



ECOLOGY
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Huntly Streamside Reserve - Bendigo Creek Mining Licences (MIN5515 and MIN5512) - Flora and Fauna Assessment.



Prepared for: JBS&G

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Summary

Ecology Australia was commissioned by JBS&G (on behalf of Huntly Common Pty. Ltd.) in March 2020 to undertake a flora and fauna assessment associated with two mining licences (MIN5515 and MIN5512) along Bendigo Creek within the Huntly Streamside Reserve, Huntly.

Huntly Common propose to remove the historical sludge material deposited over the reserve from early gold mining activities, restore the original topography and water courses and then rehabilitate the creek and floodplain. The sludge material will be processed off-site.

. This assessment involves two stages:

1. A desktop review of ecological databases, models and reports along with flora and fauna field surveys to map the extent and determine the condition of native vegetation and assess the habitat suitability for rare or threatened flora, fauna and ecological communities; and
2. Once the proposed mine footprint has been determined, calculate the losses and offsets associated with vegetation removal, identify impacts to threatened species, and outline the implications and approvals required under relevant legislation and policy.

Flora

A large portion of the study site supports patches of native vegetation of two EVCs: EVC 68 Creepline Grassy Woodland and EVC 175_61 Low Rises Grassy Woodland. A total extent of 101.7 ha of Creepline Grassy Woodland was identified in 17 patches. These patches contained 577 large old trees. There was 4.1 ha of Low Rises Grassy Woodland identified in two patches at the site, which contained in total 25 large old trees. Both of these EVCs are considered Endangered.

A total of 109 vascular plant species were recorded within the study site. The majority of these (59%) were introduced, with 45 (41%) species of species being indigenous to the site. A total of 29 rare or threatened plant species have previously been recorded or have habitat modelled within 5 km of the study area. Of these, one was recorded within the study area during surveys for this project (Whirrakee Wattle *Acacia williamsonii*): note, individuals of this species recorded have been recently planted. No other rare or threatened flora species were recorded during the survey.

Three EPBC Act-listed ecological communities were modelled as potentially occurring within 5 km of the site. However, none were identified within the study area. The floristic components of the site do not match any of the communities.

A total of 220 indigenous scattered trees (isolated trees, alive and dead) were recorded within the reserve. The majority of these scattered trees (154; 70%) were River Red Gum *Eucalyptus camaldulensis*. A total of 42 trees (19%) were considered to be large scattered trees.

Fauna

A total of 49 fauna species were recorded for the study area during the site visit, comprising 41 species of birds (all native), three species of mammal (two introduced species), two species of reptile and two species of frog and one aquatic invertebrate. No threatened species were recorded during the site visit.

A total of 68 significant fauna species have previously been recorded or had habitat modelled within 5 km of the study area. A catchment based search for aquatic fauna yielded no additional significant fauna

species. Of the 68 significant fauna species, 22 species are considered to have a moderate likelihood of occurrence in the study area. The majority of these species are unlikely to be significantly impacted by proposed vegetation and fauna habitat clearance. However, some of these species may require further work and will need the impacts of the proposed works to be formally assessed. In particular, additional surveys of the project area are required to determine the presence or absence of the EPBC-listed Flat-headed Galaxias, Swift Parrot *Lathamus discolor* and Growling Grass Frog *Litoria raniformis*, FFG-listed Phascogale *Phascogale tapoatafa tapoatafa* and large forest owls (Barking Owl *Ninox connivens* and Powerful Owl *Ninox stenua*) and Advisory listed Brown Toadlet *Pseudophryne bibronii*.

Recommendations

In the absence of a current proposed mine footprint, the following recommendations are made to avoid and minimise impacts to biodiversity values within the reserve and further assessments required:

- Identify potential design options for the mine and measures that could avoid and minimise significant impacts on native vegetation, waterway habitat and threatened species. This should include:
 - Avoidance of native vegetation where possible.
 - Where this is not possible, mitigate impacts through minimising of the extent of native vegetation removal, avoiding the areas of highest quality and minimising the loss of large old trees.
- Once the mine footprint is known, calculation of the native vegetation losses and offsets under the Victorian *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017).
- Once the mine footprint is known, assess the direct and indirect effects of the project on threatened fauna (i.e. threatened species listed under the EPBC Act, the FFG Amendment Act, DELWP Advisory Lists and or migratory species listed under the EPBC Act).
- If proposed native vegetation clearance has the potential to reach 10 ha, a detailed assessment of referral criteria under the *Environmental Effects Act 1978* needs to be undertaken to determine whether the project requires referral to the relevant Minister regarding the need for an Environmental Effects Statement.
- Assessment of permits and approvals under other relevant legislation and policy once the mine footprint has been confirmed.

1 Introduction

Ecology Australia was commissioned by JBS&G (on behalf of Twenty-Seventh Yeneb Pty. Ltd.) in March 2020 to undertake a flora and fauna assessment associated with two mining licences (MIN5515 and MIN5512) along Bendigo Creek within the Huntly Streamside Reserve, Huntly. Huntly Common propose to remove the historical sludge material deposited over the reserve from early gold mining activities, restore the original topography and water courses and then rehabilitate the creek and floodplain. The sludge material will be processed off-site.

The report will:

- Detail the flora and fauna values present within the Huntly Streamside Reserve;
- Identify and map the extent and condition of native vegetation (Ecological Vegetation Classes, Scattered Trees and Large Trees within patches) and fauna habitat;
- Identify legislative implications of future developments of the site (under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Victorian *Flora and Fauna Guarantee Act 1988*, *Environmental Effects Act 1978*, *Planning and Environment Act 1987* and the *Catchment and Land Protection Act 1994*;
- Outline policy implications of any proposed clearance of native vegetation under Victoria's Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017); and
- Identify any further targeted survey work required for future development applications.

2 Study Area

The assessment was undertaken within the 216 ha Huntly Streamside Reserve that extends between Epsom and Huntly North along the riparian corridor of Bendigo Creek. Specifically, the study area comprises the area covered by the two mining licences (MIN5515 and MIN5512) that is located within the reserve and adjoining private land, covering approximately 170 ha between Leans Road in the south and Millwood Road, Huntly in the north (Figure 1). While the mining lease areas extended slightly beyond the reserve boundary, access was not possible within private land adjoining the reserve (stock present) and as such mapping was restricted to that within the public land only.

Huntly Streamside Reserve is located on public land managed by Parks Victoria and is bounded by private farmland in the east and west. Greater Bendigo National Park and Whipstick Nature Conservation Reserve are located one kilometre and 360 m to the west of the reserve respectively.

The study area is located within the Greater Bendigo Municipality. Under the Greater Bendigo Planning Scheme the following zones and overlays apply:

- Public Conservation and Resource Zone (PCRZ) with Farming Zone (FZ);
- Bushfire Management Overlay (BMO);
- Environmental Significance Overlay, Schedules 1 and 2 (ESO1, and ESO2);
- Land Subject to Inundation, Schedule 1 and 2 (LSIO1 and LISO2);
- Vegetation Protection Overlay, Schedule 1 and 2 (VPO1 and VPO2).

The study area is located along the boundary of two Bioregions. The majority of the study area is modelled within the Victorian Riverina, with a smaller area of the reserve on the central west side within the Goldfields Bioregion. On-site it was determined that the entire site was treated as occurring within the Victorian Riverina bioregion. This decision was made by taking into account the modelled data, the landscape setting and the EVC descriptions. Despite this determination, there is clear evidence of influence from the Goldfields Bioregion, as would be expected at the boundary of two bioregions. This is particularly evident in the species composition on the dominant canopy species. The modelled pre-1750s Ecological Vegetation Class mapping (DEWLP 2020b) for the study area shows that Creekline Grassy Woodland EVC 68 covers the entirety of the site.

The geomorphology of Bendigo Creek has substantially changed since European settlement. Engineering works including a levee bank and creek channel were constructed along the eastern side of the reserve during Bendigo's mining era with the aim of reducing flooding and silting across adjacent farmland. Further, levee banks and drains were constructed within the reserve along the western edge (Northern Bendigo Landcare Group 2017). The channel bed is currently deeply eroded and well below the level of the original creek bed.

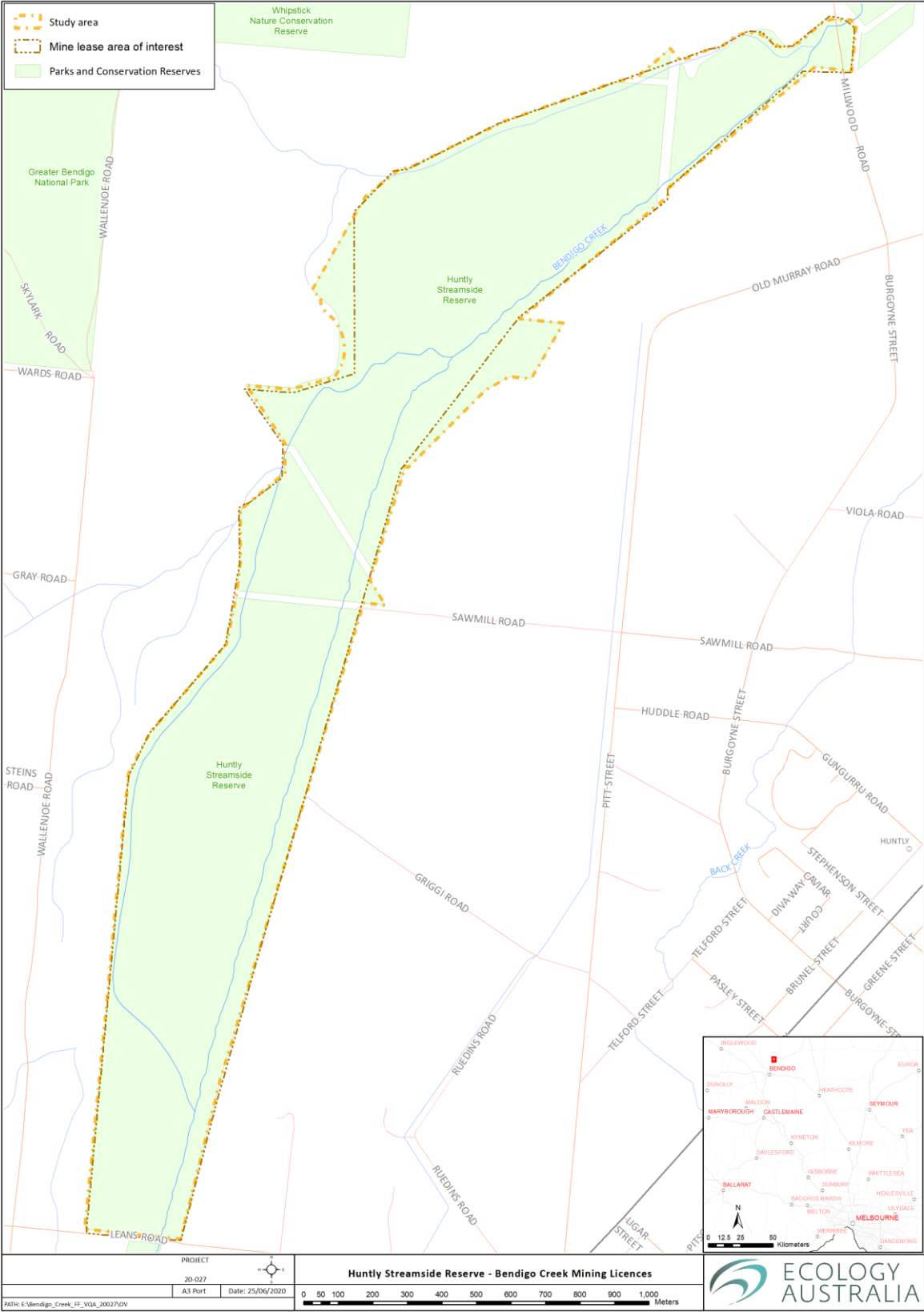


Figure 1 Study area: Huntly Streamside Reserve and Mining Leases covering the site, Huntly Victoria.

3 Methods

3.1 Desktop Review

A desktop review was conducted to compile:

- Flora and terrestrial fauna records within 5 km of the study site held in DELWP's Victorian Biodiversity Atlas (VBA) online database (DELWP 2020a);
- Aquatic fauna records from Bendigo Creek between Bendigo and Kow Swamp;
- Records of ecological communities and flora and terrestrial fauna species listed under the EPBC Act within a 5 km radius of the study area using the EPBC Protected Matters Search Tool (DAWE 2020);
- Records of aquatic fauna and ecological communities listed under the EPBC Act within a 5 km radius of Bendigo Creek between Bendigo and Minto using the EPBC Protected Matters Search Tool (DAWE 2020);
- Ecological Vegetation Class (EVC) mapping/modelling of the area (both extant and pre-1750) from DELWP's NatureKit interactive map (DELWP 2020b);
- Review of any relevant GIS data and aerial photography;
- The Victorian Planning Schemes online (DTPLI 2020);
- Publically available Landcare reports; and
- Any additional relevant legislation, government policies and strategies.

3.2 Field Assessment

A field survey was undertaken by an ecologist and botanist on 22-24 April and 5 May 2020. Instream habitat of Bendigo Creek was not assessed. Aquatic ecological assessment consisted of a desktop assessment aided by photos and discussion with ecologists and botanists who undertook the field survey.

3.2.1 Flora Survey

Indigenous vegetation was assigned to an Ecological Vegetation Class (EVC) by reference to DELWP's EVC modelling (DELWP 2020b) and EVC benchmarks (DELWP 2020c). Following the definitions presented in the Guidelines, native vegetation was classified as either a remnant patch or scattered tree (DELWP 2017a):

- A patch of native vegetation is:
 - An area of vegetation where at least 25% of the total perennial understorey plant cover is native¹; or

¹ Native plants are species that are indigenous to Victoria, including trees, shrubs, herbs and grasses.

- Any area with three or more native canopy trees² where the drip line³ of each tree touches the drip line of at least one other tree, forming a continuous canopy; or
- Any mapped wetland including the Current Wetlands map, available in the DELWP systems and tools.
- A scattered tree is:
 - A native canopy tree that does not form part of a patch.

A Vegetation Quality Assessment (Habitat Hectare Assessment) was undertaken for patches of native vegetation following DELWP's Vegetation Quality Assessment Manual (DSE 2004).

An inventory of plant species was recorded for the study site and an assessment of the likelihood of rare or threatened species or communities was undertaken.

Photos were taken of all habitat zones recorded on-site.

3.2.2 Fauna Survey

The study area was assessed for its terrestrial fauna habitat values and potential to support threatened terrestrial fauna species. The assessment involved review of aerial photographs to gain an appreciation of the vegetation cover on site, and regionally, and to place the study area in a broader landscape context. This was followed by the site inspection.

The site inspection focused on the extent of native vegetation cover, composition and structure of the vegetation, as well as other features important in determining habitat quality. For example, the presence or absence of nectar-producing and hollow-bearing trees, the level of disturbance (e.g. weed invasion) and ground-layer characteristics, including leaf litter and logs. Other habitat attributes noted included:

- size and shape of vegetation patches;
- presence of specific habitat features (e.g. hollows or moist depressions);
- connectivity (habitat links, adjoining native vegetation or conservation reserves); and
- structural heterogeneity of the vegetation.

All vertebrates either directly observed or heard calling (e.g. birds and frogs) during field surveys, were recorded to compile an inventory of terrestrial fauna species utilising the site. Observers also used indirect evidence to detect the presence of animals, including bird nests, possum dreys, scats (droppings), diggings, tracks or burrows.

