Macedon Ranges Shire Council

Final Report:

Environmental Management Plan – Bushland Reserve, Sandy Creek Road, Riddells Creek

Prepared by Atlas Ecology

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Victorian Local Sustainability Accord
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Environmental Management Plan
Bushland Reserve, Sandy Creek Road, Riddells Creek

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Photography: All photos taken by Bianca Aquilina, Tanya Loos and Matt Aquilina (Atlas Ecology) except:

Russell Best – Plate 5. Hairy-leaf Triggerplant *Stylidium armeria* subsp. *pilosifolium*; Plate 8. Common Cinnamon-wattle *Acacia leprosa* var. *graveolens*; Plate 18. Blotched Blue-tongue Lizard.

Daniel Rybak – Front cover photo- Musk Hood-orchid *Caladenia moschata*; Plate 4. Orchids within Heathy Dry Forest; Plate 12. Grey Parrot-pea *Dillwynia cinerascens* in flower; Plate 17. Echidna; Plate 29. Hawthorn *Crataegus monogyna*.

Front cover photos, left to right: Musk Hood-orchid *Caladenia moschata*; Austral Grass-tree *Xanthorrhoea australis* within Heathy Dry Forest; Wax-lip Orchid *Glossodia major*. Back cover photo: Broad-leaved Peppermint *Eucalyptus dives* in flower.

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- Paul Gray and Lachlan Milne (Macedon Ranges Shire Council) for project and site information.
- Russell Best (local resident and botanist) for reserve information and assistance with flora identification and survey.

We would like to acknowledge the Wurundjeri who are the traditional custodians of this land.

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1 VISION

Bushland Reserve, Sandy Creek Road is valued by the community of Riddells Creek as an ecologically diverse location that supports flora species of state significance.

Biodiversity at Bushland Reserve, Sandy Creek Road is actively managed by Macedon Ranges Shire Council and the community to conserve and enhance its values and to provide resilience to the vegetation communities present.

Local residents and visitors alike are provided an opportunity to learn and engage with the vegetation communities present through an informal track that provides access into the reserve.

Bushland Reserve, Sandy Creek Road provides passive recreational and tourism opportunities for photography, bird watching, naturalists and students.

Bushland Reserve, Sandy Creek Road is valued as an important contributor to the tourism values of the Macedon Ranges and its reputation as a clean, green destination.

2 INTRODUCTION

2.1 Reserve Location and Description

Bushland Reserve, Sandy Creek Road ('the reserve') is a 20 hectare forest owned by the Macedon Ranges Shire Council. The reserve is located on the lower foothills of the eastern Macedon Ranges and adjoins the Parks Victoria managed T Hill Reserve (Figure 1). The reserve rises up above the town of Riddells Creek and is located approximately two and a half kilometres north-west of the Riddells Creek central business district (Figure 1) and approximately 66 kilometres north-west of Melbourne.

The reserve features steep crests, south-facing spurs and sheltered gullies that support a range of remnant and regenerating forest. Three forest vegetation communities are present, being heathy dry forest, lowland forest and damp forest that varies in quality, density and height across the reserve. A total of 33 fauna species and 128 indigenous flora species including species of state significance were recorded during site surveys conducted at the reserve.

An offset site is currently proposed within a small section of the reserve (see Figure 2) to offset vegetation removal elsewhere within the municipality. Refer to the Offset Management Plan prepared for this area (Atlas Ecology 2013) for more information.

Located close to the township of Riddells Creek, the reserve provides locals and visitors with recreational and leisure opportunities. Tracks that vary in steepness and grade traverse the site and provide visitors with good access into the reserve and the neighbouring T Hill Reserve.

2.2 Regional Context

The reserve is located within a fragmented landscape of forested ranges and cleared foothills. The plains grassy woodland that once dominated the lowlands of Riddells Creek and surrounds has now been largely cleared for grazing, equine, agriculture and housing. The reserve is bordered immediately to the south by a horse stud that has been largely cleared of vegetation. Beyond this farm, the encroaching suburban fringe of Riddells Creek continues to steadily rise up to the foothills of the Macedon Ranges.

To the north and west of the reserve are large areas of forested public and private land interspersed by cleared farms. To the north of Bushland Reserve, Sandy Creek Road is the 2,379 hectare Macedon Regional Park that is managed by Parks Victoria, with the much smaller T Hill Reserve located to the immediate east. Other reserves, including Mt Charlie Flora and Fauna Reserve, Mt Teneriffe and Conglomerate Gully Flora Reserve are located close to the reserve (Figure 1). Barrm Birrm, a highly diverse and significant area on the eastern slopes of the Robertson Range, is within close proximity (Figure 1). This area is

currently un-reserved but the public can readily access the site. Barrm Birrm is a highly significant area of great importance and value to the local community.

2.3 Zones and Overlays

The Bushland Reserve, Sandy Creek Road is currently zoned Public Use Zone 6 (PUZ6). The purpose of this zone is to recognise public land use for public utility and community service and facilities; and to provide for associated uses that are consistent with the intent of the public land reservation or purpose. A Development Plan Overlay – Schedule 12 (DPO12) and a Bushfire Management Overlay (BMO) cover the entire reserve. The entrance points into the reserve from Sandy Creek Road are covered by a Schedule 1 to the Rural Conservation Zone (RCZ1) and a Low Density Residential Zone (LDRZ).

2.4 Bioregion

Victoria is divided into 28 bioregions each representing different ecological characteristics and underlying geological features. The Bioregional Conservation Status of an Ecological Vegetation Class (EVC) (see below) is assessed at this bioregional level.

The reserve occurs within the *Central Victorian Uplands Bioregion* (CVU), which extends from Stawell in the west, to Ballarat and the You Yangs in the south, to the north-east through Alexandra and Mansfield, ending near Bright (DSE 2012).

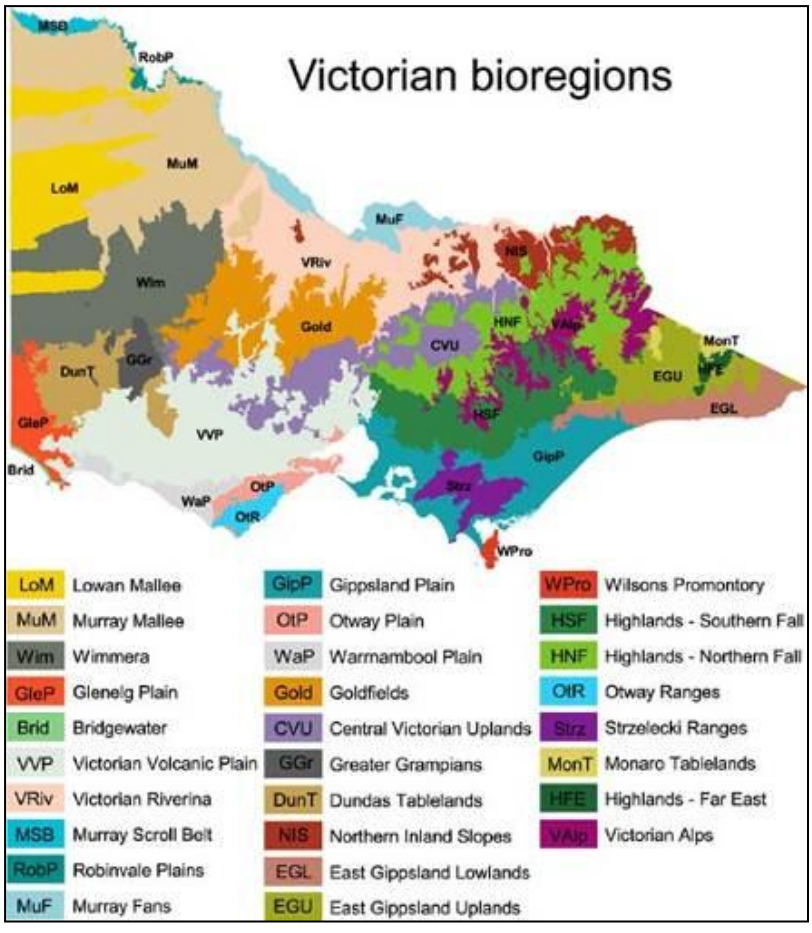
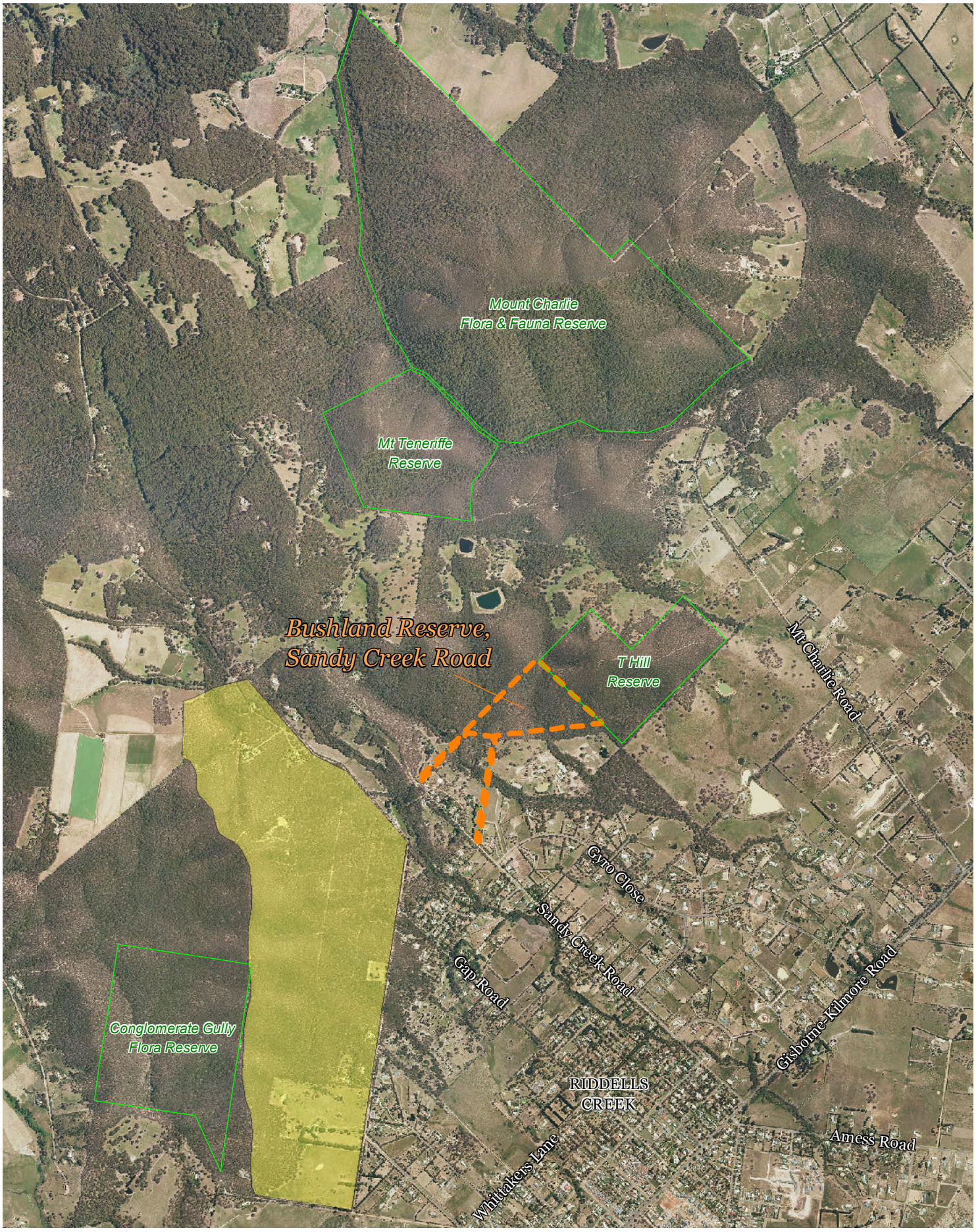


Figure 1 - Reserve location



Bushland Reserve, Sandy Creek Road

Barrm Birrm

N

0 500 1,000m

atlas ecology

Note: Map features are approximate and are to be used as a guide only.

3 EXISTING VALUES AND USES WITHIN RESERVE

3.1 Flora

3.1.1 Ecological Vegetation Class and Vegetation Communities

Ecological Vegetation Classes (EVC's) consist of groups of plants which commonly occur together within a recognisable environmental niche. This is determined by rainfall, soil type, soil moisture levels, slope and altitude (e.g. mountains, plains, and foothills), aspect (e.g. north or south) and type of canopy (e.g. open or closed canopy). An EVC is likely to be made up of a similar group of species where a certain combination of these factors recurs. An EVC typically consists of between one to three different vegetation layers (such as overstorey, mid-storey and ground layer). There are approximately 300 recognised EVCs within Victoria.

Three EVCs are present within the reserve – Heathy Dry Forest (EVC 20), Lowland Forest (EVC 16) and Damp Forest (EVC 29) (see Figure 2). All three EVCS represent differing characteristics with respect to soils, position in the landscape, aspect and vegetation structure. All three have a conservation status of 'Least Concern' within the Central Victorian Uplands bioregion. These EVCs are described in more detail in Section 3.1.3 below.

3.1.2 Flora Species

No formal flora surveys have previously been undertaken within the reserve. Site visits undertaken in October and November 2012 identified a total of 157 flora species within the reserve. This includes 128 indigenous and 29 introduced flora species. All of these species, together with their significance rating or status, are listed in Appendix 1.1.

3.1.3 Current Vegetation Description

Vegetation across the reserve generally consists of remnant and regenerating forest to varying height, density and quality. The mid-storey layer is variable in cover and diversity whilst the ground layer is largely grassy and herbaceous. The quality of vegetation across the reserve varies according to position in landscape, surrounding land uses, previous land disturbances and current management.

The reserve consists of a series of crests, south-facing spurs and gullies that form part of the lower foothills of the eastern Macedon Ranges. The position of vegetation communities (or EVCs, see Section 3.1.1) within the landscape largely follow the reserve's topography which in turn influences the soil type, moisture availability and vegetation composition and structure. Bryophyte and lichen micro-habitats, such as logs, woody debris, stones, tussocks and organic litter, are common throughout the reserve.

Heathy Dry Forest

Heathy Dry Forest occupies exposed crests and spurs within the reserve (see Figure 2, Plate 1) and is characterised by colluvial shallow loam soils of low fertility with low moisture holding capacity. Vegetation here has adapted to these conditions with only a select combination of species occupying these areas. The overstorey eucalypts are generally short and stunted in form and consist of Broad-leaved Peppermint *Eucalyptus dives*, Messmate Stringybark *Eucalyptus obliqua* and Mealy Stringybark *Eucalyptus cephalocarpa*. Trees in these areas are largely recruits from past fire events, such as Ash Wednesday, and are generally small, coppiced and high in density (Plate 2). This is particularly apparent within the eastern Heathy Dry Forest area (see Figure 2). Larger dead trees and burnt out stags are dotted across the landscape in this area; remnants of the Ash Wednesday bushfires of 1983.

Plate 1. Heathy Dry Forest on hill crest

Plate 2. Stunted coppiced trees and dense swards of Silvertop Wallaby-grass

The mid-storey layer is minimal in cover, however Austral Grass-tree *Xanthorrhoea australis*, typical of these drier environments, is dominant at the peak of crests (see front cover photo). The ground layer is dominated by grasses, herbs, orchids, lilies and a variety of small shrubs. Silvertop Wallaby-grass *Rytidosperma pallidum* forms extensive swards at the crests (see Plate 2) and is interspersed with herbs such as Common Raspwort *Gonocarpus tetragynus*, Tall Sundew *Drosera auriculata*, Ivy-leaf Violet *Viola hederacea* and Yam Daisy *Microseris* sp.3 (Plate 3).

