Emergency Preparedness and Response Plan for Biodiversity and Agricultural Natural Capital Assets in the Wimmera region

Prepared by Wimmera CMA 24 Darlot St | Horsham VIC 3400

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We acknowledge the Traditional Owners and other Aboriginal and Torres Strait Islander Peoples across the region and pay respect to Elders past, present and emerging.

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Emergency Preparedness and Response Plan for Biodiversity and Agricultural Natural Capital Assets in the Wimmera region

This Plan seeks to improve preparedness for, response to, and recovery from emergency events as they relate to Australian Government biodiversity and agricultural natural-capital assets. This will be achieved through improved integration of assets in emergency planning, response and recovery.

The Plan will enhance the resilience of biodiversity and agricultural natural-capital assets by recognising the risks and threats posed by natural disasters and undertaking planning to improve outcomes through actions and management before, during (to the extent possible) and post-event to support recovery.

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Wimmera CMA 24 Darlot Street HORSHAM VIC 3400 03 5382 1544 wcma@wcma.vic.gov.au www.wcma.vic.gov.au

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Acronyms

AIIMS	Australasian Inter-Service Incident Management System
BGLC	Barengi Gadjin Land Council
CFA	Country Fire Authority
CMA	Catchment Management Authority
DEECA	Victorian Government Department of Energy, Environment and Climate Action
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EVC	Ecological Vegetation Class
FFG Act	Flora and Fauna Guarantee Act 1988
FFMVic	Forest Fire Management Victoria
GA	Greening Australia
PBFD	Psittacine beak and feather disease
PV	Parks Victoria
RBGV	Royal Botanic Gardens Victoria
SEMP	State Emergency Management Plan
SERtBC	South-eastern red-tailed black cockatoo
TfN	Trust for Nature
VBA	Victorian Biodiversity Atlas
Wimmore CMA	Wimmere Catchment Management Authority

Wimmera CMA Wimmera Catchment Management Authority

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1. BACKGROUND

Biodiversity in the Wimmera

The Wimmera is a biodiversity hotspot, supporting a wide range of habitats and species, nature-based tourism and local community engagement and enjoyment. The Wimmera encapsulates large areas of high biodiversity value, especially northern Gariwerd (Grampians National Park and surrounds), Burrunj (Black Range State Park), Little Desert National Park and the upper Barringgi Gadyin (Wimmera River) catchment area.

Broadacre agricultural land predominates the Wimmera landscape between these environmental parks and reserves. A mosaic of small stands of native vegetation and patches, strips and features providing wildlife habitat remain interspersed within the agricultural matrix. This includes public land reserves and wetlands; roadsides, waterway and railway corridors; and remnant vegetation, coarse woody debris, and scattered paddock trees.

These remnant patches of habitat are extremely important in supporting and maintaining biodiversity across the Wimmera. They provide habitat for some species, acting as connective 'stepping stones', or pathways for biodiversity to move through the landscape between suitable habitat, and are often the last refuge for many of the region's threatened species.

Ngalpakatia/Ngelpagutya (Lake Albacutya) is an internationally important wetland under the Ramsar Convention. The lake, together with neighbouring Gurru (Lake Hindmarsh) and Outlet Creek, support thousands of birds when inundated with water, including threatened species and international migrants.

Riparian corridors along the Barringgi Gadyin (Wimmera River), MacKenzie River, Yarriambiack Creek and upper-catchment streams also provide narrow but important connections through the landscape. The south-west Wimmera retains many remnant patches of native vegetation and wetlands, supporting a diverse array of plants and animals. Significant threatened species and landscape communities include the Malleefowl, South-Eastern Red-Tailed Black-Cockatoo, Swift Parrot, several orchid species and Wimmera native grassland, woodland and wetland communities.

Agricultural natural capital assets in the Wimmera

Agricultural natural capital assets relate to the on-farm natural resources that support food and fibre production, including soil, air, water, riparian areas, remnant native vegetation, agroforestry and environmental plantings.

The Wimmera's agricultural natural capital supports the region's economy, agricultural productivity and the biodiversity and vitality of plants and animals. Ecosystem services provided by land, soils, native habitat and animals, and waterways, include water infiltration and storage, soil stability, nutrient cycling and availability for plant growth, pollination, habitat, flood control and carbon storage.

Almost 80% of Wimmera land and soil supports a large agricultural sector. Dryland cropping comprises approximately 53%, pasture 23%, and irrigated horticulture 0.5%. The northern Wimmera is mainly a broadacre dryland cropping area. The south, particularly the south-western and south-eastern corners of the region, are a mix of broadacre cropping and sheep-meat and wool production. A horticultural industry in the mid-west of the region enabled by a groundwater resource is small in comparison to other farming industries in the Wimmera but adds value to regional farming productivity. Viticulture, olives and native flowers are also significant primary industries.

The Wimmera includes the traditional lands of the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagulk People, represented by Barengi Gadjin Land Council Aboriginal Corporation, and the Eastern Maar, represented by Eastern Maar Aboriginal Corporation. First Nations People have a deep and continuing connection to the Wimmera's living cultural landscapes.

First Nations people moved across the landscape seasonally, accessing plants and animals for food, fibre and medicine and employing cultural burning and other techniques to keep a mosaic of vegetation cover.

Natural disasters and emergency events

There is a growing need to enhance Wimmera community preparedness for natural disasters and their impact on biodiversity and agricultural natural-capital assets. Ensuring the survival of species, ecosystems and biodiverse habitats helps preserve critical ecosystem-support essentials such as clean air, water, and climate regulation, benefiting human well-being. Disaster preparedness bolsters the resilience of ecosystems, enabling them to recover following catastrophic events.

During the 25 years from 1998 to 2023 the Wimmera experienced four floods, the Millenium Drought, a locust plague in 2010-11, and many bushfires including significant landscape-scale wildfires. These events had impacts on native vegetation and biodiversity, water resources, agricultural natural-capital assets and the community.

For example, a large Mount Lubra fire burnt nearly 47% of Gariwerd (Grampians National Park) in 2006. Heavy rain and flooding followed in January 2011, significantly impacting biodiversity in the park and surrounds. The fire weakened soil integrity in the park, major landslides occurred in response to the rain and a subsequent buildup of silt affected water quality in Lake Bellfield, the primary water supply for much of the Wimmera-Mallee.

Investing in emergency and disaster preparedness can reduce impacts on natural assets and the cost of response, recovery and restoration. This in turn contributes to stronger regional economies by supporting sectors such as tourism and agriculture.

