora</i> reduce habitat suitability. A weed management plan will be implemented with a focus on monitoring and removing weeds at the entry points.	Unlikely	Minor

¹. Potential impacts are taken from the *Species Profile and Threats Database* (DoE 2016d) unless otherwise referenced

Table 4-1: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Spotted-tailed Quoll *Dasyurus maculatus maculatus* southeast mainland population

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

There are 19 WildNet (DEHP 2016) and 18 *Atlas of Living Australia* (ALA) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. However, all but two of the ALA records are from DEHP and presumably there is substantial overlap. One record is from the Queensland Museum (QM) and the source of the other is unknown. Two of the ALA records are *Dasyurus* sp., but these are likely to be *D. maculatus*. One record is 11.5 km to the south of the proposed trail but others are in the immediate vicinity. The most recent record is a 1993 QM specimen. Despite the lack of recent records, the Main Range-McPherson Range west population is considered a 'stronghold' population within a region (i.e., areas of high abundance) (DELWP 2016).

On the mainland, subspecies *maculatus* was historically distributed from Rockhampton through eastern New South Wales and Victoria to Kangaroo Island in South Australia. The subspecies is also known from Tasmania (Maxwell *et al.* 1996; Belcher *et al.* 2008; Burnett & Meyer-Gleaves 2012), though the Tasmanian population probably should be raised to sub-specific status (Firestone *et al.* 1999). The subspecies has undergone a range contraction in Victoria (Menkhorst 1995) and Queensland (Burnett & Meyer-Gleave 2012) and is thought to be extirpated in South Australia (Woinarski *et al.* 2014). The range contraction is thought to be up to 50% (Maxwell *et al.* 1996). In Queensland, it is now regularly recorded only from the Granite Belt and Border Ranges, though it may persist in mountainous country as far north as Gympie (Burnett & Meyer-Gleaves 2012).

Spotted-tailed Quolls inhabit a variety habitats including subtropical and temperate rainforests, vine thickets, wet and dry sclerophyll forests, woodland, coastal scrub and heathland. They are found from sea-level to sub-alpine regions (Belcher *et al.* 2008; DELWP 2016). In Queensland they use boulder plies, fallen logs and tree hollows for shelter. The species is the only hypercarnivore on the mainland, with mammals about 80% of its diet. Birds, reptiles and invertebrates make up the rest. Carrion is also consumed (Burnett & Meyer-Gleaves 2012). It hunts both on the ground and in trees (Jones & Barmuta 2000).

The average lifespan of Spotted-tailed Quolls in Queensland and northern New South Wales is three years (Körtner *et al.* 2004; Burnett & Meyer-Gleaves 2012). Sexual maturity is reached at about 12 months of age (Burnett & Meyer-Gleaves 2012; DELWP 2016), though some females do not produce a litter until their second year (Belcher 2003). Spotted-tailed Quolls typically occur at low densities and occupy large home ranges (Belcher *et al.* 2008). Studies in Queensland's Granite Belt have found home ranges for males from 783-1202 ha (Burnett & Meyer-Gleaves 2012), though elsewhere male home ranges are up to 5000 ha. Males are not territorial but female are, and their home range is typically less than 1000 ha. Male home ranges overlap with females and other males (Belcher *et al.* 2008). Individuals have been recorded moving at least eight km in a day and 19 km in a week (DELWP 2016).

The major cause for their decline is habitat loss and fragmentation, most of which had occurred by the mid-1990s (Belcher *et al.* 2008; Glen & Dickman 2011; Burnett & Meyer-Gleaves 2012). Other causes include inappropriate fire regimes (Dawson *et al.* 2007; Blecher *et al.* 2008), poisoning by baits (Glen & Dickman 2003), predation and competition by feral predators, particularly Red Fox *Vulpes vulpes* (Glen & Dickman 2011) and death by vehicle strikes and persecution by landholders (Burnett & Meyer-Gleaves 2012; Woinarski *et al.* 2014). Cane Toads *Rhinella marina* may be a threat (poisoning through attempted ingestion) (Burnett & Meyer-Gleaves 2012), though this is uncertain (Woinarski *et al.* 2014).

Table 4-1: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Spotted-tailed Quoll <i>Dasyurus maculatus maculatus</i> southeast mainland population	
<i>Lead to a long-term decrease in the size of a population</i>	The most recent record is a 1993 QM specimen. Despite the lack of recent records, a population is assumed to still be present. Possible impacts associated with the Project are facilitation of feral predators and Cane Toad along the trail and altered fire regime. Feral predators and Cane Toad are already present in the park and fire management measures will be in place. Any possible impacts are expected to be minor. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project is not expected to lead to a long-term decrease in the size of any population.
<i>Reduce the area of occupancy of the species</i>	The nature and extent of vegetation disturbance associated with the Project is not expected to reduce the area of occupancy of the species.
<i>Fragment an existing population into two or more populations</i>	The nature and extent of vegetation disturbance associated with the Project is not expected to fragment any existing population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	The proposed limited vegetation disturbance is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of a population</i>	The nature and extent of vegetation disturbance associated with the Project and any on-going Project activities are not expected to disrupt the breeding cycle of a population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance associated with the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Spotted-tailed Quoll or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Spotted-tailed Quoll or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-2: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Koala *Phascolarctos cinereus*

<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>There are 37 WildNet (DEHP 2016) and nine <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. One ALA record is a 1970 Queensland Museum specimen from Cunningham's Gap. The remaining ALA records are DEHP records from Spicers Gap Nature Refuge to the south. The most recent of these is 2009. Koala could occur in any eucalypt forest in the Project area.</p> <p>The Koala occurs in forests and woodland along the east coast of Australia from north-eastern Queensland to South Australia, with some introduced sub-populations (Woinarski <i>et al.</i> 2014). The species feeds almost entirely on the leaves of eucalypts and its distribution is linked to the presence and abundance of food species. They are most abundant on coastal plains and in foothills but do extend inland along watercourses with <i>Eucalyptus camaldulensis</i>. In Queensland, clearing of habitat has decreased their range by about 30% (Martin <i>et al.</i> 2008; Krockenberger <i>et al.</i> 2012). Home ranges vary from less than 1 ha to more than 300 ha, but are typically 1-10 ha (Jackson 2015a).</p> <p>Koalas have been seen feeding on or sitting in 120 species of tree but only about 20 of these can be considered primary food sources (Jackson 2015a). The food preferences of the Koala vary regionally (Martin <i>et al.</i> 2008) and seasonally, possibly due to variation in nutrient and/or defence compound concentrations and leaf moisture (Moore & Foley 2000). In southern Queensland the common food trees are <i>E. camaldulensis</i> and <i>E. tereticornis</i> but <i>E. citriodora</i>, <i>E. crebra</i>, and <i>E. populnea</i>, among others, are also eaten (Lee & Martin 1988). Eucalypt leaf is poor quality food, low in major nutrients and containing high levels of indigestible fibre and potentially toxic compounds (Martin <i>et al.</i> 2008). Habitat quality is determined not just by the species of eucalypt and extent of tree cover but also by soil fertility and water regime. The compounds that act as deterrents to folivores may also vary between individual trees of the same species and habitat suitability for Koala may vary at small scales (Krockenberger <i>et al.</i> 2012).</p> <p>The major threat to the Koala is habitat loss (Martin <i>et al.</i> 2008) and fragmentation, which has reduced its area of occupancy substantially (Woinarski <i>et al.</i> 2014). Infection with the bacterium <i>Chlamydia</i>, which causes reproductive tract disease and infertility in females, is widespread. In some locations, overpopulation and resultant habitat degradation are a severe problem, more so in Vic and SA (Martin <i>et al.</i> 2008; Woinarski <i>et al.</i> 2014). Other threats include predation by Dogs, vehicle strike, Koala Retrovirus, inappropriate fire regimes, inbreeding, Bell Miner dieback and habitat degradation due to weeds (Krockenberger <i>et al.</i> 2012; Woinarski <i>et al.</i> 2014).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>There is a recovery plan for Koala (DECC 2008) but no important population is identified.</p> <p>The Koala is likely in any eucalypt forest in the Project area, though it may be patchy in occurrence. The clearing associated with the Project is limited to regrowth on an existing track. Less than 0.3 ha of groundlayer within eucalypt forest is proposed to be disturbed. Any effects associated with clearing and fragmentation will be negligible. Possible impacts associated with the Project are an altered fire regime, weed invasion and increased access for wild Dogs <i>Canis lupus familiaris</i>. Control of wild Dogs is undertaken by Queensland Parks & Wildlife Service in conjunction with neighbouring landholders. Park managers are currently part of the Southern Downs Wild Dog Working Group. A pest plant and pathogen management strategy has also been implemented (DNPRSR (2013). In addition, the Project will have its own weed, pathogen and fire management measures in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project is not expected to lead to a long-term decrease in the size of any population, whether or not the population would be considered important.</p>

Table 4-2: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Koala <i>Phascolarctos cinereus</i>	
<i>Reduce the area of occupancy of an important population</i>	The area and nature of vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.
<i>Fragment an existing population into two or more populations</i>	The majority of vegetation disturbance associated with the Project would be removal of rainforest regrowth on an existing track. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	<i>The EPBC Act referral guidelines for the vulnerable koala (Commonwealth of Australia 2014: 5) define Koala habitat as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. This can include remnant and non-remnant vegetation in natural, agricultural, urban and peri-urban environments. Koala habitat is defined by the vegetation community present and the vegetation structure; koalas do not necessarily have to be present. Based on known Koala presence, presence of two known Koala food tree species and habitat connectivity there is habitat considered critical to the survival of the Koala (Commonwealth of Australia 2014) in the Project area.</i> Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of an important population</i>	Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will not include disturbance to larger trees present on the site. The proposed limited vegetation disturbance means that the Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Koala or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Koala or its habitat.
<i>Interfere substantially with the recovery of the species</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-3: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Greater Glider *Petauroides volans*