The instream habitat of Bendigo Creek was not assessed. The assessment of aquatic fauna habitat values and potential to support threatened aquatic fauna species was based on a desktop assessment, aided by examination of photos taken during the site visit.

² A native canopy tree is a mature tree (i.e. able to flower) > 3m high and normally found in the upper layer of the relevant vegetation type.

³ The dripline is the outermost boundary of a tree canopy (leaves and/or branches) where the water drips on to the ground.

3.3 Likelihood of Presence

Determining likelihood of presence is a subjective process that takes into consideration:

- Site attributes, including size, shape and landscape context;
- Number, age and distribution of previous records, taking into account the likely survey history, in terms of intensity and frequency;
- Documented habitats and ecological requirements for the taxon in question; and
- Presence of suitable habitat within the study area, based on the site assessment.

A general description of likelihood rankings is provided below in Table 1.

Table 1 Definitions of likelihood of presence in the project area

Likelihood	Definition
Not likely	Study area is located outside the known geographic range for the taxon or does not contain necessary landscape features and/or habitats documented for that taxon.
Low	Study area lies within, or on the edge, of the geographic range for the taxon, and supports major habitat elements, but is lacking in one or more critical features, or is located within a landscape that will most likely preclude occupancy or regular use. Historic records may be supported by more recent records within 5 km of the study area or from within the relevant catchment (aquatic fauna).
Moderate	The location and geographic features of the study area match that which is known for the taxon. Habitat shares numerous floristic, structural or physical similarities with documented habitats, but may be limited with regard to one or more known ecological requirements (e.g. size, landscape context or critical resources). Historic and contemporary records occur within 5 km of the study area and/or the broader region or relevant catchment (aquatic fauna).
High	Location of the study area lies within the known range and distribution for the taxon. Habitats present within the study area match that documented for the taxon with regard to floristics and/or structure and satisfy the known ecological requirements. Multiple historic and recent records within the surrounding landscape indicate occurrence or regular use of the area.
Present	Taxon recorded within the study area during the current assessment or other recent assessment.

3.4 Conservation Status

Species conservation status was determined by reference to DELWP's advisory lists (DEPI 2014, DSE 2013, DSE 2009) and listings under the FFG Act 1988 and the EPBC Act 1999.

3.5 Limitations

The seasonality of some plant species provides a limitation to the field survey. Some species are not visible in autumn when the surveys were undertaken or can only be identified to genus level due to the lack of fertile material at the time of the assessment.

Due to the short duration, timing and limited extent of the terrestrial fauna survey (i.e. diurnal observations only), some species that utilise the study area may not be recorded. In particular the cryptic and rare fauna species that are often the focus of threatened species legislation cannot always be expected to be detected, particularly outside active seasons or during brief surveys or when weather conditions / temperatures are suboptimal for a species. The aquatic fauna assessment was a cursory assessment only and was undertaken wholly on the basis of a desktop assessment.

These limitations were partially overcome through the use of databases, reviewing relevant literature and assessing habitat suitability for threatened species. However, the accuracy and coverage of the VBA and other sources used in the desktop review is variable and strongly influenced by whether previous ecological surveys have been undertaken in the area or catchment (aquatic fauna). Hence, the absence of species records is not necessarily indicative of that species' absence, particularly where few or no targeted surveys have been undertaken.

3.6 Nomenclature and Taxonomy

Plant taxonomy and the use of common names follow the online Flora of Victoria (VicFlora 2020) and the Victorian Biodiversity Atlas (DELWP 2020a).

The scientific names, common names, and systematic orders of fauna species follow the Victorian Biodiversity Atlas (DELWP 2020a). In general, common names are used in the text.

Where an asterisk (*) precedes a plant or animal name, it is used to signify non-indigenous taxa, those species which have been introduced to Victoria or Australia. A hash (#) is used to denote Victorian native plants that are not indigenous to the relevant vegetation type.

4 Values

4.1 Landscape Context

The Huntly Streamside Reserve is situated along the riparian corridor and floodplain associated with Bendigo Creek. Overall, Bendigo Creek stretches over 150 km in length, originating at the Big Hill Range south of Kangaroo Flat, travelling through the highly urbanised city centre of Bendigo before moving through the rural landscape in the north, eventually meeting Mount Hope Creek within the Terrick Terrick National Park.

The Huntly Streamside Reserve is situated in a rural setting and is surrounded by private farmland to the east and west that support small patches of native vegetation and scattered trees (see Figure 1 to 5). The creek and woodland habitat provide important connectivity along the riparian corridor extending north and south of the study area on public land. While native vegetation on private land immediately surrounding the reserve is highly fragmented and cleared, there are large areas of core habitat in relatively close proximity including Whipstick Nature Conservation Reserve and Greater Bendigo National Park, located approximately 365 m to the north-west and one kilometre to the west of the reserve. Bendigo Regional Park and Wellsford State Forest are 2.6 km to the south-east and 6 km to the east of the study area respectively.

Evidence of degradation from past land use is evident in the condition of the vegetation remaining on-site. Large areas within the study area have very little remaining native understorey and are dominated by exotic vegetation. Current land uses are continuing to degrade habitat values on-site including:

- unrestricted access for four-wheel driving;
- soil disturbance from harvesting of moth and beetle larvae (e.g. bait for fishing);
- Illegal firewood collection; and
- Shooting. Many cartridge shells were also observed on site and direct evidence of two White-winged Choughs *Corcorax melanorhamphos* that had been shot were recorded on-site.

The plan *Reimagining Bendigo Creek* (City of Greater Bendigo, 2020) described how the landform of this section of the Bendigo Creek has been altered, steeply sided banks, as a result of the mobilisation of sediments from mine tailings during the Gold Rush era.

More recently, approximately 23ha of native vegetation patch (Habitat Zone 8) and additional areas of exotic vegetation were burnt in January 2020 (Bushco, pers. comm, 23-4-20).

Bendigo North Landcare Group have been actively involved in rehabilitating, enhancing and protecting the biodiversity values on-site through a number of projects including: nest box installation and monitoring; and revegetation, weed control and small grazing exclusion plots.

4.2 Flora

A combined total of 109 vascular flora taxa were recorded within the study area during the field surveys in April and May 2020 (Appendix 1). Of these, 45 (41 %) are indigenous species and 64 (59 %) are exotic

(Appendix 1). Of the 45 indigenous taxa, 11 species were recorded as only occurring as planted individuals.

4.2.1 Vegetation Communities

Extant Ecological Vegetation Class (EVC) modelling for the study area (DELWP 2020b) identifies Creepline Grassy Woodland (EVC 68) occurring across the majority of the reserve. This EVC is also mapped across the entire study area in the pre-1750 modelling (DELWP 2020b). This EVC was confirmed to be present on site during the surveys, along with small areas of Low Rises Grassy Woodland (EVC 175_61). The location of each EVC is mapped in Figures 2 to 5 and a summary of each is provided below. An account of non-native vegetation (exotic pasture with Sharp Rush and exotic trees) is also provided.

Creepline Grassy Woodland (EVC 68)

Seventeen patches of Creepline Grassy Woodland were recorded in the study area, occurring mostly along the waterways and on the adjoining floodplains. The extent of this EVC at the site is 101.7 ha and contains 577 large old trees.

The dominant canopy species in this community was River Red Gum *Eucalyptus camaldulensis* (Plate 1), with scattered Grey Box *Eucalyptus microcarpa*, Yellow Box *Eucalyptus melliodora* and occasional Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa*. Most areas had an understorey dominated by exotic grasses (e.g. Barley Grass *Hordeum sp.*, Great Brome *Bromus diandrus* and Barbed Oat *Avena barbata*), herbs (*Erodium brachcarpum*), and rushes (Sharp Rush *Juncus acutus*). Indigenous grasses such as Wallaby Grasses *Rytidosperma* spp. and Spear Grasses *Austrostipa* spp. were scattered throughout and were prominent in some small areas.

One patch (Habitat Zone 7) was comprised mostly of regenerating River Red Gums *Eucalyptus camaldulensis*.

Habitat Zone 8 was recently burnt by a wildfire in January 2020 (Plate 2). This fire has altered the vegetation structure of these zones, having removed most of the understorey vegetation layer. Presence of burned tussocks suggests these areas were dominated by exotic grasses, forbs and Sharp Rush *Juncus acutus* like most of the site. The fire severely impacted these habitat zones with some trees having been entirely burnt out, leaving large holes in the ground (approximately 1 – 1.5m deep) where the trees stood. Some trees that were severely damaged by the fire have also been lopped or removed entirely.

Along the waterways, the patches of Creepline Grassy Woodland include the indigenous vegetation supported within the riverbed. These riverbeds primarily comprised of Cumbungi *Typha spp.* (due to a lack of fertile material the species was unable to be determined). This structure and nature of these *Typha spp.* patches is consistent with the Tall Marsh EVC, however, given the landscape setting and that these patches are contiguous with Creepline Grassy Woodland, these have been mapped as part of the Creepline Grassy Woodland.

Several areas throughout the site had understorey revegetation carried out with the planting of indigenous species. Some of these patches included plantings of shrubs such as Lightwood *Acacia implexa* in the understorey of Creepline Grassy Woodland. Other areas contained planted grasses such as Kangaroo Grass *Themeda triandra* and Long-awned Wheat Grass *Anthosachne scabra*. These latter plantings were often inside small, fenced enclosures and were therefore protected from rabbit grazing.

Some of these revegetation areas, where native cover was at least 25%, were included within the patches.

Low Rises Grassy Woodland (EVC 175_61)

Two patches of Low Rises Grassy Woodland (EVC 175_61) were recorded in the study area on the more elevated sites with better drainage. These are Habitat Zone 12A and B (Figure 3; Plate 3) which occupies 4.1 ha and contains 25 large old trees. Canopy Species dominant in this community were largely Grey Box and Yellow Gum, with the occasional River Red Gum.

Habitat Zone 12 A and B comprise some of the highest quality sites in the study area. These zones contained an intact understorey with low weed cover, high organic litter cover and comparably high number of native understorey species. The ground- and mid-storey vegetation contained various Wallaby Grasses *Rytidosperma spp.* and Spear Grasses *Austrostipa spp.* as well as shrubs such as Short-leaf Bluebush *Maireana brevifolia*, Ruby Saltbush *Enchylaena tomentosa var. tomentosa* and Common Rice-flower *Pimelea humilis*.

Exotic vegetation and scattered trees

Large areas within the study area, typically the centre of the reserve, were lacking in continuous tree cover and were dominated by exotic species, primarily Sharp Rush and exotic grasses such as Barely Grasses **Hordeum spp.* Great Brome and Barbed Oat (Plate 4). Other exotic forbs were scattered throughout these areas such as Soursob *Oxalis pes-caprae*, Clustered Clover **Trifolium glomerata* and Common Heron's-bill **Erodium cicutarium*.

A total of 220 indigenous scattered trees (isolated trees, alive and dead) were recorded within the reserve. The majority of these scattered trees (154; 70%) were River Red Gum. However there were also scattered Grey Box, Yellow Box and Yellow Gum trees. A total of 42 trees (19%) were considered to be large scattered trees. All scattered trees occurring at the site are documented in Appendix 4, with locations mapped in Figure 2 - 5.

Table 2 Habitat Scores for patch vegetation in Habitat Zones 1 to 13.

* Habitat Zone 11 occurs outside of the Huntly Streamside Reserve on private property. This native patch of vegetation was mapped from the public reserve, with the number of large trees estimated. Other scores within the Site Condition were not able to be assessed without access to the property, and therefore no Habitat Score is attributed to this patch. If the mining footprint, when determined, will impact on this habitat zone then access to this land will need to be arranged and a follow-up survey to confirm the large tree estimates and complete the remaining scores.

Habitat Zone			HZ1	HZ2	HZ3	HZ4	HZ6a	HZ6b	HZ6c	HZ6e	HZ6g	HZ6h	HZ6i	HZ6j	HZ7	HZ8	HZ11*	HZ12a	HZ12b	HZ13
Bioregion			VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR
Conservation status			En	En	En	En	En	En	En	En	En	En	En	En	En	En	En	En	En	En
EVC # Name			68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	68 CGW	175_61 LRGW	175_61 LRGW	68 CGW
		Max Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score
Site Condition	Large Old Trees	10	6	6	3	10	6	4	4	8	6	4	6	4	0	10	10	4	6	0
	Canopy Cover	5	5	5	5	5	5	5	5	5	5	5	5	5	0	4	NA	5	5	5
	Understorey	25	15	5	15	5	15	15	15	15	15	15	15	15	5	5	NA	15	15	5
	Lack of Weeds	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	0	0	0
	Recruitment	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	NA	1	1	1
	Organic Matter	5	5	5	5	0	5	5	5	5	5	5	5	5	3	5	NA	5	5	3
	Logs	5	3	5	5	0	5	5	5	5	5	5	5	5	0	5	NA	0	0	0
	Total Site Score	75	35	27	34	21	37	35	35	39	37	31	37	35	9	30	NA	30	32	14
	EVC standardiser (e.g. 75/55)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Adjusted Site Score		35	27	34	21	37	35	35	39	37	31	37	35	9	30	10	30	32	14	
Landscape value	Patch Size	10	1	2	1	1	4	8	2	2	1	8	1	4	4	8	1	2	1	1
	Neighbourhood	10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Distance to Core	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Habitat Score	100	42	35	41	28	47	49	43	47	44	45	44	45	19	44	NA	38	39	21	
Habitat points = #/100	1	0.42	0.35	0.41	0.26	0.47	0.49	0.43	0.47	0.44	0.45	0.44	0.45	0.19	0.44	NA	0.38	0.39	0.21	
Large Old Trees in patch		6	27	1	5	44	209	26	55	2	58	8	44	0	84	8	14	11	0	

4.2.2 Threatened Ecological Communities

Three EPBC Act-listed ecological communities were modelled as potentially occurring within 5 km of the site:

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

None of these ecological communities were identified within the study area. The floristic components of the site do not match any of the communities.

It should be noted that while Grey Box *Eucalyptus microcarpa* occurred across the site, these trees were scattered amongst the more common River Red Gum *Eucalyptus camaldulensis* in the Creekline Grassy Woodland patches and Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa* in the Low Rises Woodland patches. As these woodlands only contain Grey Box as a minor component they therefore do not meet the criteria of the listed Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.

4.2.3 Rare and Threatened Species

A total of 29 rare or threatened plant species has been previously recorded (DELWP 2020a) or had habitat modelled (DAWE 2020) within 5 km of the study area (once erroneous records have been excluded). This includes 5 EPBC Act-listed species and 6 FFG Act-listed species (Appendix 2). A likelihood of presence (LOP) has been assigned to each of these species based on criteria outlined in Section 3.3.

Only one rare or threatened flora species was recorded within the study area. This was the Whirrakee Wattle *Acacia williamsonii* which is classified as Rare on the Advisory list of rare or threatened plants in Victoria (DEPI 2014). The individuals of the Whirrakee Wattle occurring in the Huntly Streamside Reserved appeared to be planted, most likely by the local Landcare group: Northern Bendigo Landcare Group.

No other rare or threatened flora species were regarded to have a moderate or higher likelihood of presence within the study area.



Plate 1 Creekline Grassy Woodland in Habitat Zone 2 showing River Red Gum *Eucalyptus camaldulensis* canopy trees and a disturbed understorey.