Given the potential impacts emergencies can have on natural assets, the Australian Government invited Wimmera CMA to deliver a 'Biodiversity and Agricultural Natural Capital Emergency Preparedness and Response Plan' (the Plan) in advance of the forecast 2023-24 severe weather season. This acknowledged Wimmera CMA's critical role as a Regional Delivery Partner in supporting natural-resource-management preparedness, response and recovery.

The Wimmera has a reputation for collaborative emergency management, built over many decades of cooperative effort by government and partner organisations. This Emergency Preparedness and Response Plan (the Plan) consolidates and complements the many years of learning and experience gained in emergency management and planning in the Wimmera.

The Plan contributes, in part, to actions under Target 17 of the *Threatened Species Action Plan 2022-32* and Outcomes 1, 2 and 3 of the Natural Heritage Trust by addressing vulnerability from extreme weather events relevant to biodiversity and agricultural natural-capital assets identified in the Wimmera and improving emergency response and planning. The Plan also contributes to Outcomes 1 and 3 of the Climate-Smart Agriculture Program by supporting the agriculture sector to build resilience in response to climate change and conserve natural capital and biodiversity on-farm.

2. OBJECTIVES OF THIS PLAN

The objectives of this Plan are to improve preparedness for, response to, and recovery from emergency events as they relate to Australian Government biodiversity and agricultural natural-capital assets. This will be achieved through improved integration of assets in emergency planning, response and recovery.

The Plan will enhance the resilience of biodiversity and agricultural natural-capital assets by recognising the risks and threats posed by natural disasters and undertaking planning to improve outcomes through actions and management before, during (to the extent possible) and post-event to support recovery.

4. SCOPE OF THIS PLAN

This Emergency Preparedness and Response Plan seeks to reduce the impact of catastrophic events on biodiversity and agricultural natural-capital assets. The Plan considers the most likely disaster scenarios for the Wimmera, including wildfire, flood, drought, major storms, disease and pest outbreaks.

The Plan identifies mitigation measures in advance of emergency, response activities during events and recovery activities post events. Government and partner organisations can deliver actions if funding is made available. Implementation of actions and measures is out of scope for this Plan. The Plan will identify activities that are 'business as usual', already funded or underway.

This Plan will address biodiversity assets and agricultural natural-capital assets with 'high' to 'medium' susceptibility to a specific emergency. Assets with 'low' susceptibility are out of scope. We have identified where susceptibility is 'low' to assets in section 4 of this Plan. We have not included emergency preparedness, response and recovery actions for assets where they have low susceptibility to natural disasters and emergency events.

Biodiversity assets include threatened species and associated habitat features, threatened ecological communities, and Ramsar wetlands that are important to preserve during emergencies or natural disasters.

Agricultural natural-capital assets relate to the on-farm natural resources that support food and fibre production, including soil, air, water, riparian areas, remnant native vegetation including patches and large hollow-bearing trees, agroforestry and environmental plantings. The Plan focuses on the natural-capital assets that support agriculture rather than agricultural commodities themselves. For example, the Plan will not address direct threats to livestock and crops or their quality.

The Plan includes locations of high importance to multiple biodiversity and agricultural natural-capital assets that are highly susceptible to natural disasters and emergencies. These include Gariwerd (Grampians National Park and surrounds) and Gurru (Lake Hindmarsh), part of the Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar Site terminal lakes system, and threatened species and communities on private land.

To the extent possible, this Plan does not conflict with or duplicate other emergency management plans.

Introduced weeds, pests and diseases pose a significant threat to agriculture and natural assets. Victoria's Biosecurity Strategy describes how the natural environment is under continual threat from weeds, pests and diseases. They are recognised as a major driver of the decline in ecosystems and wildlife and are responsible for over 80% of mammal extinctions. In Victoria, many invasive pest animals such as pigs and carp, and weeds such as gorse, serrated tussock and blackberry, have established themselves in the natural environment and compete with native wildlife and plants for nutrition and land. Negative impacts include soil erosion, altered water flow, displacement of native species, reduction of food supply and suitable habitat for native fauna, and resilience impairment (DEECA, 2023).

The Plan does not address pests and diseases considered biosecurity threats to agriculture as they typically pose a direct threat to livestock and crops and their quality, which is beyond the scope of this Plan.

Additionally, Victoria has rigorous processes for preparing for and responding to biosecurity threats set out in the State Emergency Management Plan's Animal, Plant, Marine and Environmental Biosecurity Sub Plan and led by Agriculture Victoria. The Sub Plan references the highest priority threats to agricultural assets in Victoria and is reviewed and updated periodically (DJPR, 2021). Preparedness and Management Plans already exist for biosecurity threats using the Australasian Inter-Service Incident Management System (AIIMS) structure set out in the State Emergency Management Plan.

The Plan includes diseases where they pose a risk to biodiversity assets such as Psittacine Beak and Feather Disease which can impact on Swift Parrots.

Definition of an emergency

Australian state and territory governments have responsibility for coordinating and planning for the response to and recovery from an emergency event or natural disaster within their borders.

Under the Victorian Emergency Management Act 2013 an emergency is defined as:

'an emergency due to the actual or imminent occurrence of an event which in any way endangers or threatens to endanger the safety or health of any person in Victoria or which destroys or damages, or threatens to destroy or damage, any property in Victoria or endangers or threatens to endanger the environment or an element of the environment in Victoria including, without limiting the generality of the foregoing-

- a) an earthquake, flood, windstorm or other natural event; and
- b) a fire; and
- c) an explosion; and
- d) a road accident or any other accident; and
- e) a plague or an epidemic or contamination; and
- f) a warlike act or act of terrorism, whether directed at Victoria or a part of Victoria or at any other State or Territory of the Commonwealth; and
- g) a hi-jack, siege or riot; and
- h) a disruption to an essential service.'

The protection of life and community is paramount during emergency response. There might be times when these priorities take precedence over others identified in this Plan.

5. BIODIVERSITY ASSETS - IDENTIFICATION AND SUSCEPTIBILITY

This section identifies the Wimmera's biodiversity assets. This includes but is not limited to Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) such as key listed threatened species and ecological communities, national heritage places and Ramsar wetlands. There are no world heritage properties in the Wimmera.

Information provided for each biodiversity asset includes:

- A description and map of locations in the Wimmera.
- Identification of emergency scenarios such as bushfires, drought, floods, diseases, and pests that pose a threat and why.
- An assessment of each asset current susceptibility to emergency scenarios, assessed as high, moderate, or low.