Of note are the diverse variety of orchids observed which include Pink Fingers *Caladenia carnea*, Musk Hood-orchid *Caladenia moschata* (Plate 4 and front cover photo), Wax-lip Orchid *Glossodia major* (front cover photo), Leopard Orchid *Diuris pardina* and Slender Sun-orchid *Thelymitra pauciflora* (Plate 4). The highest diversity of herbs, lilies and orchids within the reserve can be found within Heathy Dry Forest. Small shrubs include Honey-pots *Acrotriche serrulata*, Cranberry Heath *Astroloma humifusum* and Golden Bush-pea *Pultenaea gunnii*.

Plate 3. Yam Daisy within Heathy Dry Forest

Plate 4. Slender Sun-orchid and Musk Hood-orchid within Heathy Dry Forest

The western Heathy Dry Forest area (see Figure 2) supports the highest quality vegetation within the entire reserve. Vegetation here is largely devoid of introduced species and Silvertop Wallaby-grass dominates the ground layer. The state significant Hairy-leaf Triggerplant *Stylidium armeria* subsp. *pilosifolium*, endemic to the Riddells Creek area, was found here (Plate 5, Figure 2). Heathy Dry Forest in the east of the reserve has a similar ground layer composition however Silvertop Wallaby-grass is not as prolific and the introduced Sweet Vernal-grass *Anthoxanthum odoratum* occupies a high cover in the ground layer. Regenerating eucalypts are much denser in cover in the eastern area.

Plate 5. Hairy-leaf Triggerplant

Lowland Forest

Lowland Forest occupies the lower foothill slopes downslope of Heathy Dry Forest in more sheltered positions in the landscape (see Figure 2). This EVC occurs within two distinct areas which have easterly to southerly aspects (Figure 2). Soils range from colluvial with minimum moisture holding capacity higher upslope to a deeper soil profile with greater organic matter further downslope.

The EVC is characterised by a young and regenerating canopy layer of Broad-leaved Peppermint, Messmate Stringybark and Scentbark *Eucalyptus aromaphloia*; many of which are forming dense coppiced stands post the Ash Wednesday bushfires (Plate 6). Coppiced stands are particularly prolific within the eastern portion of the reserve. A sparse number of large trees have survived the fires, which are dotted throughout the landscape. Large burnt trees, stags, logs and woody debris in the ground layer are a feature of this vegetation type (Plate 7).

Plate 6. Lowland Forest: dense coppiced stands of eucalypts in the east

Plate 7. Burnt stags and logs are a feature of Lowland Forest

The mid-storey layer is generally sparse, other than several small discrete patches of Hop Wattle *Acacia stricta* and the state significant (poorly known) Common Cinnamon-wattle *Acacia leprosa* var. *graveolens* to the east of the central gully (Plate 8, Figure 2). This species is also known as 'Southern Varnish Wattle'. Austral Grass-tree occurs in discrete patches within the drier areas (Plate 9) and the shrub Bushy Needlewood *Hakea decurrens* subsp. *physocarpa* is sparsely scattered throughout. Where Lowland Forest merges into moister gully environments, other shrub species such as Cassinia *Cassinia* spp., Snowy Daisy-bush *Olearia lirata*, Cluster Pomaderris *Pomaderris racemosa* and Hop Goodenia *Goodenia ovata* become dominant. The native but non-indigenous Early Black Wattle *Acacia decurrens* is a dominant tree within the eastern portion of the reserve and is likely a naturalised garden escape (Plate 10).

Plate 8. Common Cinnamon-wattle

Plate 9. Austral Grass-tree with the native Love Creeper *Comesperma volubile*

Plate 10. Early Black Wattle – a naturalised garden escape

The ground layer is grassy and herbaceous in nature but does not support the dense grassy swards characteristic of Heathy Dry Forest. The weed Sweet Vernal-grass is more prolific and often dominant within this vegetation type, with wet conditions over the previous seasons likely exacerbating its spread. Indigenous species include Silvertop Wallaby-grass, Grey Tussock-grass *Poa sieberiana* and Cluster-headed Mat-rush *Lomandra longifolia* subsp. *exilis*, with herbs including Tall Bluebell *Wahlenbergia stricta* subsp. *stricta*, Chocolate Lily *Arthropodium strictum* (Plate 11), Common Raspwort, Tall Sundew and Stinking Pennywort *Hydrocotyle laxiflora*. The orchids Pink Fingers, Musk Hood-orchid and Common Bird-orchid *Chiloglottis valida* (Plate 11) are present.

Several species of small shrub become more apparent to the east of the central gully line, and include Thin-leaf Wattle *Acacia aculeatissima*, Narrow-leaf Bitter-pea *Daviesia leptophylla*, Common Heath *Epacris impressa* var. *impressa* and Grey Parrot-pea *Dillwynia cinerascens* (Plate 12).

Plate 11. Chocolate Lily and Common Bird-orchid

Plate 12. Grey Parrot-pea in flower

Damp Forest

Damp Forest is restricted to the south-facing gullies within the reserve (Figure 2), where water flow is fast and ephemeral within this often steep and sheltered position in the landscape. Soils are deeper and well-structured here with much greater water-holding capacity.

The tallest trees in the reserve occupy these linear gullies with Manna Gum *Eucalyptus viminalis* subsp. *viminalis*, Swamp Gum *Eucalyptus ovata* var. *ovata*, Messmate Stringybark and Broad-leaved Peppermint dominating the overstorey (Plate 13, also see Plate 17). Large stags and woody debris are prevalent. The mid-storey is densely shrubby in nature, particularly upslope in the steeper, shadier sections where protection is greatest. Shrubs include Cassinia, Snow Daisy-bush, Cluster Pomaderris, Hop Goodenia (Plate 14), Musk Daisy-bush *Olearia argophylla* and Prickly Moses *Acacia verticillata* subsp. *verticillata*. Other notable species that are minor in number include Large-leaf Bush-pea *Pultenaea daphnoides* (Plate 14) and Common Golden-tip *Goodia lotifolia* (Plate 14). Shrubby species merge into the drier Lowland Forest areas on either side of the gullies.

Plate 13. One of the three gullies within the reserve, merging into Heathy Dry Forest in background

Plate 14. Shrubs observed within moister environments in the reserve (top to bottom): Hop Goodenia, Large-leaf Bush-pea and Common Golden-tip

A dense layer of moisture-favouring grasses dominate the ground layer, with Common Tussock-grass *Poa labillardierei*, Variable Sword-sedge *Lepidosperma laterale*, Thatch Saw-sedge *Gahnia radula* and Forest Wire-grass *Tetrarrhena juncea* dominant together with Austral Bracken *Pteridium esculentum*. Sweet Vernal-grass and Flatweed *Hypochaeris radicata* occupy a moderate proportion of the ground layer.

Small still pools of water are present within the far western gully line (Plate 15), however no other gullies held water at the time of the assessment. Gully erosion was observed within the central gully line; likely the result of unstable sub-soils being subject to high velocity water events within the flatter sections of the gully (Plate 16).

Plate 15. Small still pools of water in gully surrounded by dense layer of grasses, rushes and sedges

Plate 16. Gully erosion within flatter section of central gully

See Appendix 4 for definitions of vegetation condition.

3.1.4 Significant Flora Species

National Significance

No flora species of national significance have been recorded within the reserve. One nationally significant flora species has previously been recorded within 5 kilometres of the reserve: Matted Flax-lily *Dianella amoena* (see Appendix 1.2). Matted Flax-lily is a grassland species recorded within the lowlands of Riddells Creek, but is unlikely to be present in the reserve due to a lack of suitable habitat.

State Significance

Three species of state significance are recorded as present within the reserve – the endangered Hairy-leaf Triggerplant (Plate 5), the rare Slender Fireweed *Senecio microbasis* and the poorly known Common Cinnamon-wattle *Acacia leprosa* var. *graveolens*, also known as 'Southern Varnish Wattle' (Plate 8) (see Appendix 1.2 and Figure 2). The rare Dwarf Silver Wattle *Acacia nano-dealbata* was recorded within the adjacent T Hill Reserve, and

although not recorded at this time within the reserve, it is highly likely that this species is present.

Hairy-leaf Triggerplant is a newly discovered species that was first recorded in 2007 at Barrm Birrm in Riddells Creek; approximately one kilometre to the south-west of the reserve (Figure 1). It has since been located at Conglomerate Gully Reserve, Mt Charlie Flora and Fauna Reserve, Mt Teneriffe, Barringo Reserve and the Pyrete Range. The population recorded within Bushland Reserve, Sandy Creek Road is a new location for this species. Hairy-leaf Triggerplant is a large perennial herb with narrowly oblanceolate hairy leaves at the base and flowering stems up to 80 centimetres tall. Flowers are white to pale pink and have a 'trigger-arm' that is activated by pollinators (Best and Francis 2008). The species is only found on dry, bare soils where other forms of Triggerplant are not found (Best and Francis 2008). More targeted surveys for this species are recommended within the reserve to better understand the extent of this new population (see Section 4.8).

Slender Fireweed is present within areas of Heathy Dry Forest (Figure 2). This species has recently been re-classified, having previously formed part of *Senecio* sp. aff. *tenuiflorus*. Slender Fireweed has been recorded within other areas of the Macedon Ranges. This large perennial herb can reach up to 60 centimetres tall and supports narrow leaves at the base of and along the stem, which bears yellow flower heads in spring-summer (FIS 2012).

Common Cinnamon-wattle was recorded within one discrete patch to the east of the central gully line (see Figure 2). This species is poorly known, however populations have been recorded within the Otway Ranges, the Kinglake area, the Strzelecki Ranges, far-east Gippsland and the Alps (FIS 2012). A sparse number of records exist within the Macedon Ranges, including one record just south of Riddells Creek from 1990 (FIS 2012). Common Cinnamon-wattle is a sparse shrub to 6 metres tall with simple narrow leaves and globular flower clusters on short stalks (FIS 2012).

Any future surveys within the reserve should identify and map any Dwarf Silver Wattle that may be present (see Section 4.8).

An additional six flora species of state significance have previously been recorded within 5 kilometres of the reserve (see Appendix 1.2). None of these species is likely to inhabit areas within the reserve due to lack of suitable habitat.

Regional Significance

Of the 128 indigenous species recorded within the reserve, 44 are considered to be significant at a regional scale (within the Central Victorian Uplands bioregion). Appendix 1.1 contains a list of regionally significant and locally significant flora species.

Definitions of ecological significance for species, communities and sites are provided in Appendix 3.

3.1.5 Significant Vegetation Communities

There are no nationally or state significant vegetation communities within the reserve. Plant communities recorded (see EVCs Section 3.1.1) are classed as of 'Least Concern' within the Central Victorian Uplands bioregion.

Definitions of ecological significance for species, communities and sites are provided in Appendix 3.

3.2 Fauna

3.2.1 Fauna Assessment

Bushland Reserve, Sandy Creek Road has not been subject to any formal fauna surveys. The adjacent T Hill Reserve has previously been surveyed for fauna, with the results of one survey (MRSC 1985) reviewed in preparation for this management plan.

A combination of site visits and desktop searches were conducted for this management plan to provide a snapshot of existing fauna species and habitats. This data has informed the recommendations provided regarding future management of the reserve.

3.2.2 Fauna Species at the Reserve

Three site visits conducted from mid-October to early November 2012 recorded a total of 33 fauna species. This comprises six mammals (five native and one introduced), 28 birds (27 native and one introduced), one native reptile and one native frog. These species, together with their significance rating or status, are listed in Appendix 2.1.

The preliminary results of this assessment are provided below:

Native Birds

Three BirdLife Australia area search surveys were conducted– one in the afternoon, one in the morning and one evening spotlighting session. The BirdLife Australia area search involves surveying for bird species around a central point; these areas can cover a small area within 500 metres of the central point, or a large area out to five kilometres. The search area can be any shape and the search time can be anywhere between 20 minutes and one month. The surveys undertaken at the reserve were all 1 – 2 hours in duration and were focussed within approximately 500 metres of a central point.

The surveys revealed a typical suite of forest birds, including honeyeaters such as Yellow-faced Honeyeater, White-naped Honeyeater and migratory species such as Cuckoos and the Sacred Kingfisher. Breeding was observed in two pairs of Scarlet Robins, and a pair of Grey Currawongs. The species richness and numbers of birds counted was higher along the two creeklines or gullies (cf. Palmer and Bennett 2006).

Declining bird species that are present in forest habitats include Powerful Owl, Red-browed Treecreeper and Spotted Quail-thrush, which were not recorded during diurnal surveys, but may be present in the reserve. Small migratory birds such as Rufous Fantail, Pink Robin and Rose Robins may pass through the reserve on occasion.

Native Mammals

During the incidental bird surveys discussed above, the ground was scanned for scats, feeding traces, scratches and other signs that may indicate the presence of mammalian fauna.

The ground layer within most of the reserve is densely covered with native tussock grasses or thick swards of Sweet Vernal-grass, making scat detection difficult.

The most obvious mammal species using the reserve is the Eastern Grey Kangaroo. Approximately 10-20 individuals were observed near the entrance to the reserve, and one large lone male in a gully. Scat and resting areas occur throughout the reserve. Healthy adult males, females and pouch young were observed.

One Swamp Wallaby was observed during diurnal surveys in dense gully vegetation, which is typical habitat for this species. One echidna was observed near the southern boundary within an area of Lowland Forest (Plate 17).

Plate 17. Echidna

Stag watching and spotlighting surveys recorded arboreal mammals including Common Brushtail Possum and Common Ringtail Possum. Both species were present in low numbers, possibly due to the low numbers of hollow bearing trees in parts of the reserve. Whilst not observed, antechinus, Koalas, Sugar Gliders and Feathertail Gliders may also persist here, however the low number of hollow bearing trees would limit the presence of Sugar and Feathertail Gliders.

Frogs

One species of frog was heard during diurnal surveys and spotlighting surveys, the Common Eastern Froglet. This species was present to the south of the dam near the entrance to the reserve (see Figure 2).

Reptiles

No reptiles were recorded in diurnal or spotlighting surveys; however a Blotched Blue-tongue Lizard was noted incidentally (Plate 18).

Plate 18. Blotched Blue-tongue Lizard

Pest animals

The only introduced avian species recorded was a Common Blackbird, recorded in dense gully vegetation.

One Brown Hare was observed during diurnal surveys within Lowland Forest deep within the reserve. Rabbits were not detected, but are likely present within the reserve.

Red Fox scats were not detected, however it is highly likely that this species occurs at the reserve. Management recommendations for this species are provided in Section 4.3.5 - Pest Animal Management.

3.2.3 Fauna Habitat

Grassy Ground Cover, Grass trees and Rocky Habitat in Heathy Dry Forest

The Heathy Dry Forest areas of the reserve (Figure 2) support a grassy ground cover that provides useful ecosystem functions and dispersal opportunities for a wide range of fauna species. The tussocks provide grazing opportunities for macropods; cover and nesting resources for small mammals, birds, frogs and reptiles; and food resources for seed-eating and insectivorous birds.

