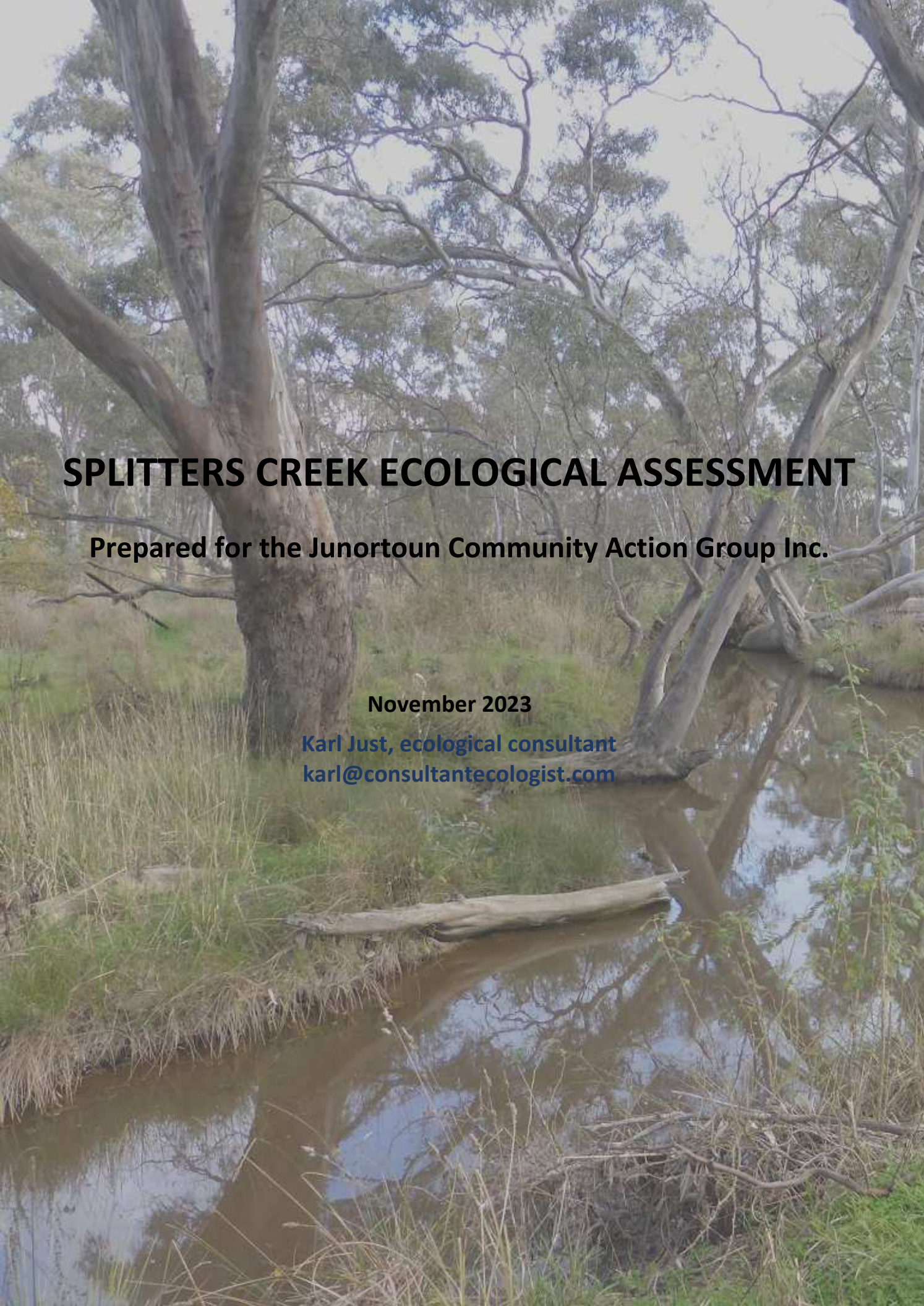

SPLITTERS CREEK ECOLOGICAL ASSESSMENT

Prepared for the Junortoun Community Action Group Inc.

November 2023

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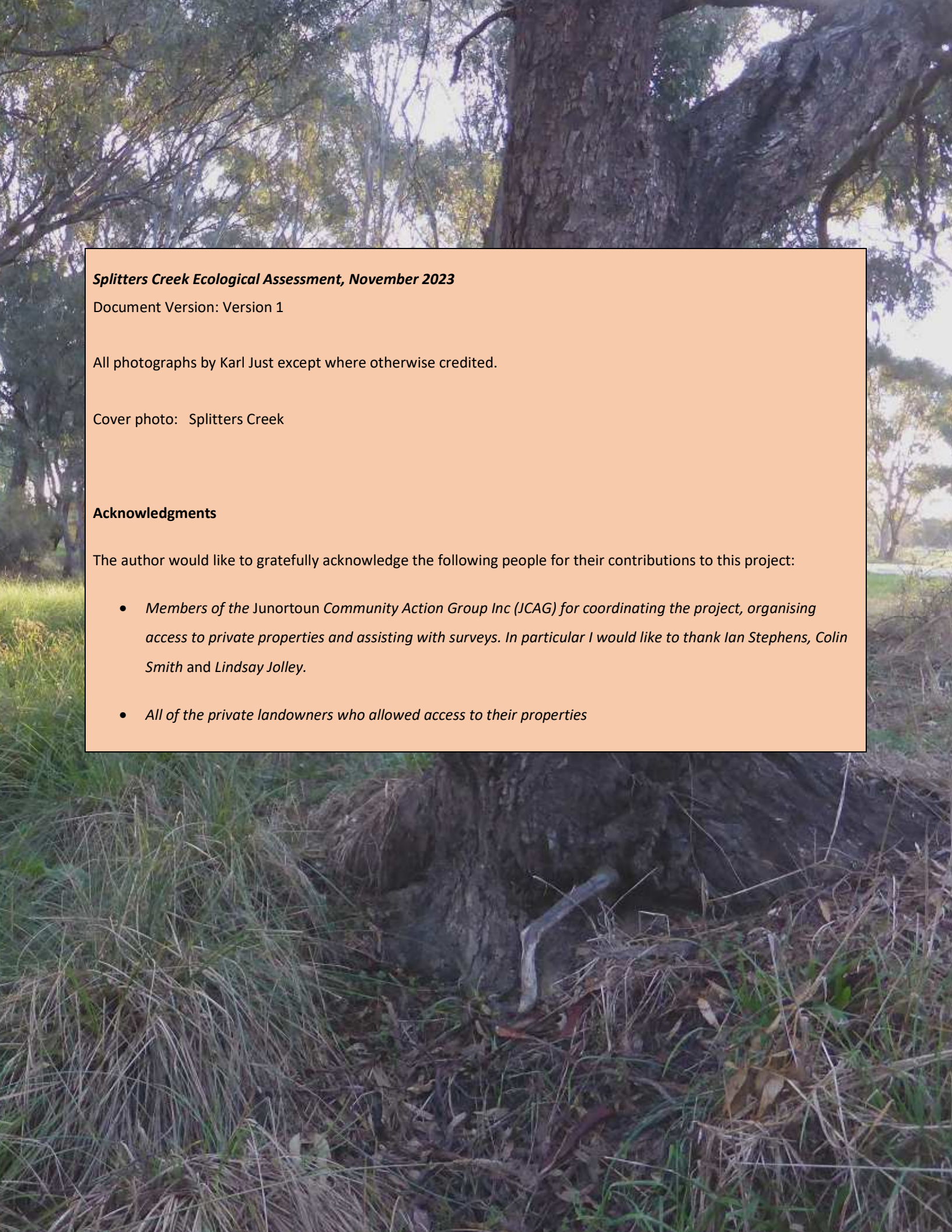