Identifying biodiversity assets

The priority assets included in the Plan are informed by regional strategic planning documents developed in collaboration with stakeholders. Key documents include the Wimmera's Natural Resource Management Plan, including the *Wimmera Regional Catchment Strategy* (2021) and its addendum, the *Regional Land Partnerships Program Action Plan – Wimmera* (2021). The latter focuses on the Australian Government's Investment Priorities, Matters of National Environmental Significance under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and sustainable agriculture in the Wimmera.

Priority assets are also informed by feedback and input from stakeholders that contributed to the development of this Plan.

Appendix 2 provides a multi-jurisdictional inventory of assets, outlining the jurisdictions each species and ecological community occurs in and relevant legislation and policies.

Susceptibility of biodiversity assets

This Plan takes a precautionary approach when considering the susceptibility and vulnerability of threatened species and ecosystems to natural disasters.

Fire, flood and drought have long been part of the Australian landscape. Most flora and fauna species have developed adaptations and strategies that help them to cope with or recover from these natural events.

Most threatened species and communities in the Wimmera exist in small and isolated populations. Their capacity to recover post fire, flood and drought is significantly reduced compared to common and widespread species due to the low number of individuals in populations and isolation from other populations.

Populations are also subject to a range of threats in addition to natural disasters. This includes weeds, pest herbivores and predators, and habitat loss. These threats exacerbate the impacts of natural disasters and events, making populations and remnants of threatened species and ecosystems highly vulnerable.

For example, wildfire leads to the death of adult plants for some species. Some plants have adapted to respond and recover their populations by germinating from the seedbank. These plants need time between fire events to mature, flower and set seed to replenish the seedbank and ensure the population's ability to recover from future fire or other events. Success of recovery and seed set is impacted by subsequent drought, flood, and fire events. It is also impacted by other threats such as weed incursion, over-competition, and pest herbivores. The result is that many species do not have the ability to recover their population numbers and quality to the same extent as the pre-fire population.

The specific response of individual species and ecological communities to fire is untested or uncertain for many of the threatened species and communities in this Plan.

The susceptibility of biodiversity assets identified in this section of the Plan is identified based on information available in National Recovery Plans, Conservation Advices, analysis of susceptibility mapping, and expert and stakeholder advice.

South-eastern Red-tailed Black Cockatoo (Calyptorhynchus banksii graptogyne)

Environment Protection and Biodiversity Conservation Act (1999) status – Endangered Flora and Fauna Guarantee Act (1988) status - Endangered

Description

The Red-tailed Black-Cockatoo (southeastern sub-species) (SERtBC) is one of five subspecies of Australian Redtailed black-cockatoo. Males largely have black plumage and scarlet panels in the tail. Females have yellow spots on the head, neck and wings, and orange-yellow barring on the breast and undertail. Both sexes have dark-brown eyes and brown-grey legs and feet; males have a dark-grey bill, while the bill of the female is off-white.

Location in the Wimmera

This subspecies inhabits south-western Victoria and south-eastern South Australia where its natural range covers approximately 18,000 square kilometres. More than 17% of the cockatoo's known range is in the south-western portion of the Wimmera region.

A map is included in Appendix 1, Figure 1.

Habitat

SERtBCs rely on stringybark, buloke and gum woodland habitats and scattered trees throughout their range for feeding and nesting. They are highly nomadic, moving throughout their range in response to food availability.

The Wimmera supports 90% of the cockatoo's known buloke feeding habitat and around 55% of stringybark habitat. Much of the Wimmera's buloke habitat occurs on roadsides and as scattered paddock trees on private land. In contrast, 98% of the Wimmera's stringybark habitat occurs in medium-sized patches on public land (Wimmera CMA, 2021).

Management actions to protect and improve SERtBC habitat will have secondary benefits for EPBC- listed threatened ecological community, 'Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions.'

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Red-tailed Black- Cockatoo (south- eastern subspecies) (SERtBC)	Bushfire	Fires can threaten food availability for SERtBC. High-intensity bushfires or prescribed burns can reduce seed availability in stringybarks. Fire is also a threat to mature individual buloke trees, including paddock trees and remnant patches. Many larger trees bear seed and fire would impact SERtBC food availability. Fires can also threaten large hollow-bearing nest trees.	Medium	Improved knowledge of bird locations and nest sites coupled with improved prescribed burning techniques has reduced impacts on some Crown and private land, but the susceptibility remains.
	Drought	Extended periods of low rainfall may reduce the capacity of stringybark and buloke to set seed, reducing habitat and therefore breeding success for SERtBC. Drought can also impact on recruitment of new trees and exacerbate the impacts of other threats.	Low/Medium	Drought is possibly a greater threat in the northern and more arid areas of the Wimmera.

Malleefowl (Leipoa ocellata)

Environment Protection and Biodiversity Conservation Act (1999) status – Vulnerable Flora and Fauna Guarantee Act (1988) status - Vulnerable

Description

The Malleefowl is an iconic threatened species in Mallee landscapes. It is a larged-footed ground-dwelling and mound-building bird, weighing up to 2.5 kilograms and only flies when in distress. It is camouflaged with its upper body patterned with bars, fringes and streaks of grey, white, black and chestnut colours. The Wimmera supports several significant populations.

Location in the Wimmera

The Malleefowl is generally distributed in the Wimmera's north-west in semi-arid Mallee scrub. The Wimmera population represents part of the species' southernmost extent in Australia.

Wimmera Malleefowl habitat and populations are primarily in and adjacent to Little Desert National Park, Nurcoung Flora Reserve, Dyurrite (Mount Arapiles)-Tooan State Park and the Big Desert and Wyperfeld region. These populations are largely isolated because the landscape between habitat reserves is largely agricultural with limited vegetation cover.

A map is included in Appendix 1, Figure 2.

Other considerations

Management actions to protect and improve Malleefowl habitat will have secondary benefits for threatened ecological communities including 'Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions' and 'Plains Mallee Box Woodland of the Murray Darling Depression and Riverina Bioregions.'

Malleefowl mate for life with the female relying on her partner to build and maintain a reusable nesting mound while she visits and leaves the mound during an egg-laying period between September to April.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Malleefowl	Bushfire	Large fires are a threat to Malleefowl. Populations may be eliminated. Fire removes vegetation which impacts habitat for some time until regrowth occurs, and ground litter is reestablished.	Medium/high	Improved knowledge of bird locations and nest sites coupled with improved prescribed burning techniques has reduced impacts on some Crown and private land, but the susceptibility remains.
	Drought	Lack of water Increased fire threat	Low	Malleefowl are quite robust in relation to lack of water. Droughts can make fire more intense, frequent and large, increasing the threat to the birds and their habitat.