When in flower, the tall spikes of the grass trees provide abundant nectar resources for a variety of honeyeaters, small parrots and small mammals such as Feathertail Gliders and Sugar Gliders. Insectivorous birds forage upon insects attracted to the flowering spikes. The ample tussocks of the grass trees provide nesting habitat for birds and mammals, and secluded resting spots for kangaroos and Swamp Wallabies may be found between the grass trees (Plate 19).

These slopes are rocky in places, with medium sized rock scattered throughout this vegetation type. Expanses of exposed rock provide breeding, foraging and refuge habitat for a suite of native fauna, including reptiles, frogs and some ground-dwelling mammals. Insectivorous bird species use the rocky areas as perching sites for hawking from the ground.

Plate 19. Grassy ground cover and Grass trees in Heathy Dry Forest

Ephemeral creeks

The three gullies that run through the reserve have ephemeral water flows during high rainfall events, with the main central gully (Figure 2) having a chain of ponds formation (Plate 20). When flowing, these ephemeral creeks provide a source of water for a range of avifauna and larger mammals such as macropods and pest animals such as Hares. These creeks provide temporary breeding habitat for a range of frog species, as well as invertebrates such as dragonflies.

Plate 20. Ephemeral creek running north-south through the reserve

Tree and Shrub Cover

Tree and shrub cover in the reserve varies in species, density and age class depending upon the vegetation type, slope and aspect (Plate 21).

Plate 21. Dense gully vegetation and eucalypts in a relatively young age class

Tree cover for fauna within the reserve has been affected by the Ash Wednesday bushfires. Dense stands of eucalypt regrowth are present on heavily burnt slopes and ridges, particularly in the eastern part of the reserve. The number of large old trees in the reserve may have been reduced by the fire, and many of the trees left standing bear severe fire scarring. Dense regrowth and a paucity of large old trees are not ideal habitat conditions for arboreal fauna. Dense regrowth hinders movement of gliders, and regrowth eucalypts are a less valuable source of food than large old trees.

Large old trees, both living and dead, represent significant resources for a wide range of fauna. Large old trees produce more nectar when they flower than younger trees, and have higher populations of insects within their peeling bark and dead branches. The larger boughs provide resting sites for larger arboreal mammals such as Brushtail Possums and Koalas. Most importantly, the numerous hollows within large old trees provide nesting and shelter sites for a large number of bird, mammal, frog and reptile species.

Eucalypt tree cover is complemented in the reserve by a healthy and diverse mid-layer of shrubs such as *Olearia* and *Pomaderris*, particularly in the Damp Forest gully areas (Plate 21). These shrubs provide food for seed-eating parrots, as well as insectivorous birds, possums and gliders in the form of insect diversity and sap resources. Structurally, the shrubs form important pathways and connectivity for some arboreal mammals as they move around the reserve.

Prickly wattles such as Prickly Moses and ground layer vegetation such as bracken provide dense cover for nesting and foraging resources for small birds such as honeyeaters, thornbills and Grey Fantails.

Coarse Woody Debris

Bushland Reserve, Sandy Creek Road supports a large amount of coarse woody debris in the form of fallen trees and shrubs, dead standing stags and litter (Plate 22). Much of this woody debris is in the lower size classes, but retains high habitat value.

Coarse woody debris provides perching and hawking sites for insectivorous birds such as Grey Shrike-thrush, Pallid Cuckoos and Superb Fairy-wren, and structural habitat in the form of runways for small mammals such as antechinus and bush rats. The stags and fallen logs provide hollows for nesting and refuge for a wide range of fauna. Coarse woody debris is an essential component in nutrient cycling as invertebrates and fungi break down the woody debris, and these in turn provide a rich food source for the reserve's fauna.

Plate 22. Large old tree with hollow and woody debris

3.2.4 Significant Fauna Species

No rare or threatened fauna species were recorded during the three site visits. A total of four rare and threatened fauna species have previously been recorded within a five kilometre radius of the reserve (VBA 2012). In addition, three rare and threatened butterfly species have previously been recorded within a 30-minute square grid incorporating the study site. All of these species are listed in Appendix 2.2.

The Regent Honeyeater and Brush-tailed Phascogale have not been recorded in the area since the 1970's, and may be regionally extinct. There are, however, anecdotal reports of Phascogales surviving in the Riddells Creek area from members of Riddells Creek Landcare (R. Best, *pers. comm.*). Mountain Galaxias have been recorded in Riddells Creek, however they are unlikely to occur due to the ephemeral nature of the waterway in the reserve. No significant butterfly species are likely to occur in the reserve.

Powerful Owls have been recorded very close to the reserve. They are commonly heard and seen along the nearby Sandy Creek valley (R. Best, *pers. comm.)*. This indicates that the reserve is used by Powerful Owls as part of their large home range, which may be 1,000 hectares in forest areas and up to nearly 5,000 hectares in Box-Ironbark forest (Soderquist and Gibbons 2007). Signs that indicate use by Powerful Owls include calls made by both male and female, white wash or droppings beneath roosts, large pellets, and the tails of Sugar Gliders, cut neatly at the base, and dropped to the ground while the whole animal is consumed.

3.3 Geology

Bushland Reserve, Sandy Creek Road is located on Late Ordovician marine sandstone. This sandstone is characterised by thin to thick bedded shale, mudstone and minor conglomerate that includes Riddell sandstone (Riddells Creek Landcare, n.d.).

3.4 Recreation

Passive recreational opportunities within the reserve include bushwalking, bird watching and nature photography. No recreational amenities are located within the reserve. The reserve is located close to Riddells Creek and is relatively difficult to access, providing a sense of remoteness for visitors. Not surprisingly, visitor numbers to the reserve are likely to be low and limited to the occasional bushwalker. Despite being a prohibited activity, horse riding appears to occur within the reserve.

An established track directs the visitor along the reserve's southern boundary, adjacent to a neighbouring horse stud (Figure 2). Offshoot informal tracks run from this southern boundary track (Plate 23). These tracks vary in condition and are steep in sections, especially where deep gullies are located.

Plate 23. Informal track

4 MANAGEMENT ISSUES, THREATS AND ACTIONS

4.1 Management Objectives

The key management objectives for the reserve are to:

- Maintain and secure the existing conservation values and biodiversity.
- Restore and enhance native vegetation communities and improve their resilience in the face of potential impacts.
- To mitigate and, where possible, eliminate identified threats to conservation values.
- Ensure adjacent use or development does not compromise the environmental values of the reserve.
- Increase community awareness of the ecological significance of Sandy Creek Bushland Reserve.
- Promote the opportunities for low impact, passive recreation.
- Conduct and facilitate appropriate monitoring and continued assessment of the site.
- To monitor, identify and manage new threats that may arise.
- To protect in perpetuity the biodiversity values present.

4.2 Management Priorities

Adjoining land uses, management practices and recreational pursuits pose the highest and most pressing threat to the ecological values identified in the reserve. Sections 4.6 and 4.7 details these threats and issues and propose management actions to mitigate their impacts. These issues must be addressed as a priority in combination with the biodiversity management actions proposed below. Management actions, their timing and level of priority are summarised in the action check list in Appendix 5.

4.3 Biodiversity Management

4.3.1 Fencing

Objective: *To exclude domestic animal threats whilst maintaining safe passage of native wildlife and appropriate gully flow*

The southern boundary of the reserve is fenced (Figure 2); separating the reserve from two adjoining grazing properties to the south. There are no boundary fences to the east with T Hill Reserve or the west with private property. The Tallawalla Road reserve (entrance point) is partly fenced.

Fencing consists of metal star pickets, chicken wire within the bottom third and a combination of plain and barbed wire as the top strands (Plate 24). Parts of the fence have wildlife-friendly white poly-piping as the top strand, which is generally used as sight wire for horses (Plate 25).

Plate 24. Southern boundary fence with barbed wire. Heathy Dry Forest within reserve on the left, private property to the right

Plate 25. Southern boundary fence with white poly-piping as top strand. Ground layer dominated by Sweet Vernal-grass

The fence is in need of repair in some sections and horse access into the reserve which is visible from the horse stud (see Plate 33). Barbed wire is a hazard for wildlife, particularly kangaroos, wallabies and birds, and chicken wire at the bottom of the fence creates difficulties for the movement of ground dwelling fauna.

Fencing across gullies has created a build-up of debris against the fence which affects the natural water flow down the gullies (Plate 26). This has also affected the sturdiness and function of the fence.

Plate 26. Build-up of debris within central gully on southern boundary fence

Actions:

- *Liaise with adjoining landowners to the south about stock access issues and fixing boundary fencing* (see also actions listed in Section 4.7.1).

- *Identify a solution to improving boundary fencing based on resources available.* Options include fixing dilapidated fenced areas using the same materials (i.e. chicken wire and barbed wire, this is the cheapest option) or modifying the entire southern boundary fence or portions of it so that the fence is sturdy yet wildlife-friendly (this is preferable).

- *Modify fencing to adequately exclude grazing animals from the reserve and maintain safe passage of fauna*. The preference is to modify existing fencing by retaining star pickets, and removing and replacing barbed wire and chicken wire.

Fencing as a minimum should include a sturdy 5-strand wire fence with the two top strands further apart to reduce injury to jumping kangaroos and wallabies. The top strand should ideally be more visible to wildlife, i.e. use white poly-piping or bright flags and tags for greater visibility. Barbed wire or electric fences should be avoided where possible as these can cause harm to native wildlife. Fence must be high enough and low enough to successfully exclude all grazing animals on adjoining properties, whilst ensuring ground dwelling animals such as echidna can easily pass through.

- *Modify fence lines across gullies*. If a fence is required across the gullies to exclude grazing animals, a hanging or suspended fence is recommended to allow for passage of water and debris and to reduce impacts from erosion. High tensile wire should be suspended across the gully between two secured posts which should be built independently of the main fence (Staton & O'Sullivan 2006). A 'curtain' of material such as mesh, chains or wood should be attached to the wire below water level; this acts as a barrier to animals and allows flexibility with high volume water flow (see Staton and O'Sullivan 2006).

4.3.2 Invasive Plants

Objective: *To reduce invasive species cover over time through integrated management techniques in cooperation with adjoining landholders.*

Invasive plants (introduced plants and weeds) can be categorised into four broad groups within the reserve (listed in order of priority for control):

- **Sweet Vernal-grass** – the largest and most serious threat to the values of the reserve is the widespread and continuing encroachment of Sweet Vernal-grass. This perennial tufted or rhizomatous grass can occupy a variety of habitats and is widespread within areas receiving high rainfall. The grass is allelopathic (produces chemicals that suppress the growth of surrounding plants) and therefore competes vigorously with indigenous ground flora. Sweet Vernal-grass can grow on shallow soils with poor fertility, and subsequently can grow in conditions that normally do not favour other weed species. Heathy Dry Forest within the reserve, for example, occupies shallow soils with poor fertility that generally does not favour other weed species. Sweet Vernal-grass is a high threat in this environment as it can readily grow and out-compete indigenous vegetation in an otherwise weed-free landscape.

  Sweet Vernal-grass is widespread within the reserve; and is particularly dominant on the east and south facing slopes (see Figure 3, Plate 27), but is present throughout the reserve. The species has likely emanated from the horse stud adjacent to the south, which is largely cleared of native vegetation and has been sown with exotic pasture grasses. High rainfall and moist conditions over the previous seasons has likely exacerbated its movement deeper into the reserve. The impact of this species on the reserve's values is severe and should be addressed as a priority. Indigenous ground

flora has been greatly reduced in cover and diversity where it dominates, and its spread will continue throughout the reserve and adjacent reserves if wet conditions persist. The high quality of the ground flora vegetation is being directly impacted by the spread of this weed. Recommended management actions for the species are listed below.

Plate 27. Sweet Vernal-grass dominates this area where Lowland Forest merges into Heathy Dry Forest in the east

- **Noxious weeds** – these plants are listed as declared noxious weeds within the Port Phillip and Westernport catchment or Weeds of National Significance (see Appendix 1.1) and currently pose a moderate threat to the values of the reserve. Noxious and high-threat weeds include the woody shrubs Blackberry *Rubus fruticosus*, Sweet Briar *Rosa rubiginosa* and Gorse *Ulex europaeus* and the herb Angled Onion *Allium triquetrum* (Figure 3). At present, their cover in the reserve is minimal and opportunities exist to eradicate these species before they mature and spread. Blackberry and Sweet Briar were only observed as small germinants in scattered locations in the reserve. No mature plants were observed, however the source population may be upslope or within adjacent properties to the south.

  Gorse was only observed in one location – on the southern boundary fence (Plate 28, Figure 3). A well-established mature Gorse population exists over the fence within private property to the south and the council-owned road reserve (Plate 28). Given the population's proximity to the reserve and the species' ability to disperse seed metres from the parent plant, it is only a matter of time before Gorse begins to encroach into the reserve.

Plate 28. Left- Gorse on southern boundary fence; Right- Gorse within adjacent private property and council road reserve

Angled Onion occurs within two discrete areas in the Sandy Creek channel (within Tallawalla road reserve) and near the main entrance gate into the reserve (Figure 3). This species thrives in this environment and should be targeted for control in collaboration with the adjacent landholder.

- **Low-threat weed populations** – these include woody species or isolated plants that are either low in cover or easily eradicated, and include: Early Black Wattle, Sticky Wattle *Acacia howittii*, Sweet Pittosporum *Pittosporum undulatum*, Radiata Pine *Pinus radiata* and Pampas Grass *Cortaderia selloana* (Figure 3). Most of these species are present as isolated individuals or discrete small populations and can be readily removed. Early Black Wattle is a lot more widespread in area, scattered within the eastern portion of the reserve (see Plate 10). This is a naturalised garden escapee that occurs in greater densities within the adjacent T Hill Reserve. Trees are large and mature in many cases, indicating that the population has been in the reserve over many years and may have recruited after the 1983 bushfires. Early Black Wattle is the main species that occupies the small tree strata within this section of the reserve. No indigenous small trees are present in such numbers.

- **Weeds brought in via horses, walkers and cyclists** – informal trails used by horses, walkers and cyclists support several weed species not observed elsewhere in the reserve. These include the noxious weeds Spear Thistle *Cirsium vulgare* and Hawthorn *Crataegus monogyna* (Plate 29) and other species such as Prunus *Prunus*

spp. and Common Sow-thistle *Sonchus oleraceus*. These species, and other isolated specimens, were only observed on or near tracks and can therefore be easily targeted for control together with other recommendations in relation to recreational uses (see Section 4.6). Spear Thistle, in particular, has the ability of spreading further within the gully areas.

Plate 29. Small Hawthorn plants were observed on or near informal trails

Management measures focused on these four broad weed groups should aim to reduce or eliminate their presence within the reserve. Weed control, together with other measures outlined in this plan, will help to increase native species cover, improve the overall ecological value and resilience of the reserve, strengthen this core area of vegetation and provide improved habitat for native fauna species. These outcomes can only be achieved through an on-going and long-term commitment by the land manager to reduce weed cover.

An integrated, planned and well-timed weed control response, in cooperation with adjoining landholders, is required to successfully eradicate or control targeted weed species. Varying weed control methods need to be utilised dependent on the ecology and morphology of the target species, the environment surrounding the target species and its current spread within the reserve. An integrated weed management approach includes methods such as:

- Manual weed control;

- Foliar spray with herbicide;
- Cut and paint or scrape and paint;
- Drill and fill;
- Slashing; and
- Fire.