Splitters Creek Ecological Assessment, November 2023

Document Version: Version 1

All photographs by Karl Just except where otherwise credited.

Cover photo: Splitters Creek

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- *All of the private landowners who allowed access to their properties*

EXECUTIVE SUMMARY

In 2022, the Junortoun Community Action Group Inc. received a Victorian Landcare Grant to fund an ecological assessment of Splitters Creek at Junortoun, to the east of Bendigo. The purpose of the project was to raise community awareness and appreciation of the values of the creek, which flows through numerous private properties. As part of the project, all areas of public land and 10 separate private properties were subject to site assessment. This included a flora survey and collection of incidental fauna records.

Splitters Creek is approximately 10 kilometres in length and originates in the hilly, dry forests of Wildflower Drive (Greater Bendigo National Park). The creek flows from west to east, eventually entering Axe Creek, which in turns flows into the Campaspe River, a tributary of the Murray River. The catchment of Splitters Creek is relatively small, covering approximately 2000 hectares between Junortoun and Longlea.

The drier upper reaches of the creek within the Greater Bendigo National Park occur in Box-Ironbark forests dominated by Red Ironbark (*Eucalyptus tricarpa*), Yellow Gum (*Eucalyptus* l*eucoxylon*) and Grey Box (*Eucalyptus microcarpa*). Downstream of Wilkie Road, River Red Gum takes over as the dominant tree. From here, the creek channel becomes slightly wider, and there are scattered large pools of water. These are lined with a variety of inundation-tolerant species including Tall Sedge (*Carex appressa*), Rushes (*Juncus* spp.), Common Spike-sedge (*Eleocharis acuta*) and Lesser Joyweed (*Alternanthera denticulata*). Aquatic plants (plants growing in the water) are not common, however some patches of Upright Milfoil (*Myriophyllum crispatum*) and Water Plantain (*Alisma plantago-aquatica*) were observed at several locations.

During the 2023 flora survey, a total of 196 vascular plant species were recorded across the Splitters Creek corridor. Of these, 114 (58%) were indigenous species and 82 (42%) were introduced. During the survey, three species listed as threatened under the Flora and Fauna Guarantee Act (FFG) 1988 were recorded. An additional three species are considered to be of significance in the Bendigo region. A total of 66 fauna species were recorded across the Splitters Creek corridor. This included 47 bird, three fish, five frog, eight mammal and three reptile species (see Appendix 2). This is only a snapshot of the faunal diversity of Splitters Creek, as these were only incidental records.

Splitters Creek is threatened by a variety of processes, including weed invasion, erosion and predation of native animals by foxes and cats. Changes to the natural hydrology are a major issue, particularly due to increased urban development and stormwater runoff into the creek.

Key recommendations of this study are to:

- initiate a project in the next three years that facilitates revegetation, weed control and erosion control on private and public land across the Splitters Creek catchment.
- ensure that future development within the Splitters Creek catchment incorporates Water Sensitive Urban Design (WSUD) principles, including establishment of stormwater wetlands to reduce direct discharge into the creek.
- JCAG to lobby Bendigo City Council to purchase the parcel of land occurring to the immediate east of Somerset Park Road and McIvor Highway.

TABLE OF CONTENTS

Tables

List of Plates

1.0 INTRODUCTION

1.1 Project Context

In 2022, the Junortoun Community Action Group Inc. received a Victorian Landcare Grant to fund an ecological assessment of Splitters Creek at Junortoun, to the east of Bendigo. The purpose of the project was to raise community awareness and appreciation of the values of the creek, which flows through numerous private properties.

As part of the project, all areas of public land and 10 separate private properties were subject to site assessment. This included a flora survey and collection of incidental fauna records.

This report describes the results of the assessment, including an overview of Splitters Creek's hydrology, flora, faunal habitat and threats, followed by recommendations for protecting and enhancing the creek's significant ecological values.