Swift Parrot (Lathamus discolor)

Environment Protection and Biodiversity Conservation Act (1999) status – Critically Endangered Flora and Fauna Guarantee Act (1988) status – Critically Endangered

Description

The Swift Parrot is a slim, medium-sized parrot with a streamlined shape in flight, angular pointed wings and a long, pointed purple-red tail. The body is mostly bright green, with a dark-blue patch on the crown. The forehead to throat is crimson and there is a crimson patch at the bend of the wing. The female is slightly duller, with a creamy underwing bar.

In flight, the bright-green body, dark flight feathers and scarlet underwing coverts are prominent. They are noisy, active and showy, with a very fast, direct flight (Birdlife Australia, 2024)

Location in the Wimmera

The Swift Parrot migrates annually from its Tasmanian breeding sites to forage over winter in eucalypt forests and woodlands spanning across Victoria, New South Wales and south-east Queensland. The remnant box-ironbark systems in the Wimmera catchment area (particularly in the upper catchment) forms an important part of what remains of optimal, remnant habitat found across the species non-breeding range.

A map is included in Appendix 1, Figure 3.

Habitat

The National Recovery Plan for the Swift Parrot identifies priority habitat for protection and management that includes the Wimmera's Deep Lead, Illawarra and Jallukar Nature Conservation Reserves and Glynwylln and Illawarra State Forests.

The Wimmera CMA also contains 55 fixed monitoring sites as part of BirdLife Australia's Swift Parrot Search, a standardised, citizen science program launched in 2021. Hundreds of Swift Parrot records occur across the region, with lower-profile reserves such as Jilpanger, West Wail, Lonsdale and Barrabool Nature Conservation Reserves, and Bryntirion and Morrl Morrl State Forests featuring among the numerous locations which have supported the species during productive periods.

Management actions to protect Swift Parrot habitat will have secondary benefits for threatened ecological communities including 'Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia' and 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.'

Other considerations

Swift parrots are primarily nectar feeders, preferring nectar from flowering Eucalyptus spp.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Swift parrot	Bushfire	Increased fire frequency and intensity is a notable threat to the Swift Parrot across its range. Eucalypt flowering frequency, nectar output, and maturation of nectar-rich plant species can be reduced where fire frequency is too regular or intense, resulting in reduced foraging resources. Tree mortality can also occur and is likely in these conditions, particularly among large, hollow- bearing trees, which typically provide more reliable and sustained flowering events.	Low/Medium	A single cooler fire is likely to have a negligible effect. There could be catastrophic loss of Wimmera habitat from intense fires, as habitat is restricted and fragmented. A severe wildfire that destroys the canopy would remove foraging opportunities.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
	Psittacine beak and feather disease (PBFD)	PBFD is a common and potentially deadly disease of parrots caused by a circovirus. While the disease is known to occur in Swift Parrots in the wild and in captive birds, the prevalence and pathogenicity of the disease is currently not known. Any fresh Swift Parrot found dead should be tested (Saunders & Tzaros, 2011).	High	The potential effects of the disease on parrot populations range from inconsequential to devastating, depending on environmental conditions and the general health of the parrots. This disease could potentially have serious implications for the Swift Parrot population should the general health of these birds be reduced from stress associated with competition for nesting and food resources (Saunders & Tzaros, 2011).

Threatened Orchid Species (*Caladenia, Thelymitra, Prasophyllum, Pterosylis, Dipodium spp*)

Descriptions

Caladenia orchids, also called spider orchids, are **perennial**, **deciduous sympodial herbs**. Their few inconspicuous and fine roots are partly surrounded by a fibrous sheath. The plant's tuber produces two daughter tubers. There is a single rolled leaf at the base of the plant and a raceme producing one to eight resupinate flowers. The three sepals and two petals are free and similar in size and shape to each other. In some species, the sepals or petals or both have narrow tips with club-like ends. A labellum is divided into three parts, while the central lobe has stalked or button-like call which are often in rows. The sexual parts of the flower are fused to the column, which has wing-like structures on its sides (Hoffman & Brown, 2011).

Thelymitra orchids, commonly called sun orchids, are **perennial**, **deciduous sympodial herbs**. They have few inconspicuous and fine roots and a pair of oval-shaped tubers. A single leaf from the plant's base surrounds the lower part of the flowering stem. Sun orchids lack a highly modified labellum, and all three petals are similar in size, shape and colour (Hoffman & Brown, 2011).

<u>Prasophyllum</u> orchids are commonly called leek orchids because they have hollow leek-like leaves. They are perennial, deciduous, sympodial herbs, often with a few inconspicuous roots and pair of tubers partly covered by a fibrous sheath. These orchids rely on non-resupinate flowers breaking through the leaf for reproduction. A dorsal sepal is wider than two lateral sepals which are often joined. Petals are often curved, shorter and narrower than sepals and the labellum is positioned above the column and rigidly attached to its base. The labellum has a callus which features a raised, fleshy plate with the base forming an inverted basin shape. The sexual parts of the flower are fused to the column (Hoffman & Brown, 2011).

Pterosylis orchids, often called green orchids, are herbs and distinguished by hood-like 'galea', a fusing of dorsal sepal and two lateral petals. The galea curves forward and covers the sexual parts of the flower. The dorsal sepal is translucent white with green, reddish or brown stripes. The two lateral sepals are joined at their base, form the front of the flower and usually protrude to form points which extend above or to the side of the galea. The third petal forms the highly modified labellum (Jones & Clements, 2002).

Dipodium orchards are commonly known as hyacinth orchids. They are perennial, herbs or climbers/ epiphytes. Many species, particularly in eastern Australia are leafless mycoheterotrophs. Others have medium-sized to very large leaves that are parallel-veined. One to 50 flowers are arranged in a raceme, which can be fragrant or odourless and white, pink, purple, yellow or green, often with spots. Sepals and petals are free from and similar to each other. The labellum projects forwards and has three lobes with a central band of colourful hairs. Each flower has two pollinia supported on two stipes (Jones, 2006).

Location in the Wimmera

The Wimmera contains many nationally threatened native orchid species, listed in Table 1 below. Orchids are often located as part of small and isolated populations and subject to a range of threats.