Plate 2 A burnt patch of Creekline Grassy Woodland in Habitat Zone 8. The fire has created a substantial amount of bare ground under River Red Gum *Eucalyptus camaldulensis* and Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa*.



Plate 3 Habitat Zone 12B with a canopy dominated by Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa* and Grey Box *Eucalyptus macrocarpa*. This patch was relatively high quality native vegetation and contained an intact understory with low weed cover.



Plate 4 Large areas of the Huntly Streamside Reserve are dominated by exotic grasses and Sharp Rush *Juncus acutus*.



Figure 2 Patches of native vegetation (Creekline Grassy Woodland) and scattered trees (large and small) in the northern section of study area at the Huntly Streamside Reserve



Figure 3 Patches of native vegetation (Creekline Grassy Woodland and Low Rises Grassy Woodland) and scattered trees (large and small) in the middle-north section of study area at the Huntly Streamside Reserve

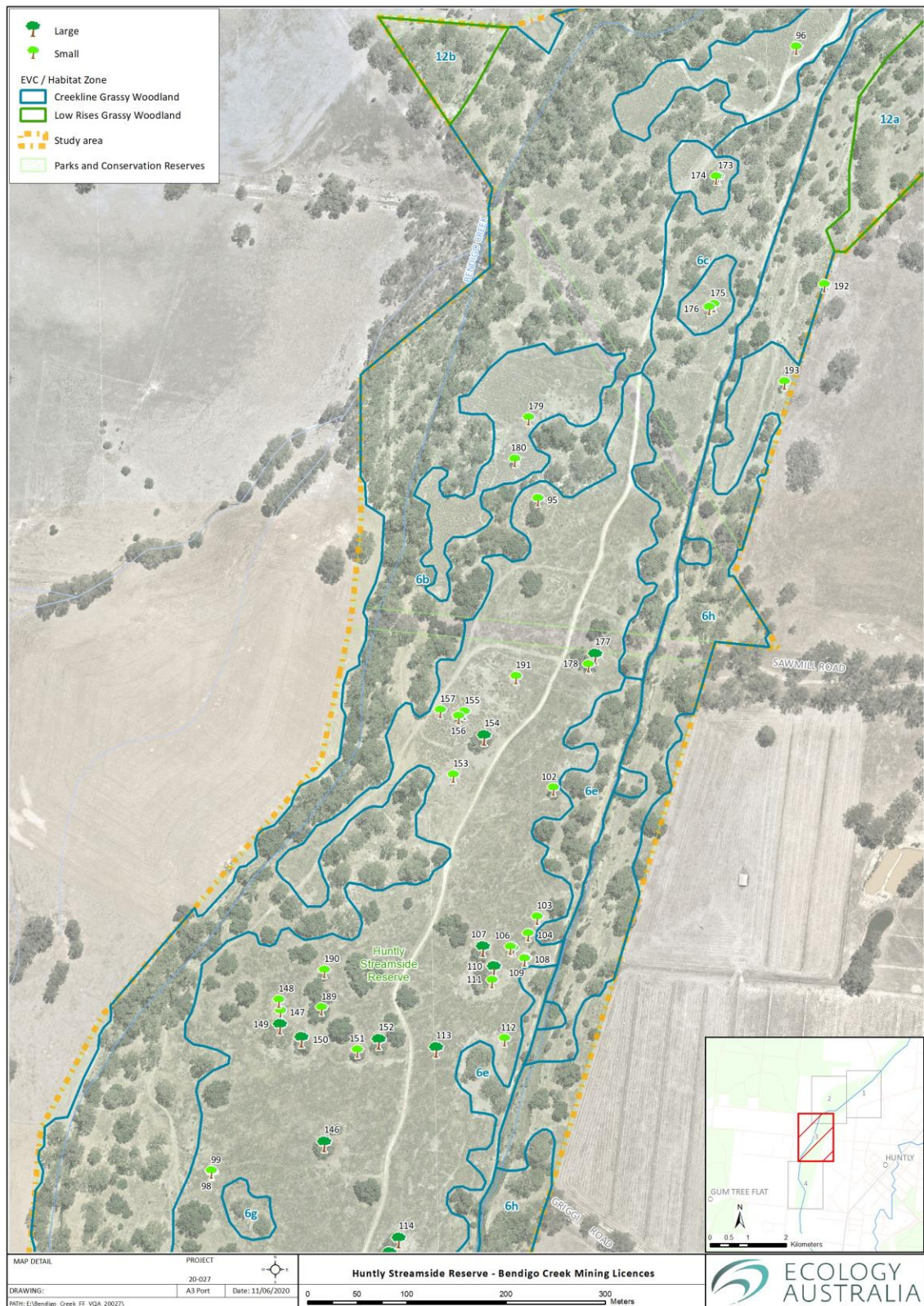


Figure 4 Patches of native vegetation (Creekline Grassy Woodland and Low Rises Grassy Woodland) and scattered trees (large and small) in the middle-south section of study area at the Huntly Streamside Reserve

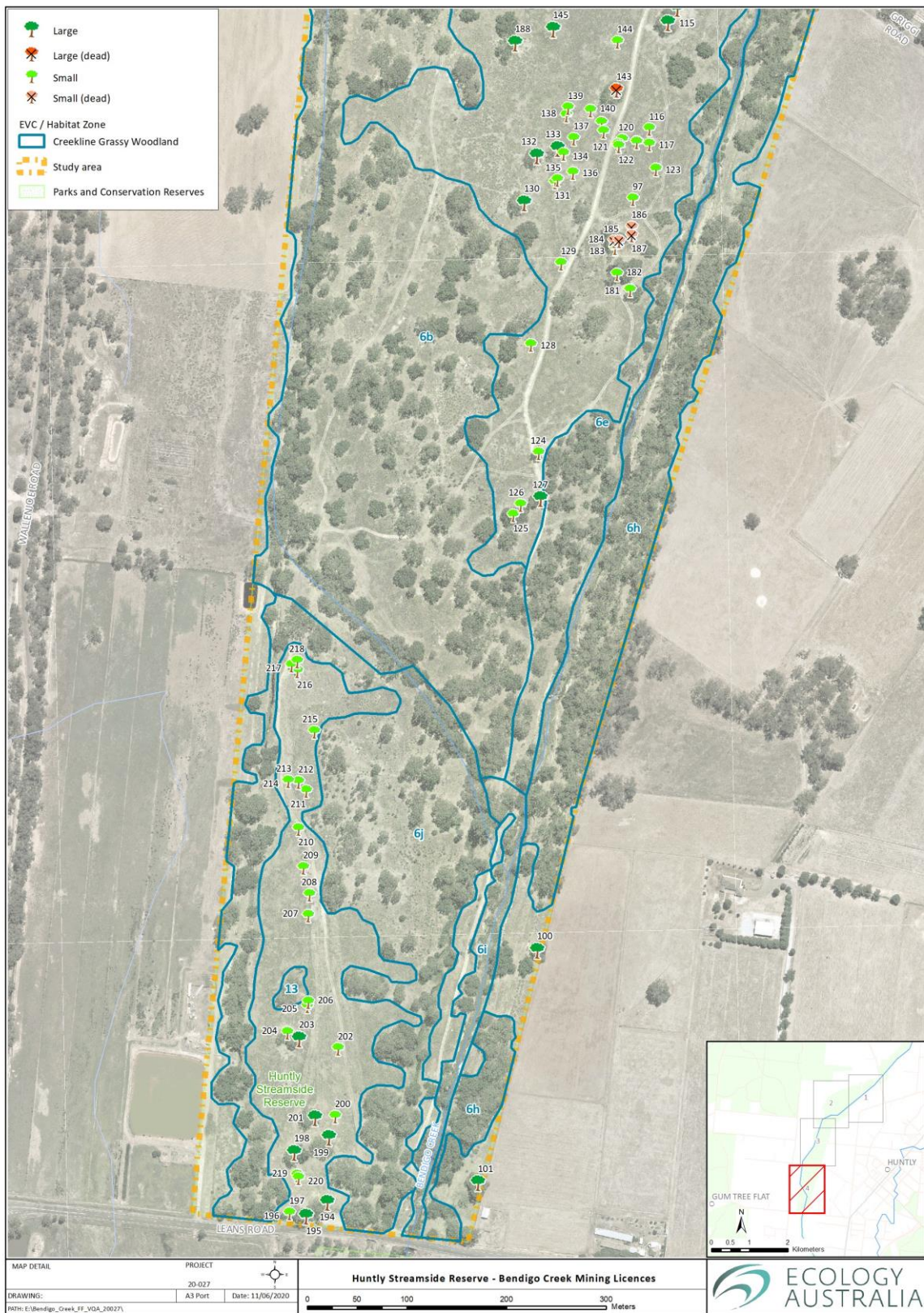


Figure 5 Patches of native vegetation (Creekline Grassy Woodland) and scattered trees (large and small) in the southern section of study area at the Huntly Streamside Reserve

4.3 Fauna

4.3.1 Fauna Species Recorded

A total of 49 fauna species were recorded for the study area during the site visit, comprising 41 species of birds (all native), three species of mammal (two introduced species), two species of reptile and two species of frog and one aquatic invertebrate (Table 3). No threatened species were recorded during the site visit.

Table 3 Fauna species recorded during the field assessment – Huntly Streamside Reserve, 22-24 April and 5 May 2020.

Ma – listed under the Marine overfly schedules of the EPBC Act.

Scientific Name	Common Name	Conservation Status
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	
<i>Coturnix pectoralis</i>	Stubble Quail	Ma
<i>Geopelia placida</i>	Peaceful Dove	
<i>Phaps chalcoptera</i>	Common Bronzewing	
<i>Egretta novaehollandiae</i>	White-faced Heron	
<i>Anas superciliosa</i>	Pacific Black Duck	
<i>Aquila audax</i>	Wedge-tailed Eagle	
<i>Falco berigora</i>	Brown Falcon	
<i>Glossopsitta concinna</i>	Musk Lorikeet	
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	
<i>Cacatua tenuirostris</i>	Long-billed Corella	
<i>Eolophus roseicapilla</i>	Galah	
<i>Platycercus elegans</i>	Crimson Rosella	
<i>Platycercus eximius</i>	Eastern Rosella	
<i>Psephotus haematonotus</i>	Red-rumped Parrot	
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	
<i>Hirundo neoxena</i>	Welcome Swallow	Ma
<i>Rhipidura albiscapa</i>	Grey Fantail	
<i>Rhipidura leucophrys</i>	Willie Wagtail	
<i>Microeca fascinans</i>	Jacky Winter	
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	
<i>Grallina cyanoleuca</i>	Magpie-lark	Ma
<i>Falcunculus frontatus</i>	Eastern Shrike-tit	
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Ma
<i>Acrocephalus australis</i>	Australian Reed Warbler	Ma
<i>Malurus cyaneus</i>	Superb Fairy-wren	
<i>Pardalotus punctatus punctatus</i>	Spotted Pardalote (coastal)	
<i>Nesoptilotis leucotis</i>	White-eared Honeyeater	
<i>Ptilotula penicillata</i>	White-plumed Honeyeater	

<i>Manorina melanocephala</i>	Noisy Miner	
<i>Anthochaera chrysoptera</i>	Little Wattlebird	
<i>Anthochaera carunculata</i>	Red Wattlebird	
<i>Corcorax melanorhamphos</i>	White-winged Chough	
<i>Strepera graculina</i>	Pied Currawong	
<i>Strepera versicolor</i>	Grey Currawong	
<i>Cracticus torquatus</i>	Grey Butcherbird	
<i>Cracticus tibicen</i>	Australian Magpie	
<i>Corvus coronoides</i>	Australian Raven	
<i>Corvus mellori</i>	Little Raven	Ma
<i>Pardalotus striatus</i>	Striated Pardalote	
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	
<i>Oryctolagus cuniculus</i> *	European Rabbit	
<i>Vulpes vulpes</i> *	Red Fox	
<i>Morethia boulengeri</i>	Boulenger's Skink	
<i>Ctenotus spaldingi</i>	Eastern Large Striped Skink	
<i>Crinia signifera</i>	Common Froglet	
<i>Litoria ewingii</i>	Southern Brown Tree Frog	
<i>Cherax destructor destructor</i>	Common Yabby	

4.3.2 Fauna Habitats

Three main fauna habitats are supported in the study area and are described below.

Woodland

The study area supports large areas of modified Creekline Grassy Woodland and small patches of higher quality Low Rises Grassy Woodland on the more elevated sites. The woodland maintains an almost continuous canopy along the creek on both the west and east branches.

The trees provide numerous habitat features for a diverse range of fauna, including roosting and nesting habitats and food resources. There are many large to very large old trees across the site, both within patches and scattered trees (Plate 5). These large old trees provide a range of hollow sizes for hollow dependant species including birds (e.g. Sulphur-crested Cockatoos *Cacatua galerita*, Galahs *Eolophus roseicapilla* and Musk Lorikeets *Glossopsitta concinna* observed frequently on-site), arboreal mammals (e.g. Sugar Gliders *Petaurus breviceps* that have been previously recorded during nest box monitoring by the Bendigo North Landcare Group). The woodland habitat also provides large hollows capable of supporting owls, including the non-threatened Southern Boobook *Ninox boobook* and the FFG-listed Barking Owl and Powerful Owl, discussed further below. The dense foliage of the exotic *Peppercorn *Schinus molle* found across the entire site provides suitable roosting habitat for large forest owls. Woodland habitat in Habitat Zone 12 a and b (Low Rises Grassy Woodland) support rough-barked Grey Box with hollows that may support FFG-listed Brush-tailed Phascogale (discussed further below).

Flowering eucalypts provide a foraging resource for birds such as honeyeaters (White-eared Honeyeater *Nesoptilotis leucotis*, White-plumed Honeyeater *Ptilotula penicillata*) and rosella's (e.g. Eastern Rosella *Platycercus eximius*) and arboreal mammals. The flowering eucalypts also provide foraging habitat for

two EPBC-listed fauna species including the Grey-headed Flying Fox *Pteropus poliocephalus* and Swift Parrot *Lathamus discolor*, both discussed further below.

The rough-barked eucalypts and shed bark harbours invertebrates, providing feeding resources for insectivorous birds such as Crested Shrike Tit *Falcunculus frontatus* recorded during the assessment and potential foraging habitat for FFG-listed Brush-tailed Phascogale and Brown Treecreeper listed under the DELWP Advisory list. Hanging bark also provides roosting habitat for fauna such as the White-striped Freetail Bat *Tadarida australis*.

The habitat values for ground dwelling fauna have been highly altered and degraded from past and current land use practices including silt deposition from flooding, construction of levee banks and channels, grazing and 4WD driving. In most areas the understorey is dominated by exotic herbs (e.g. *Sour Sob grasses and *Sharp Rush), with a sparse cover of native grasses (e.g. Wallaby Grasses and Spear Grasses). These past land uses are likely to have significantly altered the ground dwelling fauna on-site with only two species of reptile Boulenger's Skink *Morethia boulengeri* and Eastern Large Striped Skink *Ctenotus spaldingi* found during the field assessments.

Waterways and wetland habitats

The study area is situated along a 4.1 km section of the riparian corridor associated with Bendigo Creek. Within the study area and beyond, the creek has been substantially altered since European settlement. In the study area these changes include mitigation works associated with reducing flooding and silting into the adjacent farmlands during the mining era through the construction of levee banks and a creek channel along the eastern side of the reserve in the southern end. Further levee banks and drains were constructed within the reserve along the western edge (Northern Bendigo Landcare Group 2017). The creek banks are heavily incised (see Plate 6). An altered hydrological regime including stormwater runoff (i.e. higher peak flow velocities following significant rainfall events) from urbanised areas of the catchment (e.g. Bendigo) are expected to have contributed to these issues within the study area.