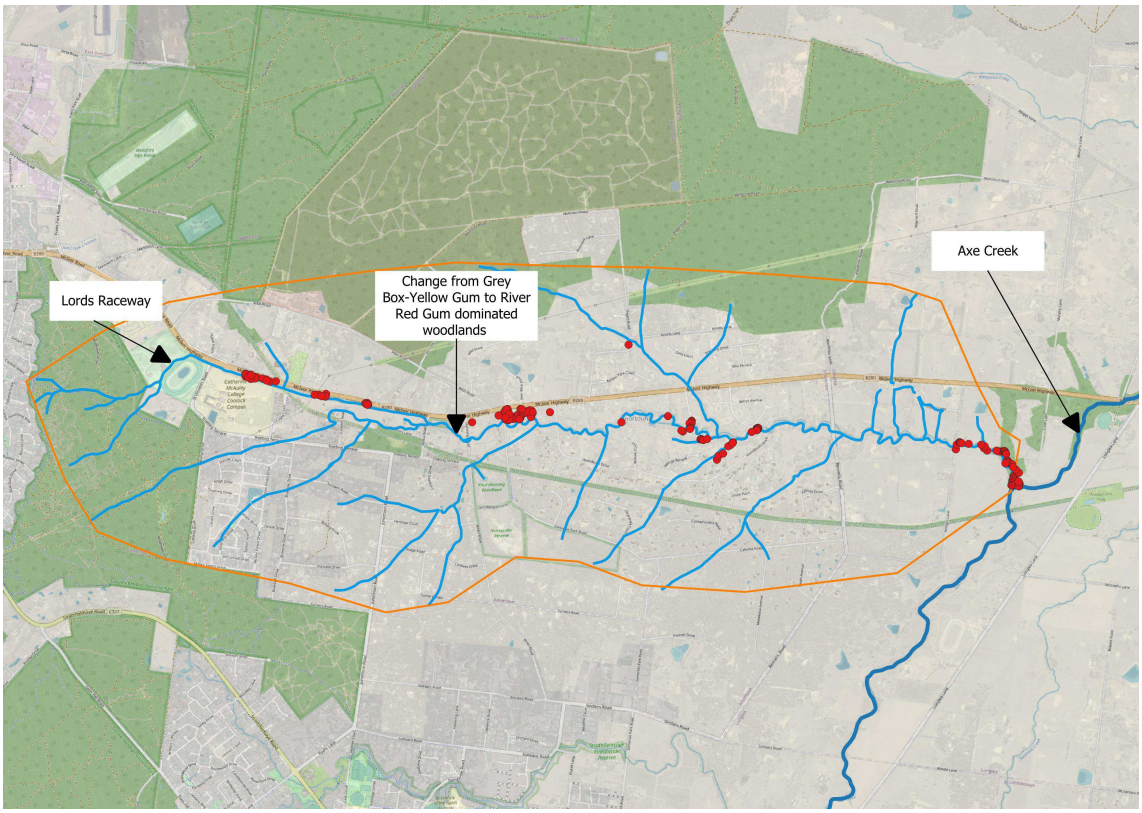

Plate 1 Splitters Creek and its tributaries. The approximate catchment boundary is shown in orange. The red circles show areas that were surveyed in 2023 for this project. Axe Creek is shown in dark blue in the east.

1.2 Location and description

Splitters Creek is approximately 10 kilometres in length and originates in the hilly, dry forests of Wildflower Drive (Greater Bendigo National Park). The creek flows from west to east, eventually entering Axe Creek, which in turns flows into the Campaspe River, a tributary of the Murray River. The catchment of Splitters Creek is relatively small, covering approximately 2000 hectares between Junortoun and Longlea.

For most of its course, the creek runs parallel to the McIvor Highway, with prominent side roads crossing the creek including Wilkie Road, Somerset Park Road, Homebush Drive, Bennets Road and Hodges Lane. Much of the western portion of the creek traverses public land until around Wilkie Road, with the remaining reach to the east running through over 25 private properties, each which are on average approximately two hectares in area.

Splitters Creek occurs within the City of Greater Bendigo and is within the jurisdiction of the North Central Catchment Management Authority (NCCMA).

Plate 2 Splitters Creek, east of Somerset Park Road

2.0 NATURAL VALUES

2.1 Geology and soils

Splitters Creek is surrounded by a narrow active floodplain that flows through undulating sedimentary terrain. Soils of the floodplain have been deposited over the last 2.5 million years, however the sedimentary terrain was formed by deposition in an ancient seabed during the Ordovician period (443-488 million years old), which was later uplifted.

Soils are variable higher in the catchment, but bleached and mottled yellow duplex soils are dominant lower in the catchment. An occasional area of sandy wash may be found overlying the yellow duplex soil where flooding has occurred.

2.2 Hydrology and stream morphology

Splitters Creek originates in the hilly, dry forests of Wildflower Drive (Greater Bendigo National Park), where several minor gullies run off a ridgeline that sits at approximately 260m elevation. From there, the creek has been piped underground beneath the Lords Raceway. It then emerges at the McIvor Highway, where the next 2.5km section has been artificially straightened and channelled in the past to prevent flooding onto the highway[1]. From around Wilkie Road, the creek returns to its natural meandering course until its junction with Axe Creek. The elevation at the Axe Creek junction is 180m above sea level, so that the total fall of the creek across its entire catchment is less than 100 metres.

The natural hydrological regime of Splitters Creek has been significantly modified since European settlement. Considering the small size of the catchment and low-rainfall environment (median annual rainfall is between 450-500mm), the upper reaches of the creek would have originally been characterised by relatively dry gullies that would rarely have supported flowing water. This is evidenced by the dominance of Grey Box (*Eucalypts microcarpa*) and Yellow Gum (*Eucalyptus leucoxylon*) along the banks of the creek upstream of Wilkie Road, two species that are generally found in dry habitats. Due to the entry of several tributaries and gullies, from the mid to lower reaches the creek would likely have supported scattered pools of water and would have flowed for short periods of the year, predominately during winter-spring. These sections contain more extensive

[1] Aerial imagery from 1945 shows that the straightening of the creek had already occurred by then. It was likely undertaken sometime in the 1800's along what was then known as the Bendigo-Heathcote Road.

alluvial soil deposits and are dominated by River Red Gum (*Eucalyptus camaldulensis*) along the creek channel, mixed with Yellow Box (*Eucalyptus melliodora*) across the alluvial terraces.

With the development of the catchment for residential and industrial purposes in the last 100 years, rainfall that would once have soaked into the ground is now captured by hard, concrete surfaces and then channelled into numerous pipes and stormwater systems that outfall into the creek. Added to this is any runoff from these areas coming from use of water for industry, gardens washing of cars and other activities. This has resulted in significantly more water flowing into the creek, including over the summer months, when the creek would originally have been largely dry.

Although more water can have some benefits for native ecosystems, it also can also shift the original vegetation communities and faunal habitat and tends to cause invasion of introduced weeds, such as Water Couch (**Paspalum distichum*). This species thrives in waterways that retain shallow water over the summer months when it is actively growing, and so the conversion from seasonal (summer) drying to near permanent inundation has led to the spread of this weed throughout the catchment. There is also evidence that the changed hydrology is causing death to some trees, particularly Yellow Box that grow near a tributary around Cashens Road. Untreated stormwater is also typically of poor quality, containing heavy metals and high suspended solids that can create turbid and low oxygen water conditions.

2.3 Overview of native vegetation

The drier upper reaches of the creek within the Greater Bendigo National Park occur in Box-Ironbark forests dominated by Red Ironbark (*Eucalyptus tricarpa*), Yellow Gum (*Eucalyptus* l*eucoxylon*) and Grey Box (*Eucalyptus microcarpa*). The gullies that make up the upper part of the creek catchment support very few riparian plant species, with the channel generally being bare or lined with scattered wattles and other shrubs.

The section between the Lords Raceway and Wilkie Road supports a eucalypt canopy dominated by Grey Box (*Eucalyptus microcarpa*) and Yellow Gum (*Eucalyptus* l*eucoxylon*), with scattered patches of terrestrial species occurring on the adjacent slopes. Some of these patches, while small, are relatively species-rich, including Bushy Needlewood (*Hakea decurrens*), Golden Wattle (*Acacia pycnantha*), Rough Wattle (*Acacia aspera*), Gorse Bitter-pea (*Daviesia ulicifolia* spp. *ruscifolia*), Grey Parrot-pea *Dillwynia* cinerascens) Copper-awned Wallaby-grass (*Rytidosperma fulvum*) and Remote-flowered Rush (*Juncus remotiflorus*). The creek channel is typically dominated be dense swards of Poong'ort

(*Carex tereticaulis*) and Tall Sedge (*Carex appressa*) with occasional patches of Narrow-leaf Cumbungi (*Typha domingensis*).