Wimmera orchids are broadly located in the Little Desert region, Gariwerd (Grampians National Park and surrounds), and south-west Wimmera.

A map is included in Appendix 1, Figure 4.

Habitat

Caladenia orchid habitats range from cool, moist forests to swamplands to almost arid mallee woodland.

Australian *Thelymitra* species grow in a range of habitats from swamps to relatively dry sandplains. They are common around granite boulders where they benefit from runoff.

Prasophyllum species can grow in a variety of habitats. Some only flower after summer fires and have flowers like those of *Xanthorroea* which can flower at the same time, suggesting they employ the same pollinating insects.

Pterystylis orchids grow in a wide range of habitats, especially in temperate zones in grassland, heath, scrub, woodland and forest, including rainforest. They can grow in semi-arid areas but usually near rocks or crevices where there is run-off during rain. Most have periods of dormancy, coinciding with climatic extremes,

Australia is home to 11 species of endemic *Dipodium* orchids that occur in a range of habitats from coastal lowlands to ranges and tablelands.

Other considerations

Native Australian orchids are vulnerable to human poaching as well as ecological threats and natural disasters.

Table 1. Nationally threatened orchids found in the Wimmera region.

Common name	Scientific name	Environment Protection and Biodiversity Conservation Act (1999) status	Flora and Fauna Guarantee Act 1988 status	Distribution notes
Audas Spider-orchid	Caladenia audasii	Endangered	Critically endangered	Total number of extant individuals <50. Wimmera contains two of the five extant locations of the species and 43 of the 50 remaining individuals within Deep Lead FFR and Ararat Hills State Park.
Candy Spider-orchid	Caladenia versicolor	Vulnerable	Endangered	The Wimmera contains two of three remaining wild populations of <i>Caladenia versicolor</i> and two translocation sites on private properties. There is estimated to be less than 1,500 individuals of this species in the wild over half of these are due to successful translocation efforts (Reiter, et al., 2019). The species is extinct in South Australia.
Coloured Spider-orchid (Small Western Spider-orchid or Painted Spider- orchid)	Caladenia colorata	Endangered	Critically Endangered	The Wimmera contains five locations for this species and all extant populations within Victoria (approximately 1500 individuals), 3 of these populations are within the Little Desert National Park, one site is on private property and the largest site of approximately 200 individuals is on a road verge. Most remaining individuals are due to successful translocations of this species (Reiter, 2020) (Reiter & Menz, 2022).
Elegant Spider-orchid (Blood-red Spider- orchid)	Caladenia formosa	Vulnerable	Critically Endangered	The Wimmera has significant populations in the Black Range State Park, Meereek and on private property in the west Wimmera.
Metallic Sun- orchid	Thelymitra epipactoides	Endangered	Endangered	Significant populations of this species in Kiata Flora and Fauna Reserve, Gariwerd (Grampians National Park) and Glenisla Flats.
Spiral Sun- orchid	Thelymitra matthewsii	Vulnerable	Endangered	Several populations in Gariwerd (Grampians National Park), 2023 surveys by members of the public suggested that the populations have declined, despite recent wildfires. The species is being assessed for Endangered status under EPBC.
Tawny Spider-orchid	Caladenia fulva	Endangered	Endangered	The Wimmera contains 4 populations of <i>Caladenia lowanensis</i> with less than 300 individuals found in recent surveys 2023. Populations are found in Kiata and Wail Flora and Fauna Reserves, and the northern side of Little Desert National Park. A population at Mt Arapiles has not been redetected in recent years.

Common name	Scientific name	Environment Protection and Biodiversity Conservation Act (1999) status	Flora and Fauna Guarantee Act 1988 status	Distribution notes
Wimmera Spider-orchid	Caladenia Iowanensis	Endangered	Critically Endangered	The Wimmera contains 4 populations of <i>Caladenia lowanensis</i> with less than 300 individuals found in recent surveys 2023. Populations are found in Kiata and Wail Flora and Fauna Reserves and the northern side of the Little Desert National Park. A population at Mt Arapiles has not been redetected in recent years.
Yellow-lip Spider-orchid	Caladenia xanthochila	Endangered	Endangered	There are three extant sites of <i>Caladenia xanthochila</i> one in South Australia, one in the Wimmera and one in the Goldfields. The Wimmera contains the largest known wild site of the species and several nearby translocation sites (Reiter, et al., 2023).
Pomonal Leek-orchid	Prasophyllum subbisectum	Endangered	Critically Endangered	Known from only two extant populations one in Deep Lead Flora and Fauna Reserve and one in Gariwerd (Grampians National Park). Total known individuals less than 400. In recent years <100 individuals have been counted in annual monitoring by Royal Botanic Gardens Victoria.
Floodplain Rustyhood	Pterostylis cheraphila	Vulnerable	Endangered	Significant populations along the Wimmera River in the Little Desert National Park and in the Barrabool Flora and Fauna Reserve. Plants subject to flooding.
Lowly Greenhood	Pterostylis despectens	Endangered	Endangered	Significant population near Horsham.
Green-striped Greenhood	Pterostylis chlorogramma	Vulnerable	Endangered	Significant populations in the Grampians National Park and Little Desert National Park.
Bell-flower Hyacinth Orchid	Dipodium campanulatum	Endangered	Endangered	Significant population of this species near Apsley, potentially the largest
Rigid Spider- orchid	Caladenia tensa	Endangered	Not listed	Significant populations in Kiata and, West Wail Flora and Fauna Reserves and Illawarra.
Brilliant Sun- orchid	Thelymitra mackibbinii	Vulnerable	Critically Endangered	Less than 150 wild plants scattered across three populations, Deep Lead, Mt Bolangum and Morrl Morrl Flora and Fauna Reserves. Translocations of Approximately 500 plants into Deep Lead, the wetter end of the range have been highly successful assessment completed as part of Nature Fund monitoring by Royal Botanic Gardens Victoria in 2023.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
All Wimmera orchids	Bushfire and controlled burns	Fire occurring during the non- dormant stage (May to November) of the orchid can impact survival and the reproductive cycle. Mechanical disturbance of small, isolated populations in bushfire recovery efforts could significantly reduce populations. Australian orchids do not produce a seed bank, so are reliant on re-sprouting post fire. Susceptibility to severe bushfire is unknown.	Medium/High	Inappropriate fire regimes/mechanical intervention can impact populations. Susceptibility to bushfire is unknown. These species already face many threats (Wraith & Pickering, 2019).
All Wimmera orchids	Flood	Prolonged flooding can impact survival and the reproductive cycle. Small populations are known to be susceptible to stochastic events, and less likely to recover post event.	High	Due to low numbers of individuals and a small number of disjunct populations, recovery without intervention is unlikely. These species already face many threats (Wraith & Pickering, 2019).
All Wimmera orchids	Drought	Prolonged drought can impact survival and the reproductive cycle, through both reduced flowering and reduced pollination if flowering occurs. Terrestrial orchids are reliant on Autumn and Winter rain for seedling recruitment. Small populations are known to be susceptible to stochastic events, and less likely to recover post drought event.	High	Due to low numbers of individuals and a small number of disjunct populations, recovery without intervention is unlikely. These species already face many threats (Wraith & Pickering, 2019).