The substrate of the creek is comprised of an alternating mix of finer sand/silt and coarse sand / gravel. There was an abundance of woody debris from large and small fallen logs, together with branches, leaves and twigs in some areas. At the time of the assessment, hydraulic habitats varied from slow-flowing glides, faster flowing runs and riffles and the occasional pool or backwater with little or no flow. Pools and sections of faster flowing waters were present during the assessment (Plate 7). Aquatic plants such as *Typha* spp. were present along large sections of the creek, particularly on the east side with a number of areas completely choked. Despite the heavy modification, the creek continues to provide habitat for a range of fauna including fish (e.g. Carp Gudgeon *Hypseleotris* sp. and Australian Smelt *Retropinna semoni*), decapod crustaceans (Common Yabby *Cherax destructor*, Common Shrimp *Paratyga australiensis*), reptiles (Eastern Snake-necked turtle *Chelodina longicollis*), frogs (e.g. Common Froglet *Crinia signifera* and Southern Brown Tree Frog *Litoria ewingii*), aquatic birds (e.g. Pacific Black Duck *Anas superciliosa* and Little Pied Cormorant *Microcarbo melanoleucos*) and potentially mammals (e.g. Water Rats *Hydromys chrysogaster*). The creek and surrounding terrestrial habitat may also provide some breeding and dispersal habitat for the EPBC-listed Growling Grass Frog *Litoria raniformis* that is known to occur about 1.5 km upstream of the study area, discussed further below. Similarly, while the understorey values are heavily degraded and hydrology altered, the study area is considered to provide some habitat values for FFG-listed Brown Toadlet *Pseudophryne bibronii* (also discussed further below).

Exotic vegetation

Large areas in the centre of the study area were dominated by *Sharp Rush and exotic pasture grasses. These areas provide limited habitat values for mostly common native fauna species such as Australian Magpie *Cracticus tibicen* and Willie Wagtail *Rhipidura leucophrys*. A Stubble Quail *Coturnix pectoralis* was flushed from this habitat during the assessment.



Plate 5 Huntly Streamside Reserve. Large old hollows bearing trees are located within patches and scattered trees and provide critical resources for hollow dependent species 24-4-20.



Plate 6 Huntly Streamside Reserve, eastern channel of Bendigo Creek facing north (24-2-20). The creek has steep eroded banks along this section of the channel.



Plate 7 Huntly Streamside Reserve, Bendigo Creek. The creek was flowing with small pools during the site assessment 22-4-20.

4.3.3 Significant Fauna Species

A total of 55 significant fauna species have previously been recorded within 5 km of the study area (see Appendix 3), as identified from records held in the VBA (DELWP 2020a). No additional threatened species were recorded from the catchment based search (aquatic fauna). These species previously recorded include:

- Six species listed as threatened under the EPBC Act;
- 20 species listed as threatened under the FFG Act;
- 20 species considered threatened or near threatened in Victoria (DSE 2009, 2013); and
- Nine species listed under the Migratory and Marine Schedules of the EPBC Act.

One of these species (FFG-listed Square-tailed Kite) has been previously recorded in the study area. An additional 18 of these species recorded on the VBA within the data review area are considered to have a moderate or higher likelihood of occurrence in the study area and three species are considered to have a low-moderate likelihood of presence in the study area. All of these species are discussed further below.

The Department of Agriculture, Water and the Environment EPBC Act Protected Matters Search Tool (PMST) (DAWE 2020) identified an additional 13 species listed as threatened and/or listed under the

Migratory and/or Marine Overfly Schedules of the EPBC Act, which may occur, or for which suitable habitat may occur, within the review area, but which have never been recorded within the study area.

The search tool predicts the occurrence of these species on the basis of broad drainage basins and Bioclim modelling. Thus, the predicted occurrences for some species highlighted in the data search extend well beyond their actual range. None of the species identified on the PMST have been previously recorded within the study area and none are considered to have a moderate or higher likelihood of presence in the study area. However the likelihood of occurrence cannot be reliably predicted for one species (Flat-headed Galaxias *Galaxias rostratus*) due to the paucity of aquatic fauna records from Bendigo Creek, and the lack of systematic survey that has been undertaken for this species.

The following section highlights Flat-headed Galaxias, together with those species previously recorded within the 5 km data review area that have a low-moderate or higher likelihood of presence based on the ratings described in Table 1. One additional threatened species, the FFG-listed Powerful Owl is included in this assessment due to the presence of suitable habitat on-site, despite having no records within the VBA search area. Further, assessment of the likely impacts on these species will be provided once the mine construction footprint is known.

Threatened Species and their likelihood of presence in the study area

Species listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999

- **Flat-headed Galaxias *Galaxias rostratus*** is a small freshwater fish found in the southern half of the Murray-Darling Basin system, generally in the middle reaches of catchments below 150 m in altitude. In Victoria, the species has been found in the Mitta Mitta, Kiewa, Ovens, Loddon, Goulburn and Murray catchments. The species inhabits a variety of habitats including billabongs, lakes, swamps and rivers, with a preference for schooling in midwater in still or slow flowing waters (TSSC 2016). There are indications that flat-headed galaxias has a preference for moving upstream in November and December, however, little else is known of their ecology (Lintermans 2007). There are no records of this species from the Bendigo Creek catchment. Known records from the Loddon River system include Two Mile Swamp in 1998 and Wandella Lake in 1963 (McGuckin & Doeg 2000). This species is considered likely to have a low likelihood of presence in the project area, however it is important to note that there is no firm basis to determine likelihood of presence for this species due to the paucity of survey records in the catchment and lack of detailed information on the species habitat requirements.
- **Swift Parrot *Lathamus discolor*** is a migratory species, breeding in Tasmania during the summer months, then moving to feed on flowering eucalypts in south-eastern mainland Australia during the winter months. In Victoria, they occur more often on north side of Great Divide in Box-Ironbark forests supporting winter-flowering eucalypts (e.g. Red Ironbark *Eucalyptus sideroxylon*, Ironbark *E. tricarpa* and Grey Box *E. microcarpa*) or psyllid-infested eucalypts (e.g. River Red Gum). In southern Victoria, they occur in Manna Gum, Swamp Gum and Yellow Gum habitats, and flowering street trees or psyllid-infested eucalypts (Higgins 1999, Webster et al. 2003), but their movements (in response to food resources) are often irregular and unpredictable probably because of the sporadic nature of their food. Swift Parrot is well known from the surrounding region with 10 records within the 5km data review area. The closest

record is 1.9 km to the west within Whipstick Conservation Reserve. The study area supports known food trees for this species including Yellow Gum and Grey Box. This species is also known to feed on lerps that occur on species such as Red Gum and Yellow Box present on-site. The species is considered to have a moderate likelihood of presence. Further assessment on the impacts to this species are likely to be required and will be evaluated once the construction footprint of the mine is known.

- **Grey-headed Flying-fox *Pteropus poliocephalus*** - The Grey-headed Flying-fox occurs along the east coast of Australia from Rockhampton in Queensland to western Victoria. There are a number of permanent camps for this species in Victoria including one at Rosalind Park in Bendigo. This colony was first detected in 2010 with 32,000 individuals recorded at its peak. The colony has since reduced ranging from hundreds of individuals in winter to thousands in summer. The camp has been confirmed as a maternity camp with breeding and birthing occurring. Flying-foxes can travel between 20-50 km from their roost sites to feed. Their movements and local distribution are usually governed by climate and flowering and fruiting of major food plants (Menkhorst 1995). Preferred food resources include eucalypt blossoms (and those from other Myrtaceae spp. and Proteaceae spp.) and fruit, (particularly figs *Ficus* spp. lilly pilly *Acmena* spp., plum), in bushland and suburban parks and gardens (Menkhorst 1995). There is only one record in the data review area in 2019 at the Huntly Pound on Millwood Road, 1.6 km north-west of the northern boundary of the study area. Flowering eucalypts are considered likely to provide foraging habitat for this species. This species has a moderate likelihood of presence in the study area.
- **Growling Grass Frog *Litoria raniformis*** – In Victoria, the Growling Grass Frog is widely distributed in most regions except for the western desert and alpine regions. Population declines have been recorded across much of southern and central Victoria (Tyler 1997; Robertson et al. 2002; Wilson 2003; Organ 2005). The Growling Grass Frog has generally been recorded in or around water that is shallow and still or slow-moving, usually with emergent aquatic vegetation, including sedges and Cumbungi (Tyler 1997; Pyke 2002). The variety of reported breeding habitats is broad and includes: lakes or reservoirs; lagoons; marshes; swamps; ponds, ditches and other artificial depressions; farm dams; areas which receive artificial flood-irrigation; and still back-waters and other sluggish areas of rivers and streams. Growling Grass Frog will potentially use degraded habitat, particularly where adjacent off-stream waterbodies, such as farm dams or quarry pits, provide this breeding habitat (Pyke 2002; Robertson and Heard 2002; Heard and Robertson 2003; Robertson et al. 2002; Wilson 2003; Heard et al. 2003; Organ 2005). At a landscape scale, suitable Growling Grass Frog habitat comprises (Organ 2005): a high density of suitable wetlands and terrestrial habitats in close proximity to one another (less than 500 m); the presence of drainage lines, creeks, rivers, water channels and artificial drains adjacent to suitable wetlands which enable dispersal and movement between sites; and no or very few barriers to dispersal (e.g. housing development and sealed roads). This species is known to occur approximately 1.5 km upstream from the southern end of the study area (Leans Road). This includes records of the species along the Bendigo Creek and within the Bendigo Water Reclamation Ponds (DELWP 2020a). Despite the highly eroded creek channel with steep sided banks, the waterway and adjacent riparian vegetation provides dispersal habitat for the species and also potentially some breeding habitat in the creek where water flow is slower and/or ephemeral pools fill after flooding events. Given

the proximity of a breeding population upstream of the study area, this species is considered to have a low-moderate likelihood of occurrence within the study area. Further targeted assessments are recommended in Section 7 .

- **White-throated Needletail *Hirundapus caudacutus*** – This species occurs as a non-breeding migrant to Australia between late spring and early autumn. They can form large flocks (sometimes of mixed species with other swifts) to feed on insects at heights of over one kilometre. These feeding flocks often form in response to rising thermal currents associated with thunderstorms or bushfires that carry insects up into the sky. There are nine records of this species within the data review area, the most recent in 2019 1.7km south of the study area within the Bendigo Water Reclamation Ponds and multiple records in 2017 within the Whipstick / Greater Bendigo National Park to the east. This species is considered to have a low-moderate likelihood of occurrence.

Species listed under the Victorian Flora and Fauna Guarantee Act 1988

- **Great Egret *Ardea alba modesta*, Plumed Egret *Ardea intermedia plumifera* and Little Egret *Egretta garzetta*** - The waterway habitats in the study area including the creek, artificial channels and floodplain have the potential to support foraging habitat for both of these species. There are 15 records of Plumed Egret within the 5km data review area, the closest of which is 1.3km to the south of Leans Road within May Swamp adjacent to the Bendigo Creek in 1990 (DELWP 2020a). There are seven records of Eastern Great Egret within the data review area, the most recent and closest of which include 1.5 km south of Leans Road along the Bendigo Creek in 2013 . All three of these species have a moderate or higher likelihood of presence in the study area.
- **Square-tailed Kite *Lophoictinia isura*** – This species is a widespread but uncommon species that is found in open eucalypt forests and woodlands but can also occur in inland areas where water bodies are present. The species is partially migratory, with most breeding records occurring within the southern two thirds of its range in spring and summer and being sighted more often in the northern areas during the non-breeding season. The species hunts for birds, insects and other prey items in the forest canopy. While this raptor was previously thought to breed infrequently in Victoria, one recent study in the Bendigo region (during the 2014-2015 breeding seasons) found ten concurrently active nests in remnant box-ironbark forests (Robinson et al. 2016). The VBA has a single record of this species being previously recorded in the Huntly Streamside Reserve in 2017 (DELWP 2020a). There are four additional records of this species within the data review area, the most recent in 2019, south of the study area in the Bendigo Water Reclamation Ponds. While, the recent research indicates they prefer the drier forest habitat for nesting sites, the study area is likely to be part of their foraging range. This species is considered to have a moderate likelihood of presence in the study area.
- **Diamond Firetail *Stagonopleura guttata*** – this species occurs in open eucalypt forests and woodlands dominated by either River Red Gum, Yellow Gum, Stringybarks and Box eucalypts, particularly Yellow, Grey and White Box (Higgins et al. 2006). The preferred understorey for this species is sparse through to dense understorey of shrubs, regrowth, and grass ground cover (e.g. Kangaroo Grass). There are seven records of the species in the data review area, including

a few in private land in Huntly and the Whipstick Nature Conservation Reserve and the Great Bendigo NP to the north-west and west. The closest record is from private land, 1.3 km to the west of the reserve in 1989. This species is considered to have a moderate likelihood of presence in the study area.

- **Hooded Robin *Melanodryas cucullata***- Hooded Robin is one of a suite of woodland birds that has declined markedly due to the effects of ongoing habitat loss and fragmentation (Garnett and Crowley 2000). The species inhabits a range of woodland and mallee communities, including Box-Ironbark associations (Emison et al. 1987; Garnett and Crowley 2000). Hooded Robin feeds on insects and small terrestrial vertebrates from the ground. Higher quality habitat for this species consists of woodland with abundant fallen timber, which the species uses as a vantage point for foraging. This species has been recorded seven times in the data review area, the most recent in 2009. The closest record of Hooded Robin is c. 1.4 km to the west in Whipstick in 1999. The study area supports suitable woodland habitat for this species. This species is considered to have a moderate likelihood of presence in the study area.
- **Barking Owl *Ninox connivens*** - The Barking Owl has been recorded from scattered localities throughout Victoria, where it occupies dry sclerophyll forests, open forests and woodlands such as Box-Ironbark, riparian River Red Gum habitats and foothill habitats on granitic slopes as well as remnant patches of forest and woodland, including clumped trees in partly-cleared land (Higgins 1999). This species is more frequently recorded from edge habitats, such as the interface between woodland and wooded farmland, than from forest interiors (Clemann and Loyn 2001). Suitable habitat for the Barking Owl must contain large trees which provide roosting and breeding sites. This species typically breeds in the tree hollows of Eucalyptus, in woodland and open forests, near watercourses or wetlands. Roosting sites are commonly situated in foliage or on the bare branches beneath the canopy of large trees with dense foliage (Higgins 1999). There is one record of the Barking Owl within the data review area at the Bendigo Sewerage Treatment Ponds in 2017, c. 1.5 km south of the study area. The study area provides suitable, nesting and roosting sites for this species in the many hollow-bearing trees and stags. Moreover, the study area represents good habitat for this species because it is an edge habitat, with farmland – woodland interfaces. This species is considered to have a moderate likelihood of presence within the study area. Recommendations for further targeted assessments for this species are provided in Section 7.
- **Powerful Owl *Ninox strenua*** - The Powerful Owl occupies forested areas of the Great Dividing Range from central Queensland to the Victorian – South Australian border (Higgins 1999). Powerful Owls generally prefer older forests where large trees provide nesting sites and arboreal prey items are abundant but resident breeding pairs are also known to occur in lower density residential areas (i.e. in the outer suburbs of Melbourne) (McNabb 1996; Cooke et al. 2002; Webster et al. 1999). Powerful Owls mostly prey upon nocturnal arboreal mammals and roosting diurnal birds (McNabb 1996; Cooke et al. 1997; Higgins 1999; Webster et al. 1999). They breed in large tree hollows, often using a small number of hollows (e.g. one to three) over many years, where breeding adults show extreme site fidelity (Higgins 1999). Estimates of the size of Powerful Owl territories or home ranges vary between 300 – 4000 ha (McNabb 1996,

Silveira 1997; Webster et al. 1999, Soderquist et al. 2002). The large territory size is necessary to maintain prey supplies. There are no Powerful Owl records within 5 km of the study area but this species is known from the Greater Bendigo area. There are nine records of the species within 20 km of the study area on the VBA. Given the availability of suitable nest trees onsite, the likely abundance of arboreal prey, the connectivity along the riparian corridor and the close proximity to large core patches of native vegetation (e.g. Whipstick and Greater Bendigo National Park, Bendigo Regional Park) this species is considered to have a moderate likelihood of presence in the study area. Further targeted surveys for large forest owls are recommended.