Downstream of Wilkie Road, River Red Gum takes over as the dominant tree. From here, the creek channel becomes slightly wider, and there are scattered large pools of water. These are lined with a small variety of inundation-tolerant species including Tall Sedge (*Carex appressa*), Rushes (*Juncus* spp.), Common Spike-sedge (*Eleocharis acuta*) and Lesser Joyweed (*Alternanthera denticulata*). Aquatic plants (plants growing in the water) are not common, however some patches of Upright Milfoil (*Myriophyllum crispatum*) and Water Plantain (*Alisma plantago-aquatica*) were observed at several locations.

Plate 3 Large River Red Gum, private land, Cashens Road.

The alluvial terraces that line the creek have often been cleared or degraded, however the most intact remnants (e.g. north of the creek and east of Somerset Park Road) were dominated by Yellow Box (*Eucalyptus melliodora*) and Grey Box (*Eucalyptus microcarpa*), with a grassy ground-layer dominated by Spear-grasses (*Austrostipa* spp.), Wallaby-grasses (*Rytidosperma* spp.), Common Love-grass (*Eragrostis brownii*) and Common Wheat-grass (*Anthosachne scabra*). Forbs were uncommon and included Naked Crane's-bill (*Geranium* sp. 5) and Woolly New Holland Daisy (*Vittadinia gracilis*), with other groundflora species including Small Mat-rush (*Lomandra nana*) and Common Rice-flower (*Pimelea humilis*).

Low rises adjacent to the creek have largely been cleared, however notable remnants occur east of Somerset Park Road and Hodges Lane. These areas contain a high diversity and cover of grasses, extensive Shiny Everlasting (*Xerochrysum viscosum*) and scattered lilies.

Plate 4 Grey Box Grassy Woodland, private land east of Hodges Lane.

Plate 5 One of the dry gullies that forms the headwaters of Splitters Creek within the Greater Bendigo National Park

Plate 6 Aquatic vegetation, including Upright Milfoil, along Splitters Creek. Private land off Homebush Drive.

Plate 7 Riparian vegetation along Splitters Creek. Private land south of McIvor Highway.

2.4 Faunal habitat

Splitters Creek supports extensive habitat for a variety of fauna. The thousands of eucalypts across the length of the creek are an important food source, with Grey Box (*Eucalyptus microcarpa*) and Yellow Gum (*Eucalyptus* l*eucoxylon*) being among the most nectar-rich of eucalypts. These species flower during autumn and winter, when they attract a wide range of honeyeaters, lorikeets and other birds, including the nationally threatened Swift Parrot (*Lathamus discolor*). River Red Gum predominately flowers over the summer months, providing a source of pollen and nectar to countless insects, which are generally more active during the warmer months. Although there are few old trees remaining across the catchment due to past logging for firewood, mining and building, those that survive contain hollows, spouts and fissures which are essential breeding habitat for birds and mammals.

Plate 8 Hollow in River Red Gum along Splitters Creek

The mid-storey habitat includes a variety of wattles and other shrubs such as Sifton Bush (*Cassinia sifton*), from 1-5m in height. These provide important nesting habitat, while thickets of Silver Wattle (*Acacia dealbata*) provide a food source for Krefft's Glider (*Petaurus notatus*), a marsupial that can glide up to 30m between trees and chews through the bark of these wattles to extract the sap.

The most intact ground habitats include many fallen logs and a grassy ground-layer to ensure there is adequate cover from predators, with native grasses providing seeds for many birds to feed upon. Removal of fallen timber for firewood or tidying purposes as well as frequent mowing of the ground layer can degrade this habitat and make it less suitable for many native birds.

Habitat along the Splitters Creek channel varies, with some sections containing deeper pools and plenty of submerged logs that provide habitat and cover for fish. The creek is known to support exotic fish such as Goldfish (*Carassius auratus*) and Mosquito Fish (*Gambusia holbrooki)*, but it is unknown if any native species survive. The creek is unlikely to support larger native fish, but could potentially support small-bodied species such as Obscure Galaxias (*Galaxias oliros*) and Flat-headed Gudgeon (*Philypnodon grandiceps)*. Aquatic vegetation is important for fish , waterbugs and other native animals, as it provides cover and a food source. The cover of aquatic plants varies along the creek, but there is generally a low cover lining the verges of deeper pools.

Artificial dams are scattered across private properties along the floodplain. Many of these are fringed by native wetland plants and provide important habitat for turtles, wetland birds, fish and insects.

Plate 9 Artificial dam, providing important faunal habitat. Private land adjacent to Splitters Creek.

Several frogs were recorded along the creek, including Southern Brown Tree-frog (*Littoria ewingii*), Common Froglet (*Crinia signifera*), Banjo Frog (*Limnodynastes dumerilii*) and Spotted Marsh-frog (*Limnodynastes tasmaniensis*). The creek was searched for the threatened Bibron's Toadlet in May 2023, but no individuals were located, despite this species being known to occur nearby. It is possible that this cryptic species occurs in low numbers across the creek, particularly in seasonally inundated depressions along the floodplain.

Plate 10 Deeper pool on Splitters Creek. These pools are a valuable refuge for many fauna during hot and dry conditions

3.0 FLORA & FAUNA SURVEY

3.1 Flora species

During the 2023 flora survey, a total of 196 vascular plant species were recorded across the Splitters Creek corridor. Of these, 114 (58%) were indigenous species and 82 (42%) were introduced (see Appendix 1).

During the survey, three species listed as threatened under the Flora and Fauna Guarantee Act (FFG) 1988 were recorded. An additional three species are considered to be of significance in the Bendigo region. These species are presented in Table 1 below.

Plate 11 Variable Glycine, a small pea observed at one location on private land adjacent to Splitters Creek. This species has been depleted across its range and is uncommon around Bendigo.

Table 1 Significant flora species recorded along Splitters Creek in 2023

Scientific Name	Common Name	Status	Comments
Acacia ausfeldii	Ausfeld's Wattle	FFG	Several plants observed in public land that occurs between the north and south sections of Homebush Drive
Correa glabra var. glabra	Rock Correa	Regionally significant	Population observed growing around rocky escarpment at junction with Axe Creek
Dianella tarda	Late-flower Flax-lily	FFG	Approximately 20 plants observed, including along Hodges Lane and near the junction with Axe Creek
Geranium sp. 3	Pale-flower Crane's-bill	FFG	Several plants observed in private and on north side of Splitters Creek near junction with Axe Creek
Glycine tabacina	Variable Glycine	Regionally significant	Approximately 20 plants recorded at one property on Homebush Drive.
Pleurosorus rutifolius	Blanket Fern	Regionally significant	Observed growing in crevices of escarpment near junction with Axe Creek

Two threatened ecological communities were recorded within the study area:

- the FFG-listed *Creekline Grassy Woodland,* occurs along the River Red Gum-dominated central and eastern sections of the creek,
- the Environment Projection and Biodiversity Conservation (EPBC) 1999 Act-listed *Grey Box Grassy Woodland,* occurs on low rises and slopes adjacent to parts of the creek. This included to the east of Hodgers Lane and Somerset Park Road.