Recommended weed control strategies, priorities and timing for target species are provided in Table 1 below. The locations of key weed species are indicated within Figure 3. It should be noted that actions targeting weeds within the reserve need to be implemented in accordance with the aims and objectives of the Macedon Ranges Shire Council's *Weed Management Strategy* (Macedon Ranges Shire Council 2009).

A Timeline and Checklist for Management Actions table (Appendix 5) provides a chronological seasonal guide to the actions listed below.

Actions:

- *Consultation with horse stud on southern boundary*. Weed encroachment and horse access from the southern boundary needs to be addressed as a priority measure (Figure 3). Liaise/education with landholders to the south is required to prevent further weed invasion. A 10-20 metre wide revegetated and managed strip along their boundary fence would provide a buffer against future weed dispersal. These landholders should be encouraged to revegetate their boundary and the local Riddells Creek Landcare group could be approached for assistance. Creating an adequate buffer that is well-managed adjacent to the reserve is the best way to avoid future weed invasion. Similarly, these landholders should be made aware of the impacts their horses are having on the reserve (horse access points observed from this property). See Section 4.7.1 for further information.

- *Consultation with other private property on southern boundary*. The second southern property should be contacted regarding the Gorse entering the reserve (Figure 3). As a noxious weed species listed under the *Catchment and Land Protection Act 1994* (CaLP Act), it is the landholder's responsibility to control this weed and ensure it does not encroach into adjacent bushland. The current status of the council road reserve that runs through this property will require determination discussed as Gorse is within the road reserve. See Section 4.7.2 for further information

- *Consultation with Parks Victoria (T Hill Reserve) to the east*. Parks Victoria should be liaised with regarding their weed control plan with the view of coordinating weed control works and exchanging information about successful methods/intended practices within their reserve (Figure 3). This is particularly pertinent with regards to Early Black Wattle control and recreational uses (see Section 4.7.4).

- *Implement a Sweet Vernal-grass control programme*. Whilst this species is widespread within the reserve, action should be taken to reduce the species' long-term cover and dispersal opportunities. The approximate location and cover of the species is shown in Figure 3 and should be used as a guide for prioritising control works. A high level of resources and a long-term commitment is required in order to successfully implement the following program:

    - The edges of Sweet Vernal-grass populations should be treated each winter-spring with an appropriate grass-selective herbicide using a spray shield to minimise impacts to other ground flora (Figure 3). This will minimise further dispersal into higher quality areas nearby (i.e. the high quality Heathy Dry Forest to the west, which may in time become engulfed by Sweet Vernal-grass if not controlled). This treatment should be implemented as a priority if funds are not available to carry out the additional works listed below.

    - Treatment of Sweet Vernal-grass with a grass-selective herbicide in winter-spring within the contained area- gradually moving into the infestation from the outer edges in (Figure 3). Higher quality areas (i.e. Heathy Dry Forest or near the edges of Heathy Dry Forest) to be prioritised for treatment. A linear 'line' of treatment could be followed along the edges of the population, gradually moving inwards. In sensitive areas supporting significant species, herbs or orchid, plants should be wick-wiped with herbicide.

    - Slash infestations to avoid flowering and seed dispersal where timing or funding does not allow for immediate herbicide control.

    - Investigate whether Sweet Vernal-grass is occurring upslope outside of the reserve within T Hill Reserve or private property. If populations are present, land managers need to be encouraged to treat their patches. Control of the grass within the reserve may be futile if seed is readily dispersing from areas upslope.

- *Target the noxious weed Gorse and Angled Onion as well as other scattered noxious weeds*. Gorse is present on the southern boundary (Figure 3) and should be sprayed when actively growing. The larger parent population needs to be targeted both within road reserve and adjacent private property (consultation with landholder advised). Angled Onion in the creek and in nearby areas to be treated and eliminated (Figure 3). Other noxious weeds are present but are not within discrete, easily located areas. Land managers must be vigilant about the recent germination of Blackberry and Sweet Briar, and germinants/seedlings must be pulled out when observed.

- *Target lower threat weed populations* such as Sticky Wattle, Sweet Pittosporum, Radiata Pine and Pampas Grass (see Figure 3). These isolated and discrete

populations can easily be cut and painted with herbicide, or in the case of Pampas Grass, slashed with the re-growth sprayed.

- *Target Early Black Wattle in consultation with Parks Victoria*. Mature trees to be targeted from its far western extent (see Figure 3) moving east towards T Hill Reserve. Any recruits to be removed. Parks Victoria (T Hill) currently does not have an active management plan for this species.

- *Target emerging weeds along informal trails*. Small Hawthorn recruits, exotic grasses and herbs to be spot sprayed on and adjacent to trails throughout the reserve (see Figure 3). Other minor trails not shown in Figure 3 intersperse the reserve and should be targeted. These works to be undertaken in conjunction with management of recreational uses (see Section 4.6).

General recommendations:

- Ensure weed control works are undertaken by qualified and experienced contractors with appropriate licenses and permits. They must be aware of the objectives of this management plan and should be sensitive to the reserve's ecological values. They must possess sound flora identification skills to limit the chance of off-target spot spraying or disturbance to native vegetation.

- Any use of herbicide must take into account the proximity of native vegetation and protective measures must be incorporated accordingly. Ensure the right type and ratio of herbicide is used for the conditions and vegetation to be targeted, avoiding off-target damage. Herbicide run-off should not be allowed to enter into any gully lines.

- Ensure weed control works are undertaken at the appropriate time of year in accordance with the life cycle of plants to be targeted, i.e. weed control works to be undertaken whilst plants are actively growing but before they set seed. Weed control works undertaken at inappropriate times of the year result in poor outcomes and an unnecessary excess of chemical residue entering the environment.

- Early Black Wattle logs could be retained within the ground layer as habitat.

- Ensure noxious weed material is removed from the site without harming native vegetation and appropriately disposed of.

Table 1. Key weeds for control within reserve

Botanical Name	Common Name	Location	Timing	Control Method*	Comments
TREES & SHRUBS					
Pinus radiata	Radiata Pine	One plant observed on boundary. Figure 3	Any time	CP, DF	Source population to be identified. Any mature plants to be cut and painted
Rosa rubiginosa	Sweet Briar	Scattered germinants	Any time	HP	Source population to be identified. Any mature plants to be cut and painted
Prunus spp.	Prunus	Scattered germinants along trails	Any time	CP	Source population to be identified. Any mature plants to be cut and painted
Rubus fruticosus	Blackberry	Scattered germinants	Sep-Dec	HP, CP, FS	Only germinants observed. Can be hand pulled at this stage of growth
Acacia decurrens	Early Black Wattle	Eastern portion of reserve. Figure 3	Any time	HP, CP, DF	Smaller plants easily hand pulled. Logs to be left as habitat
Crataegus monogyna	Hawthorn	Scattered germinants along trails	Any time	HP, CP	Any emerging seedlings can easily be hand pulled
Acacia howittii	Sticky Wattle	Small population to the east. Likely garden escape. Figure 3	Any time	CP	Source population to be identified. Any mature plants to be cut and painted
Pittosporum undulatum	Sweet Pittosporum	One individual observed. Figure 3	Any time	CP	Could potentially be more plants in reserve
Ulex europaeus	Gorse	Minor number on boundary. Figure 3	Any time	CP, FS	Parent population in adjacent private property and road reserve needs to be targeted
HERBS & CLIMBERS					
Allium triquetrum	Angled Onion	Two discrete patches observed. Figure 3	Mid-winter to spring	SL, FS	Population in Sandy Creek to be prioritised. Repeated slashing or foliar spray at bulb exhaustion phase in the early flowering period. Will take several seasons to control
Cortaderia selloana	Pampas Grass	One individual observed. Figure 3	Spring-summer	SL. FS	Flowering stems can be cut and appropriately discarded or burnt off-site. Foliage can be slashed with re-growth sprayed
Cirsium vulgare	Spear Thistle	Scattered	Early spring	SS	Spray rosettes
Hypochaeris radicata	Flatweed/Cat's Ear	Common throughout	Winter-spring	SS	Spot sprayed at rosette stage.
GRASSES					
Anthoxanthum odoratum	Sweet Vernal-grass	Widespread. Figure 3	Winter-spring	SL, SS, WW	Slash where required before seed set. Otherwise spot spray, hand pull or wick-wipe amongst native vegetation. Areas to be prioritised as per actions listed above.

* HP = Hand Pull; CP = Cut and Paint with herbicide; FS = Foliar spray; SS = Spot spray with herbicide; SL = Slash or Brushcut; DF = Drill and fill; WW = Wick-wipe

4.3.3 Phytophthora cinnamomi

Objective: *To contain and avoid the further spread of this pathogen within the reserve.*

Phytophthora cinnamomi (Pc) is an introduced water pathogen brought in by the early settlers in the 1800s (DSE 2008). It attacks the roots of susceptible plants and is spread through the movement of water, soil and plant material (DSE 2008). The pathogen spreads through the root systems of infected plants and kills off the plant's vascular system, thereby impeding its ability to absorb nutrients and water (DSE 2008). Symptoms are likened to drought stress or 'dieback' whereby the outer parts of the plant yellow and die first (DSE 2008). Heathy vegetation communities, such as Heathy Dry Forest, are the most susceptible to the pathogen and there is evidence that Pc is present within the reserve, most notably within the higher quality area of Heathy Dry Forest (Plate 30, Figure 2).

Plate 30. Austral Grass-trees affected by *Phytophthora* within higher quality area of Heathy Dry Forest

Humans are the main cause of Pc spread through movement of infected plants or contaminated soil (DSE 2008). The pathogen has most likely been brought in to the reserve via footwear of unknowing bushwalkers, trail bikers, cyclists or horse riders. The pathogen is most commonly spread through movement of soil and vehicle contamination, both of which do not apply to the infected area of the reserve which has not been subject to recent soil stockpiling or vehicle access. The pathogen may have been spread by native animals (DSE 2008). *Phytophthora* has been recorded throughout the Riddells Creek area.

Once a site is infected, Pc spreads with the movement of water, therefore in the case of the reserve, the pathogen will likely continue to move downslope. Movement can occur across

and upslope via root to root contact with nearby plants (DSE 2008). Over time, the pathogen can dramatically alter and reduce species composition and structure, which in turn affects the fauna assemblage (DSE 2008). Wilsons Promontory and Brisbane Ranges National Park are prominent parks well-known for their issues with the pathogen.

The aim within the reserve should be to contain the pathogen and minimise its movement through the landscape. As the pathogen has most likely been introduced through bushwalkers and recreational users, access to infected sites should be restricted. Access to highly susceptible areas nearby should be avoided. The provision of educational signage and foot hygiene stations at the main entrance point to the reserve are key management requirements.

Actions:

- *Install educational signage at the main entrance point of reserve*. Signage at the main entrance should include a brief introduction to the disease and how it's affecting the reserve. Signage should encourage walkers to avoid grass tree areas, and in particular areas where the pathogen exists. A photo of an infected grass tree on the sign could assist here.

- *Restrict visitor access to the southern track near the fence line which avoids areas of grass trees*. At present, a small network of informal trails cross east-west through the reserve, including areas with Pc. Walkers should be encouraged to use the trails closest to the southern fence line. Within the infected area of Heathy Dry Forest, no trail exists. Walkers in this area should be encouraged to walk along the southern fence line when crossing the reserve. Small signs to denote walking trails could be considered to keep walkers on the track and close to the fence line (see Section 4.6.2).

- *Establish footwear wash-down point at main entrance gate.* There is no running water at the reserve; however hygiene stations need to be erected at the main entrance point. As a minimum, a scrubbing brush to scrub boots and spray bottles with methylated spirits to disinfect footwear could be set-up. A more formal wash-down station (i.e. such as the 'Anakie Scrubber' footwear station near the Brisbane Ranges National Park, see Plate 31) should also be investigated. Footwear, equipment and vehicle hygiene is the most important preventative measure for halting Pc spread and should be seriously considered if protection of vegetation is of paramount priority. Signage should also be placed at the wash-down point with instructions to remove soil and mud from boots with the scrubbing brush and to spray boots with disinfectant both prior to and upon leaving the reserve. Refilling of spray bottles (which should have at least 70% methylated spirits) may need to be coordinated with Council staff or the local Landcare group on a rotational basis.

Plate 31. The 'Anakie Scrubber' footwear station (Source: D. Peters, Parks Victoria)

- *Consider using a biodegradable fungicide to reduce the impact of Phytophthora cinnamomi.* Phosphonate (also called phosphite) is a biodegradable fungicide that reduces the impacts of Pc on host plants, however it will not eradicate it from a site (Suddaby & Liew 2008). Both infected plants and surrounding uninfected plants could be sprayed with the fungicide to minimise its spread. Further information can be found at the Western Australian Dieback Working Group website: http://www.dwg.org.au/. This should only be applied once the above-mentioned management actions have been implemented.

4.3.4 Fireblight Beetle

Objective: *To identify any potential wattle dieback within the reserve as a result of the Fireblight Beetle.*

The Fireblight Beetle is a native Australian beetle that has become a significant pest within wattle plantations and wattle re-growth after bushfire (Traralgon South and District Environmental Action 2012). Widespread defoliation of Black Wattle *Acacia mearnsii* and Silver Wattle *Acacia dealbata* has occurred within re-growth areas affected by the Black Saturday bushfires of 2009. The beetle emerges in autumn to feed on foliage and lay eggs, whilst the larvae in turn feeds on the foliage (Traralgon South and District Environmental Action 2012). Although the stronghold for this species is within the Kinglake area, the beetle has been observed in the Barrm Birrm area of Riddells Creek where defoliation of wattles is evident (see Nature Share- http://natureshare.org.au/observation/6652/).

The beetle has not been observed within the reserve where populations of Black Wattle and Silver Wattle are relatively minor. Nevertheless, local council officers and the community must remain vigilant of the beetle and report any potential wattle defoliation that is observed. The beetle is not known to feed on Early Black Wattle, an introduced tree species within the

reserve, however a dead and senescing population of Early Black Wattle was observed in T Hill Reserve. It is unknown at this stage what has caused this attrition.

Actions:

- *Report any sightings of the beetle or wattle defoliation to local council and Riddells Creek Landcare* who are contributing to the monitoring of the beetle through Nature Share (a locally produced database for documenting flora and fauna observations).

4.3.5 Pest Animal Management

Objective: *Monitor the number of invasive pest animals within the reserve and adjoining properties, and reduce weeds which may provide den sites.*

One individual European Hare was sighted at the reserve. No Red Fox scats were recorded, however these animals are likely to be present. No rabbits were sighted during the site visits, although they are numerous in the area (R. Best, *pers. comm.)*. Hares and rabbits have the potential to cause serious environmental damage through the suppression of indigenous plant regeneration, competition with native wildlife for food resources, and by providing a ready food source for foxes.

Foxes prey upon many smaller native animals and have been identified as a known or perceived threat to 34 indigenous fauna species in threat abatement plans provided under the EPBC Act. The European Hare, and Red Fox, are declared Established Pest Animals under the *Catchment and Land Protection Act 1994* (CaLP Act). Under this Act, landowners must take all reasonable steps to control established pest animals on their property. Predation by foxes is also listed as Key Threatening Processes under both the FFG Act and EPBC Act.

It should be noted that a Pest Animal Strategy is being developed by the Macedon Ranges Shire Council and is due for completion in 2014. Actions targeting pest animal management at the reserve will need to be conducted in accordance with this Strategy's aims and objectives.