- **Brown Toadlet *Pseudophryne bibronii*** - The Brown Toadlet is a ground dwelling, terrestrial breeding species that occupies moist microhabitats in both dry and wet sclerophyll forest as well as woodland, shrubland, heathland, and grasslands (Cogger 1996; Robinson 1998). This species relies heavily on moist conditions, and adults are often found sheltering in moist soaks and depressions, under cover in the form of dense grasses, sedges, fallen logs, leaf litter and other woody debris. Breeding congregations often form in inundated grassy areas, beside small creeks, drainage lines or gutters and dams (Cogger 1996). Eggs are spawned in shallow burrows under leaf litter and in low lying areas and depressions near water, that will later be flooded (Hero et al. 1991), providing an aquatic environment for tadpoles. There are 23 records of this species within the data review area (DELWP 2020a). Despite the degraded understorey values across large sections of the site, this species is known to persist in areas after some level of disturbance (e.g. old mining depressions). The low lying, temporarily wet depressions in the woodland habitats adjacent to the creek support suitable breeding habitat for the Brown Toadlet. The main creek channel with the steep sided slopes is unlikely however to provide breeding habitat for this species. This species is considered to have a low-moderate likelihood of presence and further targeted surveys are recommended.
- **Crested Bellbird *Oreoica gutturalis*** – this species occurs in dry acacia shrublands, mallee or taller dry woodlands and forest from arid inland Australia to semi-arid coastal regions (Higgins and Peter 2002). There are 30 records of this species within the data review area, the most recent in 2019. Of these many records are from the area immediately surrounding the study area including the Greater Bendigo NP, Whipstick Conservation Reserve and Bendigo Regional Park. The closest is from 1999 in Whipstick 1.4 km to the west of the study area. This species is considered to have a moderate likelihood of presence, particularly within the areas of Low Rises Grassy Woodland.
- **Brush-tailed Phascogale *Phascogale tapoatafa*** -. The Brush-tailed Phascogale has a fragmented distribution in Victoria occurring to the east and north of Melbourne and through central, north-eastern and western Victoria. The species occurs in a variety of treed habitats but prefers open dry foothill forest with little ground cover. Phascogales are primarily arboreal and forage for their diet of large insects, spiders, and centipedes on the trunks and major branches of rough-barked trees and fallen logs (Soderquist 2002). Eucalypt nectar may also be taken when Iron-bark or box trees are flowering. Mating occurs in early winter and most males die after the breeding season at an age of 11 – 12 months. Females seldom survive a second year and usually only have a single litter. Phascogales typically need large areas of forest to supply their prey demands. Large trees (i.e. >60cm breast-height diameter) provide the best foraging sites for phascogale and the most reliable nest hollows (Strahan 1995). There are 24 records of this species within the data review area and many records in the landscape surrounding the study

area, particularly to the north, north-west in the Great Bendigo NP. The closest record is from Whipstick Conservation Reserve in 1999, 2.6 km to the north-west of the study area. The patches of Low-Rises Grassy Woodland (Habitat Zones 12 a and b) in the study area that support hollow bearing Grey Box provided ideal habitat for this species. Fragmented vegetation on private land to the west connects the study area to Whipstick and Greater Bendigo National Park where this species is known to occur. This species is considered to have a moderate likelihood of presence in the study area. Impacts to this species will need to be further evaluated once the mine construction footprint is known.

Species classified as threatened in Victoria by DSE (2013)

- **Brown Treecreeper *Climacteris picumnus*** – The Eastern sub-species of the Brown Treecreeper *C. picumnus victoria* is listed as near-threatened and is found primarily along the Great Dividing Range (Schodde and Mason 1999). This species predominantly occurs in woodlands dominated by rough barked eucalypts with a grassy open understorey, abundant woody debris, deep leaf litter and a variety of small tree hollows (Higgins et al, 2001). There are 18 Brown Treecreeper records within the data review area. There are multiple records of this species in Whipstick and Bendigo National Park, the closest record is from the Whipstick Nature Conservation Reserve in 1999, 1.3 west of the Huntly Streamside Reserve. Brown Treecreeper is likely to utilise the woodland habitat across the entire study area.
- **Latham's Snipe *Gallinago hardwickii***- Latham's Snipe are spring/summer migrants to Australia from Japan and nearby islands. 'Important habitat' is a key concept for migratory species under the EPBC Act. DEWHA's (2009) EPBC Act Policy Statement 3.21 outlining the Significant Impact Assessment Guidelines for 36 Migratory Shorebird species, with revised criteria for 'important sites', define 'important habitat' for Latham's Snipe as those sites that support at least 18 individuals of the species. There are eight records of this species within the data review area, the most recent in 2017 (DELWP 2020a). The closest record is from 2012 within the Bendigo Water Reclamation Ponds and along Bendigo Creek in 1999, c. 1.5 km south of the study area. The dense beds of emergent aquatic vegetation in the creek provide suitable foraging habitat for this species. This species is considered to have a moderate likelihood of occurrence within the study area.
- **Nankeen Night Heron *Nycticorax caledonicus***- The Nankeen Night Heron has a widespread distribution in wetlands throughout Australia, particularly in the north, south, and southwest. This species inhabits shorelines of lakes, rivers, estuaries, terrestrial wetlands and grasslands, particularly those sheltered by tall ground vegetation and/or trees, with shallow, slow-moving water. Breeds in colonies, usually in the crown or canopy of trees, in forks or on horizontal boughs; also in reed beds or atop shrubs. In Victoria, most numerous in the Murray River region, and in smaller numbers in more coastal/near-coastal regions (Marchant, 1990 and Pizzey, 2007). There are six records of this species within the data review area, the most recent in 2017 (DELWP 2020a). The dense reed beds in the creek combined with the close proximity of canopy trees provide suitable habitat for this species. This species is considered to have a moderate likelihood of occurrence within the study area.
- **Pied Cormorant *Phalacrocorax varius***- This species is most often found along the coast, however are known to use inland wetlands including billabongs, deep and open swamps and rivers (large

freshwater and saline wetlands). They nest in colonies, building platform nests in mangroves or other trees (Marchant, 1990 and Pizzey, 2007). There are 12 records of this species within the data review area, the most recent in 2017 (DELWP 2020a). The wetland habitats of the creek combined with the close proximity of canopy trees provide suitable habitat for this species. This species is considered to have a moderate likelihood of occurrence within the study area.

- **Royal Spoonbill *Platalea regia***- The Royal Spoonbill inhabits the shallow parts of fresh and saline wetlands, these birds are gregarious in small flocks. They are mostly common on intertidal mudflats in coastal bays. Their stick-nests are built in reeds, shrubs or trees, singly or in loose colonies and are often seen with other species (Marchant, 1990). There are 11 records of this species within the data review area, the most recent in 2019 (DELWP 2020a). The wetland habitats of the creek combined with the close proximity of canopy trees provide suitable habitat for this species. This species is considered to have a moderate likelihood of occurrence within the study area.
- **Eastern Snake-necked Turtle *Chelodina longicollis***- This species is distributed throughout south-eastern Australia including coastal rivers of Victoria. It occurs in a broad range of habitats including permanent riverine waterholes, lakes, farm dams and shallow temporary ponds. Found in greatest abundance in shallow, ephemeral waterholes or in bodies of water that are remote from remnant rivers, often in the absence of other turtle species. It is able to distribute overland (Kennett and Georges 2009). There are two records of this species within the data review area, the most recent in 2014 (DELWP 2020a). The creek provides suitable habitat for this species. This species is likely to move overland to and from neighbouring farm dams. This species is considered to have a moderate likelihood of occurrence within the study area.

5 Summary of key values and preliminary assessment of impacts associated with development

The following is a summary of the key values identified within the Huntly Streamside Reserve and potential impacts associated with any proposed mine activity. These issues will be evaluated in more detail once a mine footprint has been provided. Key values include:

- Flora:
 - 101.7 ha of Endangered Creekline Grassy Woodland supporting 577 large old trees in 17 patches.
 - 4.1 ha of Endangered Low Rises Grassy Woodland supporting 25 large old trees in 2 patches.
 - 220 Scattered trees including 42 large old trees
- Fauna:
 - Potential habitat for 22 significant fauna species including:
 - Four listed as threatened under the EPBC Act
 - Ten listed under the FFG Act
 - Seven listed under the Victorian Threatened Species Advisory Lists
 - One listed under the Migratory and Marine Overfly schedules of the EPBC.
 - Fauna habitats including woodland with many large old hollow bearing trees along the waterways. The riparian corridor provides important connectivity that extends well beyond the study area boundary to the north and south and would also act as a drought refuge, particularly under future climate change scenarios.

While the proposed mine construction footprint is not yet finalised, the following provides a preliminary assessment of potential impacts if construction works are proposed within the study area. These include:

- Direct loss of native vegetation and associated ecological communities;
- Direct loss of large old trees;
- Potential for direct loss or degradation to habitat for fauna species listed as threatened under the EPBC Act, FFG Amendment Act and/or DELWP Advisory Lists, including but not limited to:
 - Swift Parrot, Growling Grass Frog, Brush-tailed Phascogale and Barking Owl.
- Direct and indirect impacts to biodiversity values in the waterway, including changes to hydrology, hydrogeology, groundwater, water pollution, fish passage and siltation downstream.
- Weed and pathogen introduction.
- Increased mortality of fauna species resulting from mining activities such as clearing of vegetation / soil and increased road traffic.

6 Legislation and Policy Implications

6.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act pertains to matters of 'national environmental significance', including Ramsar wetlands, listed threatened species and ecological communities, listed migratory species and Commonwealth Marine Areas. It applies to both public and private land.

A proponent is obliged to refer matters to the Commonwealth Environment Minister if such values may be significantly impacted by a proposed action. The Commonwealth Environment Minister decides whether there will be a significant impact and if it needs to be a 'controlled action' and requires a formal assessment under the EPBC Act. The Commonwealth can intervene to modify or block an action if it deems this necessary for the protection of a species or community of national significance.

No EPBC Act-listed species or communities were recorded during the site assessment.

Two fauna species listed as threatened under the EPBC Act are considered to have a moderate likelihood of presence: Swift Parrot and Grey-headed Flying Fox. Foraging habitat (flowering eucalypts) is present in the study area for both of these species. Further work for these species is outlined in Section 7. Insufficient data exists to accurately determine the likelihood of presence of Flat-headed Galaxias. It is recommended that a fish survey be undertaken to determine the fish community values of this section of Bendigo Creek.

Two additional threatened species, Growling Grass Frog and White-throated Needletail are considered to have a low-moderate likelihood of presence along the waterways and surrounding terrestrial habitat. A population of Growling Grass Frog is known to occur approximately 1.5 km upstream of the southern boundary (Leans Road) of the study area. This includes records along the Bendigo Creek and within the Bendigo Water Reclamation Ponds (DELWP 2020a). It is recommended that targeted surveys be undertaken to determine the presence of this species in the study area (Section 7).

One species listed under the Migratory schedules of the EPBC Act (Lathams Snipe) is considered to have a moderate likelihood of presence in the study area.

6.2 Victorian Flora and Fauna Guarantee Amendment Act 2019

The Flora and Fauna Guarantee Amendment Bill 2019 amends the FFG Act to provide a modern and strengthened framework for the protection of Victoria's biodiversity. The amendments took effect on 1 June 2020. In summary, the Amendment Act:

- retains the FFG Act's objective to 'guarantee' the future of Victoria's flora and fauna and updates it to recognise the importance of flora and fauna adapting to environmental change;
- introduces principles to guide the implementation of the FFG Act, including consideration of the rights and interests of Traditional Owners and the impacts of climate change;
- requires consideration of biodiversity across government to ensure decisions and policies are made with proper consideration of the potential impacts on biodiversity;
- clarifies existing powers to determine critical habitat and improves their protection by encouraging cooperative management;

- gives effect to a consistent national approach to assessing and listing threatened species, the Common Assessment Method, which will reduce duplication of effort between jurisdictions and facilitate the monitoring and reporting of species' conservation status; and
- modernises the FFG Act's enforcement framework including stronger penalties.

The FFG Amendment Act still lists flora and fauna species and ecological communities that are recognised to be threatened in Victoria. It also identifies threatening processes (e.g. loss of hollow-bearing trees) and flora that require protection (i.e. protected flora). Protected flora include those species listed as threatened under the FFG Act, plant taxa that belong to listed communities and plant taxa that are not threatened, but require protection for other reasons (e.g. from over-collection). A permit is required to remove protected flora from public land.

No flora and fauna species or communities listed as threatened under the FFG Act were recorded during the site assessments.

One FFG-listed fauna species (Square-tailed Kite) has been previously recorded in the Huntly Streamside Reserve in 2017 (DELWP 2020a). The study area is considered to have a low-moderate or higher potential for presence of an additional 12 fauna species listed as threatened under the FFG Amendment Act 2019. This includes nine species with a moderate likelihood of presence in the study area. These species with a moderate LOP include Barking Owl, Brown Toadlet, Brush-tailed Phascogale, Crested Bellbird, Little Egret, Hooded Robin, Eastern Great Egret and Plumed Egret. The four remaining species are considered to have a low-moderate likelihood of occurrence and are discussed in Section 5.

No flora species listed under the FFG Act are considered likely to occur within the study area.

One aquatic species listed under the FFG Act has some potential (probably low) to occur in the study area, Flat-headed Galaxias. A fish survey is recommended and if the species is detected, a permit would be required from DELWP to take, kill, injure, or disturb this listed fish species.

The protected flora controls are set out in Division 2 of Part 5 of the FFG Act. An application for permit to take protected flora can be found here: <https://www.environment.vic.gov.au/conserving-threatened-species/flora-and-fauna-guarantee-act-1988/protected-flora-controls>.

The specific implications of the FFG Amendment Act on any proposed mining will be determined once the footprint of the proposed mine has been confirmed.

6.3 Victorian Planning and Environment Act 1987 and other relevant planning scheme matters

The Planning and Environment Act 1987 (P&E Act) establishes a framework for planning the use, development and protection of land, including native vegetation retention controls. The P&E Act allows for the development of planning schemes in Victoria. In particular Clause 52.17 of the planning scheme identifies circumstances where a planning permit is required for native vegetation removal within the municipality.