3.2 Fauna species

During the 2023 survey, a total of 66 fauna species were recorded across the Splitters Creek corridor. This included 47 bird, three fish, five frog, eight mammal and three reptile species (see Appendix 2). This is only a snapshot of the faunal diversity of Splitters Creek, as these were only incidental records. A more detailed survey using targeted fauna survey techniques would be required to compile a more complete list, particularly for invertebrates and cryptic species such as micro-bats.

Plate 12 White-winged Chough, a woodland bird that lives in small family groups, observed in a River Red Gum on Splitters Creek.

Plate 13 Common Froglet, this is one of the more common frog species along Splitters Creek

4.0 SUMMARY OF PROPERTY ASSESSMENTS

Ten private properties were included in the 2023 ecological survey of Splitters Creek. Access to these properties was of great value, not only to allow recording of flora and fauna species, but to hear observations and concerns from landholders. Key points that were raised included:

- Not knowing what kind of management or activities are permitted along the creek was a common concern that was raised by many landholders.
- All landholders had left areas of the creek for wildlife, but some raised concerns about snakes and fire. This was often addressed through frequent mowing near the creek.
- The effects of flooding were discussed by many landowners, including the recent October 2022 flood and previous flood events in 2016 and 2010. Some landowners pointed out particular issues, such as old fences across the creek that trapped debris during flood events, ineffective drains and culverts and areas that were badly eroding.
- Many landowners showed a strong interest in the potential for being part of creek rehabilitation works, including revegetation, installation of nestboxes and control of pest plants and animals.

5.0 GUIDELINES FOR THE PROTECTION AND MANAGEMENT OF THE SPLITTERS CREEK FLOODPLAIN

5.1 Flood mitigation

Historically, flood mitigation works carried out by government agencies often involved removing vegetation and instream logs and snags across river and creek systems. These works were undertaken because large amounts of debris can potentially slow and widen floodwaters, and in some cases worsen erosion (if wood directs the flow into a bank). However, extensive research carried out in recent times has shown that unless instream and riparian vegetation and logs are very dense, these components have minimal impacts on flooding (DELWP 2016a, DELWP 2016b DELWP 2016c DELWP 2016d). For example:

- Dense reedbeds are often blamed for flooding. However, during floods, reeds flatten to the ground and provide very minimal resistance to water flow (DELWP 2019a).
- A channel needs to be substantially blocked by wood (>10% of the cross-sectional area of the channel) before there is any measurable effect on flood levels. It is unusual to find anything like that amount of wood in river channels today (DELWP 2019b)

Furthermore, in cases where these components do slow flooding, this can actually reduce impacts to human infrastructure, as slowing water flow reduces the chance of peak flashes downstream. For these reasons, the current Victorian Floodplain Management Strategy and North Central Catchment Management Authority (NCCMA) Floodplain Management Strategy both state that removal of riparian vegetation and logs is only to be undertaken in extreme circumstances and following completion of a local Flood Study. A Works on Waterways permit is also required prior to conducting any such works (NCMA 2018, DELWP 2016).

Splitters Creek generally supports a low density of logs and reed beds and so the physical components of the creek are unlikely to be increasing flood risk. Of greater concern is the rapidly developing catchment, leading to more stormwater runoff into the system.

5.2 Habitat values

Refraining from 'cleaning up' the floodplain is vitally important for maintaining and enhancing habitat for native fauna. Scattered logs provide cover from predators such as foxes and cats, with

those containing hollows also serving as potential nesting areas for birds and mammals. Reedbeds and other instream are essential for many fauna, particularly waterbirds that require dense cover such as Buff-banded Rail and Australian Reed Warbler. Logs, sticks, leaves and vegetation also play an important role in protecting soil from erosion and filtering water of heavy metals and sediment.

Landowners may also want to consider reducing mowing in areas of the floodplain adjacent to the creek, allowing native grasses to grow and set-seed. This will provide much better-quality habitat than grass that is regularly mown to ground height.

Residents with land along the floodplain may want to keep some areas open for recreation and other use, but could consider leaving at least a portion of the creek and floodplain unmodified for the benefit of fauna. This can increase aesthetic values by encouraging more birds and other fauna to frequent the property.

Installation of next boxes should also be considered for areas that support a paucity of hollow bearing trees. Nest box designs vary for the type of animal, with designs available for birds of varying size as well as possums and bats. A recommended local supplier can be found at: https://wildlifenestboxes.com.au/

5.3 Weed control

A variety of high threat weeds threat the ecological integrity of the Splitters Creek corridor. Of those recorded, 18 are identified here to be the top priority for control, predominately woody shrubs (Table 2). If landowners have plant identification skills and experience controlling weeds, they could consider removing these species. Those without experience should engage a bushland management contractor, to prevent off-target damage to native species while using herbicides.

The recommended removal technique for most mature woody weeds is to cut the stem at ground height and paint the stem with a small amount of Glyphosate. Smaller plants and seedlings can generally be removed by hand. Some weeds, such as Blackberry, will likely be more difficult to control and may require slashing or more widespread application of herbicide. Most weeds require follow-up control every 2-3 years to prevent re-establishment, although the work load will be lessened if ongoing removal of seedlings is undertaken, preventing the establishment of large mature stands.

Table 2 Priority weeds for control

Origin	Scientific name	Common name
#	*Acacia baileyana*	Cootamundra Wattle
#	*Acacia floribunda*	White Sallow-wattle
#	*Acacia howittii*	Sticky Wattle
#	*Acacia longifolia*	Sallow Wattle
*	*Acer negundo*	Box-elder Maple
*	*Asparagus asparagoides*	Bridal Creeper
*	*Chrysanthemoides monilifera*	Boneseed
*	*Cortaderia selloana*	Pampas Grass
*	*Crataegus monogyna*	Hawthorn
*	*Disa bracteata*	South African Orchid
*	*Fraxinus angustifolia*	Desert Ash
*	*Gazania linearis*	Gazania
*	*Genista monspessulana*	Montpellier Broom
*	*Hypericum perforatum subsp. veronense*	St John's Wort
*	*Juncus acutus subsp. acutus*	Spiny Rush
*	*Olea europaea*	Olive
*	*Opuntia spp.*	Prickly Pear
*	*Prunus cerasifera*	Cherry Plum
*	*Rosa rubiginosa*	Sweet Briar
*	*Rubus anglocandicans*	Blackberry
*	*Ulex europaeus*	Gorse

Key to symbols: * indicates an exotic species introduced from outside of Australia. # - indicates Australian species that has been introduced from outside its natural range, usually from inter-state.