Actions:

- *Implement weed control program as outlined in Section 4.3.2 of this management plan*. Works to target present and potential pest animal harbour to be implemented in accordance with this management plan. This will reduce the cover of pest animal harbour and the presence of pest animals within the wider area. Neighbouring landholders should be notified of these works and encouraged to undertake similar works on their properties.

4.3.6 Native Fauna Management

Objective: *To retain habitat for the local macropod population.*

Macropod density at the reserve is moderate to high, depending on the use of the reserve by the surrounding macropod population. Eastern Grey Kangaroos use forested areas as secluded resting areas that are quiet and largely free from human disturbance. Hillsides are used on hot days to catch cooling breezes. It is expected that the Sandy Creek Bushland Reserve is used by the surrounding Eastern Grey Kangaroo population at least some of the time, with movements in and out of the area to graze in the surrounding farmlands, especially to the south. Well-worn macropod pathways may be observed running in a north-south direction.

Grass specialists such as Eastern Grey Kangaroos do not pose a significant grazing threat to the ecological values of the reserve; it is likely they are grazing on the Sweet Vernal-grass that is found in large patches within the reserve.

General recommendations:

- Given the connectivity of the reserve with surrounding forest and open land, it is unlikely that macropod density will reach deleterious levels on site. Active control measures are therefore not advised at this stage.

4.3.7 Retention of large trees, logs and coarse woody debris

Objective: *To retain habitat for hollow-using and other fauna through the retention of large old trees, large logs and coarse woody debris.*

Large old trees and logs are a reduced habitat component at the reserve. This has a particular impact on obligate hollow users such as the Powerful Owl, Brushtail Possum, Sugar Glider, parrots and other bird species such as the Laughing Kookaburra and Sacred Kingfisher. Hollows are required by smaller mammals including microbats and antechinus as roosting and maternity sites (Gibbons and Lindenmayer 2002).

Any future prescribed fuel reduction burns proposed for the reserve must take into consideration these habitat resources. Preliminary studies in the Mount Alexander Shire and in the Pillaga Forests of New South Wales show that prescribed burning operations, utilising low intensity burns, result in high collapse rates and loss of hollow bearing trees, with up to a 54% loss per burn in some areas (Parnaby *et al* 2010).

Loss of logs and coarse woody debris, on private land, may result from “cleaning up” by local landholders or user groups for aesthetic or fire prevention reasons (‘cleaning up’ of woody

debris and mowing was observed immediately to the west and south of reserve near main entrance gate).

Actions:

- *Retain all remaining large old trees, logs and coarse woody debris in the reserve as a high management priority.*
- *Any prescribed burning operations must rake around remaining large old trees or logs to ensure that fire operations do not reduce the hollow resource further.*
- *Land managers to liaise with surrounding landholders to promote the values of coarse woody debris and its low fire risk.*

General recommendations:

- Nest boxes are often considered to be a good solution to low numbers of hollow bearing trees, however the use of nest boxes as a management tool should be regarded with care and caution.

  Nest boxes require maintenance at least three times per year, ideally monthly. Their maintenance requires the use of a ladder which must be carried into the site, which may present problems due to the lack of direct access into the reserve. Adherence to relevant regulations and procedures need to be followed when using a ladder, including Worksafe requirements. Volunteers must have access to people with carpentry skills, and expertise in feral bee and ant removal. Nest box programs are best carried out in conjunction with a TAFE, school or university so that there is a ready stream of able-bodied volunteers, and a long term commitment can be undertaken (Irvine and Bender 1997). Further options include contact with the Friends of Organ Pipes National Parks who construct their own nest boxes or through volunteers with a local Men's Shed.

4.3.8 Habitat Connectivity

Objective: *Secure and broaden existing habitat corridors on public and private land and promote conservation programs to nearby landholders.*

Bushland Reserve, Sandy Creek Road and the Macedon Ranges rise up from the Plains Grassy Woodland that once dominated Riddells Creek and surrounds. This mosaic landscape supported many different fauna species that bred, foraged and dispersed throughout their home range and beyond. Whilst the Macedon Ranges has retained a large portion of its vegetation cover and has been afforded some degree of protection, the Plains Grassy Woodland has been largely cleared for grazing, cropping, equine and urbanisation. This

clearing has resulted in isolated patches of native vegetation that remain in an otherwise cleared landscape around Riddells Creek and beyond.

Native fauna species are less able to move across this ever changing landscape and are more vulnerable to local extinction. Local incidents of fire or disease can devastate populations that exist in remnant patches of vegetation, with species less able to recolonise areas they once occupied. With increasing urbanisation and smaller lot developments encroaching upon the reserve and the Macedon Ranges, there is perhaps an increased need for secure and healthy habitat corridors between Bushland Reserve, Sandy Creek Road and other nearby reserves such as T Hill Reserve, Mt Charlie Flora and Fauna Reserve, Mt Teneriffe, Barrm Birrm and the Macedon Regional Park.

Improving and securing habitat connectivity on public and private land within the Macedon Ranges will link areas of remnant vegetation within an otherwise modified landscape. It will allow for the movement of wildlife between remnant patches of native vegetation and will provide useful fauna habitat, effectively reversing habitat fragmentation in the local area. Mammals, birds, reptiles, amphibians and invertebrates that would otherwise be isolated in one patch can utilise such connections to travel between patches with relative ease and safety. Habitat connectivity allows animals to respond to environmental variability, e.g. by enabling movement from areas of scarce resources to resource-rich areas. It allows animals to respond to population pressure, e.g. by movement from over-populated to under-populated areas, or to re-colonise areas after a population crash, preventing inbreeding and loss of genetic diversity and allowing the creation of a successful meta-population.

An aim of Council should be to encourage private landholders in the Macedon Ranges to secure and enlarge existing vegetation corridors. This measure would increase the resistance and resilience of local flora and fauna communities, providing a stronger habitat link between the reserve and other core areas of remnant vegetation.

Actions:

- *Engage and encourage landholders located near Bushland Reserve, Sandy Creek Road and the wider Macedon Ranges to secure and broaden habitat corridors and promote conservation programs such as Trust for Nature and Land for Wildlife.*

4.3.9 Further Surveys

No formal flora or fauna surveys have previously been undertaken at the reserve. Recent site visits have provided a solid introduction to reserve features, species composition and utilisation within the reserve. Formal species and/or targeted surveys and additional incidental records by council staff and contractors will further add to our knowledge and the aims of this management plan.

Actions:

- *Encourage local council officers, ecologists, on-ground contractors and the community to identify and document new species.* Any new species records should be recorded and provided to local council, the Flora Information System (FIS) or any other relevant database systems available at the time. Local bushwalkers and naturalists use the site for recreation and should be encouraged to submit any new species information. The recording and submission of new species will increase our current knowledge of what is present within the reserve which will in turn further inform management practices.

- *Undertake a more comprehensive flora and fauna survey of the reserve in spring to early summer.* For fauna, the methodology should include a general daytime survey, stag watching, spotlighting, the use of an Anabat detector and call playback and may also include more intensive techniques (e.g. rock rolling, tiling, pit trapping, harp trapping, hair tubing and use of remote infrared cameras). Future bird surveys using the Birdlife Australia 20 minute two hectare search methodology would have the added bonus of including information on bird habitat.

- *Undertake a targeted survey for the two state significant flora species recorded within the reserve.* A targeted survey for the Hairy-leaf Triggerplant and Common Cinnamon-wattle should be undertaken within the spring period. The Dwarf Silver Wattle should be included in the surveys. Each individual plant, or patch, should be recorded with a GPS and notes taken (i.e. evidence of flowering or fruiting material, size of patch, number of individuals, level of recruitment, threats). Biennial monitoring of these populations is advised after this baseline data has been recorded. See 'Monitoring' Section 4.8.

4.3.10 Protection covenant

Objective: *To protect in perpetuity the reserve's biodiversity values.*

Actions and initiatives that aim to improve the reserve's biodiversity values will be greatly assisted by covenant measures that protect the reserve in perpetuity. A Trust for Nature conservation covenant is an agreement between the landowner and Trust for Nature which aims to permanently protect the natural values of the land. The covenants are registered on the Certificate of Title to the land and are legally binding. Costs may be incurred to Council in establishing the covenant.

Registration of a Trust for Nature covenant over Bushland Reserve, Sandy Creek Road was identified as a priority action (Action 4.3) in the Macedon Ranges Council's Natural Environment Strategy 2009. Councils that neighbour the Macedon Ranges have successfully

utilised protection covenants to improve biodiversity outcomes on reserves, including Hume City Council's Evans Street Grassland and Melton Shire's Pinkerton Forest.

Actions:

- *Council to seek funding to enable a Trust for Nature covenant over the reserve.*

4.4 Climate Variability

Objective: *Implement an adaptive management framework that is cognisant of the potential impacts of climate change.*

A changing climate presents a major challenge for conservation planning and for the management of natural assets. Climate change is expected to have a wide range of impacts on species and ecosystems, including changes in species distribution and abundance, ecosystem processes, interactions between species and various threats to biodiversity (DCC 2008). Whilst presenting some unique challenges, the impacts of climate change can be considered yet another stressor that adds to and interacts with existing stressors that have already impacted upon our biodiversity assets (DCC 2008). Furthermore:

'*Without early and vigorous mitigation actions, climate change has the potential by the second half of the century to become an overwhelmingly profound and pervasive driver of change in Australia's biotic fabric, resulting in many extinctions and the formation of many novel ecosystems that might not provide the essential ecosystem services on which humans depend*' (DCC 2008, p. 3).

Predictions for the north central region of Victoria, which includes the Riddells Creek region, are for drier and hotter conditions under climate change scenarios. By 2030 a temperature increase of 0.9^{o}C is predicted, while a temperature increase of between 1.4^{o} C and 2.8^{o} C can be expected by 2070. Less rainfall events are likely with a total net reduction of 4% annually expected, and bushfire intensity and frequency will rise (State Government of Victoria 2011). In Victoria, climate change has already impacted on flora and fauna species, with preliminary research showing that habitat ranges are presently being affected (State Government of Victoria 2011).

Despite the increasing certainty of climate change predictions, it is not possible to precisely identify the impact on the reserve from a changing climate. There are, however, a number of likely threats and impacts that may arise such as:

- Species distribution and abundance: a reduction in the number of some indigenous flora and fauna species, while other indigenous species will disappear, be unaffected or prosper as temperatures rise and rainfall decreases;
- The appearance of new invasive flora and fauna species, while other pest species might prosper, disappear or be unaffected;

- An increasing vulnerability for aquatic species as rain events become less frequent but more severe; periodic inundation of the reserve to become less frequent but more severe;

- An increasing frequency and severity of fire events.

Consideration and reference to the objectives and outcomes of the Macedon Ranges Shire Council's *Climate Change Risk Assessment and Early Adaptation* project should be made in developing an adaptive management framework for the reserve.

Actions:

- *Implement an adaptive management framework that increases the resistance and resilience of the reserve to the impacts of climate change*. A robust management framework, action and monitoring plan that addresses potential impacts such as the appearance of invasive pest plants and animals, the decline of some indigenous plant and animal species and new fire regimes is required under a changing climate scenario. This management framework should recognise that natural assets are not static systems but undergo change, which is likely to accelerate under a warming climate.

- *Adopt a landscape scale approach to management of the reserve*. A landscape scale management approach provides better options for species distribution and abundance. The location of the reserve, within the Macedon Ranges, provides good management opportunities for connectivity and ecosystem resistance and resilience to extreme climatic events.

- *Integrate conservation aims and programs between the various authorities and community groups*. Measures by the Macedon Ranges Shire Council to improve the resilience of the reserve on a landscape scale approach requires effective cooperation, communication and integration with the various authorities and community groups including Parks Victoria, the catchment management authority and Riddells Creek Landcare.

4.5 Cultural Management

Objective: *Explore further partnership opportunities with traditional owners.*

The reserve is located within the traditional land of the Wurundjeri. Under the Victorian *Aboriginal Heritage Act2006*, Aboriginal people are recognised as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage. At a local level, the Wurundjeri Tribe Land and Compensation Cultural Heritage Council (WTLaCCHC) is the registered Aboriginal party responsible for the management of Aboriginal cultural heritage. The WTLaCCHC provide advice on applications for Cultural Heritage Permits, decisions

about Cultural Heritage Agreements and advice or application for interim or on-going Protection Declarations.

Actions:

- *Through discussion with the Wurundjeri (WTLaCCHC), explore potential partnership approaches.* Partnership opportunities between the WTLaCCHC and Macedon Ranges Shire Council range from informal 'in principal' documents such as a memorandum of understanding or statement of intent through to formal, legally binding agreements such as a Cultural Heritage Agreement.

4.6 Recreation Management

***Objective**: Limit visitor impacts to the reserve.*

Encourage low impact, passive recreation opportunities.

Opportunities for low impact engagement with the ecological values of the reserve should be encouraged. This engagement will appeal to bush walkers, bird watchers, photographers, naturalists and students of science. Such interactions are aimed at informing and educating visitors on the values of heathy dry, lowland and damp forest communities. It is hoped that this engagement will increase visitor appreciation and, ultimately, awareness and action that results in the protection and conservation of these fragile and diminishing environmental assets.

Measures aimed at encouraging recreational access to the reserve need to be undertaken in a cautionary and sensitive manner. The presence of state significant species and a rich diversity of indigenous flora and fauna species require careful management to ensure these values are conserved and not damaged through visitor interaction.

4.6.1 Visitor impacts

***Objective**: limit impacts through the management of visitor activities.*

Visitor impacts within the reserve are relatively minor. A number of tracks that criss-cross the reserve appear to have been formed by horse riders and/or cyclists. It was observed that a number of trees that had fallen across a track had been cut with a chainsaw, while marker tape was observed on at least two trees (see Plate 32).

Horse Riders

Horse riding within the reserve is a prohibited activity. Horse riding is a threatening ecological process that results in weed introduction and infestation, increased nutrient loading, soil compaction and grazing of significant flora species. Riders are likely to stray from established tracks and venture into sensitive and significant areas. Horse riding on

narrow paths can pose significant safety concerns for horse riders and for other users of the reserve, including bushwalkers.

The Shire of Macedon Ranges provides horse riders with considerable opportunities to ride within other reserves and organised clubs. The exclusion of this reserve will not impact significantly on horse riding opportunities within the local area.

Mountain Bike Riders

Mountain bike riding appears to be a popular activity in the adjoining T Hill Reserve (see section 4.7.4), and cyclists also enter Bushland Reserve, Sandy Creek Road. Competitions have been held within Sandy Creek Reserve in recent times, with the southern private properties acting as competition marshalling areas. Informal tracks within the reserve are suited to single cyclists and small groups that minimise ecological impacts and the potential for safety issues with walkers. Large groups of cyclists and competition events are not appropriate activities within the reserve. The creation of new informal trails into ecologically sensitive areas is an ever-present threat, as are the creation of track jumps and the grooming of trails. Cyclists must be reminded to ride only along the existing track network at a speed that does not pose safety concerns for other users or wildlife.

Actions:

- *Consider installing interpretive signage within the reserve that highlights prohibited and inappropriate activities within the reserve including horse riding* (see Section 4.6.4).

- *Consider installing interpretive signage that encourages mountain bike riders to stay within the established track system and to travel at low speed* (see Section 4.6.4).