The proposed removal of native vegetation would require a permit under Clause 52.17 of the planning scheme. Design of the proposed mine must take into account the three-step approach to vegetation

removal (avoid, minimise, offset), which is set out in DELWP (2017). Once the construction footprint has been supplied, calculations of the losses and offsets under the Guidelines will be determined.

The study area is located within the Greater Bendigo Municipality. Under the Greater Bendigo Planning Scheme the following zones and overlays apply:

- Public Conservation and Resource Zone (PCRZ) with Farming Zone (FZ);
- Bushfire Management Overlay (BMO);
- Environmental Significance Overlay, Schedules 1 and 2 (ESO1, and ESO2);
- Land Subject to Inundation, Schedule 1 and 2 (LSIO1 and LISO2);
- Vegetation Protection Overlay, Schedule 1 and 2 (VPO1 and VPO2).

The implications of the proposed mine under the Greater Bendigo Planning scheme will be determined once the construction footprint has been provided.

6.4 Environmental Effects Act 1978

The *Environment Effects Act 1978* provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. The Act does this by enabling the Minister administering the Act to decide that an Environment Effects Statement (EES) should be prepared (DSE 2006).

Relevant referral criteria that would invoke the requirement for an EES for this project are:

1. potential clearing of 10 ha or more of native vegetation from an area that:
 - is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment; or
 - is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and
 - is not authorised under an approved Forest Management Plan or Fire Protection Plan.
2. potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria.
3. potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan **AND** (for matters listed under the Flora and Fauna Guarantee Act 1988):
 - potential loss of a significant area of a listed ecological community; or
 - potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or

- potential loss of critical habitat; or
- potential significant effects on habitat values of a wetland supporting migratory bird species

Until the mine footprint is finalised the extent of vegetation clearance is not known, however, it may be that clearing 10 ha of native vegetation is required. Both EVC's recorded on site, Creekline Grassy Woodland and Low Rises Grassy Woodland, are considered to be endangered in the bioregion (https://www.environment.vic.gov.au/__data/assets/pdf_file/0012/50511/Bioregional-Conservation-Status-for-each-BioEVC.pdf). Should JBS&G determine that vegetation clearance of this magnitude is required of the endangered EVC; a detailed assessment of the above criteria and referral to the Minister may be necessary.

6.5 Environment Protection Act 1970

The EPA Act provides a legal framework to protect the environment in the State of Victoria and is administered by the Victorian Environment Protection Authority (EPA). It applies to noise emissions and the air, water and land in Victoria. This includes the requirement to ensure any discharge of waste (e.g. herbicide or firefighting foam) or emissions (e.g. smoke) into water or air is in accordance with declared State environment protection policy.

The Act provides the legal framework for the protection and management of Victoria's environment. The EPA issues licenses and permits, and sets requirements under the Act, relating to the discharge of wastes into air, land, water, groundwater, and the control of noise and litter. The EPA has also developed State Environment Protection Policies (SEPPs) and Industrial Waste Management Policies (IWMPs) and associated guidelines.

State Environment Protection Policies

State Environment Protection Policies (SEPPs) are declared under Clause 16(1) and 16 A(1) of the Environment Protection Act 1970. These policies set environmental management objectives and provide a context for decision making, works approvals, licensing and issuing of pollution abatement and infringement notices under the Act. The SEPPs most relevant to the proposed mine include:

- SEPP Waters of Victoria;
- SEPP Groundwaters of Victoria; and
- SEPP Prevention and Management of Contaminated Land.

Discussion of the implications under this Act will be determined once the mine footprint is known. Provided all the appropriate planning and approvals are achieved under the Mineral Resources (Sustainable Development) Act 1990, additional formal approvals may not be required under the EP Act.

6.8 Water Act 1989 and Water Act (Irrigation Farm Dams) Act 2002

The Water Act 1989 provides the legislative framework for the management and allocation of Victorian surface water and groundwater and the maintenance of aquatic ecosystem functions. By-laws under the

Act regulate works within and in the vicinity of waterways, including any works that may affect water quality and quantity, riparian vegetation or waterway streambed or banks.

The purpose of the Act is to integrate management of all elements of the terrestrial phase of the water cycle. This includes promotion of orderly, equitable and efficient water use, greater community involvement, integration of surface and subsurface flow management, to promote conservation and environmental enhancement and provide for the protection of catchment conditions.

For any construction on a waterway, including works to deviate a waterway, whether temporary or permanent, a licence is required under this Act. A licence for construction on a waterway is unlikely to be issued if the dam is to be used for storage of process or recycled water. A water authority may reject a proposal where it is considered that the risks are too high or unlikely to be manageable.

The Water Act 1989 also applies to situations where "water" is the primary objective of a drilling program such as a series of aquifer reinjection bores or dewatering bores.

A licence under this Act is required for such bores. This Act applies to the drilling and construction of bores and the licensing of drillers for water drilling.

Drilling to explore for mineral resources is authorised under the Minerals Resources Development Act 1990 and drillers carrying out mineral exploration drilling do not require licences under the Water Act 1989.

The 2002 amendment to the Water Act 1989 requires licensing of all irrigation and commercial use from waterways, springs, soaks and dams. Under these amendments, some previously unlicensed water use for quarries and mines now needs to be licensed.

Operators of quarries and mines are subject to the Act in a similar way to any other commercial users of water. Licences may be required under this Act in certain circumstances such as construction of new works on waterways or groundwater interception is possible. There are also a number of exempted activities. The local Water Authority and North Central Catchment Management Authority should be consulted to regarding the requirements under the Act.

6.6 Wildlife Act 1975 and Wildlife Regulations 2002

The Victorian Wildlife Act 1975 protects native fauna species, and regulates the conduct of any persons engaged in activities concerning or relating to wildlife. The Act establishes procedures to promote the protection and conservation of wildlife, to prevent wildlife taxa from becoming extinct, and the sustainable use of and access to wildlife. It also provides the basis for the majority of Wildlife permit/licensing requirements within the state. Under the Act a person must not hunt, take or destroy endangered, notable or protected wildlife; this includes all native vertebrate animals, all kinds of deer, non-indigenous quail, pheasants, and partridges, and all terrestrial invertebrate fauna listed under the Flora and Fauna Guarantee Act 1988.

The Wildlife Regulations 2013 provide further detail relating to the act, including that a person not to damage, disturb or destroy any wildlife habitat, although this does not apply if the person is authorised to do so under any other Act such as the Planning and Environment Act 1987.

The legislation also provides for the declaration of State Wildlife Reserves, Nature Reserves and declared Wildlife Management Co-operative Areas, Prohibited Areas and Sanctuaries

It is unlikely a separate permit is required under this Act as damage should only be to wildlife habitat and not wildlife directly. However, if any wildlife is located within the habitat proposed for clearing, salvage and translocation of such wildlife may be required as part of the planning permit. This should also ensure damage to wildlife does not occur.

The Huntly Streamside Reserve is not listed under the Wildlife Act or the Wildlife Regulations as a declared area.

6.7 Victorian Fisheries Act 1995

The Fisheries Act 1995 is the primary legislative framework in Victoria for the regulation, management and conservation of fisheries. Syngnathidae (seahorses and pipefish) and any FFG Act-listed fish or aquatic invertebrates are 'protected aquatic biota' under this Act. A Fisheries Permit is required to take, injure, damage, destroy or release protected aquatic biota.

One FFG listed fish (Flat-headed Galaxias) has some potential (probably low) to occur within the proposed area of works. Should any dewatering or removal of aquatic habitat be required, then an FFG permit may be required. An FFG permit could absolve the need for a Protected Aquatic Biota Permit; however, clarification should be sought from the Victorian Fisheries Authority.

6.8 Crown Land (Reserves) Act 1978

The Crown Land (Reserves) Act 1978 provides a legal framework for reserving areas as public land and for establishing specific reservation status. It also governs the administration of and management of Crown Reserves, including Nature Conservation Reserves, and deals with regulations, Committees of Management, leasing and licensing.

This Act under certain circumstances can require that Land Manager consent is required for mining operations regulated under the Mineral Resources (Sustainable Development) Act. 1990.

As the site is a Streamside Reserve which is listed as Restricted Crown Land as per Schedule 3 of the Mineral Resources (Sustainable Development) Act 1990 then consent is most likely required from the land manager, Parks Victoria.

6.9 Victorian Catchment and Land Protection Act 1994

The Catchment and Land Protection Act 1994 (CaLP Act) provides a legislative framework for the management of land, including the control of declared noxious weeds and pest animals. Each Catchment Management Authority (CMA) region within Victoria has a designated list of declared noxious weeds (control of which is enforceable).

The CaLP Act applies to the management and protection of water catchments throughout Victoria. Schedule 5 of the CaLP Act lists 124 proclaimed special water supply catchment areas covering a total area of 52,262 km². The Huntly Streamside Reserve is not within a declared protected water catchment.

Eleven noxious weed species were recorded in the study area (Table 4; Appendix 1). Seven species are listed as 'regionally controlled', and four of these species are listed as 'regionally restricted'. Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of regionally controlled weeds on their land.

Of the noxious species recorded, Sharp Rush was the most common and abundant. This species occurred across most of the site in high abundance. Other noxious species such as Soursob and Long-spine Thorn-apple *Datura ferox* were also common throughout the reserve.

Table 4 Noxious weed species recorded onsite that are listed under the Catchment and Land Protection Act 1994, Huntly Streamside Reserve 22-24 April and 5 May 2020.

Key:

C = Noxious weed listed as Regionally Controlled under the Catchment and Land Protection Act 1994

R = Noxious weed listed as Regionally Restricted under the Catchment and Land Protection Act 1994

CaLP	Scientific Name	Common Name
R	<i>Allium triquetrum</i>	Angled Onion
C	<i>Allium vineale</i>	Crow Garlic
C	<i>Cirsium vulgare</i>	Spear Thistle
C	<i>Cynara cardunculus</i>	Artichoke Thistle
C	<i>Datura ferox</i>	Long-spine Thorn-apple
R	<i>Foeniculum vulgare</i>	Fennel
C	<i>Juncus acutus</i>	Sharp Rush
C	<i>Lycium ferocissimum</i>	African Box-thorn
R	<i>Oxalis pes-caprae</i>	Soursob
C	<i>Rubus fruticosus spp. agg.</i>	Blackberry
R	<i>Salix xfragilis</i>	Crack Willow

7 Recommendations

Recommendations

In the absence of a current proposed mine footprint, the following preliminary recommendations are made to avoid and minimise impacts to biodiversity values within the reserve and further assessments required:

- Identify potential design options for the mine and measures that could avoid and minimise significant impacts on native vegetation, waterway habitat and threatened species. This should include:
 - Avoidance of native vegetation where possible.
 - Where this is not possible, mitigate impacts through minimising of the extent of native vegetation removal, avoiding the areas of highest quality and minimising the loss of large old trees.
- Once the mine footprint is known, calculation of the native vegetation losses and offsets under the Victorian *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017).
- Once the mine footprint is known, assess the direct and indirect effects of the project on threatened fauna (i.e. threatened species listed under the EPBC Act, the FFG Amendment Act, DELWP Advisory Lists and or migratory species listed under the EPBC Act). Further targeted surveys are recommended to determine the presence or absence within the study area including surveys for EPBC-listed Flat-headed Galaxias, Swift Parrot and Growling Grass Frog, FFG-listed Phascogale and large forest owls (Barking Owl and Powerful Owl) and Advisory listed Brown Toadlet.
- If proposed native vegetation clearance has the potential to reach 10 ha, a detailed assessment of referral criteria under the *Environmental Effects Act 1978* needs to be undertaken to determine whether the project requires referral to the relevant Minister regarding the need for an Environmental Effects Statement.
- Assessment of permits and approvals under other relevant legislation and policy once the mine footprint has been confirmed (e.g. EPBC Act, FFG Act).
- Develop rehabilitation strategies to enable the return of native vegetation / fauna habitat / hydrology impacted by the proposed mine.

8 References

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9 Glossary

Biodiversity	The variety of all life-forms, plants, animals, fungi, protists (including algae) and bacteria, their encoded genes, and the ecosystems of which they form a part
Bioregion	Defined geographical regions of Australia with similar climatic and geophysical characteristics, and which generally contain a suite of distinct ecosystems and species
CaLP Act	<i>Victorian Catchment and Land Protection Act 1994</i>
Conservation status	Categorisation of the threat risk to biological assets (plant and animal species, EVCs or plant communities) at a defined scale (e.g. national, state), as determined by specific criteria
Ecological Vegetation Class (EVC)	A vegetation classification described through a combination of its floristic composition, life form and ecological characteristics, and its association with particular environmental attributes. EVCs may include one or more floristic communities that occur across a biogeographic range, and have similar habitat and ecological processes operating
Endemic	Naturally found only in a defined geographic area
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
Exotic	Plants, animals, fungi and other organisms that have been introduced (deliberately or accidentally) to Australia or a given area after European settlement
Exotic vegetation	Vegetation comprised wholly or substantially of exotic species
FFG Act	<i>Victorian Flora and Fauna Guarantee Act 1988</i>
Floristic	Of or pertaining to plant species, i.e. flora
GIS	Geographic Information System. A digital platform for creating, analysing and viewing maps and other spatially referenced data
Habitat Hectares	A measure of the quality and extent of native vegetation, incorporating attributes including presence of large trees, tree canopy health, understorey structure and diversity, weed cover and landscape context
High threat weeds	Introduced species (including non-indigenous 'natives') which, as invading species have highly deleterious impacts on indigenous vegetation and faunal habitats
Indigenous	Plant and animal species found naturally in pre-European Australia
Indigenous vegetation	Vegetation native to Australia or native to a specific geographic region
Introduced	Deliberately or accidentally brought to Australia or part of Australia, usually by human agency

Life form	An abbreviated description of the habit, growth form and longevity of a plant species (e.g. tree, shrub, vine, annual, submerged aquatic)
Native vegetation	Species occurring naturally in Australia as part of the pre-European flora or fauna
Vegetation community	Term for interacting plant populations forming vegetation. A vegetation community in formal classifications may have characteristic plant species, composition and structure
VROTS	Victorian Rare or Threatened Species
WONS	Weeds of National Significance

Appendix 1 Flora species recorded during the field assessment, 22-24 April and 5 May 2020, Huntly Streamside Reserve.