<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>Currently, the <i>Australian Faunal Directory</i> (AFD) maintained by the Department of the Environment (DoE 2016b), recognizes one species Greater Glider, with three subspecies. Recent works (e.g., Jackson 2015b) have elevated these to species level, in keeping with taxonomies dating back to the 19th century. The species profile hereunder follows the AFD taxonomy.</p> <p>There are 31 WildNet (DEHP 2016) and 22 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. Most of ALA records are from the picnic grounds at Gap Creek West or Spicers Gap Nature Refuge to the south. The most recent of these is 2007. Great Glider could occur in any eucalypt forest in the Project area.</p> <p>The Greater Glider is found from the Windsor Tableland in north Queensland to central Victoria, occurring from sea level to 1200 m a.s.l. (Woinarski <i>et al.</i> 2014). The species lives in a variety of eucalypt-dominated forest and woodland. By day it shelters in tree hollows, feeding on eucalypts at night (McKay 2008). The species glides between trees. A glide may cover 100 m and include changes of direction of as much as 90° (McKay 2008). An individual typically uses 4-7 tree hollows as dens in its home range (Jackson 2015b), and as many as 18 dens. Not all tree species form hollows to the same extent but hollow availability doesn't necessarily match hollow use (Kehl & Borsboom 1984). The species is absent from regenerating forest lacking old trees with suitable hollows (McKay 2008).</p> <p>Greater Gliders occupy individual home ranges with no overlap between males. Female home ranges may overlap with other females and males (McKay 2008), but individuals generally use the overlapping sections at different times with aggressive behaviour when two females meet (Henry 1984). Home ranges are about 1-4 ha in size (Kehl & Borsboom 1984). The species occurs patchily in forest with apparently suitable forest often supporting no animals. Defining habitat as suitable needs to be done carefully (Henry 1984).</p> <p>The greatest threat to Greater Glider is habitat loss and fragmentation. The species has little dispersal ability to and from forest fragments (Kavanagh & Stanton 1998; Woinarski <i>et al.</i> 2014). Other threats include high intensity fires and, though minor, entanglement on barbed wire fences (Woinarski <i>et al.</i> 2014). Greater Gliders are clumsy on the ground and are known to be killed by Dingoes <i>Canis lupus dingo</i> and Red Foxes <i>Vulpes vulpes</i> (McKay 2008).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>There is no recovery plan. Important populations are not identified. The Greater Glider could occur in any eucalypt forest in the Project area, though it may be patchy in occurrence. The only clearing associated with the Project would be of regrowth on an existing track. Less than 0.3 ha of <i>Eucalyptus</i> forest would be disturbed in the groundlayer. Any effects associated with the proposed limited vegetation disturbance and fragmentation will be negligible. Possible impacts associated with the Project are an altered fire regime and increased access for wild Dogs <i>Canis lupus familiaris</i>. Control of wild Dogs is undertaken by Queensland Parks & Wildlife Service in conjunction with neighbouring landholders. Park managers are currently part of the Southern Downs Wild Dog Working Group. The Project will have its own fire management measures in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project is not expected to lead to a long-term decrease in the size of any population, whether or not the population would be considered important.</p>
<p><i>Reduce the area of occupancy of an important population</i></p>	<p>The proposed limited vegetation disturbance required means the Project is not expected to reduce the area of occupancy of any population.</p>

Table 4-3: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Greater Glider <i>Petauroides volans</i>	
<i>Fragment an existing population into two or more populations</i>	Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	Habitat critical to the survival of the species is not defined. The proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of an important population</i>	Large trees will not be cleared as part of the Project. The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Greater Glider or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Greater Glider or its habitat.
<i>Interfere substantially with the recovery of the species</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-4: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Long-nosed Potoroo *Potorous tridactylus tridactylus*

<p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p>	<p>Frankham <i>et al.</i> (2012) splits <i>Potorous tridactylus tridactylus</i> into <i>P. t. tridactylus</i> (central New South Wales to southern Queensland) and <i>P. t. trisulcatus</i> (southern New South Wales and Victoria). This treatment is adopted by <i>The action plan for Australian mammals 2012</i> (Woinarski <i>et al.</i> 2014) and the <i>Handbook of the Mammals of the World</i> Eldridge & Frankham (2015). However, for the purposes of the EPBC Act and this species profile, <i>Potorous tridactylus tridactylus</i> is treated as occurring between southern Queensland and Victoria (DoE 2016e).</p> <p>There are six WildNet (DEHP 2016) and three <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. The three ALA records are from Cunningham’s Gap. The most recent of these is 1998. Suitable habitat for the species in the project area comprises wet sclerophyll forest with dense groundcover, particularly along ecotones with rainforest.</p> <p>The nominate subspecies of Long-nosed Potoroo occurs in coastal areas from near Gladstone in Queensland through New South Wales and Victoria to south-eastern South Australia. <i>Potorous t. apicalis</i> occurs on some Bass Strait islands and is widespread in northern and eastern Tasmania. <i>Potorous t. tridactylus</i> is generally found within 50 km of the coast, though the Grampians population is 130 km inland. The species is mostly found from sea level to 800 m a.s.l. (Claridge <i>et al.</i> 2007), but in north-eastern New South Wales it occurs to 1500 m a.s.l. (NSW NPWS 2002).</p> <p>The Long-nosed Potoroo lives in wet and dry sclerophyll forest, coastal woodland and coastal heathland. A dense understory is almost always present, comprised of species of <i>Xanthorrhoea</i>, sedges, ferns and low-lying shrubs. The soil is generally light and sandy (Claridge <i>et al.</i> 2007; Johnston 2008). The species sleeps in a nest of grass and other plant material in a scrape below dense scrub (NSW NPWS 2002). Home ranges vary from 2-34 ha, males having larger home ranges. The size varies with location, possibly a reflection of habitat quality. The home ranges of males overlap with other males and, more so, with females but female home ranges are exclusive (Claridge <i>et al.</i> 2007). The species is solitary, though trapping data suggest it aggregates in small groups (Johnston 2008). The Long-nosed Potoroo is partly diurnal, possibly due to the protection provided by the dense vegetation. It mostly eats fungi (approximately 80% of diet), but also grasses, sedges and various invertebrates (Claridge <i>et al.</i> 2007; Eldridge & Frankham 2015). Foraging occurs in relatively open floristically diverse patches (Norton 2012).</p> <p>The Long-nosed Potoroo is threatened by habitat loss and fragmentation, fuel-reduction burning programs and predation by Red Fox <i>Vulpes vulpes</i>, Cat <i>Felis catus</i> and wild Dog <i>Canis lupus familiaris</i> (NSW NPWS 2002; Claridge <i>et al.</i> 2007; Norton 2012; Woinarski <i>et al.</i> 2014; Eldridge & Frankham 2015). The species is also threatened over-grazing by livestock (Norton 2012) and replacement of native ground cover with introduced pasture grasses (NSW NPWS 2002; Woinarski <i>et al.</i> 2014).</p>
<p>Lead to a long-term decrease in the size of an important population of a species</p>	<p>The Long-nosed Potoroo could occur in any suitable habitat in the Project area. Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will not include disturbance to larger trees present on the site. The two proposed Ecocamps would be established on a ridgeline (Amphitheatre site) and at the site of an historical woodcutters’ shack (Woodcutters site). Any effects associated with the proposed limited vegetation disturbance and fragmentation will be negligible. Possible impacts associated with the Project are an altered fire regime and increased access for feral predators. Control of</p>

Table 4-4: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Long-nosed Potoroo <i>Potorous tridactylus tridactylus</i>	
	wild Dogs is undertaken by Queensland Parks & Wildlife Service in conjunction with neighbouring landholders. Park managers are currently part of the Southern Downs Wild Dog Working Group. The Project will have its own fire management measures in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project is not expected to lead to a long-term decrease in the size of any population, whether or not the population would be considered important.
<i>Reduce the area of occupancy of an important population</i>	The area and nature of proposed vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.
<i>Fragment an existing important population into two or more populations</i>	Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	Habitat critical to the survival of the species is not defined. The proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of an important population</i>	The nature and extent of the proposed limited vegetation disturbance means that the Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Long-nosed Potoroo or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Long-nosed Potoroo or its habitat.
<i>Interfere with the recovery of the species</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-5: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Brush-tailed Rock-Wallaby *Petrogale penicillata*

<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>There are 55 WildNet (DEHP 2016) and 11 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. Six of the ALA records are from Cunningham’s Gap. The most recent of these is 2006. The species is known to be present along parts of the proposed trail in the vicinity of escarpment edges (Peter Young pers. obs.), and one animal was observed during the field survey at the escarpment edge in the north of the project area.</p> <p>The Brush-tailed Rock-Wallaby occurs from Yarraman in southern Queensland to the Grampians in western Victoria, its distribution having declined substantially. Many subpopulations have been extirpated (Woinarski <i>et al.</i> 2014). The species lives in colonies of up to 70 individuals (Eldridge & Coulson 2015), though such groups may reflect the patchiness of suitable refugial habitat rather than a behavioral trait (Jarman & Bayne 1997). Genetic studies show that populations are highly structured, with very limited dispersal (Eldridge & Coulson 2015).</p> <p>The Brush-tailed Rock-Wallaby lives in rocky habitats including cliffs, gorges, rocky outcrops, boulder piles and steep rocky slopes in dry eucalypt forest (Johnson 2003), rainforest and open woodland (Eldridge & Close 2008; Lundie-Jenkins 2012). It also colonises artificial habitats such as dam walls (Johnson 2003). Populations inhabiting sites that are not structurally complex tend to die out, presumably as they offer insufficient shelter from Red Fox <i>Vulpes vulpes</i> (Lundie-Jenkins 2012). Most sites have a northerly aspect, allowing animals to sun themselves in the morning and evening. Home ranges vary from 2-30 ha (Eldridge & Close 2008). Radio-tracking has shown that movements of up to 500 m a night are relatively common, suggesting home ranges may be larger (Woinarski <i>et al.</i> 2014).</p> <p>The Brush-tailed Rock-wallaby forages at night and mainly feeds on grasses and forbs, but also some seeds, fruit and flowers (Eldridge & Close 2008; Lundie-Jenkins 2012). Feeding occurs in grassy areas above or below the rocky habitats (NSW NPWS 2003) and may include pasture (Woinarski <i>et al.</i> 2014).</p> <p>Populations of Brush-tailed Rock-Wallaby were decimated in the late 1980s and early 1900s by hunting for its skins and for bounties as it was deemed an agricultural pest. Habitat degradation, predation by Red Fox and competition with Goats <i>Capra hircus</i> were part of the decline and continue to be threats (Jarman & Bayne 1997; Lundie-Jenkins 2012; Eldridge & Coulson 2015). The species is also threatened by illegal shooting (NSW NPWS 2003). Predation by Cat <i>Felis catus</i> and wild Dog <i>Canis lupus familiaris</i> and inappropriate fire regimes may be minor threats (Woinarski <i>et al.</i> 2014). The Main Range population is not identified as an important population in the recovery plan (Menkhorst & Hynes 2010).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of <i>Eucalyptus</i> forest would be disturbed in the groundlayer. One of the proposed Ecocamps, Amphitheatre View Wilderness Ecocamp, would be established on a ridgeline overlooking a very steep drop-off and may be in an area supporting rock-wallabies. Any effects associated with the proposed limited vegetation disturbance and fragmentation will be short-term and negligible. Regrowth of groundcover at the Ecocamp following any disturbance during construction may enhance foraging for any rock-wallabies that may be present in the short term.</p> <p>Possible impacts associated with the Project are an altered fire regime and increased access for feral predators. Control of wild Dogs is undertaken by Queensland Parks & Wildlife Service in conjunction with neighbouring landholders. Park managers are currently part of the Southern Downs Wild Dog Working Group. The Project will have its own fire management measures in place and is not expected to alter the local fire regime, recognising that walkers are supervised by Ecoguides. The Project is not expected to lead</p>