Forked Spyridium (Spyridium furculentum)

Environment Protection and Biodiversity Conservation Act (1999) status – Endangered Flora and Fauna Guarantee Act (1988) status – Critically Endangered

Description

Forked Spyridium is a small to medium-sized shrub to about 1.6m high with small, white-cream flowers growing in clusters and y-shaped grey-green leaves and soft-hairy young stems. The species regrows from seed following fire, meaning unsuitable fire frequency and intensity might affect survival.

Location in the Wimmera

Forked Spyridium is endemic to the Wimmera, with four populations occurring on roadsides and private property south of the Little Desert National Park al within a 10 km radius.

A map is included in Appendix 1, Figure 5.

Habitat

Mallee woodland specific to its distribution. Plants regrow from seed following fire, meaning unsuitable fire frequency and intensity might affect survival.

Other considerations

Only formally described in 2012. Apart from bushfire, other threats include road maintenance, vegetation clearing or disturbance, weed invasion and grazing from feral animals such as rabbits. *Phytophthora cinnamomi*, an invasive soil-borne water pathogen, has been detected at all populations.

Sites are facing multiple threats (Carter & Downe, 2006) (Threatened Species Scientific Committee , 2016). The decline of roadside populations is thought to be because of *Phytophthora cinnamon* (Silcock, 2017).

Surveys by the Royal Botanic Gardens Victoria in 2023 across all known locations found substantial seedling recruitment (>100 individuals) at two sites in the absence of fire after the significant and prolonged rains of 2022. Both sites are fenced and soil disturbance was absent. Plants germinating from seed following rain means drought may affect long term survival.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Forked Spyridium	Bushfire	Forked Spyridium possesses hard, physically dormant seed that requires heat from a fire or other disturbance such as physical scarification or weathering to crack the seed coat prior to germinating. Plants regrow from seed following fire, and are unable to recover vegetatively, meaning unsuitable fire frequency and intensity may affect survival. Cool fires can destroy plants but be of insufficient temperature to stimulate seed germination (Carter & Downe, 2006). Mechanical disturbance during fire suppression may introduce <i>Phytophthora</i> .	Low	It is unlikely that any significant bushfire would be cool. Fire frequency is important, for plants to have time to mature, set seed, form a seed bank, and before populations become senescent and die out.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
	Drought	Prolonged drought can impact flowering and seed set and potentially recruitment.	Medium	Both flowering amount and seed set may be reduced in droughts due to resource limitation (i.e. the plant does not have enough resources to flower or set seed). Prolonged drought may therefore affect population numbers, in already limited populations.

Avenue Cassinia (Cassinia tegulata)

Environment Protection and Biodiversity Conservation Act (1999) status – Critically Endangered Flora and Fauna Guarantee Act (1988) status – Critically Endangered

Description

Avenue cassinia is an upright small to medium-sized shrub with grey-green to yellowish green, hairy, needle-like leaves, fissured brown bark and off-white to cream flowers at the end of branches. Flowers are honey-scented. Leaves and stems are odourless and not sticky.

Location in the Wimmera

The Avenue cassinia is known from a small number of individuals and only three populations, one in the southwest Wimmera near Edenhope and two in south-eastern South Australia near Lucindale and Blackford. All populations occur along roadsides and are impacted by multiple threats.

A map is included in Appendix 1, Figure 6.

Habitat

The Avenue cassinia occurs on seasonally inundated flats of Mallee honey-myrtle (*Melaleuca brevifolia*) and Chaffy Saw-sedge (*Gahnia filum*) shrubland. It is associated with interdune flats with shallow, grey or yellow, sandy, clay soils on a limestone parent material.

Other considerations

The Avenue cassinia germinates seed in the seedbank post fire. Fire is likely to kills adult plants (DEWHA, 2008).

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Avenue cassinia	Bushfire	Little information on Avenue cassinia's response to fire, age to flowering and recruitment post-fire is available. A small trial burn in South Australia in 2019 showed a positive response to fire, with significant germination occurring. Most adult plants died. Too frequent fires are likely to impact on plant maturity and seed set. Only 8 out of 239 post-fire germinates reached flowering after 2 years since the fire, suggesting that a longer interval would be required to build up a significant seed bank (Haywood, 2019).	Medium	Susceptibility is rated medium due to Avenue cassinia's vulnerability arising from the small number, size and isolation of populations and significant threats faced. Too frequent fire is likely to impact on seed available for germination.
	Drought	Prolonged drought can impact flowering and seed set and potentially recruitment. Recruitment and survival may be severely impacted if drought was to occur following a wildfire.	Medium	The amount of flowering and seed set are likely to be reduced during droughts if plants do not have enough resources. Prolonged drought could affect population numbers, in already limited populations.

Gariwerd and Surrounds – Threatened Species

Gariwerd (including Grampians National Park and surrounds) supports a range of habitat types from montane habitat to gullies, wetlands, creeks, rocky outcrops, woodlands, heathlands and forests. This range of habitats supports an extremely high diversity of habitats and species, including one third of Victoria's native flora species and approximately 17% of Victoria's wildlife species. This includes rare or endangered species and many endemic species found only in Gariwerd (Grampians National Park) (Parks Victoria, 2021).

A map is included in Appendix 1, Figure 7. Nationally threatened orchid species including Gariwerd species are mapped in Appendix 1, Figure 4.

Nationally Threatened Orchid Species

Spiral Sun-orchid (Vulnerable) and Candy Spider-orchid (Vulnerable) are in Gariwerd (Grampians National Park) (Appendix 1, Figure 4). They are discussed in the sections of this Plan related to Threatened Orchid Species.