Key * Exotic P Indigenous but only planted individuals noted

Origin	Species	Common name	VROT
	<i>Acacia genistifolia</i>	Spreading Wattle	
P	<i>Acacia implexa</i>	Lightwood	
P	<i>Acacia mearnsii</i>	Black Wattle	
	<i>Acacia provincialis</i>	Wirilda	
P	<i>Acacia pycnantha</i>	Golden Wattle	
P	<i>Acacia verniciflua</i>	Coast Wirilda	
	<i>Acacia williamsonii</i>	Whirrakee Wattle	Rare
	<i>Acaena echinata</i>	Sheep's Burr	
	<i>Alisma plantago-aquatica</i>	Water Plantain	
*	<i>Allium neapolitanum</i>	Naples Onion	
*	<i>Allium triquetrum</i>	Angled Onion	
*	<i>Allium vineale</i>	Crow Garlic	
P	<i>Allocasuarina sp.</i>	Sheoak	
*	<i>Amaryllis belladonna</i>	Belladonna Lily	
	<i>Amyema miquelii</i>	Box Mistletoe	
	<i>Anthosachne scabra</i>	Long-awned Wheat-grass	
*	<i>Arctotheca calendula</i>	Cape weed	
	<i>Aristida behriana</i>	Brush Wire-grass	
*	<i>Asparagus asparagoides</i>	Bridal Creeper	
	<i>Atriplex semibaccata</i>	Berry Saltbush	
P	<i>Atriplex sp.</i>	Saltbush	
	<i>Austrostipa scabra</i>	Rough Spear-grass	
	<i>Austrostipa sp.</i>	Corkscrew Spear-grass	
*	<i>Avena barbata</i>	Bearded Oat	
*	<i>Avena fatua</i>	Wild Oat	

*	<i>Bromus diandrus</i>	Great Brome	
	<i>Carex appressa</i>	Tall Sedge	
P	<i>Cassinia aculeata</i>	Cassinia	
*	<i>Cassinia sifton</i>	Rough Cassinia	
	<i>Chloris truncata</i>	Windmill Grass	
*	<i>Cichorium intybus</i>	Chicory	
*	<i>Cirsium vulgare</i>	Spear Thistle	
*	<i>Cynara cardunculus</i>	Lemon Grass	
*	<i>Cynodon dactylon var. dactylon</i>	Couch	
*	<i>Cyperus eragrostis</i>	Drain Flat-sedge	
	<i>Cyperus gunnii</i>	Slender Flat-sedge	
*	<i>Datura ferox</i>	Long-spine Thorn-apple	
P	<i>Dodonaea viscosa subsp. cuneata</i>	Wedge-leaf Hop-bush	
	<i>Einadia nutans</i>	Nodding Saltbush	
	<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush	
	<i>Epilobium hirtigerum</i>	Hairy Willow-herb	
*	<i>Erodium brachycarpum</i>	Hairy-pit Heron's-bill	
*	<i>Erodium cicutarium</i>	Common Heron's-bill	
	<i>Eucalyptus camaldulensis</i>	River Red-gum	
	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Waxy Yellow-gum	
	<i>Eucalyptus melliodora</i>	Yellow Box	
	<i>Eucalyptus microcarpa</i>	Grey Box	
	<i>Exocarpos cupressiformis</i>	Cherry Ballart	
*	<i>Foeniculum vulgare</i>	Fennel	
*	<i>Fraxinus angustifolia subsp. angustifolia</i>	Desert Ash	
*	<i>Gazania linearis</i>	Gazania	
	<i>Geranium sp. 2</i>	Variable Crane's-bill	
*	<i>Gladiolus sp.</i>	Coastal Gladiolus	

*	<i>Heliotropium europaeum</i>	Common Heliotrope	
*	<i>Hordeum sp.</i>	Barley Grass	
*	<i>Hypericum perforatum</i>	Matted St John's Wort	
*	<i>Hypochaeris radicata</i>	Flatweed	
*	<i>Iris sp.</i>	Flag Iris	
*	<i>Juncus acutus</i>	Sharp-fruited Rush	
	<i>Juncus sp.</i>	Rush	
*	<i>Lactuca serriola</i>	Prickly Lettuce	
*	<i>Lepidium africanum</i>	Common Peppergrass	
*	<i>Lolium rigidum</i>	Wimmera Rye-grass	
*	<i>Lycium ferocissimum</i>	African Box-thorn	
	<i>Maireana brevifolia</i>	Short-leaf Bluebush	
*	<i>Malva sp.</i>	Mallow	
*	<i>Marrubium vulgare</i>	Horehound	
*	<i>Medicago polymorpha</i>	Burr Medic	
P	<i>Melaleuca sp.</i>	Violet Honey-myrtle	
*	<i>Modiola caroliniana</i>	Red-flower Mallow	
*	<i>Nassella neesiana</i>	Chilean Needle-grass	
*	<i>Olea europaea</i>	Olive	
*	<i>Oxalis exilis</i>	Shade Wood-sorrel	
*	<i>Oxalis pes-caprae</i>	Soursob	
*	<i>Panicum capillare</i>	Common Millet	
*	<i>Paspalum dilatatum</i>	Paspalum	
*	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	
	<i>Pimelea humilis</i>	Common Rice-flower	
*	<i>Plantago lanceolata</i>	Ribwort	
*	<i>Poa bulbosa subsp. bulbosa</i>	Bulbous Meadow-grass	
	<i>Potamogeton ochreatus</i>	Blunt Pondweed	

*	<i>Prunus sp.</i>	Wild Plum	
	<i>Ranunculus sp.</i>	Annual Buttercup	
*	<i>Raphanus raphanistrum</i>	Wild Radish	
P	<i>Rhagodia spinesins</i>	Hedge Saltbush	
*	<i>Romulea rosea</i>	Onion Grass	
*	<i>Rosa rubiginosa</i>	Sweet Briar	
*	<i>Rubus fruticosus spp. agg.</i>	Blackberry	
	<i>Rumex brownii</i>	Slender Dock	
*	<i>Rumex crispus</i>	Curled Dock	
*	<i>Rumex obtusifolius subsp. Obtusifolius</i>	Broad-leaf Dock	
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	
	<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass	
	<i>Rytidosperma racemosum</i>	Tall Wallaby-grass	
	<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	
*	<i>Salix xfragilis</i>	Crack Willow	
	<i>Salsola tragus</i>	Prickly Saltwort	
*	<i>Schinus molle</i>	Pepper Tree	
*	<i>Solanum nigrum</i>	Nightshade	
*	<i>Solanum triflorum</i>	Cut-leaf Nightshade	
*	<i>Sonchus asper</i>	Prickly Sow-thistle	
*	<i>Sonchus oleraceus</i>	Common Sow-thistle	
*	<i>Themeda triandra</i>	Kangaroo Grass	
*	<i>Trifolium angustifolium subsp. Angustifolium</i>	Narrow-leaved Clover	
*	<i>Trifolium glomeratum</i>	Cluster Clover	
	<i>Typha sp.</i>	Cumbungi	
*	<i>Verbena sp.</i>	Verbena	
*	<i>Vicia sp.</i>	Vetch	
	<i>Vittadinia cuneata</i>	Fuzzy New Holland Daisy	

Appendix 2 Significant Flora species recorded within the 5km data review area and their likelihood of presence in the study area, Huntly Streamside Reserve.

Key EPBC Act: CR – Critically endangered, EN – Endangered, VU – vulnerable; FFG Act: L – listed as threatened; N – nominated for listing as threatened; DELWP advisory lists: r – rare, e – endangered, v – vulnerable, k – poorly known. Likelihood of Presence (LOP) for the current assessment applies immediately to the study site as indicated in Figure 1. LOP definitions in Table 1, N = Not Likely, L = Low, M = Medium.

Species	Common name	Conservation status			
		EPBC	DELWP	FFG	LOP
<i>Acacia ausfeldii</i>	Ausfeld's Wattle		vu	X	L
<i>Acacia flexifolia</i>	Bent-leaf Wattle		r		N
<i>Acacia williamsonii</i>	Whirrakee Wattle		r	X	M
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	VU			N
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	Jericho Wire-grass		en	L	N
<i>Austrostipa breviglumis</i>	Cane Spear-grass		r		L
<i>Boronia anemonifolia</i> subsp. <i>aurifodina</i>	Goldfield Boronia		r		L
<i>Calotis cuneifolia</i>	Blue Burr-daisy		r		N
<i>Cassinia diminuta</i>	Dwarf Cassinia		r		L
<i>Cassinia ozothamnoides</i>	Cottony Cassinia		vu		N
<i>Choretrum glomeratum</i> var. <i>glomeratum</i>	Common Sour-bush		r		N
<i>Crocea exalata</i> subsp. <i>revoluta</i>	Whipstick Crocea		vu		L
<i>Daviesia genistifolia</i> s.s.	Broom Bitter-pea		r		L
<i>Dodonaea procumbens</i>	Trailing Hop-bush	VU	vu		L
<i>Eucalyptus froggattii</i>	Kamarooka Mallee		r	L	N
<i>Eucalyptus polybractea</i>	Blue Mallee		r		L
<i>Eucalyptus sideroxylon</i> subsp. <i>Sideroxylon</i>	Mugga		r		L

Species	Common name	Conservation status			
		EPBC	DELWP	FFG	LOP
<i>Goodenia benthamiana</i>	Small-leaf Goodenia		r		N
<i>Glycine latrobeana</i>	Clover Glycine	VU	vu	L	N
<i>Grevillea rosmarinifolia</i>	Rosemary Grevillea		r		L
<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle		r		L
<i>Phebalium festivum</i>	Dainty Phebalium		vu	L	N
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	CR	en	L	N
<i>Pseudanthus ovalifolius</i>	Oval-leaf Pseudanthus		r		N
<i>Rytidosperma setaceum</i> var. <i>brevisetum</i>	Short-bristle Wallaby-grass		r		L
<i>Swainsona behriana</i>	Southern Swainson-pea		r		L
<i>Westringia crassifolia</i>	Whipstick Westringia	EN	en	L	N

Appendix 3 Significant Fauna species recorded within the 5km data review area and their likelihood of presence in the study area, Huntly Streamside Reserve.

Key

EPBC Act: CR – Critically endangered, EN – Endangered, VU – vulnerable, Mi – Migratory, Ma - Marine; FFG Act: L – listed as threatened; N – nominated for listing as threatened; DELWP advisory lists: cr – critically endangered, en – endangered, vu – vulnerable, nt – near threatened, dd – data deficient

k – poorly known. Likelihood of Presence (LOP) for the current assessment applies immediately to the study site as indicated in Figure 1. LOP definitions in Table 1, N = Not Likely, L = Low, M = Moderate, H = High.

* insufficient data exists for accurate likelihood of presence assessment

Scientific Name	Common Name	EPBC	Count of Sightings	Last Record	Likelihood of presence
EPBC-listed species					
<i>Galaxias rostratus</i>	Flat-headed Galaxias	CR, vu	-		Low*
<i>Maccullochella peelii</i>	Murray Cod	VU, L, vu	-		Low
<i>Anthochaera phrygia</i>	Regent Honeyeater	CR, L, cr	-		Low
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN, L, en	1	18/10/1997	Low
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR, Mi, Ma, L, en	2	31/03/1984	Low
<i>Grantiella picta</i>	Painted Honeyeater	VU, L, vu	-		Low
<i>Hirundapus caudacutus</i>	White-throated Needletail	VU, Mi, Ma, L, vu	9	8/02/2019	Low- Moderate
<i>Numenius madagascariensis</i>	Eastern Curlew	CR, Mi, Ma, L, vu	-		Low
<i>Lathamus discolor</i>	Swift Parrot	CR, Ma, L, en	10	14/10/2000	Moderate
<i>Synemon plana</i>	Golden Sun Moth	CR, L, cr	-		Low
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU, L, vu	1	13/05/2019	Moderate
<i>Aprasia parapulchella</i>	Pink-tailed Worm-Lizard	VU, L, en	-		Low

<i>Crinia sloanei</i>	Sloane's Froglet	EN	-		Low
<i>Litoria raniformis</i>	Growling Grass Frog	VU, L, en	7	26/11/2014	Low-Moderate
<i>Delma impar</i>	Striped Legless Lizard	VU, L, en	-		Low
FFG-listed species					
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Ma, L, vu	3	10/03/2019	Low
<i>Ardea alba modesta</i>	Eastern Great Egret	L, vu	7	29/03/2019	Moderate
<i>Ardea intermedia plumifera</i>	Plumed Egret	L, en	15	8/02/2019	Moderate
<i>Burhinus grallarius</i>	Bush Stone-curlew	L, en	1	1/01/1987	Low
<i>Egretta garzetta</i>	Little Egret	Ma, L, en	2	17/03/2018	Moderate
<i>Falco subniger</i>	Black Falcon	L, vu	2	18/03/2019	Low
<i>Chthonicola sagittatus</i>	Speckled Warbler	L, vu	1	1/11/1992	Low
<i>Geopelia cuneata</i>	Diamond Dove	L, nt	2	13/12/2017	Low
<i>Lewinia pectoralis</i>	Lewin's Rail	L, vu	5	6/07/2001	Low
<i>Lophoictinia isura</i>	Square-tailed Kite	L, vu	5	11/01/2019	Previously recorded - High
<i>Melanodryas cucullata</i>	Hooded Robin	L, nt	3	12/10/2009	Moderate
<i>Ninox connivens</i>	Barking Owl	L, en	1	13/03/2017	Moderate
<i>Oreoica gutturalis</i>	Crested Bellbird	L, nt	30	17/07/2019	Moderate
<i>Oxyura australis</i>	Blue-billed Duck	L, en	51	24/04/2019	Low
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	L, en	6	9/02/1995	Low
<i>Porzana pusilla</i>	Baillon's Crake	Ma, L, vu	7	19/01/2019	Low
<i>Stagonopleura guttata</i>	Diamond Firetail	L, nt	7	8/04/2019	Low- Moderate
<i>Stictonetta naevosa</i>	Freckled Duck	L, en	24	25/04/2019	Low
<i>Pseudophryne bibronii</i>	Brown Toadlet	L, en	23	23/05/2007	Moderate
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	L, vu	24	1/02/2017	Moderate
Vic Advisory listed species					

<i>Tringa glareola</i>	Wood Sandpiper	Mi, Ma, vu	3	27/03/1988	Low
<i>Tringa nebularia</i>	Common Greenshank	Mi, Ma, vu	2	7/12/1984	Low
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Mi, Ma, vu	4	2/12/1990	Low
<i>Turnix velox</i>	Little Button-quail	nt	2	24/10/1990	Low
<i>Nycticorax caledonicus</i>	Nankeen Night Heron	Ma, nt	6	18/03/2017	Moderate
<i>Gallinago hardwickii</i>	Latham's Snipe	Mi, Ma, nt	8	1/02/2017	Moderate
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi, Ma, vu	7	21/01/2014	Low
<i>Aythya australis</i>	Hardhead	vu	98	26/05/2019	Low
<i>Biziura lobata</i>	Musk Duck	Ma, vu	108	28/06/2019	Low
<i>Calidris melanotos</i>	Pectoral Sandpiper	Mi, Ma, nt	-		Low
<i>Charadrius australis</i>	Inland Dotterel	vu	1	9/07/1983	Low
<i>Chalcites osculans</i>	Black-eared Cuckoo	Ma, nt	4	11/10/2017	Low
<i>Chlidonias hybrida</i>	Whiskered Tern	nt	9	25/09/2018	Low
<i>Climacteris picumnus</i>	Brown Treecreeper	nt	18	8/04/2019	Moderate
<i>Lichenostomus cratitius</i>	Purple-gaped Honeyeater	vu	7	4/10/2017	Low
<i>Limosa limosa</i>	Black-tailed Godwit	Mi, Ma, vu	1	19/02/1982	Low
<i>Phalacrocorax varius</i>	Pied Cormorant	nt	12	21/10/2017	Moderate
<i>Platalea regia</i>	Royal Spoonbill	nt	11	2/01/2019	Moderate
<i>Plegadis falcinellus</i>	Glossy Ibis	Mi, Ma, nt	8	28/10/2018	Moderate
<i>Chelodina longicollis</i>	Eastern Snake-necked Turtle	dd	2	26/11/2014	Moderate
<i>Anilius proximus</i>	Woodland Blind Snake	nt	2	1/01/2019	Low
Migratory / Marine only					
<i>Apus pacificus</i>	Fork-tailed Swift	Mi, Ma	1	25/03/1986	Low
<i>Bubulcus coromandus</i>	Eastern Cattle Egret		3	12/05/2013	Low
<i>Calidris ruficollis</i>	Red-necked Stint	Mi, Ma	8	3/06/2013	Low
<i>Charadrius bicinctus</i>	Double-banded Plover	Mi, Ma	1	17/02/1985	Low

<i>Charadrius ruficapillus</i>	Red-capped Plover	Ma	4	12/04/2014	Low
<i>Himantopus leucocephalus</i>	Pied Stilt	Ma	65	29/03/2019	Low
<i>Merops ornatus</i>	Rainbow Bee-eater	Ma	28	29/03/2019	Moderate
<i>Monarcha melanopsis</i>	Black-faced Monarch	Mi, Ma	-		Low
<i>Motacilla tschutschensis</i>	Eastern Yellow Wagtail		-		Low
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Mi, Ma	-		Low
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	Ma	34	8/04/2019	Low
<i>Spatula rhynchotis</i>	Australasian Shoveler	vu	84	28/06/2019	Low

Appendix 4 Inventory of indigenous scattered trees (alive and dead) at the Huntly Streamside Reserve.