Table 4-5: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Brush-tailed Rock-Wallaby <i>Petrogale penicillata</i>	
	to a long-term decrease in the size of any population, whether or not the population would be considered important.
<i>Reduce the area of occupancy of an important population</i>	The area and nature of proposed vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.
<i>Fragment an existing important population into two or more populations</i>	Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	Habitat critical to the survival of the species includes refuge habitat, feeding habitat, and commuting routes in between. Refuge habitat includes rock faces or outcrops with large tumbled boulders, ledges and caves (often with vegetation cover) that provide shelter and some protection from predators (Menkhorst & Hynes 2010). The proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species. Should the species be present at the proposed Amphitheatre View Wilderness Ecocamp there may be some disruption to animals during construction of a lookout deck but the rocky habitat will not be affected.
<i>Disrupt the breeding cycle of an important population</i>	Should the species be present at the proposed Amphitheatre View Wilderness Ecocamp there may be some disruption to animals during construction of a lookout deck but the rocky habitat will not be affected and any impact should be short-term. The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Brush-tailed Rock-Wallaby or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Brush-tailed Rock-Wallaby or its habitat.
<i>Interfere with the recovery of the species.</i>	A lack of dispersal, leading to a loss of genetic diversity is a concern for the recovery of the species (Menkhorst & Hynes 2010; Woinarski <i>et al.</i> 2014). Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-6: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Grey-headed Flying-fox *Pteropus poliocephalus*

<p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p>	<p>There are two WildNet (DEHP 2016) and two <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. One of the ALA records is a 2003 Queensland Parks & Wildlife Service record from Mount Mathieson within Main Range NP. The location details for the other record are Black Horse Creek Road via Kyogle in New South Wales. It is assumed that the co-ordinates are incorrect and that the record does not pertain to the Project area. DEHP does not provide location or date information for public searches of WildNet. The two ALA records may correspond to the two WildNet records.</p> <p>The Grey-headed Flying-fox occurred along coastal eastern Australia from Cape Upstart in Queensland to south-western Victoria (Churchill 2008). In Queensland, its range contracted southwards to Maryborough (Churchill 2008), but camps of this species have been recently recorded as far north again as the Mackay region, with several records further south between Gladstone and Bundaberg, Queensland (Roberts <i>et al.</i> 2008). Its range has extended in the south and the species has been sighted in Adelaide and Tasmania in recent years (Eby & Roberts 2012; Woinarski <i>et al.</i> 2014).</p> <p>The species roosts in camps, which can be in almost any dense vegetation greater than 3 m in height (Churchill 2008), though more typically >8 m tall (Eby & Roberts 2012). Camps are usually near water and are often in mangroves, rainforest, <i>Melaleuca</i> woodland and sometimes introduced trees (Churchill 2008), usually within 50 km of the coast or less 65 m a.s.l. (Eby & Roberts 2012). They flight up to 50 km from a camp at night to forage (Churchill 2008; Tidemann <i>et al.</i> 2008), feeding in native vegetation and in agricultural and urban areas (Eby & Roberts 2012). The species eats fruit, flowers, pollen and nectar, with the major food resource being eucalypt blossom. They also eat native figs and cultivated fruit in orchards (Churchill 2008). Individuals will disperse more than 1000 km from camps seeking food (Eby & Roberts 2012).</p> <p>The Grey-headed Flying-fox population is thought to have declined by at least 30% between 1989 and 2004 (Eby & Roberts 2012). Loss of feeding habitat is thought to be the main cause for the decline and is probably still the primary threat to the species (NSW NPWS 2002; Eby & Roberts 2012; Woinarski <i>et al.</i> 2014). Other threats include shooting at orchards (Tidemann <i>et al.</i> 2008; Eby & Roberts 2012; Woinarski <i>et al.</i> 2014), eucalypt dieback, inappropriate fire regimes, death from powerlines and barbed wire fences, competition with Black Flying-fox <i>P. alecto</i> (Eby & Roberts 2012; Woinarski <i>et al.</i> 2014), persecution at camps, especially in or near towns, secondary poisoning from agricultural chemicals and habitat degradation due to myrtle rust (Woinarski <i>et al.</i> 2014).</p>
<p>Lead to a long-term decrease in the size of an important population of a species</p>	<p>There are only three known records of Grey-headed Flying-fox for the area and possibly only one if the ALA and WildNet records correspond. This is not a cryptic species and the presence of the species is unlikely to be under-represented.</p> <p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees. A possible impact associated with the Project is introduction or spread of myrtle rust or <i>Phytophthora</i> root fungus. The Project will have its own pathogen management measures in place. The Project is not expected to lead to a long-term decrease in the size of any population.</p>
<p>Reduce the area of occupancy of an important population</p>	<p>The proposed limited vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.</p>

Table 4-6: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Grey-headed Flying-fox *Pteropus poliocephalus*

<i>Fragment an existing important population into two or more populations</i>	Clearing associated with the Project would be limited to regrowth on an existing track. Such clearing would be 2.5 m wide. Less than 0.3 ha of eucalypt forest would be disturbed in the groundlayer. Establishment of Ecocamps will be with minimal disturbance to native vegetation. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	The Project area includes foraging habitat critical to the survival of Grey-headed Flying-fox based on the definition in the draft national recovery plan (DECCW 2009) as it contains eucalypt species that are productive during winter and spring, as is typical in southern Queensland. There is no evidence that the Project area includes any roosting habitat critical to survival. Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees. A possible impact associated with the Project is introduction or spread of myrtle rust or <i>Phytophthora</i> root fungus. The Project will have its own pathogen management measures in place. The proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of an important population</i>	There is no known camp in the vicinity of the Project area. Camps are usually within 50 km of the coast (Eby & Roberts 2012). The Project area is 100 km from the coast. The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Grey-headed Flying-fox or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State approval process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Grey-headed Flying-fox or its habitat.
<i>Interfere with the recovery of the species</i>	No critical foraging habitat will be lost and critical roosting habitat is not present. Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-7: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Large-eared Pied Bat *Chalinolobus dwyeri*

<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>There are three WildNet records for Main Range National Park (DEHP 2016). DEHP does not provide location or date information for public searches of WildNet.</p> <p>The Large-eared Pied Bat occurs in areas with extensive cliffs and caves from the Blackdown Tableland in central Queensland to the Southern Highlands of New South Wales (Churchill 2008). It is most commonly recorded in dry sclerophyll forest and woodland, and also in sub-alpine woodland and <i>Callitris</i>-dominated forest (Churchill 2008). In south-eastern Queensland the species has primarily been recorded from higher altitude moist tall open forest adjacent to rainforest (Duncan <i>et al.</i> 1999). The species flies slowly and is highly maneuverable, flying at mid-canopy (Dennis 2012).</p> <p>The species roosts in caves, cliff crevices and mines (Churchill 2008) and disused Fairy Martin <i>Petrochelidon ariel</i> nests (Schulz 1998). Natural roosts may depend heavily on sandstone outcrops (Duncan <i>et al.</i> 1999). One known maternity colony was in a sandstone cave (Pennay 2008) and the largest numbers of records are from sandstone escarpment country (Hoye & Schulz 2008; Woinarski <i>et al.</i> 2014). Large-eared Pied Bat has also been caught near rhyolite cliffs in south-east Queensland, suggesting physical presence of caves or overhangs may be more important than geology (DERM 2012).</p> <p>The Large-eared Pied Bat is poorly known and any possible declines are poorly documented. Habitat modelling suggests the species is largely confined to the interface of sandstone escarpment and relatively fertile wooded valleys, presumably for foraging. This naturally restricted combination of habitats has been reduced by extensive clearing of the woodlands (Pennay 2008). The species is considered most at threat from destruction of roost sites and disturbance of roost sites by Goats <i>Capra hircus</i>. Other threats are habitat loss near roost sites, mining induced subsidence affecting the availability of roost sites and feral predators. Possible threats include exposure to chemicals in agriculture and disturbance by humans at roost sites (DERM 2012; Woinarski <i>et al.</i> 2014).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. A possible impact associated with the Project is increased access for feral predators. However, the feral predators considered most likely to be a threat, Cat <i>Felis catus</i> and Red Fox <i>Vulpes vulpes</i>, are already in the park and the Project will not increase access to any possible roost site. The Project is not expected to lead to a long-term decrease in the size of any population, whether or not the population is considered important. The national recovery plan has not identified any important population in Queensland (DERM 2012).</p>
<p><i>Reduce the area of occupancy of an important population</i></p>	<p>The proposed limited vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.</p>
<p><i>Fragment an existing important population into two or more populations</i></p>	<p>Clearing associated with the Project would be limited to regrowth on an existing track. Such clearing would be 2.5 m wide. Less than 0.3 ha of eucalypt forest would be disturbed in the groundlayer only. Establishment of Ecocamps will be with minimal disturbance to native vegetation. The Project is not expected to fragment any population into two or more populations.</p>
<p><i>Adversely affect habitat critical to the survival of a species</i></p>	<p>The national recovery plan considers maternity roosts, sandstone cliffs and fertile wooded valley habitat within close proximity, and, in Queensland, rainforest and moist eucalypt forest habitats on other geological substrates at high elevation to be critical habitat (DERM 2012). The Project area does</p>

Table 4-7: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Large-eared Pied Bat *Chalinolobus dwyeri*

	<p>contain critical habitat based on the latter consideration.</p> <p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species.</p>
<i>Disrupt the breeding cycle of an important population</i>	<p>There is no known maternity site in the vicinity of the Project area. The national recovery plan has not identified any important population in Queensland (DERM 2012). The Project is not expected to disrupt the breeding cycle of an important population.</p>
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	<p>The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	<p>A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Large-eared Pied Bat or its habitat.</p>
<i>Introduce disease that may cause the species to decline</i>	<p>A pest and weed management plan will be implemented, as is required under State approval process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Large-eared Pied Bat or its habitat.</p>
<i>Interfere with the recovery of the species.</i>	<p>No critical foraging habitat will be lost and critical roosting habitat is not present. Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.</p>

Table 4-8: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable New Holland Mouse *Pseudomys novaehollandiae*