Grampians Pincushion-lily (Borya mirabilis)

Environment Protection and Biodiversity Conservation Act (1999) status – Endangered Flora and Fauna Guarantee Act (1988) status – Endangered

Description

The Grampians Pincushion Lily produces clumps of brown, branched stems up to 15cm tall, with tufts of spiky leaves, each about 1.5cm long. During spring the plant produces round heads of star-shaped white flowers on a stem at the ends of branches. It is a 'resurrection' plant, which appear to die during dry periods but instead, if drought has not been excessively long, enter a dormant stage. They regenerate from buds when they receive sufficient moisture again.

Location in the Wimmera

The Grampians Pincushion Lily is one of Australia's most endangered plants. Population genetic studies revealed the plant to be highly clonal, consisting of only 3 individuals (Reiter, et al., 2015). Its only known location is a single rock outcrop within Gariwerd (Grampians National Park), where it covers an area of just 60m by 20m.

A map is included in Appendix 1, Figure 7.

Habitat

This plant lives in low open shrubland on a ferruginous sandstone outcrop consisting of a series of rocky terraces. Colonies are distributed over an area approximately 60m x 20m. Soils are seasonally moist from seepage, which has also caused bedrock erosion and contributed to accumulation of fine sandy loam soil. Soil depth ranges from just a few centimetres up to one metre (Kohout & Coates, 2010).

Other considerations

While resurrection plants can tolerate harsh, dry conditions, they are poor competitors against other species.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Grampians Pincushion- lily (Borya mirabilis)	Bushfire	Both wild and translocated populations of <i>Borya</i> <i>mirabilis</i> have undergone reductions post wildfire in the Grampians National Park. <i>Borya mirabilis</i> is susceptible to <i>Phytophthora</i> <i>cinnamomi</i> (Reiter, et al., 2004), which can be spread due to mechanical disturbance associated with fire. <i>Borya mirabilis</i> was formerly more widespread in the Grampians and thought	High	A wildfire in the Grampians in January 2006 severely burnt all <i>B. mirabilis</i> plants at the Wonderland site. In 2014 a bushfire swept through the northern end of the park the translocated population was subsequently burn in wildfire in the northern Grampians and was lost due to regrowth of vegetation within cages outcompeting the plants (Silcock, et al., 2021).The wild population have shown signs of recovery since, with 50% of the plants re-

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
	Storra	to be reduced in distribution through fire (Churchill, 1987).	ligh	sprouting within a few months of the fire, however the plants in 2019 had still not recovered to pre fire levels (Silcock, et al., 2021). Recovery has been slowed by a reduction in shade and increased soil drying because of the fire, exacerbated by drought conditions, and about one- half of the ramets remain in a desiccated state (2009). As the vegetation is regenerating the site is becoming more shaded and retaining more moisture, and it is likely that most plants will recover. The main issue is that <i>Borya mirabilis</i> is unable to produce seed so is reliant on resprouting to survive fire (Reiter, et al., 2015) and is susceptible to <i>Phytophthora,</i> which is at the wild site and reducing the vigour of the plants.
	Storms, especially drought and fire followed by storm	Storms have caused erosion of habitat where the plant occurs. This has been exacerbated in occasions by drought and fire followed by storms.	High	very small, localised population in an area known to be susceptible to erosion. Accelerated erosion of soil due to fire and drought is a significant threat to the survival of <i>B. mirabilis</i> , and in the past has been so severe as to leave the plants on pedestals of soil. Soil disturbance is also likely to limit the opportunity for vegetative reproduction, which is the only form of reproduction for this species.
	Drought	Borya mirabilis is a resurrection plant and has the ability to tolerate desiccation over summer and rehydrate after the onset of autumn rains. Prolonged drought conditions and increased exposure and drying of soil habitat can contribute to reduced vigour of plants. Leaf shedding and a gradual decline in the ability of some plants to produce new	Medium	Surveys at known locations have shown impact from droughts. Resurrection plants are either basal resprouting is observed mostly in plants growing beneath shrubs and in crevices between boulders, in deeper soils where plants are better protected from disturbance and moisture loss.

Asset E	Emergency scenario	Why it poses a threat	Susceptibility	Why
		growth or resurrect fully from a desiccated state have been observed during monitoring.		Reduction of rainfall and long-term drying predicted as a result of climate change may be a major long-term threat. <i>Borya</i> species, like many other resurrection plants, are able to survive a state of dehydration for months and possibly years (Gaff, 1987). The process in which the leaves of resurrection plants shrink without damage to the tissue is known as cytorrhysis. <i>Borya mirabilis</i> takes advantage of this by desiccating the leaves, whereas several western Australian species shed their leaves, and thus survive dry, hot summer months (Churchill, 1987).

Heath Mouse (Pseudomys shortridgei)

Environment Protection and Biodiversity Conservation Act (1999) status – Endangered Flora and Fauna Guarantee Act (1988) status - Endangered

Description

In Victoria, the Heath Mouse is about 120-125 millimetres long and weighs about 70 grams. The tail is shorter than the body, about 100 millimetres and has a distinct bicoloured pattern of dark above and white below. The coat has black guard hairs and brown underfur, giving it a brindled appearance. The belly is grey-white, and the ears are dark and covered with soft fine hairs.

Location in the Wimmera

The Heath Mouse occurs in isolated locations in Western Australia, South Australia and Victoria. In Victoria, it occurs in Gariwerd (Grampians National Park and surrounds) and Lower Glenelg National Park. Gariwerd (Grampians National Park) is considered a stronghold for the species.

A map is included in Appendix 1, Figure 7.

Habitat

In Victoria, the Heath Mouse is most frequently found in species-rich dry heathland that has been burnt within the previous 5–15 years. But it also occurs in dry brown stringybark (*Eucalyptus baxteri*) and desert stringybark (*Eucalyptus arenacea*) open woodland and open forest with a heath understorey. The species can exploit heathlands by colonising patches a few years after fire. However, where individuals occur in heathy woodland, they can inhabit much older vegetation, up to 25 years post-fire.

Other considerations

The Heath Mouse is considered a generalist herbivore. Studies in Gariwerd (Grampians National Park) have shown a strong correlation between Heath Mouse abundance and rain. The species responds to rain in a 'boom and bust' dynamic (Threatened Species Scientific Committee, 2016).