Plate 32. Marker tape

4.6.2 Reserve access

Objectives: *Encourage low impact visitation by restricting access to the southern boundary track.*

A series of informal tracks have been created that offshoot from a primary track on the southern boundary. These tracks vary in condition and have likely been created by horse riders and/or cyclists. As discussed in Section 4.3.3, recreational users within the reserve are contributing to the spread of the pathogen *Phytophthora cinnamomi.*

Actions:

- *Restrict visitor access to the southern boundary track.* The southern boundary track provides visitors with access into the reserve and provides ample opportunity to engage with the vegetation communities and fauna present. This southern boundary track also provides access into T Hill Reserve. Offshoot tracks that lead further into the reserve provide an unnecessary threat to the ecological values present and should be closed off to visitor access. They also promote the further spread of *Phytophthora cinnamomi.* Tracks should direct walkers away from grass trees, with signs directing visitors to stay on the track at all times.

4.6.3 Reserve entrance and parking

Objective: *Consider providing visitors a walk-in access point.*

The main entrance point into the reserve is from an unlocked gate on Sandy Creek Road, while visitors can also enter the reserve from T Hill Reserve. The main entrance point is non-descript and informal. Visitors arriving by vehicle are required to park on Sandy Creek Road or nearby locations as no car parking space is provided within the reserve.

Actions:

- *Consider providing a walk-in entrance point on Sandy Creek Road.* Visitors at present must open and close a large gate at the entrance to the reserve. A walk in entrance point is recommended to improve the ease of access for visitors.

- *Ensure the entrance point is weed free and maintained.* The entrance point is marked by weeds including English Broom *Cytisus scoparius*. This entrance point should be managed as part of the reserve's weed control and maintenance duties.

4.6.4 Signage

Objective: *Raise community awareness of the reserve.*

Consider interpretive signage to inform visitors of the reserve's ecological and geological significance.

No signage is located at the reserve. A street front sign at the entrance to the reserve on Sandy Creek Road could be placed to inform visitors of the entrance point and to raise awareness of the reserve. Further, Council should consider providing the reserve with a formal name, as it is currently un-named.

Actions:

- *Engage the community in selecting a formal name for the reserve.* Council to engage the local community to select a formal name for the reserve that will appear on all signage and promotional material.
- *Install a street front sign at the entrance on Sandy Creek Road.*
- *Consider placing interpretive signage at the Sandy Creek Road entrance.* Detailed information could be provided on the resident flora and fauna. If signage is installed, use non-fade material and ensure signage areas are weed free and maintained.
- *Inappropriate activities may be highlighted on signage.* Inappropriate activities within the reserve such as vehicle access, horse riding, trail bikes, rubbish dumping and camping should be noted.

4.6.5 Low Impact, Passive Tourism

Objective: *Encourage low impact, passive tourism within the reserve.*

The biodiversity values present at the reserve heightens its appeal as a destination for low impact, nature-based tourists including bushwalkers, bird watchers, photographers, naturalists and students of science and education. Such interactions are aimed at informing and educating visitors on the values of this diverse vegetation community. It is hoped that this engagement will increase visitor appreciation and, ultimately, awareness and action that results in the protection and conservation of these fragile and diminishing environmental assets.

Promotion of the reserve and its conservation and geological values aligns with the vision of the Macedon Ranges as a destination that delivers excellence in nature-based tourism (Macedon Ranges Shire Council 2011). Nature based visitors may also deliver significant economic benefits to Riddells Creek and the wider region.

i. Bushwalkers, Birdwatchers, Photographers, Naturalists

Objective: *Increase the awareness of the reserve as a destination for bushwalkers, bird watchers, photographers and naturalists.*

Promotion of the reserve and its geology will attract low impact visitors interested in bushwalking, photography, bird watching and ecology.

Actions:

- *Promote the values of the reserve to bushwalkers and naturalists* via Council's website, Landcare email broadcast and other promotional methods to members of the Field Naturalists Club of Victoria, Indigenous Flora and Fauna Association, Birds Australia, Landcare, Nature Share etc.

ii. Education and Science

Objective: *Increase the awareness of the reserve as a destination for science and education.*

Promotion of the reserve's ecological values will likely attract local secondary and regional tertiary institutions across a diverse field of studies that includes ecology, biology, botany, zoology and geology.

Actions:

- *Promote the values of the reserve to local and regional schools and tertiary institutions* via Council's website, Landcare email broadcast and other promotional methods.
- *Consider an interpretive 'walk and gawk' tour in cooperation with a local Landcare group.*

4.7 Adjoining Uses

Objective: *Ensure that adjoining landholders do not impact on the reserve's conservation values.*

Engage landholders in measures to enhance and conserve the reserve.

4.7.1 Private property – southern and western boundary

The property to the south of the reserve is a large horse stud that has been largely cleared of vegetation. The fence along this boundary is broken in sections and it is clear that horses are

entering the reserve from this property (see Section 4.3.1 and Plate 33). The location of this access point is shown in Figures 2 and 3. Weeds are also entering into the reserve from this property.

The boundary to the west of the reserve is not delineated. This property is mowed in parts and woody debris has been stockpiled. It is likely that the landholder is unknowingly conducting works in the reserve (see Section 4.3.7).

Plate 33. Access into the reserve along the southern boundary

Actions:

- *Ensure the southern boundary fence line is repaired in sections where required and liaise with property owner to ensure stock is not entering the reserve* (see Section 4.3.1).
- *Discuss the creation of a revegetated buffer zone along the southern boundary to limit further weed intrusion into the reserve* (see Section 4.3.2).
- *Ensure the western boundary fence line is delineated in sections where it is absent*. This delineation can be via stakes or wildlife friendly fencing.
- *Encourage adjoining landholders to undertake weed control measures on their property to prevent weeds spreading into the reserve* (see Section 4.3.2).

- *Encourage adjoining landholders to retain and improve remnant vegetation patches on their properties.*
- *Provide information to adjoining landholders on the values of the reserve and potential impacts from adjoining uses including invasive plants and animals.* This information could be provided via the production of a 'Good Neighbour' brochure (see Frankston City Council 'Good Bushland Neighbour' guide).
- *Ensure adjoining landholders know their responsibilities regarding pet animals to prevent them from entering the reserve at all times.*
- *Encourage adjoining landholder to sign up with a local Landcare group.*
- *Encourage adjoining landholder to act as champions for the reserve by reporting any illegal activities occurring within the reserve.*

4.7.2 Road reserve – southern boundary

Weeds including Gorse are entering the reserve from the road reserve on the southern boundary (see Section 4.3.2, Figure 3).

Actions:

- *Identify management responsibilities regarding the road reserve and either ensure the landholder conducts weed control works or include the reserve as part of Council's weed control measures.*

4.7.3 Parks Victoria – T Hill Reserve

The coordination of management activities between Council and Parks Victoria will provide better ecological outcomes for both reserves (see Section 4.3.2). This coordination may also reduce costs for measures such as weed control and stock access prevention.

It was observed during site visits that mountain bike riders in T Hill Reserve have created cycle jumps and moved tree limbs to delineate cycle paths (see Plates 34 and Plate 35).

Actions:

- *Liaise with Parks Victoria and seek cooperation and coordination of measures such as weed control and stock access prevention.*
- Alert Parks Victoria as to the impact of mountain biking in T Hill Reserve.

Plate 34. Mountain bike trails, T Hill Reserve

Plate 35. Mountain bike trails, T Hill Reserve

4.8 Monitoring

Management actions implemented at the site and outlined within this management plan require monitoring to determine whether they are achieving their stated objectives. Monitoring should generally assess current site values, changes, issues, improvements and the appropriateness of management actions being undertaken. Monitoring should be undertaken by an experienced council officer, bushland management contractor or ecologist at biennial intervals, and should be undertaken within the same period (i.e. spring) of each monitoring year in order to provide comparative results. The following actions should be undertaken as part of the monitoring process, with results provided within a brief letter report to the Macedon Ranges Shire Council:

- *An assessment of management actions undertaken and outlined within this plan.* Objectives and actions outlined in this plan need to be formally assessed and documented. This should include whether they have/have not been undertaken on-site or are in progress, and how objectives are/are not being met. Appendix 5 summarises the plan's management actions and can be used as a check list.

- *Establishment of permanent 10m x 10m quadrats within the reserve.* Quadrats should be strategically placed within areas subject to weed control (mainly Sweet Vernal-grass). The number of quadrats required will need to be tailored to the area targeted for management, however, as a guide, a minimum of three quadrats should be established in the reserve. Areas selected should ideally represent differing reserve characteristics. The corners of these quadrats should be marked discreetly in the ground (i.e. soil pins or nails with flagging tape) so that the quadrat can be identified on-site by the assessor without being visible to the wider community. Each corner is to be marked with a GPS with the coordinates provided to Council. Species cover and diversity is to be assessed within each quadrat using the Braun-Blanquet scale (or similar). The same quadrats should be assessed biennially to determine any changes, issues or improvements to the quadrat areas. The quadrats should be assessed prior to any works being undertaken in order to provide comparative results. The following needs to be assessed and recorded for each quadrat:

    - All introduced species to be recorded with their % cover;
    - All native species to be recorded with their % cover;
    - Bare earth % cover;
    - Height of tallest plant in quadrat;
    - List of native species successfully recruiting or regenerating;
    - Organic litter % cover;
    - Works undertaken (i.e. weed control).

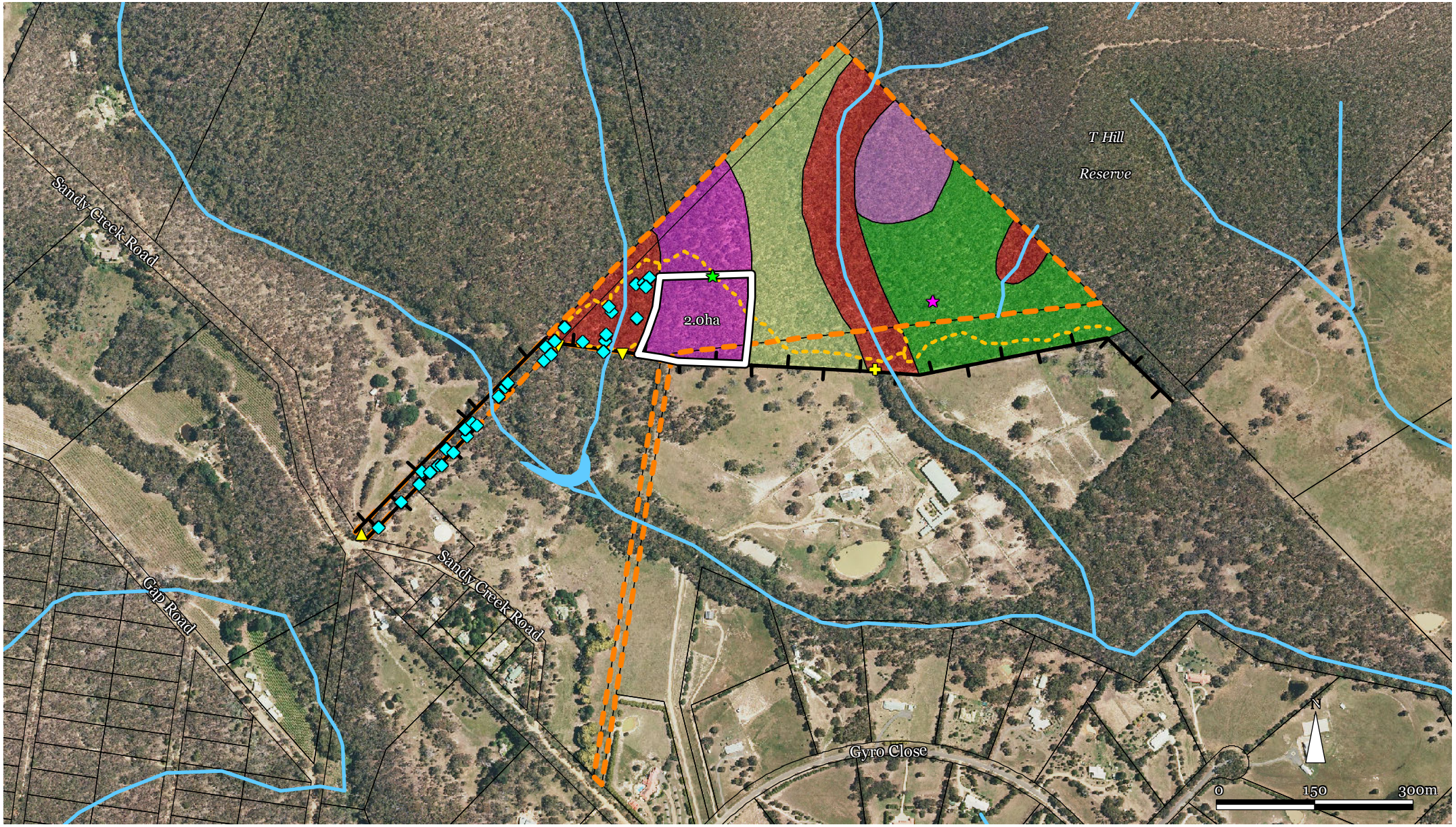
- *Establishment of one photopoint within each quadrat*. One corner of each quadrat is to form a photopoint to visually document changes that occur in the reserve. The photopoint should aim to capture the landscape and ideally incorporate trees, shrubs and weeds. The photopoint GPS coordinate and direction of photo should be documented and provided to Council.

- *Further recommendations or changes to be provided* if the desired results or objectives are not on the way to being achieved.

- *Documentation of any changes or new threats to the reserve not outlined within this management plan*. Any new threats or changes need to be incorporated into this management plan as required.

- *This management plan is an adaptable document which also needs to be reviewed and modified where necessary in accordance with these monitoring results*. New priorities, issues and management requirements that become apparent may need to be factored into this plan. Monitoring methodology should be reviewed and changed if required.