<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>There are 1 WildNet (DEHP 2016) and 2 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. The ALA records are from Glenrock, a property to the west of Main Range NP, in 1997.</p> <p>The New Holland Mouse has a patchy distribution from southeast Queensland to Tasmania. It is mostly found in coastal areas but has been recorded up to 400 km inland. It lives in heathlands, woodlands, open forest and paperbark swamps and on sandy, loamy or rocky soils (Kemper & Wilson 2008). The species was first recorded in Queensland in 1996, in open forest near Crows Nest in southeast Queensland (Van Dyck & Lawrie 1997).</p> <p>The New Holland Mouse has home ranges of 0.5-1.5 ha and home ranges overlap. It shelters in burrows during the day (Kemper & Wilson 2008) and eats seeds, fungi, roots and insects, insects more so in winter (Watts & Aslin 1981). The species appears to benefit from certain levels of habitat disturbance (Kemper & Wilson 2008). Suitable habitat does not occur in areas that are completely protected from fire or burnt too frequently or grazed too heavily. It increases in abundance in regenerating areas and becomes rare as succession continues (Watts & Aslin 1981). Subpopulations also appear to be heavily affected by rainfall, presumably affecting resource availability, with increased densities after above average rainfall (Woinarski <i>et al.</i> 2014).</p> <p>The most severe threats to New Holland Mouse are inappropriate fire (Kemper & Wilson 2008) and predation by feral Cats <i>Felis catus</i>, especially in association with frequent fire. Other threats include habitat loss and fragmentation, predation by Red Fox <i>Vulpes vulpes</i>, weed invasion, over-grazing by livestock and feral herbivores and habitat degradation by <i>Phytophthora</i> infection (Woinarski <i>et al.</i> 2014). Competition with introduced rodents, such as House Mouse <i>Mus musculus</i> is a potential threat (TSSC 2010).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>There is no recovery plan for the species (DoE 2016f). Important populations are not identified.</p> <p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. Possible impacts associated with the Project are increased access for feral predators, altered fire regimes, fragmentation of habitat, weed invasion and spread of <i>Phytophthora</i>. The feral predators considered most likely to be a threat, Cat <i>Felis catus</i> and Red Fox <i>Vulpes vulpes</i>, are already in the park. A pest plant and pathogen management strategy has been implemented in the park (DNPRSR (2013). In addition, the Project will have its own weed, pathogen and fire management measures in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project is not expected to lead to a long-term decrease in the size of any population, whether or not the population is considered important.</p>
<p><i>Reduce the area of occupancy of an important population</i></p>	<p>The proposed limited vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.</p>

Table 4-8: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable New Holland Mouse <i>Pseudomys novaehollandiae</i>	
<i>Fragment an existing important population into two or more populations</i>	Clearing associated with the Project would be limited to regrowth on an existing track. Such clearing would be 2.5 m wide. Less than 0.3 ha of eucalypt forest would be disturbed in the groundlayer only. Establishment of Ecocamps will be with minimal disturbance to native vegetation. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	There is no recovery plan for the species (DoE 2016f). Critical habitat is not defined. The proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species, based on known habitat use.
<i>Disrupt the breeding cycle of an important population</i>	The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to New Holland Mouse or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State approval process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to New Holland Mouse or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-9: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Hastings River Mouse *Pseudomys oralis*

<p><i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i></p>	<p>There are 48 WildNet (DEHP 2016) and five <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. The Gambubal section of Main Range NP is a stronghold for the species in Queensland and is significant at the national scale (DECC 2005; Woinarski <i>et al.</i> 2014). Elsewhere in the park Hastings River Mouse has also been recorded at Cunninghams Gap (DNPRSR 2013).</p> <p>The Hastings River Mouse is patchily distributed from far south-eastern Queensland to near Muswellbrook in New South Wales. The species is one of the most poorly known Australian rodents (Watts & Aslin 1981). It was first recorded in Queensland in 1969, having been thought to be extinct (Townley 2008) and was not recorded between 1971 and 1993, when it was trapped near the original location. In 1994 the species was found at a second Queensland location, near Lamington National Park (Gynther & O'Reilly 1995). More recently, it has been recorded at Cunningham's Gap and North Branch Creek (Ian Gynther, personal communication). During the field survey, a single Hastings River Mouse was trapped on the steep hillside approximately 30 m above the proposed Woodcutters Ecocamp site. Suitable habitat for Hastings River Mouse in the local area comprises the eucalypt forest both upslope and downslope to the west and north of the proposed Woodcutters Ecocamp site, in areas where the groundcover is dense and is dominated by the mat-rush <i>Lomandra longifolia</i> and/or the grass <i>Themeda triandra</i>. The proposed pad area for the ecocamp itself is not suitable habitat for the species, since the groundcover is more open and dominated by bracken and raspberry shrubs. Some potentially suitable habitat also occurs along a short section of trail in the north of the project area and there is potential habitat south of Cunningham's Gap in the Mt Mitchell Trail section, although the trail is confined to existing tracks and trails in this location and no habitat disturbance would occur.</p> <p>The species lives in open eucalypt forest at altitudes from 300-1250 m a.s.l., with a groundcover of grasses, ferns or <i>Lomandra</i>, though shrubs may be present (Townley 2008). In Queensland, the species is mostly found on volcanic soils with <i>Eucalyptus campanulata</i> (Meek 2012). Important structural features include dense ground cover 10-75 cm in height and the presence of shelter sites (Woinarski <i>et al.</i> 2014). The species uses a variety of nest sites, including holes in the ground, cavities in boulder piles, hollow logs, epiphytes at ground level and cavities in the roots of large trees (Townley 2008). Graham <i>et al.</i> (2005) described hollow logs as an important habitat feature, and rock piles and root holes also appear critical features (Meek 2012).</p> <p>Hastings River Mouse appears to require periodic disturbance to habitat to produce mid-successional vegetation. Too frequent or too infrequent fire both produce unsuitable habitat (Meek 2012). The optimal fire regime is uncertain (DECC 2005; Woinarski <i>et al.</i> 2014). Females show strong site fidelity, some using the same nest site for more than two years. Males may use several nests in a home range of up to 2 ha (Townley 2008). The species eats leaves, stems, seed, flowers, pollen, fungi and insects (Meek 2012).</p> <p>The species is threatened by predation by Cats <i>Felis catus</i> and Red Fox <i>Vulpes vulpes</i>, inappropriate fire regime (Townley 2008; Meek 2012; Woinarski <i>et al.</i> 2014), grazing (Townley 2008; Woinarski <i>et al.</i> 2014), removal of rocks, logs and dead trees (Meek 2012), inbreeding and habitat loss and fragmentation (Woinarski <i>et al.</i> 2014).</p> <p>Hastings River Mouse was recorded during fauna surveys for this Project in habitat adjacent to the proposed Woodcutters Ecocamp. The fauna assessment determined that this is the edge of an extensive area of habitat for the species.</p>
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Table 4-9: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Hastings River Mouse <i>Pseudomys oralis</i>	
<i>Lead to a long-term decrease in the size of a population</i>	Possible impacts associated with the Project are facilitation of access for feral predators, altered fire regime, weed invasion and removal of micro-habitat such as rocks and logs. Feral predators are already present in the park and fire and weed management measures will be in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. Disturbance associated with establishment of Ecocamps will be kept to a minimum. Any possible impacts are expected to be minor and the Project is not expected to lead to a long-term decrease in the size of any population.
<i>Reduce the area of occupancy of the species</i>	The proposed limited vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.
<i>Fragment an existing population into two or more populations</i>	Clearing of regrowth on the existing track will be 2.5 m wide. Less than 0.3 ha of eucalypt forest would be disturbed in the groundlayer only. Disturbance associated with establishment of Ecocamps will be kept to a minimum. The proposed limited vegetation disturbance is not expected to fragment any existing population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	There is no national recovery plan for the species. There is an approved New South Wales recovery plan (DECC 2005). Assessment of critical habitat was to be undertaken as a recovery action in this plan. No critical habitat has been declared for the Hastings River Mouse in Queensland (DECC 2005). The proposed limited vegetation disturbance is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of a population</i>	No disturbance to habitat for the species will occur during construction of the Woodcutters Ecocamp. Activity at the Woodcutters Ecocamp will be low key and the Ecocamp is designed for common areas to be shielded from adjacent habitat by the sleeping cabins. The proposed limited vegetation disturbance and any on-going Project activities are not expected to disrupt the breeding cycle of a population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Hastings River Mouse or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State assessment process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Hastings River Mouse or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-10: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Red Goshawk *Erythrotriorchis radiatus*

<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>There are 1 WildNet (DEHP 2016) and 2 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. One ALA record is listed as (Queensland) Department of National Parks, Sport and Racing and is probably the WildNet record. Both ALA records have imprecise co-ordinates, decimal degrees -27.9, 152.3, and are likely to be west of the Project area, though such birds could easily have occurred in the Project area based on known movement patterns (DERM 2012). Main Range NP is the centre of a recognised territory historically (DNPRSR 2013). However, the southerly range of Red Goshawk appears to have undergone a significant retraction over the past several decades and the species may no longer be breeding in the South-East Queensland region (Seaton 2014).</p> <p>The Red Goshawk is found in north-western, northern and eastern Australia in coastal and subcoastal areas. The species is resident but very sparsely distributed, with home ranges of 120 km² for females and 200 km² for males (Debus & Czechura 1988; Marchant & Higgins 1993; Olsen 1995). Occasional records from central Australia may be resident birds but could be dispersing individuals (Aumann 2201). Breeding range appears to be continuous and the species could be described as consisting of one large population (Garnett & Crowley 2000).</p> <p>The Red Goshawk occurs in woodlands and forests, particularly tall forests in areas of high rainfall (Woinarski 2007) and, ideally, with intact forest or woodland, a mosaic of vegetation types and permanent water, particularly riverine forests. The species avoids both very dense and very open habitats (Marchant & Higgins 1993) but occur in rainforest in New South Wales and vine forest in southeast Queensland (DERM 2012). In partly cleared habitats in eastern Australia it occurs in areas with gorges and escarpments (Czechura 2012). Nests are restricted to trees taller than 20 m and within one km of a watercourse or wetland (Garnett & Crowley 2000).</p> <p>Habitat loss is thought to have caused the historical decline in southern Queensland (Czechura & Hobson 2000; Czechura <i>et al.</i> 2010). Continuing threats include fragmentation of habitat, loss of, or disturbance to, nesting sites, fire, egg-collecting, shooting, loss of prey species, and possibly secondary poisoning (Marchant & Higgins 1993; Garnett & Crowley 2000). Red Goshawks breed in large areas of intact forest and woodland and fragmentation reduces their breeding success. Fire can destroy nest trees and may decrease prey abundance. Inappropriate fire regimes may also result in thickening of vegetation, reducing prey availability (DERM 2012).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>The most recent known record for Main Range NP was in 2000. However, the species typically has a low recording rate and, despite the apparent lack of recent records, is assumed to still be present. Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. Any effects associated with clearing and fragmentation will be negligible. A possible impact associated with the Project is an altered fire regime but fire management measures will be in place. Any evidence of breeding would immediately be reported to Queensland Parks & Wildlife Service. The Project is not expected to lead to a long-term decrease in the size of any population.</p>
<p><i>Reduce the area of occupancy of an important population</i></p>	<p>The species could be described as consisting of one large population (Garnett & Crowley 2000). The proposed limited vegetation disturbance means the Project is not expected to reduce the area of occupancy of the species.</p>