5.1 Revegetation

Large areas of the Splitters Creek floodplain now support few shrubs, partly a legacy of past stock grazing activity. Reinstating the shrub layer is an effective way for improving habitat for birds and other fauna, by increasing cover, connectivity and flowering resources. Two separate revegetation lists are provided below, including for drier sites in Grey Box and Yellow Gum dominated areas, and for alluvial soils dominated by River Red Gum. Several grasses, sedges and rushes have been included in the River Red Gum list for improving the ground-layer, which are best planted in dense clusters.

Table 3 Revegetation list for Grey Box and Yellow Gum dominated sites

Scientific name	Common name
Acacia acinacea	Gold-dust Wattle
Acacia aspera	Rough Wattle
Acacia ausfeldii	Ausfeld's Wattle
Acacia genistifolia	Spreading Wattle
Acacia montana	Mallee Wattle
Acacia paradoxa	Hedge Wattle
Acacia pycnantha	Golden Wattle
Acacia williamsonii	Whirrakee Wattle
Allocasuarina muelleriana subsp. muelleriana	Slaty Sheoak
Bursaria spinosa	Sweet Bursaria
Carpobrotus modestus	Inland Pigface
Cassinia complanata	Sticky Cassinia
Cassinia diminuta	Dwarf Cassinia
Daviesia leptophylla	Narrow-leaf Bitter-pea
Daviesia ulicifolia subsp. ruscifolia	Gorse Bitter-pea
Dianella revoluta s.l.	Black-anther Flax-lily
Goodenia varia	Sticky Goodenia
Hakea decurrens	Bushy Needlewood
Melaleuca wilsonii	Violet Honey-myrtle
Olearia teretifolia	Cypress Daisy-bush
Olearia tubuliflora	Rayless Daisy-bush

Table 4 Revegetation list for River Red Gum dominated sites

Scientific name	Common name
Acacia dealbata	Silver Wattle
Acacia mearnsii	Black Wattle
Acacia melanoxylon	Blackwood
Acacia provincialis	Wirilda
Banksia marginata	Silver Banksia (tree form)
Carex appressa	Tall Sedge
Carex tereticaulis	Poong'ort
Callistemon sieberi	River Bottlebrush
Cassinia aculeata subsp. aculeata	Common Cassinia
Juncus pallidus	Pale Rush
Melaleuca decussata	Totem-poles
Poa labillardierei	Common Tussock-grass

5.2 Citizen science

Citizen science is the practice of getting the community involved in science activities such as ecological monitoring. It is of great value, as professional ecologists are often under-resourced and it is a great way for local residents to get involved in caring for and understanding their local environments.

There are many opportunities for local residents to get involved in citizen science projects. Contact the Junortoun Community Action Group Inc. if you would like more information. Potential projects could include:

- *Bird surveys* - The 'Birdata' phone application makes it very easy to record bird species and send the data to Birdlife Australia to add to their database. This could include monitoring the same area each season to determine if any change are occurring over longer time periods.
- *Frog surveys* - The FrogID phone application allows users to record frog calls and easily send them off to an expert for identification. The records are then added to the national database.
- *Water quality monitoring* – this involves regular monitoring of water quality parameters such as salinity, PH, turbidity, temperature and phosphorous. Water quality monitoring programs are generally led by volunteers supported and trained by the local Catchment Management Authority (CMA). Contact the North Central CMA if you are interested in undertaking water quality monitoring on Splitters Creek.

5.3 Purchase of land east of Somerset Park Drive

A key recommendation of this study is for JCAG to lobby Bendigo City Council to purchase the parcel of land occurring to the immediate east of Somerset Park Road and McIvor Highway. This parcel is approximately 5.5 hectares in area and is of high ecological value, containing:

- Good quality remnants of the FFG-listed *Creek-line Grassy Woodland* ecological community
- Good quality remnants of the EPBC-listed *Grey Box Grassy Woodland* ecological community
- A high diversity of native grasses and other indigenous flora species

The presence of protected ecological communities and the danger of flooding make this parcel highly unsuitable for residential development. Conversely, the parcel would be ideal as a conservation reserve, having easy access, high environmental and aesthetic values, and representing one of the best remnants along Splitters Creek.

Plate 14 The Somerset Park Road parcel. A key recommendation of this study is for JCAG to lobby Bendigo City Council to purchase the parcel to create a conservation reserve

Plate 15 The Somerset Park Road parcel. This parcel contains good quality remnants of the FFG-listed *Creekline Grassy Woodland* ecological community and the EPBC-listed *Grey Box Grassy Woodland* ecological community.

6.0 CONCLUSION & RECOMMENDATIONS

Prior to this study, the ecological values of Splitters Creek had not been formerly documented. This study found that the creek contains valuable remnant vegetation, including threatened flora species and extensive faunal habitat. The creek is a vital habitat corridor that links the drier forests to the west with the Axe Creek floodplain to the east.

The creek corridor is faced with a variety of threats, including further changes to the natural hydrology and weed invasion. Residents with land backing onto the creek can help to protect and enhance the ecology through revegetation, weed control, retention of logs, and reducing mowing of native grass. Getting involved in citizen science projects is a positive way for residents to learn more about their local environment and monitor the health of the ecosystem over time.

Key recommendations of this study are to:

- initiate a project in the next three years that facilitates revegetation, weed control and erosion control on private and public land across the Splitters Creek catchment.
- ensure that future development within the Splitters Creek catchment incorporates Water Sensitive Urban Design (WSUD) principles, including establishment of stormwater wetlands to reduce direct discharge into the creek.
- JCAG to lobby Bendigo City Council to purchase the parcel of land occurring to the immediate east of Somerset Park Road and McIvor Highway.

Plate 16 Splitters Creek, flanked by dense sedgeland

7.0 REFERENCES

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Appendix 1 Vascular flora species recorded across the Splitters Creek corridor, winter and spring 2023

Legend
* exotic taxa # non-indigenous native taxa

Origin	Scientific name	Common name
	Acacia acinacea	Gold-dust Wattle
	Acacia aspera subsp. aspera	Rough Wattle
	Acacia ausfeldii	Ausfeld's Wattle
#	*Acacia baileyana*	Cootamundra Wattle
#	*Acacia floribunda*	White Sallow-wattle
	Acacia genistifolia	Spreading Wattle
#	*Acacia howittii*	Sticky Wattle
#	*Acacia longifolia*	Sallow Wattle
	Acacia mearnsii	Black Wattle
	Acacia paradoxa	Hedge Wattle
	Acacia pycnantha	Golden Wattle
	Acaena echinata	Sheep's Burr
	Acaena novae-zelandiae	Bidgee-widgee
*	*Acer negundo*	Box-elder Maple
*	*Acetosella vulgaris*	Sheep Sorrel
	Acrotriche serrulata	Honey-pots
*	*Agrostis stolonifera*	Creeping Bent
*	*Aira elegantissima*	Delicate Hair-grass
	Alisma plantago-aquatica	Water Plantain
*	*Allium triquetrum*	Angled Onion
*	*Allium vineale*	Crow Garlic
	Alternanthera denticulata s.s.	Lesser Joyweed
	Amphibromus macrorhinus	Long-nosed Swamp Wallaby-grass
	Amphibromus nervosus	Swamp Wallaby-grass
	Anthosachne scabra	Wheat-grass
*	*Arctotheca calendula*	Cape weed
	Aristida behriana	Brush Wire-grass
	Arthropodium strictum	Chocolate Lily
*	*Asparagus asparagoides*	Bridal Creeper