Figure 2 - Features of Bushland Reserve, Sandy Creek Road



Heathy Dry Forest
- Higher quality
- Lower quality

Damp Forest

Lowland Forest
- Higher quality
- Lower quality

Offset site

Common Cinnamon-wattle (State significant)

Hairy-leaf Triggerplant (State significant)

Large Old Tree (Protected under offset)

Main entrance

Access gate

Horse access

Informal track

Watercourse/Gully

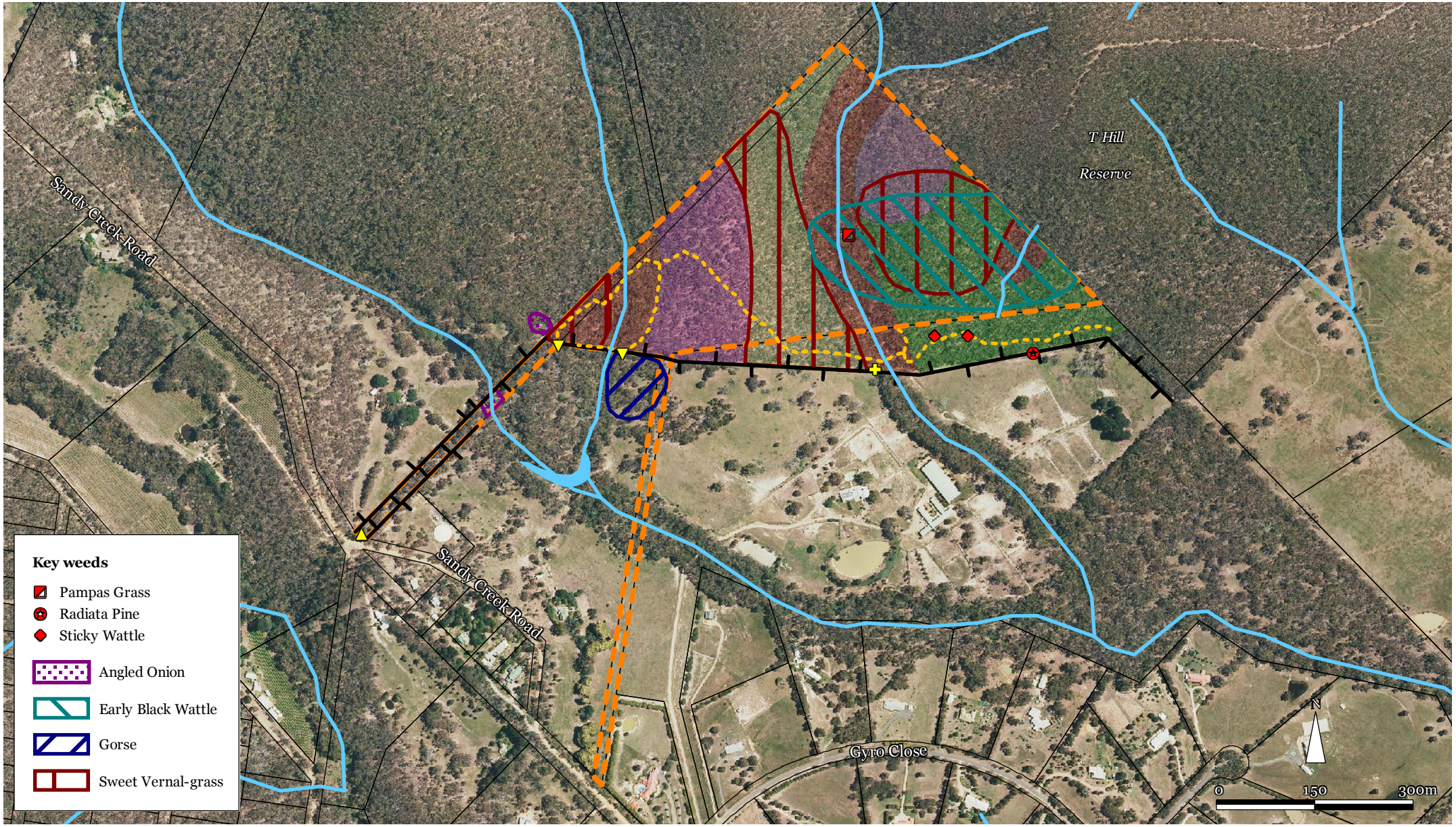
Fence

Bushland Reserve, Sandy Creek Road

atlas ecology

Note: Map features are approximate and are to be used as a guide only.

Figure 3 - Key Weeds within Bushland Reserve, Sandy Creek Road



Main entrance
Access gate
Horse access
Informal track
Watercourse/Gully
Fence
Bushland Reserve, Sandy Creek Road

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Note: Map features are approximate and are to be used as a guide only.

Glossary

Arboreal: living in or among trees

Avifauna: birds of a specific region or period

Bioregion: an area representing a natural ecological community with characteristic flora, fauna, and environmental conditions

Boughs: a tree branch, especially a large or main branch

Canopy: the cover of foliage of a plant

Ecological Vegetation Class (EVC): groups of plants which commonly occur together within a recognisable environmental niche

Habitat: the environment in which a plant or animal lives

Herbs: a plant that produces a fleshy rather than woody stem

Indigenous: native to a particular area, not introduced

Insectivorous: feeding on insects

Invertebrates: lacking a backbone or spinal column, for example insects

Late Ordovician: geological time period between 485.4 ± 1.9 to 443.4 ± 1.5 million years ago. It follows the Cambrian Period and is followed by the Silurian Period.

Macropods: a marsupial family that includes kangaroos and wallabies

Passive recreation: non-competitive and unorganised recreational activities

Prostrate: a plant that grows close to the ground

Remnant: areas or patches of vegetation that remains after land has been cleared or altered

Resilience: the ability of systems or landscapes to recover from disturbance events such as drought, floods and fire

Stag: dead standing trees

Vegetation community: different species of plants growing together in a particular habitat

Appendix 1.1 – Flora Species Recorded Within Reserve

Table A1.1. Flora species recorded within reserve – October & November 2012

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Acacia aculeatissima	Thin-leaf Wattle	Local
Acacia dealbata subsp. *dealbata*	Silver Wattle	Local
Acacia gunnii	Ploughshare Wattle	Regional
Acacia leprosa var. *graveolens* ***k***	Common Cinnamon-wattle	**State**
Acacia mearnsii	Black Wattle	Local
Acacia nano-dealbata ***r***	Dwarf Silver Wattle	**State**
Acacia stricta	Hop Wattle	Regional
Acacia verticillata subsp. *verticillata*	Prickly Moses	Local
Acaena echinata	Sheep's Burr	Local
Acaena novae-zelandiae	Bidgee-widgee	Local
Acrotriche serrulata	Honey-pots	Local
Adiantum aethiopicum	Common Maidenhair	Regional
Amyema pendula subsp. *pendula*	Drooping Mistletoe	Local
Arthropodium milleflorum	Pale Vanilla-lily	Regional
Arthropodium strictum	Chocolate Lily	Local
Asperula scoparia subsp. *scoparia*	Prickly Woodruff	Regional
Astroloma humifusum	Cranberry Heath	Local
Austrostipa rudis	Veined Spear-grass	Regional
Bossiaea prostrata	Creeping Bossiaea	Local
Burchardia umbellata	Milkmaids	Local
Bursaria spinosa subsp. *spinosa*	Sweet Bursaria	Local
Caesia parviflora	Pale Grass-lily	Regional
Caladenia carnea	Pink Fingers	Regional
Caladenia moschata	Musk Hood-orchid	Regional
Cassinia aculeata	Common Cassinia	Local
Cassinia arcuata	Drooping Cassinia	Local
Cassinia longifolia	Shiny Cassinia	Regional
Cheilanthes austrotenuifolia	Green Rock-fern	Local
Chiloglottis valida	Common Bird-orchid	Regional
Clematis aristata	Mountain Clematis	Local

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Comesperma volubile	Love Creeper	Regional
Coronidium scorpioides	Button Everlasting	Local
Correa reflexa var. *reflexa*	Common Correa	Local
Cymbonotus preissianus	Austral Bear's-ear	Local
Daviesia leptophylla	Narrow-leaf Bitter-pea	Local
Dianella admixta	Black-anther Flax-lily	Local
Dichondra repens	Kidney-weed	Local
Dillwynia cinerascens	Grey Parrot-pea	Local
Dillwynia sericea	Showy Parrot-pea	Local
Diuris pardina	Leopard Orchid	Regional
Drosera aberrans	Scented Sundew	Local
Drosera auriculata	Tall Sundew	Local
Eleocharis acuta	Common Spike-sedge	Regional
Epacris impressa var. *impressa*	Common Heath	Local
Eucalyptus aromaphloia	Scentbark	Local
Eucalyptus cephalocarpa	Mealy Stringybark	Regional
Eucalyptus dives	Broad-leaf Peppermint	Local
Eucalyptus obliqua	Messmate Stringybark	Local
Eucalyptus ovata var. *ovata*	Swamp Gum	Local
Eucalyptus radiata subsp. *radiata*	Narrow-leaf Peppermint	Local
Eucalyptus viminalis subsp. *viminalis*	Manna Gum	Local
Euchiton japonicus	Creeping Cudweed	Local
Exocarpos cupressiformis	Cherry Ballart	Local
Gahnia radula	Thatch Saw-sedge	Local
Galium gaudichaudii subsp. *gaudichaudii*	Rough Bedstraw	Regional
Geranium potentilloides	Soft Crane's-bill	Local
Glossodia major	Wax-lip Orchid	Regional
Glycine clandestina	Twining Glycine	Local
Gonocarpus tetragynus	Common Raspwort	Local
Goodenia ovata	Hop Goodenia	Regional
Goodia lotifolia	Common Golden-tip	Regional
Hakea decurrens subsp. *physocarpa*	Bushy Needlewood	Regional
Hardenbergia violacea	Purple Coral-pea	Local

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Helichrysum luteoalbum	Jersey Cudweed	Regional
Hovea heterophylla	Common Hovea	Local
Hydrocotyle callicarpa	Small Pennywort	Regional
Hydrocotyle laxiflora	Stinking Pennywort	Local
Hypericum involutum	Small St John's Wort	Local
Isolepis fluitans	Floating Club-sedge	Regional
Juncus pallidus	Pale Rush	Local
Juncus planifolius	Broad-leaf Rush	Regional
Juncus subsecundus	Finger Rush	Local
Kennedia prostrata	Running Postman	Local
Lagenophora stipitata	Common Bottle-daisy	Local
Lepidosperma elatius	Tall Sword-sedge	Regional
Lepidosperma laterale	Variable Sword-sedge	Local
Leptospermum continentale	Prickly Tea-tree	Local
Lomandra filiformis subsp. *coriacea*	Wattle Mat-rush	Local
Lomandra longifolia subsp. *exilis*	Cluster-headed Mat-rush	Regional
Luzula meridionalis var. *flaccida*	Common Woodrush	Local
Microlaena stipoides var. *stipoides*	Weeping Grass	Local
Microseris sp. 3	Yam Daisy	Regional
Olearia argophylla	Musk Daisy-bush	Regional
Olearia lirata	Snowy Daisy-bush	Regional
Olearia myrsinoides	Silky Daisy-bush	Regional
Opercularia varia	Variable Stinkweed	Local
Oxalis perennans	Grassland Wood-sorrel	Local
Ozothamnus obcordatus	Grey Everlasting	Local
Pelargonium inodorum	Kopata	Regional
Pimelea humilis	Common Rice-flower	Local
Plantago varia	Variable Plantain	Local
Poa labillardierei	Common Tussock-grass	Local
Poa sieberiana	Grey Tussock-grass	Local
Pomaderris racemosa	Cluster Pomaderris	Regional
Poranthera microphylla	Small Poranthera	Local
Pteridium esculentum	Austral Bracken	Local
Pterostylis melagramma	Tall Greenhood	Regional

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Pultenaea daphnoides	Large-leaf Bush-pea	Local
Pultenaea gunnii	Golden Bush-pea	Local
Rhytidosporum procumbens	White Marianth	Regional
Rumex spp.	Dock	Local
Rytidosperma geniculatum	Kneed Wallaby-grass	Local
Rytidosperma pallidum	Silvertop Wallaby-grass	Local
Rytidosperma spp.	Wallaby Grass	Local
Schoenus apogon	Common Bog-sedge	Local
Senecio glomeratus subsp. *glomeratus*	Annual Fireweed	Local
Senecio hispidulus	Rough Fireweed	Regional
Senecio linearifolius var. *linearifolius*	Fireweed Groundsel	Regional
Senecio minimus	Shrubby Fireweed	Local
Senecio phelleus	Stony Fireweed	Regional
Senecio microbasis ***r***	Slender Fireweed	**State**
Senecio quadridentatus	Cotton Fireweed	Local
Stackhousia monogyna	Creamy Candles	Regional
Stellaria pungens	Prickly Starwort	Local
Stylidium armeria subsp. *pilosifolium* ***e, FFG Act***	Hairy-leaf Triggerplant	**State**
Tetrarrhena juncea	Forest Wire-grass	Local
Thelymitra pauciflora	Slender Sun-orchid	Regional
Thysanotus patersonii	Twining Fringe-lily	Local
Triglochin striata	Streaked Arrowgrass	Regional
Veronica calycina	Hairy Speedwell	Local
Veronica gracilis	Slender Speedwell	Regional
Viola hederacea	Ivy-leaf Violet	Local
Wahlenbergia gracilis	Sprawling Bluebell	Regional
Wahlenbergia multicaulis	Branching Bluebell	Regional
Wahlenbergia stricta subsp. *stricta*	Tall Bluebell	Local
Wurmbea dioica	Common Early Nancy	Local
Xanthorrhoea australis	Austral Grass-tree	Local
Xerochrysum viscosum	Shiny Everlasting	Regional

e = endangered in Victoria (DSE 2005), FFG Act = listed as threatened under Victoria's *Flora and Fauna Guarantee Act 1988*

r = rare in Victoria (DSE 2005)
k = poorly known in Victoria (DSE 2005)

INTRODUCED SPECIES		
Botanical Name	**Common Name**	**Declared Noxious Weed ***
Acacia decurrens #	Early Black-wattle	-
Acacia howittii #	Sticky Wattle	-
Agrostis capillaris	Brown-top Bent	-
Aira spp.	Hair Grass	-
Allium triquetrum	Angled Onion	Restricted
Anthoxanthum odoratum	Sweet Vernal-grass	-
Briza maxima	Large Quaking-grass	-
Briza minor	Lesser Quaking-grass	-
Centaurium spp.	Centaury	-
Cerastium glomeratum	Sticky Mouse-ear Chickweed	-
Cirsium vulgare	Spear Thistle	Regionally controlled
Conyza spp.	Fleabane	-
Cortaderia selloana	Pampas Grass	-
Crataegus monogyna	Hawthorn	Regionally controlled
Holcus lanatus	Yorkshire Fog	-
Hypochaeris glabra	Smooth Cat's-ear	-
Hypochaeris radicata	Flatweed	
Pinus radiata	Radiata Pine	-
Pittosporum undulatum #	Sweet Pittosporum	-
Prunella vulgaris	Self-heal	-
Prunus spp.	Prunus	-
Romulea rosea var. *australis*	Onion Grass	-
Rosa rubiginosa	Sweet Briar	Regionally controlled
Rubus fruticosus spp. agg.	Blackberry	Regionally controlled, WON
Solanum nigrum	Black Nightshade	-
Sonchus asper	Rough Sow-thistle	-
Sonchus oleraceus	Common Sow-thistle	-
Taraxacum officinale spp. agg.	Garden Dandelion	-
Ulex europaeus	Gorse	Regionally controlled, WON

= Native to Victoria or Australia but not indigenous to the local area

*= Declared noxious weed within the Port Phillip and Westernport catchment under the *Catchment and Land Protection Act 1994 (*CaLP Act*)*. Declared noxious weeds cause environmental or economic harm or have the potential to cause such harm (DPI 2012).

Noxious weeds are categorised into one of four categories:
State Prohibited Weeds: These invasive plants either do not occur in Victoria but pose a significant threat if they invade, or are present, pose a serious threat and can reasonably be expected to be eradicated. If present, infestations of a State prohibited weed are relatively small.

Regionally Prohibited Weeds: Regionally prohibited weeds are not widely distributed in a region but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate regionally prohibited weeds on their land.

Regionally Controlled Weeds: These invasive plants are usually widespread in a region. To prevent their spread, ongoing control measures are required. Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of regionally controlled weeds on their land.

Restricted: This category includes plants that pose an unacceptable risk of spreading in this State and are a serious threat to another State or Territory of Australia. Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials is prohibited.