Table 4-9: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Hastings River Mouse <i>Pseudomys oralis</i>	
<i>Fragment an existing important population into two or more populations</i>	The species could be described as consisting of one large population (Garnett & Crowley 2000). Clearing associated with the Project would be limited to regrowth 2.5 m wide on an existing track. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	All known sites for nesting, food resources, water, shelter, essential travel routes, dispersal and buffer areas may be considered habitat critical to the survival of the species (DERM 2012). Presumably the Project area does include habitat that could be considered critical to the survival of the species. However, the proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of an important population</i>	There is no known nest in the Project area and the proposed vegetation disturbance will not affect prey availability or movement. Any evidence of breeding would immediately be reported to Queensland Parks & Wildlife Service. The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Red Goshawk or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Red Goshawk or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-11: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Black-breasted Button-quail *Turnix melanogaster*

<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>There are four WildNet (DEHP 2016) and 2 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. The ALA records are both (Queensland) Department of Environment and Heritage Protection records from 1993, one for Main Range NP and the other for Spicers Gap.</p> <p>The Black-breasted Button-quail is found from Byfield in southeast Queensland south to the Border Ranges. It is generally found east of the Great Dividing Range but does extend inland to the Bunya Mountains and Barakula State Forest (Marchant & Higgins 1993; Smyth and Pavey 2001; Garnett <i>et al.</i> 2011). There are 14 known populations in Queensland (Smith & Mathieson 2012). There is no known record from New South Wales since 2000 (Garnett <i>et al.</i> 2011).</p> <p>The species occurs in dry rainforest and vine-thickets with abundant leaf-litter. It has also been recorded in Brigalow, Belah and Bottle-tree scrubs, in eucalypt forests with a dense understorey including Lantana <i>Lantana camara</i>, and in acacia thickets and patches of dense shrubs in littoral areas (Marchant & Higgins 1993; Smith & Mathieson 2012). The species prefers larger vine-thicket remnants (>15 ha) connected to eucalypt woodland (Smyth & Pavey 2001). Radio-tracking studies suggest the birds do not occupy exclusive territories and have home ranges of 2.2-6.1 ha (Smith <i>et al.</i> 1998). The species is recorded in remnant patches intermittently with absences for extended periods, suggesting that individuals may move large distances (Marchant & Higgins 1993).</p> <p>Black-breasted Button-quails forage for invertebrates and possibly seeds in thick leaf-litter, creating distinctive 'platelets' by scratching litter away with the feet and turning in a circular motion (Smith & Mathieson 2012). They can be difficult to observe due to the dense vegetation in their preferred habitat and their cryptic behaviour (Marchant & Higgins 1993).</p> <p>At least 90% of Black-breasted Button-quail habitat has been cleared (Garnett & Crowley 2000). Current threats to the species include continued loss and fragmentation of habitat, habitat degradation by livestock and feral Pigs <i>Sus scrofa</i>, weed invasion, habitat loss or degradation by fire and predation by feral predators (Mathieson & Smith 2009; Smith & Mathieson 2012).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>There is no mention of a Main Range population in the national recovery plan (Mathieson & Smith 2009). The closest identified population is at Mt. French, c. 20 km to the east. It is assumed that any birds present are not recognized as an important population.</p> <p>The Project would require 0.3 ha of groundlayer to be brushed back by hand as carefully as possible within rainforest habitat, and within which regular use by walkers will prevent significant regrowth. Possible impacts associated with the Project are increased access for feral predators and feral Pig, altered fire regimes, fragmentation of habitat and weed invasion. Pigs and the feral predators considered most likely to be a threat, Cat <i>Felis catus</i> and Red Fox <i>Vulpes vulpes</i>, are already in the park. A pest plant and pathogen management strategy has been implemented in the park (DNPRSR (2013)). In addition, the Project will have its own weed and fire management measures in place. The Project is not expected to lead to a long-term decrease in the size of any population, whether or not the population is considered important.</p>
<p><i>Reduce the area of occupancy of an important population</i></p>	<p>The proposed limited vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.</p>
<p><i>Fragment an existing important population into two or more populations</i></p>	<p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which</p>

Table 4-11: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Black-breasted Button-quail <i>Turnix melanogaster</i>	
	regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	<p>The recovery plan for the species (Mathieson & Smith 2009: 10) identifies critical habitat as:</p> <ul style="list-style-type: none"> • Vine thickets and rainforest vegetation types that are periodically water-stressed. These include: semi-evergreen vine thicket, low microphyll vine forest, Araucarian microphyll vine forest, Araucarian notophyll vine forest and <i>Brachychiton</i> scrubs that may incorporate bottle trees (<i>Brachychiton sp.</i>), brigalow (<i>Acacia harpophylla</i>) and belah (<i>Casuarina cristata</i>) • Low thickets or woodlands with a dense understorey but little ground cover, typically dominated by <i>Acacia</i> spp. • In littoral situations, dry vine scrubs, acacia thickets and areas densely covered in shrubs, particularly midgen berry <i>Austromyrtus dulcis</i>. <p>The proposed trail passes through simple microphyll fern thicket, which is not included as critical habitat. Nonetheless it has similar structural components. The trail is to be built to Class 5 Australian Standards, where minimal disturbance is made to the path. Should the vegetation in question be considered critical habitat the proposed limited vegetation disturbance means that the Project is not expected to adversely affect habitat critical to the survival of the species.</p>
<i>Disrupt the breeding cycle of an important population</i>	The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Black-breasted Button-quail or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Black-breasted Button-quail or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-12: Assessment of Matters of National Environmental Significance impact criteria for the Critically Endangered Swift Parrot *Lathamus discolor*

<p><i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i></p>	<p>There is no record in the <i>Atlas of Living Australia</i> database (ALA 2016) and one WildNet database record (DEHP 2016). DEHP does not provide location or date information for public searches of WildNet.</p> <p>The Swift Parrot occurs in south-eastern Australia, breeding in Tasmania and spending the winter on the mainland. On the mainland it is most common in Victoria and eastern New South Wales, rarely recorded in South Australia and infrequently in Queensland (Higgins 1999; Garnett <i>et al.</i> 2011). The species is probably annual in Queensland in small numbers (Higgins 1999; Saunders 2012). Its area of occupancy has declined significantly, with losses of more than 70% of its habitat in Tasmania, New South Wales and Victoria (Garnett <i>et al.</i> 2011).</p> <p>On mainland Australia, the Swift Parrot mainly occurs in dry open eucalypt forest and woodland, usually box-ironbark communities, especially with species such as Mugga Ironbark <i>Eucalyptus sideroxylon</i>, Grey Box <i>E. microcarpa</i>, River Red Gum <i>E. camaldulensis</i> and Swamp Mahogany <i>E. robusta</i> (Higgins 1999; Kennedy & Overs 2001). They feed preferentially in the largest trees (Kennedy & Overs 2001). The species mostly eats eucalypt nectar and also psyllids and lerp, seeds and fruit. It is usually seen in small flocks, 10-30 birds, but can congregate in large numbers (Higgins 1999).</p> <p>The main threat to the Swift Parrot is habitat loss and degradation. Other threats, away from its breeding area, include tree dieback, too-frequent fire, collision with fences, windows and cars and possibly Psittacine Beak and Feather Disease (Garnett <i>et al.</i> 2011; Saunders 2012).</p>
<p><i>Lead to a long-term decrease in the size of a population</i></p>	<p>The national recovery plan (Saunders & Tzaros 2011: 3) states <i>the Swift Parrot occurs as a single, migratory population.</i></p> <p>Possible impacts associated with the Project are weed invasion, spread of <i>Phytophthora</i> and altered fire regime. Weed and fire management measures will be in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project will have its own pathogen management measures in place. Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of the groundlayer within eucalypt forest would be brushed back by hand as carefully as possible. Establishment of Ecocamps will not include disturbance to larger trees present on the site. Any possible impacts are expected to be minor. Any possible occurrence by Swift Parrot in the Project area would be highly irregular and unlikely to be annual. The Project is not expected to lead to a long-term decrease in the size of any population.</p>
<p><i>Reduce the area of occupancy of the species</i></p>	<p>The proposed limited vegetation disturbance is not expected to reduce the area of occupancy of the species.</p>
<p><i>Fragment an existing population into two or more populations</i></p>	<p>The proposed limited vegetation disturbance is not expected to fragment any existing population into two or more populations.</p>
<p><i>Adversely affect habitat critical to the survival of a species</i></p>	<p>The national recovery plan (Saunders & Tzaros 2011: 8) identifies critical habitat as <i>those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot, or are otherwise identified by the recovery team.</i> The Main Range area is not included as priority habitat (Saunders & Tzaros 2011).</p> <p>The Project is not expected to adversely affect habitat critical to the survival of the species.</p>
<p><i>Disrupt the breeding cycle of a population</i></p>	<p>The Project is not expected to disrupt the breeding cycle of an important population.</p>

Table 4-12: Assessment of Matters of National Environmental Significance impact criteria for the Critically Endangered Swift Parrot *Lathamus discolor*

<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Swift Parrot or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Swift Parrot or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-13: Assessment of Matters of National Environmental Significance impact criteria for the Endangered (Coxen's) Double-eyed Fig-parrot *Cyclopsitta diophthalma coxeni*