Tree ID	Species	Scattered Size	DBH (cm)	Circumference (cm)
15	<i>Eucalyptus camaldulensis</i>	Small	10	31
16	<i>Eucalyptus camaldulensis</i>	Small	12	38
17	<i>Eucalyptus camaldulensis</i>	Small	75	236
19	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	21	66
24	<i>Eucalyptus camaldulensis</i>	Small	50	157
50	<i>Eucalyptus camaldulensis</i>	Small	14	44
51	<i>Eucalyptus camaldulensis</i>	Small	10	31
58	<i>Eucalyptus camaldulensis</i>	Small	14	44
59	<i>Eucalyptus camaldulensis</i>	Small	11	35
60	<i>Eucalyptus camaldulensis</i>	Small	15	47
66	Dead tree	Small	62	195
76	<i>Eucalyptus camaldulensis</i>	Small	16	50
77	<i>Eucalyptus camaldulensis</i>	Small	12	38
91	<i>Eucalyptus camaldulensis</i>	Small	14	44
92	<i>Eucalyptus camaldulensis</i>	Small	14	44
93	<i>Eucalyptus camaldulensis</i>	Small	16	50
113	<i>Eucalyptus camaldulensis</i>	Small	10	31
159	<i>Eucalyptus camaldulensis</i>	Small	12	38
170	<i>Eucalyptus camaldulensis</i>	Small	15	47
171	<i>Eucalyptus camaldulensis</i>	Small	15	47
182	<i>Eucalyptus camaldulensis</i>	Small	10	31
187	<i>Eucalyptus camaldulensis</i>	Small	20	63
191	<i>Eucalyptus camaldulensis</i>	Small	16	50
239	<i>Eucalyptus camaldulensis</i>	Large	121	380
240	<i>Eucalyptus camaldulensis</i>	Small	12	38
241	Dead tree	Small	66	207

242	Dead tree	Small	70	220
263	<i>Eucalyptus camaldulensis</i>	Small	43	135
264	<i>Eucalyptus camaldulensis</i>	Small	56	174
281	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	21	66
282	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	18	57
283	<i>Eucalyptus camaldulensis</i>	Small	18	57
284	<i>Eucalyptus camaldulensis</i>	Small	30	94
285	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	104	327
286	<i>Eucalyptus camaldulensis</i>	Large	105	330
287	<i>Eucalyptus camaldulensis</i>	Large	99	311
288	<i>Eucalyptus camaldulensis</i>	Small	20	63
289	<i>Eucalyptus camaldulensis</i>	Small	19	60
290	<i>Eucalyptus camaldulensis</i>	Small	13	41
291	<i>Eucalyptus camaldulensis</i>	Small	24	75
292	<i>Eucalyptus camaldulensis</i>	Small	15	47
293	<i>Eucalyptus camaldulensis</i>	Small	15	47
294	<i>Eucalyptus camaldulensis</i>	Large	91	286
295	<i>Eucalyptus camaldulensis</i>	Large	97	305
296	<i>Eucalyptus camaldulensis</i>	Small	14	44
297	<i>Eucalyptus camaldulensis</i>	Small	11	35
298	<i>Eucalyptus camaldulensis</i>	Small	11	35
299	<i>Eucalyptus camaldulensis</i>	Small	11	35
300	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	55	173
301	Dead tree	Small	52	163
302	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	84	264
303	<i>Eucalyptus camaldulensis</i>	Small	10	31
304	<i>Eucalyptus camaldulensis</i>	Small	11	35
305	<i>Eucalyptus camaldulensis</i>	Small	11	35
306	<i>Eucalyptus camaldulensis</i>	Small	10	31

307	<i>Eucalyptus camaldulensis</i>	Small	10	31
308	<i>Eucalyptus camaldulensis</i>	Small	14	44
309	<i>Eucalyptus camaldulensis</i>	Small	18	57
310	<i>Eucalyptus microcarpa</i>	Small	18	57
311	<i>Eucalyptus camaldulensis</i>	Small	10	31
312	<i>Eucalyptus camaldulensis</i>	Small	13	41
313	<i>Eucalyptus camaldulensis</i>	Small	11	35
334	<i>Eucalyptus microcarpa</i>	Small	14	44
335	<i>Eucalyptus camaldulensis</i>	Small	79	248
336	<i>Eucalyptus camaldulensis</i>	Small	11	35
337	<i>Eucalyptus camaldulensis</i>	Small	13	41
338	<i>Eucalyptus camaldulensis</i>	Small	15	47
339	<i>Eucalyptus camaldulensis</i>	Small	16	50
340	<i>Eucalyptus camaldulensis</i>	Small	13	41
341	<i>Eucalyptus camaldulensis</i>	Small	14	44
342	<i>Eucalyptus camaldulensis</i>	Small	12	38
343	<i>Eucalyptus camaldulensis</i>	Small	22	69
344	<i>Eucalyptus microcarpa</i>	Large	98	308
345	<i>Eucalyptus microcarpa</i>	Small	10	31
367	<i>Eucalyptus microcarpa</i>	Large	120	377
368	<i>Eucalyptus camaldulensis</i>	Small	10	31
369	<i>Eucalyptus camaldulensis</i>	Small	10	31
380	<i>Eucalyptus camaldulensis</i>	Small	10	31
381	<i>Eucalyptus camaldulensis</i>	Small	10	31
382	<i>Eucalyptus microcarpa</i>	Small	12	38
392	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	49	152
393	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	59	184
394	<i>Eucalyptus microcarpa</i>	Large	115	360
409	<i>Eucalyptus camaldulensis</i>	Small	15	47

421	<i>Eucalyptus camaldulensis</i>	Small	11	33
430	<i>Eucalyptus camaldulensis</i>	Small	15	47
431	<i>Eucalyptus camaldulensis</i>	Small	15	47
432	<i>Eucalyptus camaldulensis</i>	Small	11	35
433	<i>Eucalyptus camaldulensis</i>	Small	11	35
434	<i>Eucalyptus camaldulensis</i>	Small	12	38
555	<i>Eucalyptus camaldulensis</i>	Small	20	63
556	<i>Eucalyptus camaldulensis</i>	Small	20	63
557	<i>Eucalyptus camaldulensis</i>	Small	20	63
558	<i>Eucalyptus camaldulensis</i>	Small	15	47
627	<i>Eucalyptus camaldulensis</i>	Small	50	157
677	<i>Eucalyptus camaldulensis</i>	Small	20	63
755	<i>Eucalyptus camaldulensis</i>	Small	30	94
834	<i>Eucalyptus camaldulensis</i>	Small	16	50
835	<i>Eucalyptus camaldulensis</i>	Small	14	44
957	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	120	377
962	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	85	267
1029	<i>Eucalyptus microcarpa</i>	Small	68	212
1030	<i>Eucalyptus microcarpa</i>	Small	15	47
1031	<i>Eucalyptus microcarpa</i>	Small	20	61
1032	<i>Eucalyptus microcarpa</i>	Small	22	68
1033	<i>Eucalyptus microcarpa</i>	Small	17	53
1034	<i>Eucalyptus microcarpa</i>	Large	95	297
1035	<i>Eucalyptus microcarpa</i>	Small	12	36
1036	<i>Eucalyptus microcarpa</i>	Small	14	44
1037	<i>Eucalyptus microcarpa</i>	Large	109	341
1038	<i>Eucalyptus microcarpa</i>	Small	58	182
1039	<i>Eucalyptus microcarpa</i>	Small	12	36
1040	<i>Eucalyptus microcarpa</i>	Large	101	316

1041	<i>Eucalyptus melliodora</i>	Large	80	251
1042	<i>Eucalyptus melliodora</i>	Large	99	309
1043	<i>Eucalyptus camaldulensis</i>	Small	13	41
1044	<i>Eucalyptus camaldulensis</i>	Small	25	77
1045	<i>Eucalyptus camaldulensis</i>	Small	15	46
1046	<i>Eucalyptus camaldulensis</i>	Small	24	74
1047	<i>Eucalyptus camaldulensis</i>	Small	11	33
1048	<i>Eucalyptus camaldulensis</i>	Small	17	52
1049	<i>Eucalyptus camaldulensis</i>	Small	18	55
1050	<i>Eucalyptus camaldulensis</i>	Small	13	41
1051	<i>Eucalyptus camaldulensis</i>	Small	68	214
1052	<i>Eucalyptus camaldulensis</i>	Small	29	91
1053	<i>Eucalyptus camaldulensis</i>	Small	72	226
1054	<i>Eucalyptus camaldulensis</i>	Large	122	383
1055	<i>Eucalyptus camaldulensis</i>	Small	14	44
1056	<i>Eucalyptus camaldulensis</i>	Small	13	41
1057	<i>Eucalyptus camaldulensis</i>	Large	107	336
1058	<i>Eucalyptus camaldulensis</i>	Small	14	44
1059	<i>Eucalyptus camaldulensis</i>	Large	82	258
1060	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	114	358
1061	<i>Eucalyptus camaldulensis</i>	Small	14	44
1062	<i>Eucalyptus camaldulensis</i>	Small	14	44
1063	<i>Eucalyptus camaldulensis</i>	Small	13	41
1064	<i>Eucalyptus camaldulensis</i>	Small	24	74
1065	<i>Eucalyptus camaldulensis</i>	Small	13	41
1066	<i>Eucalyptus camaldulensis</i>	Small	17	53
1067	<i>Eucalyptus melliodora</i>	Small	17	53
1068	<i>Eucalyptus camaldulensis</i>	Small	13	41
1069	<i>Eucalyptus camaldulensis</i>	Small	14	44

1070	Dead tree	Large	93	292
1071	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	11	35
1072	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	89	280
1073	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	140	440
1074	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	15	47
1075	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	11	35
1076	<i>Eucalyptus camaldulensis</i>	Large	111	349
1077	<i>Eucalyptus camaldulensis</i>	Large	84	264
1078	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	68	214
1079	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	97	305
1080	<i>Eucalyptus microcarpa</i>	Small	11	33
1081	<i>Eucalyptus microcarpa</i>	Large	94	295
1082	<i>Eucalyptus camaldulensis</i>	Small	60	188
1083	<i>Eucalyptus camaldulensis</i>	Small	11	33
1084	<i>Eucalyptus camaldulensis</i>	Small	11	35
1085	<i>Eucalyptus camaldulensis</i>	Small	9	29
1086	<i>Eucalyptus camaldulensis</i>	Small	71	221
1087	<i>Eucalyptus camaldulensis</i>	Small	36	113
1088	<i>Eucalyptus camaldulensis</i>	Small	32	101
1089	<i>Eucalyptus camaldulensis</i>	Large	80	251
1090	<i>Eucalyptus camaldulensis</i>	Small	65	204
1091	<i>Eucalyptus camaldulensis</i>	Small	21	67
1092	<i>Eucalyptus camaldulensis</i>	Small	39	121
1093	<i>Eucalyptus microcarpa</i>	Small	72	227
1094	<i>Eucalyptus camaldulensis</i>	Small	54	170
1095	<i>Eucalyptus camaldulensis</i>	Small	46	143
1096	Dead tree	Small	32	100
1097	Dead tree	Small	42	132
1098	Dead tree	Small	66	208

1099	Dead tree	Small	57	179
1100	<i>Eucalyptus camaldulensis</i>	Large	115	361
1101	<i>Eucalyptus microcarpa</i>	Small	47	148
1102	<i>Eucalyptus microcarpa</i>	Small	58	183
1103	<i>Eucalyptus camaldulensis</i>	Small	43	134
1104	<i>Eucalyptus microcarpa</i>	Small	43	136
1105	<i>Eucalyptus camaldulensis</i>	Small	48	152
1106	<i>Eucalyptus melliodora</i>	Large	118	371
1107	<i>Eucalyptus camaldulensis</i>	Large	123	387
1108	<i>Eucalyptus camaldulensis</i>	Small	48	150
1109	<i>Eucalyptus camaldulensis</i>	Small	12	38
1110	<i>Eucalyptus camaldulensis</i>	Large	133	419
1111	<i>Eucalyptus camaldulensis</i>	Large	138	433
1112	<i>Eucalyptus camaldulensis</i>	Small	18	57
1113	<i>Eucalyptus camaldulensis</i>	Large	123	388
1114	<i>Eucalyptus camaldulensis</i>	Small	30	93
1115	<i>Eucalyptus melliodora</i>	Large	81	254
1116	<i>Eucalyptus melliodora</i>	Small	70	218
1117	<i>Eucalyptus camaldulensis</i>	Small	18	57
1118	<i>Eucalyptus camaldulensis</i>	Small	22	69
1119	<i>Eucalyptus camaldulensis</i>	Small	11	35
1120	<i>Eucalyptus camaldulensis</i>	Small	14	43
1121	<i>Eucalyptus camaldulensis</i>	Small	10	33
1122	<i>Eucalyptus camaldulensis</i>	Small	19	59
1123	<i>Eucalyptus camaldulensis</i>	Small	17	54
1124	<i>Eucalyptus camaldulensis</i>	Small	15	48
1125	<i>Eucalyptus camaldulensis</i>	Small	10	32
1126	<i>Eucalyptus camaldulensis</i>	Small	13	40
1127	<i>Eucalyptus camaldulensis</i>	Small	21	65

1128	<i>Eucalyptus camaldulensis</i>	Small	20	63
1129	<i>Eucalyptus camaldulensis</i>	Small	22	68
1130	<i>Eucalyptus camaldulensis</i>	Small	13	40
1131	<i>Eucalyptus camaldulensis</i>	Small	18	57
1132	<i>Eucalyptus camaldulensis</i>	Small	10	32
1133	<i>Eucalyptus camaldulensis</i>	Large	80	251
1134	<i>Eucalyptus camaldulensis</i>	Large	90	283
1135	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	90	283
1137	<i>Eucalyptus camaldulensis</i>	Large	85	267
1140	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Large	90	283
1143	<i>Eucalyptus camaldulensis</i>	Small	50	157
1144	<i>Eucalyptus camaldulensis</i>	Small	60	188
1146	<i>Eucalyptus camaldulensis</i>	Small	70	220
1147	<i>Eucalyptus camaldulensis</i>	Small	70	220
1148	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	40	126
1149	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Small	70	220
1150	<i>Eucalyptus melliodora</i>	Small	70	220
1153	<i>Eucalyptus microcarpa</i>	Small	50	157
1154	<i>Eucalyptus microcarpa</i>	Small	60	188
1162	Dead tree	Large	75	236