Origin	Scientific name	Common name
	Asperula conferta	Woodruff
	Astroloma humifusum	Cranberry Heath
	Atriplex semibaccata	Berry Saltbush
	Austrodanthonia spp.	Wallaby Grass
	Austrostipa bigeniculata	Kneed Spear-grass
	Austrostipa densiflora	Dense Spear-grass
	Austrostipa mollis	Supple Spear-grass
	Austrostipa oligostachya	Fine-head Spear-grass
	Austrostipa rudis subsp. rudis	Veined Spear-grass
	Austrostipa scabra subsp. falcata	Rough Spear-grass
	Austrostipa spp.	Spear Grass
*	*Avena barbata*	Bearded Oat
*	*Avena spp.*	Oat
*	*Briza maxima*	Large Quaking-grass
*	*Briza minor*	Lesser Quaking-grass
*	*Bromus catharticus*	Prairie Grass
*	*Bromus diandrus*	Great Brome
	Bursaria spinosa subsp. spinosa	Sweet Bursaria
	Callistemon sieberi	River Bottlebrush
*	*Callitriche stagnalis*	Water-starwort
	Carex appressa	Tall Sedge
	Carex breviculmis	Grass-sedge
*	*Carex divisa*	Divided Sedge
	Carex inversa	Knob Sedge
	Carex tereticaulis	Poong'ort
	Cassinia sifton	Sifton Bush
	Chloris truncata	Windmill Grass
*	*Chrysanthemoides monilifera*	Boneseed
*	*Cirsium vulgare*	Spear Thistle
	Correa glabra var. glabra	Rock Correa
*	*Cortaderia selloana*	Pampas Grass
	Crassula decumbens var. decumbens	Spreading Crassula
*	*Crataegus monogyna*	Hawthorn
	Cycnogeton procerum	Water-ribbons
*	*Cynodon dactylon*	Couch
	Cyperus difformis	Variable Flat-sedge
*	*Cyperus eragrostis*	Drain Flat-sedge
	Cyperus gunnii subsp. gunnii	Flecked Flat-sedge
*	*Dactylis glomerata*	Cocksfoot
	Daviesia ulicifolia subsp. ruscifolia	Gorse Bitter-pea
	Dianella revoluta var. revoluta	Black-anther Flax-lily
	Dianella tarda	Late-flower Flax-lily
	Dillwynia cinerascens	TBA
*	*Disa bracteata*	South African Orchid
*	*Ehrharta longiflora*	Annual Veldt-grass
	Einadia nutans subsp. nutans	Nodding Saltbush
	Elatine gratioloides	Waterwort
	Eleocharis acuta	Spike-sedge
	Enchylaena tomentosa var. tomentosa	Ruby Saltbush
	Epilobium billardierianum subsp. cinereum	Grey Willow-herb

Origin	Scientific name	Common name
	Epilobium hirtigerum	Hairy Willow-herb
	Eragrostis brownii	Love-grass
	Eragrostis elongata	Close-headed Love-grass
*	*Erodium botrys*	Big Heron's-bill
*	*Erodium moschatum*	Musky Heron's-bill
	Eucalyptus camaldulensis	River Red-gum
	Eucalyptus leucoxylon subsp. leucoxylon	Yellow Gum
	Eucalyptus melliodora	Yellow Box
	Eucalyptus microcarpa	Grey Box
	Exocarpos cupressiformis	Cherry Ballart
*	*Fraxinus angustifolia*	Desert Ash
*	*Freesia leichtlinii*	Freesia
*	*Galium aparine*	Cleavers
*	*Gazania linearis*	Gazania
*	*Genista monspessulana*	Montpellier Broom
	Geranium retrorsum	Cranesbill
	Geranium sp. 2	Variable Crane's-bill
	Geranium sp. 3	Pale-flower Crane's-bill
	Geranium sp. 5	Naked Crane's-bill
	Glycine tabacina	Variable Glycine
	Gonocarpus tetragynus	Raspwort
	Goodenia hederacea	Ivy Goodenia
	Hakea decurrens	Bushy Needlewood
	Hardenbergia violacea	Purple Coral-pea
*	*Holcus lanatus*	Yorkshire Fog
*	*Hordeum marinum*	Sea Barley-grass
	Hypericum gramineum	Small St John's Wort
*	*Hypericum perforatum subsp. veronense*	St John's Wort
	Hypochaeris glabra	Smooth Cat's-ear
*	*Hypochaeris radicata*	Flatweed
*	*Isolepis hystrix*	Awned Club-sedge
	Isolepis inundata	Swamp Club-sedge
*	*Juncus acutus subsp. acutus*	Spiny Rush
	Juncus amabilis	Hollow Rush
	Juncus aridicola	Tussock Rush
	Juncus bufonius	Toad Rush
	Juncus flavidus	Gold Rush
	Juncus homalocaulis	Wiry Rush
*	*Juncus imbricatus*	Folded Rush
	Juncus remotiflorus	Diffuse Rush
	Juncus sarophorus	Broom Rush
	Juncus subsecundus	Finger Rush
	Laphangium luteoalbum	Jersey Cudweed
*	*Lepidium africanum*	Peppercress
*	*Lolium rigidum*	Wimmera Rye-grass
	Lomandra filiformis subsp. coriacea	Wattle Mat-rush
	Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush
	Lomandra nana	Dwarf Mat-rush
	Lythrum hyssopifolia	Small Loosestrife
*	*Mentha pulegium*	Pennyroyal