<p><i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i></p>	<p>There are eight records in the Atlas of Living Australia database, the most recent is 1994 (ALA 2016). There are 10 WildNet database records (DEHP 2016). The subspecies was reliably recorded from Main Range National Park in 1997 (Coxen's Fig-Parrot Recovery Team 2001). DEHP does not provide location or date information for public searches of WildNet. However, all eight ALA records are from DEHP. All are within 10 km of the Project area. The closest is less than two km from the proposed trail. There were approximately 90 reliable sightings between 1970 and 2000 in Queensland (Coxen's Fig-Parrot Recovery Team 2001).</p> <p>The distribution of Coxen's Fig-Parrot is poorly known (DoE 2016g). The core distribution extends from Gympie in Queensland to the Richmond River in north-eastern New South Wales, and west to the Bunya Mountains in Queensland (Holmes 1990 in DoE 2016c). There have also been recent and credible reports from further north around Rockhampton and further south in the Hastings River area (Coxen's Fig-Parrot Recovery Team 2001).</p> <p>Double-eyed Fig-Parrots occur in rainforest in the lowlands and up to 1200 m a.s.l., usually containing fig trees <i>Ficus</i> spp. They are often at the ecotone of rainforest and sclerophyll forest and also occur in vine forest and gallery forest and are sometimes seen in open forest or woodland. However, Coxen's Fig-Parrot is now thought to occur in small habitat patches and on the edges of larger areas, their habitat having been fragmented (Higgins 1999). The subspecies occurs to about 900 m a.s.l. (Coxen's Fig-Parrot Recovery Team 2001). The subspecies also uses agricultural and other disturbed land with fig trees (Garnett <i>et al.</i> 2011).</p> <p>Coxen's Fig-Parrot has declined since the 1950s, mainly due to habitat loss (Higgins 1999). Though the species is also considered to have been very rare since at least the 1920s (Olsen 2007) and was probably never common, even before European colonisation (DoE 2016c). The rate of reporting has varied little in recent decades, suggesting the subspecies is no longer declining (Garnett <i>et al.</i> 2011). Although no population of Coxen's Fig-Parrot has been identified as being of special importance to the recovery effort, lack of knowledge about the subspecies and its distribution indicates that all remaining populations are important for the long-term survival of the subspecies (DoE 2016g).</p> <p>The major cause for their decline is habitat loss and fragmentation (Higgins 1999; Gynther 2012). Remaining habitat is vulnerable to weed invasion (Garnett <i>et al.</i> 2011; Gynther 2012) and the subspecies may be susceptible to illegal egg or nestling collection (Holmes 1990 in Garnett <i>et al.</i> 2011). Additional threats include seasonal gaps in food availability and inappropriate fire regimes (Gynther 2012).</p>
<p><i>Lead to a long-term decrease in the size of a population</i></p>	<p>The most recent known record for Main Range NP is a 1997. The subspecies has always had a low recording rate and, despite the lack of recent records, a population is assumed to still be present. Possible impacts associated with the Project are weed invasion and altered fire regime. Weed and fire management measures will be in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The trail itself will be up to 0.6 m in width. Any effects associated with fragmentation will be negligible. Any possible impacts are expected to be minor. The Project is not expected to lead to a long-term decrease in the size of any population.</p>

Table 4-13: Assessment of Matters of National Environmental Significance impact criteria for the Endangered (Coxen's) Double-eyed Fig-parrot <i>Cyclopsitta diophthalma coxeni</i>	
<i>Reduce the area of occupancy of the species</i>	The proposed limited vegetation disturbance is not expected to reduce the area of occupancy of the species.
<i>Fragment an existing population into two or more populations</i>	The proposed limited vegetation disturbance is not expected to fragment any existing population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	The proposed limited vegetation disturbance is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of a population</i>	The proposed limited vegetation disturbance and any on-going Project activities are not expected to disrupt the breeding cycle of a population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to (Coxen's) Double-eyed Fig-parrot or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to (Coxen's) Double-eyed Fig-parrot or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-14: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Rufous Scrub-bird *Atrichornis rufescens*

<p><i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i></p>	<p>There are 19 WildNet (DEHP 2016) and 17 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet. The most recent ALA record is 2007. In Main Range NP the species occurs along the upper reaches of Dalrymple Creek and at Mount Cordeaux (Stewart 2012b).</p> <p>The Rufous Scrub-bird is found from southeast Queensland to Barrington Tops in New South Wales, and formerly to the Chichester Range. The species formerly inhabited areas in lowlands and on coastal plains but is now extinct below 400 m a.s.l. and possibly 600 m a.s.l. (Higgins <i>et al.</i> 2001). The northern subspecies, present in Main Range NP, occurs from 700 to 1100 m a.s.l. (Newman <i>et al.</i> 2014). Rufous Scrub-bird has disappeared from many areas, including Cunningham's Gap and Spicer's Gap (Stewart 2012b).</p> <p>The species occurs in rainforest, including Nothofagus forest, and adjacent eucalypt forest with a rainforest understorey. In rainforest the species lives in patches of dense vegetation where there are gaps in the canopy. Preferred habitat in eucalypt forest is usually well buffered from fire, often on the ecotone with rainforest. Dense groundcover 2-50 cm above ground and moderately dense cover 50-100 cm above ground with abundant leaf litter is required. The species will occur in dense vegetation along roads, tracks and campgrounds (Higgins <i>et al.</i> 2001).</p> <p>Males occupy permanent territories averaging 1.17 ha. The species forages on the ground, taking small invertebrates (Higgins <i>et al.</i> 2001). Birds are very difficult to observe, moving like rodents on the ground, mostly keeping to extremely dense vegetation (Higgins <i>et al.</i> 2001; Stewart 2012b; Newman <i>et al.</i> 2014).</p> <p>Rufous Scrub-bird is threatened by loss of habitat and inappropriate fire regimes (though optimal burning intervals are unknown) (Higgins <i>et al.</i> 2001). However, birds in Queensland are no longer threatened by clearing and fire is a threat in eucalypt forest (a habitat in New South Wales) but the species has continued to decline. Other threats are unknown (Stewart 2012b). The species may require selective logging to create suitable habitat (Stewart 2012b; Newman <i>et al.</i> 2014).</p>
<p><i>Lead to a long-term decrease in the size of a population</i></p>	<p>The Project would require 0.3 ha of groundlayer to be brushed back by hand as carefully as possible within rainforest habitat, and within which regular use by walkers will prevent significant regrowth. The trail will be 0.6 m wide within which groundcover would be carefully brushed back by hand, within which regular use would suppress regrowth. Should Rufous Scrub-bird be present in the area to be disturbed any disturbance should be temporary based on the occurrence of the species along tracks in other locations. Other possible threats to the species in this habitat are unknown. The Project is not expected to lead to a long-term decrease in the size of any population.</p>
<p><i>Reduce the area of occupancy of the species</i></p>	<p>The proposed limited vegetation disturbance is not expected to reduce the area of occupancy of the species.</p>
<p><i>Fragment an existing population into two or more populations</i></p>	<p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The proposed limited vegetation disturbance is not expected to fragment any existing population into two or more populations.</p>

Table 4-14: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Rufous Scrub-bird <i>Atrichornis rufescens</i>	
<i>Adversely affect habitat critical to the survival of a species</i>	There is no recovery plan for the species (DoE 2016h). No critical habitat is defined. However, it could be considered that any suitable habitat where the species occurs could be regarded as critical habitat. The proposed limited vegetation disturbance is not expected to adversely affect habitat possibly critical to the survival of the species.
<i>Disrupt the breeding cycle of a population</i>	The proposed limited vegetation disturbance and any on-going Project activities are not expected to disrupt the breeding cycle of a population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Rufous Scrub-bird or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Rufous Scrub-bird or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-15: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Eastern Bristlebird *Dasyornis brachypterus*

<p><i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i></p>	<p>There are 86 WildNet (DEHP 2016) and 122 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. DEHP does not provide location or date information for public searches of WildNet.</p> <p>The Eastern Bristlebird occurs around Mallacoota in Victoria, in southern New South Wales from Barren Grounds to Jervis Bay and around the Queensland/New South Wales border (Higgins & Peter 2002; Garnett <i>et al.</i> 2011). The northern subspecies <i>monoides</i> is found in 12 locations (Garnett <i>et al.</i> 2011), including Conondale, Lamington, Mount Barney and Main Range national parks. The subspecies is thought to number less than 40 individuals (OEH 2012). A survey in 2007 found only 15 birds, distributed between Lamington, Conondale and Main Range national parks Stewart 2012a). There is possibly only a single pair remaining in the Conondale Ranges. The largest known colony, just south of Cunningham’s Gap, was wiped out by fire in 1991 (Gregory 2007). Historical records in the project area are shown on Figure 1.</p> <p>The northern subspecies occurs mostly in upland open forest with a dense grassy groundcover and in heath. Colonies are found within 750 m of rainforest, which acts as a fire refuge. (Stewart 2012a). Eastern Bristlebird is a fire-sensitive species, i.e., it is ground-dwelling, cover-dependent, a poor flier and a poor disperser (Baker 2000). The ground layer typically includes tussock grasses, with logs, shrubs, tall ferns and sometimes vines. The birds require dense foliage near the ground. Birds are sedentary in territories of 1-4 ha. Nests are built in low vegetation, often a grass tussock and readily abandon nests if disturbed during incubation (Stewart 2012a).</p> <p>The Eastern Bristlebird is threatened by an inappropriate fire regime (Baker 2000; Stewart 2012a), particularly by a lack of suitable refuges due to frequent fires (Bain <i>et al.</i> 2008). Other potential threats include predation by Cats <i>Felis catus</i> and Red Foxes <i>Vulpes vulpes</i>, weed invasion, disturbance to active nests (Garnett <i>et al.</i> 2011; Stewart 2012a)), predation or habitat degradation by feral Pig <i>Sus scrofa</i>, habitat damage by vehicles, inappropriate grazing, and illegal collection of eggs (Stewart 2012a).</p>
<p><i>Lead to a long-term decrease in the size of a population</i></p>	<p><i>The small size of the Eastern Bristlebird national population means that all extant populations are likely to be important to the long-term survival and recovery of the species</i> (OEH 2012: 8).</p> <p>Clearing associated with the Project would be limited to regrowth on an existing track in a location that is not preferred Eastern Bristlebird habitat. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. No Eastern Bristlebirds have been recorded from these areas. There would be no disturbance required south of Cunningham’s Gap as this proposed section of the SRT is entirely confined to existing walking trails and tracks. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. Possible impacts associated with the Project are increased access for feral predators and Pigs, weed invasion, altered fire regime and the presence of humans. Weed and fire management measures will be in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. No population is known to be present in the areas to be disturbed and a previous population is absent in the Mt Mitchell Trail section which is confined to existing walking tracks and trails. The Project is not expected to lead to a long-term decrease in the size of any population.</p>
<p><i>Reduce the area of occupancy of the species</i></p>	<p>The proposed limited vegetation disturbance is not expected to reduce the area of occupancy of the species.</p>

Table 4-15: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Eastern Bristlebird <i>Dasyornis brachypterus</i>	
<i>Fragment an existing population into two or more populations</i>	The proposed limited vegetation disturbance is not expected to fragment any existing population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	<i>All habitat currently occupied by the Eastern Bristlebird is critical to its survival (OEH 2012: 11).</i> No population is known to be present in the area to be disturbed and there is no habitat disturbance proposed in the Mt Mitchell Trail section as the trail here would be confined to existing walking trails and tracks. The Project is not expected to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of a population</i>	Although the trail is confined to existing tracks in the Mt Mitchell area and no impact is expected, having regard to the historical record of the population in the region SRT intends to undertake long-term monitoring for Eastern Bristlebird in the section of trail south of Cunningham's Gap. Should a population be found to be present or establish again in the future Gainsdale would immediately notify QPWS and cooperatively develop operational procedures to ensure there is no impact on breeding activity. No population is known to be present in the areas proposed to be physically disturbed for trail establishment or Ecocamps. The Project is not expected to disrupt the breeding cycle of a population of Eastern Bristlebird.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	No population is known to be present in the area to be physically disturbed for trail establishment or Ecocamps and there is no habitat disturbance proposed in the Mt Mitchell Trail section as the trail here would be confined to existing walking trails and tracks. The Project would not modify, remove, isolate or decrease the availability of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Eastern Bristlebird or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Eastern Bristlebird or its habitat.
<i>Interfere with the recovery of the species.</i>	No population is known to be present in the area to be disturbed and there is no habitat disturbance proposed in the Mt Mitchell Trail section as the trail here would be confined to existing walking trails and tracks. Long term monitoring is proposed to determine whether apparently abandoned habitat in the Mt Mitchell Trail section is recolonised by the species. Should a population be found to be present or establish again in the future Gainsdale would immediately notify QPWS and cooperatively develop operational procedures to ensure there is no impact on breeding activity. Opportunities will exist with the Hidden Vale UQ Wildlife Centre to study the species and its habitat requirements for potential reintroduction to former habitat. Significant disruptions to breeding cycles and interference to species recovery are not expected.