WON: Weed of National Significance

Appendix 1.2 – Significant Flora Species Previously Recorded Within Local Area

Key

EPBC Act - *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
CR – Critically endangered
EN – Endangered
VU – Vulnerable
K – Poorly known

FFG Act - *Flora and Fauna Guarantee Act 1988* (Victoria)
L – Listed on the *FFG Act*

DSE - Advisory List of Threatened Flora in Victoria (DSE 2005)
x – Extinct
e – Endangered
v – Vulnerable
r – Rare
k – Poorly known

= Information derived from Flora Information System (FIS 2012)
* = EPBC Act Protected Matters Report (DSEWPC 2012)

Table A1.2. Significant flora species previously recorded within 5 kilometres of the reserve

Botanical Name	Common Name	Total number of records#	EPBC Act 1999	FFG Act 1988	DSE
NATIONALLY SIGNIFICANT SPECIES					
Dianella amoena	Matted Flax-lily	11	EN	L	e
STATE SIGNIFICANT SPECIES					
Geranium sp. 1	Large-flower Crane's-bill	2	-	-	e
Acacia leprosa var. *graveolens*	Common Cinnamon-wattle	1	-	-	k
Acacia nano-dealbata	Dwarf Silver Wattle	14	-	-	r
Dianella callicarpa	Swamp Flax-lily	1	-	-	r
Eucalyptus yarraensis	Yarra Gum	1	-	-	r
Geranium solanderi var. *solanderi* s.s.	Austral Crane's-bill	1	-	-	v
Microseris scapigera s.s.	Plains Yam-daisy	1	-	-	v
Stylidium armeria subsp. *pilosifolium*	Hairy-leaf Triggerplant	6	-	L	e
Diuris punctata var. *punctata*	Purple Diuris	12	-	L	v

Appendix 2.1 – Fauna Species Recorded within Reserve

Table A2.1. Fauna species recorded within Sandy Creek Reserve (October and November 2012)

Common name	Species Name	Survey information	Comments
BIRDS			
Sulphur-crested Cockatoo	*Cacatua galerita*	S	
Crimson Rosella	*Platycercus elegans*	S	
Common Bronzewing	*Phaps chalcoptera*	S	
Laughing Kookaburra	*Dacelo novaeguineae*	S	
Sacred Kingfisher	*Todiramphis sanctus*	S	
Pallid Cuckoo	*Cacomantis pallidus*	S	
Fan-tailed Cuckoo	*Cacomantis flabelliformus*	S	
Grey Fantail	*Rhipidura fuliginosa*	S	
Superb Fairy-wren	*Malurus cyaneus*	S	
Scarlet Robin	*Petroica boodang*	S	Breeding
Eastern Yellow Robin	*Eopsaltria australis*	S	
Rufous Whistler	*Pachycephala rufiventris*	S	
Grey Shrike-thrush	*Colluricincla harmonica*	S	
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	S	
Spotted Pardalote	*Pardalotus punctatus*	S	
Striated Pardalote	*Pardalotus striatus*	H	

Common name	Species Name	Survey information	Comments
Striated Thornbill	*Acanthiza lineata*	S	
Buff-rumped Thornbill	*Acanthiza reguloides*	S	
White-browed Scrubwren	*Sericornis frontalis*	S	
White-browed Woodswallow	*Artamus superciliosus*	S	Approximately 80-100 birds foraging high over the forest canopy
White-throated Treecreeper	*Cormobates leucophaea*	S	
White-naped Honeyeater	*Melithriptus lunatus*	S	
Yellow-faced Honeyeater	*Lichenostomus chrysops*	S	
Red Wattlebird	*Anthochaera carunculata*	S	
White-winged Chough	*Corcorax melanorhamphos*	S	
Pied Currawong	*Strepera graculina*	S	
Grey Currawong	*Strepera versicolor*	S	Breeding
Australian Magpie	*Gymnorhina tibicens*	S	
Common Blackbird*	*Turdus merula*	S	Observed in creek gully outside of reserve
Mammals			
Eastern Grey Kangaroo	*Macropus giganteus*	S	
Swamp Wallaby	*Wallabia bicolor*	S	
Common Brushtail Possum	*Trichosurus vulpecula*	S	
Common Ringtail Possum	*Pseudocheirus peregrinus*	S	
Brown Hare*	*Lepus capensis*	S	
Short-beaked Echidna	*Tachyglossus aculeatus*	S	

Common name	Species Name	Survey information	Comments
Frogs and Reptiles			
Blotched Blue-tongue Lizard	*Tiliqua nigrolutea*	S	
Eastern Common Froglet	*Crinia signifera*	H	In dam outside of reserve

* denotes exotic or introduced species.

S – species seen during three area search surveys Oct - Nov 2012, H – species heard during three area search surveys in Oct – Nov 2012. Note: no status information is supplied as all species recorded above are regarded as Common or Least Concern.

Appendix 2.2 – Significant Fauna Species Previously Recorded Within Local Area

Table A2.2. Significant fauna species previously recorded within a 5 kilometre radius of the reserve

Sources used to determine species status:

EPBC	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FFG	*Flora and Fauna Guarantee Act 1988* (Victoria)
DSE	*Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007) and *Advisory List of Threatened Invertebrate Fauna in Victoria* (DSE 2009)

Conservation Status:

EX	Extinct
RX	Regionally Extinct
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
RA	Rare
DD	Data Deficient (Insufficiently or poorly known)
NT	Near Threatened
LR (NT)	Lower Risk (Near Threatened)
L	Listed as threatened under FFG Act

Common Name	Scientific Name	Most Recent Record (VBA)	Location (VBA)	Conservation Status		
				EPBC	FFG	DSE
NATIONAL SIGNIFICANCE						
Regent Honeyeater	*Anthochaera phrygia*	1/12/1975	Base of Mount Macedon	EN	CR	L
STATE SIGNIFICANCE						
Powerful Owl	*Ninox strenua*	12/01/2008	292 Gap Rd, Riddells Creek	-	L	VU
Mountain Galaxias	*Galaxias olidus*	27/06/2006	Gisborne-Kilmore Rd, Riddells Creek	-	L	VU
Brush-tailed Phascogale	*Phascogale tapoatafa tapoatafa*	30/06/1970	Riddells Creek	-	L	VU
Yellow-ochre Butterfly ^	*Trapezites lutea lutea*	-	Riddells Creek area	-	L	EN
Fiery Jewel ^	*Hypochrysops ignita ignita*	-	Riddells Creek area	-	L	VU
Amethyst Hairstreak #	*Jalmenus icilius*	-	Riddells Creek area	-	L	-

Sources: VBA 2012. Victorian Biodiversity Atlas © The State of Victoria, Department of Environment and Primary Industries

^ Data obtained from the Victorian Butterfly Database (Museum Victoria)

Data obtained from a local record

Appendix 3
Definitions of Ecological Significance

Based on *Standard Criteria for Sites of Biological Significance in Victoria* (Amos 2004)

Nationally Significant

Species of national significance are flora or fauna listed as Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable or Rare under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999* or under the relevant National Action Plan. Relevant National Actions Plans include: Maxwell *et al.* (1996), Duncan *et al.* (1999), Lee (1995), Garnett and Crowley (2000), Cogger *et al.* (1993), Tyler (1997), Wagner and Jackson (1993) and Sands and New (2002).

Ecological Communities of national significance are those listed as Critically Endangered, Endangered or Vulnerable under the EPBC Act.

Sites are considered nationally significant if they support:

- Known habitat for nationally significant species or communities.
- Areas with unusually high native species richness, vegetation, habitat types or communities that are exceptional when compared to sites nationally.
- Corridors or habitat components that are important at a national scale. i.e. forming a link with nationally significant vegetation such as a National Park, and/or Ramsar Wetlands.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥1% of the national breeding population of a species.
- Areas regularly used by migratory species which are nationally threatened, or used by ≥1% of the world or national population of a taxon.
- Known or potential feeding sites of a nationally significant nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species is nationally Critically Endangered, Endangered or Vulnerable.

State Significant

Species of state significance in Victoria are flora or fauna listed as Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable or Conservation Dependent in the *Advisory List of Rare or Threatened Plants* (DSE 2005), the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007A), or the *Advisory List of Threatened Invertebrate Fauna in Victoria* (DSE 2009); species listed as Near Threatened, Conservation Dependent

or Least Concern under the *EPBC Act* or the relevant National Action Plan; and/or species listed under the Victorian *FFG Act*. Relevant National Actions Plans include: Maxwell *et al.* (1996), Duncan *et al.* (1999), Lee (1995), Garnett and Crowley (2000), Cogger *et al.* (1993), Tyler (1997), Wagner and Jackson (1993) and Sands and New (2002).

Ecological Communities of state significance in Victoria are those listed as threatened under the Victorian *FFG Act*.

Sites are considered to be of state significance if they support:

- Known habitat for state significant species or communities.
- Areas that support, or regularly support individuals of a state significant species or community.
- Vegetation which would have a vegetation significance rating of 'Very High' or 'High' if assessed using the DSE Vegetation Quality Assessment Manual (DSE 2004).
- Areas with unusually high native species richness, vegetation, habitat types or communities that are exceptional when compared to sites on a statewide basis.
- Corridors or habitat components that are important at a state scale. i.e. forming a link with state significant vegetation such as State Parks and/or Flora and Fauna Reserves.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥1% of the state breeding population of a species.
- Areas regularly used by migratory species which are threatened in Victoria, or used by ≥1% of the state population of a taxon.
- Known or potential feeding sites of a nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species is state Endangered, Vulnerable or Data Deficient.

Regionally Significant

Species of regional significance in the Central Victorian Uplands Bioregion are flora species considered rare by the authors or in any relevant regional Native Vegetation Plan, and fauna species considered rare by the authors or listed as Near Threatened or Data Deficient in the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007A) or the *Advisory List of Threatened Invertebrate Fauna in Victoria* (DSE 2009).

Ecological Communities of regional significance in the Central Victorian Uplands Bioregion are those listed as an Endangered, Vulnerable or Depleted ecological vegetation class within a particular bioregion in the relevant catchment Native Vegetation Plan.

Sites are considered to be of regional significance if they support:

- Known habitat for regionally significant species or communities.
- Areas that support, or regularly support individuals of a regionally significant species or community.
- Vegetation, which would have a vegetation significance rating of 'Medium' if assessed under the DSE Vegetation Quality Assessment Manual (DSE 2004).
- Areas with unusually high native species richness, vegetation, habitat types or communities that are exceptional when compared to sites regionally.
- Corridors or habitat components that are important at a regional scale.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥5% of the bioregional breeding population of a species.
- Areas regularly used by migratory species which are declining in the bioregion, or used by ≥5% of the bioregional population of taxon.
- Known or potential feeding sites of a nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species is regionally significant.

Locally Significant

All indigenous species and communities are considered locally significant within the Central Victorian Uplands Bioregion.

Sites are considered to be of local significance if they support:

- Vegetation which would have a vegetation significance rating of 'Low' if assessed under the DSE Vegetation Quality Assessment Manual (DSE 2004).
- Corridors or habitat components important at a local scale.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥25% of the local breeding population of a species.
- Areas regularly used by migratory species which are locally declining, or use by ≥25% of local population of taxon.
- Known or potential feeding site of a nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species utilises a feeding resource that is particularly limited in the local area.

Appendix 4
Definitions of Vegetation Condition

Good Condition

Vegetation in good condition supports a diverse range of native floristic and structural components and a low cover of introduced species. Ecosystem processes are likely to be intact.

Moderate Condition

Vegetation of moderate condition supports some range of floristic and structural components with greater than 25% cover of introduced species. Some ecosystem processes may be present or disrupted in some way.

Poor Condition

Vegetation of poor condition is likely to be dominated by introduced species with a low presence of native floristic and structural components. Relevant ecosystem processes are likely to be absent.

APPENDIX 5 – MANAGEMENT ACTIONS

Action #	Management Action	Refer to section within report	Who is involved in undertaking this action?	Description of works undertaken	Issues encountered	Works still to undertake
Immediate and/or ongoing planning and liaison actions						
1	Trust for Nature covenant registered on-title of reserve	Section 4.3.10	Council, TFN			
2	Implement an adaptive management framework that increases the resistance and resilience of the reserve to the impacts of climate change	Section 4.4	Council			
3	Liaise with adjoining landowners about stock access issues, fixing boundary fencing and weed issues. A regeneration/revegetated buffer zone along southern boundary should be discussed	Sections 4.3.1., 4.3.2 & 4.7.1. Figure 3	Council and contractors, adjoining landholders			
4	Determine opportunities to maintain/improve habitat connectivity with surrounding landholders and promote involvement with conservation programs such as Trust for Nature and Land for Wildlife	Section 4.3.8	Council. landholders			
5	Explore potential partnerships with the Wurundjeri	Section 4.5	Council, Wurundjeri (WTLaCCHC)			
6	Modify fence lines across gullies	Section 4.3.1. Figure 3	Council and contractors, adjoining landholders			

7	Delineate western boundary fence line where absent	Section 4.7.1. Figure 2	Council, adjoining landholders			
8	Liaise with Parks Victoria staff (T Hill Reserve) regarding weed management and recreational user issues with the view of coordinating works	Section 4.3.2	Council and contractors, Parks Victoria			
9	Liaise with adjoining neighbours regarding invasive plants and animals, pet animals and protection and enhancement of native vegetation on their properties	Section 4.7.1	Council, landholders			
10	Promote the values of the reserve to local and regional schools and tertiary institutions	Section 4.6.5 (ii)	Council			
11	Identify management responsibilities of southern road reserves	Section 4.7.2	Council, landholders			
Immediate and/or ongoing ecological management actions						
1	Council officers, local groups and individuals encouraged to submit new species sightings to council, state govt and biological databases	Section 4.3.9	Council, contractors, residents			
2	Retain all stags, logs and coarse woody debris	Section 4.3.7	Council			
3	Install educational signage about *Phytophthora* at main entrance point	Section 4.3.3	Council			
4	Establish footwear wash-down point at main entrance gate	Section 4.3.3	Council			
5	Consider using a biodegradable fungicide to reduce the impacts of *Phytophthora*	Section 4.3.3	Council			
6	Report any sightings of Fireblight Beetle or wattle defoliation to council and Riddells Creek Landcare	Section 4.3.4	Visitors			

Immediate and/or ongoing recreation management actions						
1	Provide a walk-in entrance point on Sandy Creek Road	Section 4.6.3	Council			
2	Restrict visitor access to southern track near fence line to avoid grass trees and other vegetation	Sections 4.3.3 & 4.6.2	Council			
3	Engage the community in selecting a formal name for the reserve	Section 4.6.4	Council			
4	Install a street front sign at the entrance on Sandy Creek Road	Section 4.6.4	Council			
5	Consider placing interpretive signage within reserve	Section 4.5.2	Council			
6	Consider installing signage that directs visitors to stay on trails. Inappropriate activities may be highlighted on signage	Section 4.6.1	Council			
7	Promote the values of the reserve to bushwalkers and naturalists	Section 4.6.5 (i)	Council			
8	Consider an interpretive 'walk and gawk' tour in cooperation with the local Landcare group	Section 4.6.5 (i)	Council			
Spring - Summer						
1	Treatment of Sweet Vernal-grass populations	Section 4.3.2. Table 1. Figure 3	Council and contractors			
2	Control of populations of noxious and high-threat weeds (Gorse, Angled Onion, Blackberry, Sweet Briar)	Section 4.3.2. Table 1. Figure 3	Council and contractors			
3	Control of lower threat weed populations in reserve and along trails (Early Black Wattle, Sticky Wattle, Sweet Pittosporum, Radiata Pine, Pampas Grass, Hawthorn)	Section 4.3.2. Table 1. Figure 3	Council and contractors			
4	Undertake comprehensive flora and fauna survey in spring-summer- include targeted surveys for Hairy-leaf Triggerplant, Common Cinnamon-wattle and Dwarf Silver Wattle	Section 4.3.9	Council and contractors			

5	Monitoring (undertaken biennially)	Section 4.8	Council and contractors			

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