Origin	Scientific name	Common name
	Microlaena stipoides var. stipoides	Weeping Grass
*	*Moraea fugacissima*	Galaxia
	Myriophyllum crispatum	Upright Water-milfoil
*	*Olea europaea*	Olive
*	*Opuntia spp.*	Prickly Pear
	Oxalis exilis	Shade Wood-sorrel
*	*Oxalis pes-caprae*	Soursob
*	*Oxalis purpurea*	Large-flower Wood-sorrel
*	*Paspalum dilatatum*	Paspalum
*	*Paspalum distichum*	Water Couch
	Pelargonium rodneyanum	Magenta Stork's-bill
	Persicaria hydropiper	Water Pepper
	Persicaria prostrata	Creeping Knotweed
*	*Phalaris aquatica*	Toowoomba Canary-grass
	Phragmites australis	Reed
	Pimelea curviflora subsp. sericea	Curved Rice-flower
	Pimelea humilis	Rice-flower
*	*Pinus radiata*	Radiata Pine
*	*Plantago coronopus*	Buck's-horn Plantain
*	*Plantago lanceolata*	Ribwort
	Plantago varia	Variable Plantain
	Pleurosorus rutifolius	Blanket Fern
*	*Poa annua*	Annual Meadow-grass
	Poa labillardierei	Tussock-grass
*	*Poa pratensis*	Kentucky Blue-grass
*	*Polygonum arenastrum*	Wireweed
*	*Prunus cerasifera*	Cherry Plum
*	*Ranunculus repens*	Creeping Buttercup
*	*Romulea rosea var. australis*	Onion-grass
*	*Rosa rubiginosa*	Sweet Briar
*	*Rubus anglocandicans*	Blackberry
	Rumex brownii	Slender Dock
*	*Rumex conglomeratus*	Clustered Dock
*	*Rumex crispus*	Curled Dock
	Rumex tenax	Narrow-leaf Dock
	Rytidosperma caespitosum	Common Wallaby-grass
	Rytidosperma duttonianum	Brown-back Wallaby-grass
	Rytidosperma erianthum	Hill Wallaby-grass
	Rytidosperma fulvum	Copper-awned Wallaby-grass
	Rytidosperma racemosum var. racemosum	Slender Wallaby-grass
	Rytidosperma setaceum	Bristly Wallaby-grass
	Rytidosperma spp.	Wallaby Grass
*	*Schinus molle*	Pepper Tree
	Schoenus apogon	Common Bog-sedge
	Senecio quadridentatus	Cotton Fireweed
*	*Setaria parviflora*	Slender Pigeon Grass
*	*Sonchus oleraceus*	Sow-thistle
	Styphelia humifusa	Cranberry Heath
*	*Symphyotrichum subulatum*	Aster-weed
	Thelymitra arenaria	Forest Sun-orchid

Origin	Scientific name	Common name
	Themeda triandra	Kangaroo Grass
*	*Tragopogon porrifolius subsp. porrifolius*	Salsify
*	*Tribolium acutiflorum*	Crested Desmazeria
*	*Tribolium acutiflorum s.l.*	Desmazeria
*	*Trifolium angustifolium var. angustifolium*	Narrow-leaf Clover
*	*Trifolium glomeratum*	Cluster Clover
*	*Trifolium subterraneum*	Subterranean Clover
	Typha domingensis	Narrow-leaf Cumbungi
*	*Ulex europaeus*	Gorse
	Veronica gracilis	Slender Speedwell
*	*Vicia hirsuta*	Tiny Vetch
*	*Vinca major*	Blue Periwinkle
	Vittadinia gracilis	Woolly New Holland Daisy
*	*Vulpia bromoides*	Squirrel-tail Fescue
*	*Vulpia spp.*	Fescue
	Wahlenbergia luteola	Bronze Bluebell
	Xerochrysum viscosum	Shiny Everlasting

Appendix 2 Fauna species recorded across the Splitters Creek corridor, winter and spring 2023

Legend
* exotic taxa

Origin	Scientific name	Common name
Birds		
	Australian Magpie	*Cracticus tibicen*
	Australian White Ibis	*Threskiornis molucca*
	Australian Wood Duck	*Chenonetta jubata*
	Black-chinned Honeyeater	*Melithreptus gularis*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Blue-faced Honeyeater	*Entomyzon cyanotis*
	Brown Treecreeper	*Climacteris picumnus*
*	Common Blackbird	Turdus merula
*	Common Starling	*Sturnus vulgaris*
	Crested Pigeon	*Ocyphaps lophotes*
	Crimson Rosella	*Platycercus elegans*
	Dusky Moorhen	*Gallinula tenebrosa*
	Dusky Woodswallow	*Artamus cyanopterus*
	Eastern Rosella	*Platycercus eximius*
	Galah	*Eolophus roseicapillus*
	Grey Butcherbird	*Cracticus torquatus*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Grey Teal	*Anas gracilis*
	Little Pied Cormorant	*Microcarbo melanoleucos*
	Little Raven	*Corvus mellori*
	Long-billed Corella	*Cacatua tenuirostris*
	Magpie-lark	*Grallina cyanoleuca*
	Musk Lorikeet	*Glossopsitta concinna*
	New Holland Honeyeater	*Phylidonyris novaehollandiae*
	Noisy Miner	*Manorina melanocephala*
	Olive-backed Oriole	*Oriolus sagittatus*
	Pacific Black Duck	*Anas superciliosa*
	Pallid Cuckoo	*Cacomantis pallidus*
	Rainbow Bee-eater	*Merops ornatus*
	Rainbow Lorikeet	*Trichoglossus haematodus*
	Red Wattlebird	*Anthochaera carunculata*
	Red-rumped Parrot	*Psephotus haematonotus*
	Rufous Songlark	*Cincloramphus mathewsi*
	Sacred Kingfisher	*Todiramphus sanctus*
	Spotted Pardalote	*Pardalotus punctatus*
	Straw-necked Ibis	*Threskiornis spinicollis*
	Striated Pardalote	*Pardalotus striatus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Superb Fairy-wren	*Malurus cyaneus*

Origin	Scientific name	Common name
	Tawny Frogmouth	*Podargus strigoides*
	Weebill	*Smicrornis brevirostris*
	Welcome Swallow	*Hirundo neoxena*
	White-faced Heron	*Egretta novaehollandiae*
	White-plumed Honeyeater	*Lichenostomus penicillatus*
	White-winged Chough	*Corcorax melanorhamphos*
	Willie Wagtail	*Rhipidura leucophrys*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Fish		
*	European Carp	*Cyprinus carpio*
*	Goldfish	*Carassius auratus*
*	Mosquito Fish	*Gambusia holbrooki*
Frogs		
	Common froglet	*Crinia signifera*
	Eastern Banjo Frog	*Limnodynastes dumerilii*
	Plains froglet	*Crinia parasignifera*
	Southern Brown Tree-frog	*Litoria ewingii*
	Spotted Marsh-frog	*Limnodynastes tasmaniensis*
Mammals		
	Black Wallaby	*Wallabia bicolor*
*	European Hare	*Lepus europaeus*
*	European Rabbit	*Oryctolagus cuniculus*
*	Red Fox	*Vulpes vulpes*
*	Black Rat	*Rattus rattus*
	Eastern Grey Kangaroo	*Macropus giganteus*
	Eastern Ringtail Possum	*Pseudocheirus peregrinus*
	Short-beaked Echidna	*Tachyglossus aculeatus*
Reptiles		
	Blue-tongue Lizard	*Tiliqua scincoides*
	Eastern Brown Snake	*Pseudonaja textilis*
	Garden Skink	*Lampropholis delicata*