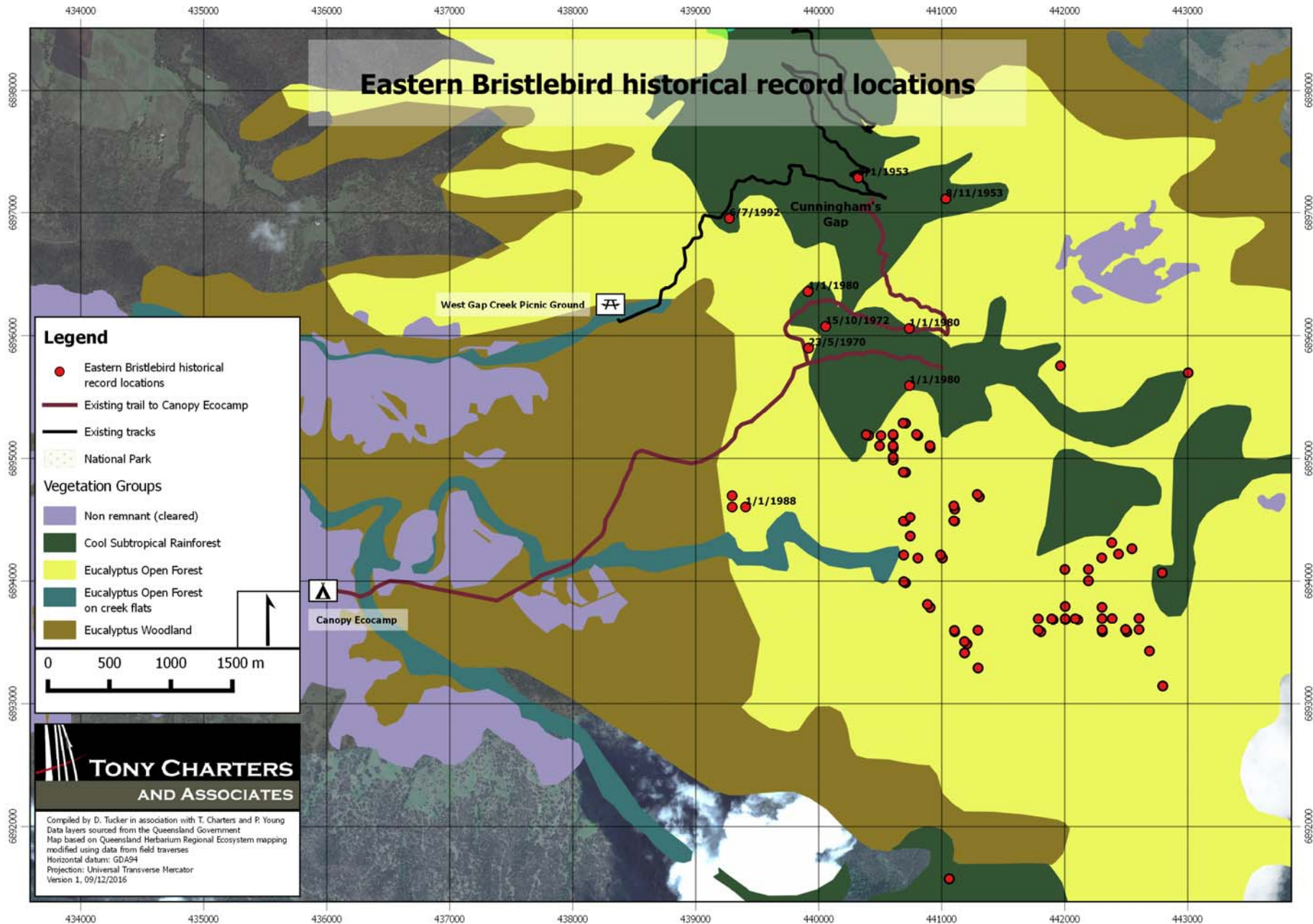


Table 4-16: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Collared Delma *Delma torquata*

<p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p>	<p>There is no WildNet (DEHP 2016) or <i>Atlas of Living Australia</i> (ALA 2016) database record for Main Range National Park and its immediate surrounds. The EPBC Protected Matters Report states that the <i>Species or species habitat may occur within area</i> (DoE 2016i).</p> <p>Although there is no known record for the Project area, the distribution of this species has significantly increased in recent years. Some new records have been from what would have been considered atypical habitats.</p> <p>The majority of records of Collared Delma are from the western suburbs of Brisbane and the Toowoomba ranges in south-east Queensland. The species does also occur north to Blackdown Tablelands National Park and west to the Roma area in Brigalow Belt South (Peck 2012). The species is typically associated with west-facing ridgelines with dry open sclerophyll and acacia woodlands with an open midstorey and a ground cover of native grasses, thick leaf litter and abundant loose rocks (Peck 2012). It has also been recorded from semi-evergreen vine thickets (Ryan 2006) and from <i>Eucalyptus tereticornis</i> woodland and brigalow without abundant rock (Wilson 2015; Peck 2012). A 1998 specimen from Wondul Range was from grey cracking clay with brigalow (<i>Acacia harpophylla</i>) woodland (T. Reis pers. obs.). Individuals typically shelter under fallen debris (e.g., rocks, fallen timber, leaf litter) but may also be found below the ground surface or in soil cracks (Richardson 2006; Wilson & Swan 2013). Surface rocks are a significant habitat feature (Peck 2012).</p> <p>The Collared Delma is poorly known. Predominantly diurnal, it feeds on small arthropods. It is possible that subterranean termites may be part of the species' diet (Peck 2003). Movements are not well documented, but limited recapture data suggest that the species is highly sedentary, often repeatedly using the same rock shelter, but will abandon these shelter sites if they are disturbed (Porter 1998). It may therefore be possible for populations to be restricted to very small areas and be very vulnerable to disturbance.</p> <p>The species is threatened by habitat loss, inappropriate fire regimes (Peck 2012), invasive weeds (TSN 2008; Peck 2012), over-grazing and pasture improvement (Cogger <i>et al.</i> 1993; TSN 2008), removal or disturbance of rocks (TSN 2008), use of agricultural chemicals and predation by feral Cats <i>Felis catus</i> and Foxes <i>Vulpes vulpes</i> (DoE 2016d).</p>
<p>Lead to a long-term decrease in the size of an important population of a species</p>	<p>There is no important population near Main Range identified in the draft recovery plan (Richardson 2006). There is no evidence of a population in the Project area.</p> <p>Clearing associated with the Project would be limited to regrowth on an existing track. The Project would require less than 0.3 ha of eucalypt forest to be disturbed in the groundlayer only. Possible impacts associated with the Project are increased access for feral predators, altered fire regimes, fragmentation of habitat and weed invasion. The feral predators considered most likely to be a threat, Cat and Red Fox, are already in the park. A pest plant and pathogen management strategy has been implemented in the park (DNPRSR (2013)). In addition, the Project will have its own weed and fire management measures in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project is not expected to lead to a long-term decrease in the size of any possible population, whether or not the population is considered important.</p>
<p>Reduce the area of occupancy of an important population</p>	<p>The proposed limited vegetation disturbance is not expected to reduce the area of occupancy of any population.</p>

Table 4-16: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Collared Delma <i>Delma torquata</i>	
<i>Fragment an existing important population into two or more populations</i>	Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The Project is not expected to fragment any population into two or more populations.
<i>Adversely affect habitat critical to the survival of a species</i>	The draft recovery plan for Brigalow Belt reptiles (Richardson: 12) does not identify critical habitat. Instead it lists micro-habitat features used by the species, including leaf litter, rocks, fallen timber, soil cracks and rock outcrops. There will be some limited loss of micro-habitat features such as leaf litter and possibly small rocks and fallen timber. The proposed limited project footprint is not considered likely to adversely affect habitat critical to the survival of the species.
<i>Disrupt the breeding cycle of an important population</i>	The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Collared Delma or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Collared Delma or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-17: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Three-toed Snake-tooth Skink <i>Coeranoscincus reticulatus</i>	
<p><i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i></p>	<p>There are 12 WildNet (DEHP 2016) and seven <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds.</p> <p>The Three-toed Snake-tooth Skink occurs in subtropical rainforest and wet sclerophyll forest from the Grafton area in New South Wales north to Fraser Island in Queensland. It mostly occurs in montane areas on rich, dark soils but on Fraser Island and the nearby mainland it occurs in pale sands (Wilson & Swan 2013). The species lives in loose soils under rotting logs and rocks and feeds on invertebrates (Ehmann 1992).</p> <p>The Three-toed Snake-tooth Skink is threatened by habitat loss and fragmentation (Cogger <i>et al.</i> 1993; NSW NPWS 2002), loss of logs and leaf litter through too-frequent fire (NSW NPWS 2002; Boyes 2004), degradation of habitat, including compaction of soil, by livestock (Cogger <i>et al.</i> 1993; NSW NPWS 2002; Boyes 2004) and degradation of habitat by weed invasion (Boyes 2004).</p>
<p><i>Lead to a long-term decrease in the size of an important population of a species</i></p>	<p>There is no important population identified for this species.</p> <p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer.</p> <p>There will be a loss of leaf litter along the trail, which will be 06 m wide. Other possible impacts associated with the Project are increased access for feral Pig, a species already in the park, and weed invasion. A pest plant and pathogen management strategy has been implemented in the park (DNPRSR (2013)). In addition, the Project will have its own weed and fire management measures in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected. The Project is not expected to lead to a long-term decrease in the size of any population, whether or not the population is considered important.</p>
<p><i>Reduce the area of occupancy of an important population</i></p>	<p>The proposed limited vegetation disturbance means the Project is not expected to reduce the area of occupancy of any population.</p>
<p><i>Fragment an existing important population into two or more populations</i></p>	<p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The Project is not expected to fragment any population into two or more populations.</p>
<p><i>Adversely affect habitat critical to the survival of a species</i></p>	<p>The species is including in the Biodiversity recovery plan for Gatton and Laidley Shires, South-East Queensland 2003-2008 (Boyes 2004). Critical habitat is not defined.</p> <p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The proposed limited vegetation disturbance is not expected to adversely affect habitat critical to the survival of the species.</p>

Table 4-17: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Three-toed Snake-tooth Skink <i>Coeranoscincus reticulatus</i>	
<i>Disrupt the breeding cycle of an important population</i>	The Project is not expected to disrupt the breeding cycle of an important population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The proposed limited vegetation disturbance means the Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Three-toed Snake-tooth Skink or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Three-toed Snake-tooth Skink or its habitat.
<i>Interfere with the recovery of the species.</i>	The Project is not expected to interfere substantially with the recovery of the species.

Table 4-18: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Fleay's Barred Frog <i>Mixophyes fleayi</i>	
<p><i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i></p>	<p>There are 4001 WildNet (DEHP 2016) and 646 <i>Atlas of Living Australia</i> (ALA 2016) database records for Main Range National Park and its immediate surrounds. Main Range NP is a stronghold for the species (DNPRSR 2013), particularly the Goomburra area. During the field survey, the species was detected at the proposed trail crossing of the perennial headwater stream of Blackfellows Creek.</p> <p>Fleay's Barred Frog occurs from far north-eastern New South Wales to the Conondale Ranges in south-east Queensland. The species previously occurred at the Bunya Mountains and Mount Tamborine but those populations appear to be extirpated (Hines 2012). Fleay's Barred Frog has also disappeared from some locations in New South Wales (Hines <i>et al.</i> 1999).</p> <p>The species occurs in temperate and subtropical rainforest and tall open forest (Hines 2012; Anstis 2013). Breeding takes place along streams, eggs are laid in gently flowing water. Little is known about non-breeding habitat but juveniles and females can be found 100s of metres from streams, sometimes on ridges (Hines 2012). Females only come to streams to breed (Anstis 2013). Adults feed on arthropods and tadpoles feed on bottom sediment, algae, detritus, fallen fruit and carrion (Hines 2012).</p> <p>Fleay's Barred Frog is threatened by Chytrid fungus, feral Pigs <i>Sus scrofa</i>, trampling by livestock, degradation of streams by livestock, weed invasion, death on roads from vehicles (Hines 2012), pollution or sedimentation of streams, altered hydrology, loss of leaf litter and fallen logs from fire and use of herbicides near streams (NSW NPWS 2002). Chytrid fungus was discovered in Fleay's Barred Frog at Cunningham's Gap in 1996 (Berger <i>et al.</i> 1999) and is now widespread in Main Range NP but the population appears to be recovering (Hines 2012).</p> <p>The species was recorded from a small, perennial stream located in the upper valley between the Winder Track and the Amphitheatre Track during the fauna field survey. This is near the location where a new section of trail for the proposed SRT crosses the stream.</p>
<p><i>Lead to a long-term decrease in the size of a population</i></p>	<p>Trail establishment would require 0.4 ha of groundlayer to be brushed back by hand within rainforest habitat. With regular use by walkers the 0.6 m wide trail will not significantly regrow.</p> <p>Other possible threats to the species from the Project include possible spread of Chytrid fungus by walkers, increased access for feral Pigs and degradation of streams. A study of Fleay's Barred Frog at Main Range showed that almost 100% of tadpoles carried the infection (Hines 2012). The spread of Chytrid fungus into new areas seems very unlikely. Feral pigs are already present in the park and the degree of increased access via trails will be minimal. Two creeks will be crossed by the trail. One of these, Cascade Creek, will be crossed at a number of existing crossings along an already established track. The other creek, upper Blackfellow Creek, will be crossed where there are steep banks and the crossing will be designed to ensure no dislodgement of soil into creek. The Project is not expected to lead to a long-term decrease in the size of any population.</p>
<p><i>Reduce the area of occupancy of the species</i></p>	<p>The proposed limited vegetation disturbance is not expected to reduce the area of occupancy of the species.</p>
<p><i>Fragment an existing population into two or more populations</i></p>	<p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The proposed limited vegetation disturbance associated with the Project is not expected to fragment any existing population into two or more populations.</p>

Table 4-18: Assessment of Matters of National Environmental Significance impact criteria for the Endangered Fleay's Barred Frog <i>Mixophyes fleayi</i>	
<i>Adversely affect habitat critical to the survival of a species</i>	<p>Critical habitat is defined as <i>permanent and semi-permanent freshwater streams, between 100-1000 m in altitude, in rainforest and other communities</i> in a number of locations, including Main Range (Hines & SQTFR 2002).</p> <p>The Project area includes critical habitat. However, the very low impact nature of the project and the implementation of construction and operation protocols to preserve existing water quality mean that the Project is not expected to adversely affect habitat possibly critical to the survival of the species.</p>
<i>Disrupt the breeding cycle of a population</i>	The proposed limited vegetation disturbance associated with the Project and the proposed on-going Project activities are not expected to disrupt the breeding cycle of a population.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	The nature and extent of the vegetation disturbance associated with the Project and on-going operational activities are not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
<i>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Fleay's Barred Frog or its habitat.
<i>Introduce disease that may cause the species to decline</i>	A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species (and associated diseases) as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Fleay's Barred Frog or its habitat.
<i>Interfere with the recovery of the species.</i>	Population scale movement will be unaffected and significant disruptions to breeding cycles and interference to species recovery are not expected.

Table 4-19: Assessment of Matters of National Environmental Significance impact criteria for Assessment of Matters of National Environmental Significance impact criteria for Migratory species known or expected to occur	
<p><i>An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:</i></p>	<p>Oriental Cuckoo <i>Cuculus optatus</i> There are two <i>Atlas of Living Australia</i> records (ALA 2016) and two WildNet records (DEHP 2016), which may be the same records. Oriental Cuckoo occurs in rainforest, vine thicket and open forest and woodland. The species is often recorded in gardens and plantations (Higgins 1999).</p> <p>White-throated Needletail <i>Hirundapus caudacutus</i> There are six ALA records (ALA 2016) and six WildNet records (DEHP 2016). In Australia, White-throated Needletail is almost completely an aerial species, possibly even sleeping on the wing. The species is sometimes found roosting in trees and may on rare occasions rest in trees and on the ground during the day. Found over a wide variety of habitat, including open areas, modified land and the ocean but most often recorded over wooded areas (Higgins 1999).</p> <p>Fork-tailed Swift <i>Apus pacificus</i> There is one WildNet record (DEHP 2016) and no ALA record (ALA 2016). In Australia, Fork-tailed Swift is almost exclusively an aerial species, probably even sleeping on the wing, though individuals are occasionally recorded roosting in trees. Foraging occurs over a wide variety of habitats including towns and cities, open areas, farmland, coastal areas and sometimes forest (Higgins 1999).</p> <p>Rufous Fantail <i>Rhipidura rufifrons</i> There are 153 ALA records (ALA 2016) and 123 WildNet records (DEHP 2016). Rufous Fantail mostly occurs in moist habitats, including rainforest and along watercourses and gullies (Higgins <i>et al.</i> 2006). The field survey confirmed that the species is a common inhabitant of rainforest and adjoining wet sclerophyll habitats in the project area.</p> <p>Spectacled Monarch <i>Symposiachrus trivirgatus</i> There are 17 ALA records (ALA 2016) and 22 WildNet records (DEHP 2016). Spectacled Monarch occurs in low dense vegetation, mainly in rainforest, but also in wet sclerophyll forests and other dense vegetation (Higgins <i>et al.</i> 2006).</p> <p>Black-faced Monarch <i>Monarcha melanopsis</i> There are 133 ALA records (ALA 2016) and 117 WildNet records (DEHP 2016). Black-faced Monarch occurs in rainforest, wet sclerophyll forest and deep gullies (Higgins <i>et al.</i> 2006). The field survey confirmed that the species is a common inhabitant of rainforest and adjoining wet sclerophyll habitats in the project area.</p> <p>Satin Flycatcher <i>Myiagra cyanoleuca</i> There are 4 ALA records (ALA 2016) and 2 WildNet records (DEHP 2016). Satin Flycatcher occurs in wet, dense forests, often at high elevations, and also in gullies and near watercourses. It may occur in other habitats on passage (Higgins <i>et al.</i> 2006).</p>
<p><i>Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species</i></p>	<p>An area of 'important habitat' for a migratory species is:</p> <ul style="list-style-type: none"> • habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or • habitat that is of critical importance to the species at particular life-cycle stages, and/or • habitat utilised by a migratory species which is at the limit of the species range, and/or • habitat within an area where the species is declining. <p>Clearing associated with the Project would be limited to regrowth on an existing track. Less than 0.3 ha of eucalypt forest groundlayer and less than 0.4 ha of rainforest groundlayer would be disturbed along the proposed trail by being carefully brushed aside by hand for trail establishment, and within which</p>

Table 4-19: Assessment of Matters of National Environmental Significance impact criteria for Assessment of Matters of National Environmental Significance impact criteria for Migratory species known or expected to occur

	<p>regular use will suppress regrowth. Establishment of Ecocamps will be with minimal disturbance to native vegetation, with no removal of large trees and maintenance of the natural groundlayer. The trail itself will be up to 0.6 m in width. Any effects associated with fragmentation and loss of habitat will be negligible. The Project will have its own weed and fire management measures in place. Access to the public trails as part of the Project is limited to supervised walkers sleeping in custom built lodgings. No detectable increase in fire risk is expected.</p> <p>White-throated Needletail and, rarely, Fork-tailed Swift may occur but both species will forage aerially above the Project area should suitable flying invertebrates be present. The Project area is not an area of important habitat for the species.</p> <p>Oriental Cuckoo and Satin Flycatcher would be irregular visitors to the Project, particularly the former. Satin Flycatcher is virtually confined to the east of the Great Dividing Range (Boles 1988) and the Project area will not be an important area for passage. The Project area is not an important area for these species.</p> <p>Rufous Fantail and Black-faced and Spectacled Monarch are common species in Main Range NP. Threats to these three species include the loss and fragmentation of habitat, especially along migratory routes, and predation of eggs and young by the Black Rat <i>Rattus rattus</i> (Higgins <i>et al.</i> 2006). The proposed limited vegetation disturbance for the Project will not fragment habitat nor impede migration. Black Rat is already present in the park. Whether or not the Project area is considered important habitat, the Project will not substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat.</p>
<p><i>Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species</i></p>	<p>A pest and weed management plan will be implemented, as is required under the State approval process, to control and prevent the establishment of invasive species as a result of the Project. The successful implementation of the plan will ensure that there is no introduction or spread of invasive species that are harmful to Migratory species or their habitat.</p>
<p><i>Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species</i></p>	<p>There is no evidence to suggest that the Project area supports an 'ecologically significant proportion of the population' of any of the migratory species known or considered likely to occur. In any case, the nature and extent of the proposed limited vegetation disturbance would not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of any of these species.</p>

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