Asset	Emergen cy scenario	Why it poses a threat	Susceptibili ty	Why
Heath mouse	Fire	It is considered that multiple high-intensity fires within several years during a drought period would severely impact the ability of the heath mouse to recover and persist. Large- scale and frequent bushfires can also result in increased predation by introduced species due to loss of dense vegetation cover. A catastrophic bushfire in a long unburnt site is likely to cause a significant loss of habitat for a subpopulation, decrease habitat patchiness and limit areas for dispersal (Threatened Species Scientific Committee, 2016).	Medium	Loss of habitat from bushfire will impact on this vulnerable subpopulation. The threat of predation increases following fire due to loss of habitat vegetation cover.
	Droughts	Drought events have caused a contraction in the range of the Heath Mouse. An increased frequency of drought events will reduce the ability of the heath mouse and its habitat to recover from wildfire events. A drying climate is likely to drive population density down with predation exerting a greater pressure on the species during such periods.	Medium	Climate change is a key threat to the Heath Mouse because the species' abundance is related to rainfall. Annual rainfall has declined in south- west Western Australia and western Victoria and is predicted to decline further.

Grampians Globe-pea (Sphaerolobium acanthos)

Environment Protection and Biodiversity Conservation Act (1999) status – Critically Endangered Flora and Fauna Guarantee Act (1988) status - Critically Endangered

Description

Grampians globe-pea is an erect, perennial, shrub that grows to 1m tall, has rigid stems and branches with rough surfaces, and has many spiny branchlets. The leaves are scattered to semi-whorled, slender, and tapering and 2–3mm long. Leaves easily detach and shed early so adult plants are leafless. One to two flowers occur on short stalks along the branchlets. The plant flowers in summer and its petals are yellow, orange, or reddish-brown and around 7–7.5mm long (Threatened Species Scientific Committee, 2016).

Location in the Wimmera

The Grampians Globe-pea is endemic to Gariwerd (Grampians National Park). It has been recorded in the Halls Gap – Mount William area and the Victoria Valley.

A map is included in Appendix 1, Figure 7.

Habitat

The Grampians Globe-pea has been recorded in Gariwerd (Grampians National Park) sclerophyll forest, woodland and heathland on lower slopes, gullies and near streams. It sometimes occurs beside tracks and roads.

Other considerations

Fabaceae form symbiotic associations with nitrogen-fixing soil bacteria called rhizobia. Rhizobia produce root nodules in which the bacteria reside. Rhizobia turn molecular nitrogen into ammonia (suitable for plant uptake) and the plant produces sugars for the rhizobia (Sprent & Raven, 1985). This exchange has facilitated the growth of Fabaceae into areas that have poor soils, such as the Grampians National Park. Symbiotic propagation can increase survival in native Fabaceae (Reiter, et al., 2021).

In 2015 the total population size was estimated to be fewer than 70 individual plants across four populations, with the largest population containing fewer than 50 individual plants. The area of occupancy of the Grampians Globepea is estimated to be 20 km² and the extent of occurrence is estimated to be 86 km² (Threatened Species Scientific Committee, 2016).

In 2022 significant damage occurred to the largest population of this species in the Grampians National Park when a car park for the Grampians walking trail was constructed within the population on Redmans Track. Due to susceptibility to *Phytophthora* it is likely that this population will be further affected as disease spreads in the population (Reiter, et al., 2004). Monitoring in 2023 was unable to find >10 plants that were previously next to the newly installed walking trail and carpark.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Grampians Globe-pea	Bushfire	Grampians Globe-pea possesses hard, physically dormant seed that is likely to require heat from a fire or other disturbance such as physical scarification or weathering to crack the seed coat prior to germinating. Plants regrow from seed following fire, and it is likely they are unable to recover vegetatively, meaning unsuitable fire frequency and intensity may affect survival. Cool fires can destroy plants but be of insufficient temperature to stimulate seed germination (Threatened Species Scientific Committee, 2016).	Medium	A significant fire passed through the Grampians National Park in 2006, the effect of which upon the Grampians globe-pea is unknown, although a previously unknown population was found following this fire in an area that had been severely burnt. In 2014 a bushfire swept through the northern end of the park, including an area where one population of the Grampians globe pea had been recorded but the effect of the fire on the population is unknown. The risk of mechanical disturbance and disease spread in fire prevention operations, as <i>S. accanthos</i> is highly susceptible to <i>Phytophthora cinnamomi</i> (Reiter, et al., 2004). This species already faces significant threats. Due to low numbers of individuals and a small number of disjunct populations, recovery without intervention is unlikely.
	Drought	Prolonged drought can impact flowering, seed set and recruitment.	High	This species already faces significant threats. Due to low numbers of individuals and a small number of disjunct populations, recovery without intervention is unlikely.

Grampians Rice flower (Pimelia pagophila)

Environment Protection and Biodiversity Conservation Act (1999) status – Vulnerable Flora and Fauna Guarantee Act (1988) status - Endangered

Description

The Grampians Rice-flower is a shrub usually to 1.2m tall. Leaves are opposite and narrowly obovate to elliptic, 7–20mm long, 2–5 mm wide, mid green and usually paler on the lower surface. Distinctly pendulous flowerheads appear in October – November. Individual flowers are white, tubular, to 15mm long and 8 mm wide. Four, six or eight floral bracts surround the inflorescence and are hairless and pale green or yellow (Carter, 2006).

Location in the Wimmera

The Grampians rice-flower is endemic to the Mt William Range within Gariwerd (Grampians National Park) in western Victoria.

A map is included in Appendix 1, Figure 7.

Habitat

Populations of Grampians Rice-flower occur in *Eucalyptus baxteri* (brown stringybark) – *E. obliqua* forest (messmate stringybark) and are present near a range of common heathy forest species. All known populations occur close to the edges of tracks (generally <10 m) or in more open habitat nearby, generally on sandy loam soils (Threatened Species Scientific Committee, 2016).

Other considerations

Prior to the January 2006 fires in Victoria, it was estimated that approximately 70-90 individuals existed in six populations. Most populations were burnt in 2006. Many of the sites of *P. pagophila* including around Mt William have undergone reduction in numbers due to *Phytophthora cinnamomii*, which this species is highly susceptible to (Reiter, et al., 2004). With climate change *Phytophthora* is likely to affect those plants on Mt William that are currently escaping disease and decline due to altitude/cold reducing disease symptoms.

Asset	Emergen cy scenario	Why it poses a threat	Susceptibili ty	Why
Grampians Rice Flower	Bushfire (inappropr iate fire regimes)	Long fire-free intervals may threaten the viability of populations by suppressing regeneration. To frequent fire intervals may lead to local extinction of the species, before maturity and a seed bank build up occurs. <i>Phytophthora</i> <i>cinnamomi</i> can be spread due to mechanical disturbance associated with fire.	High	 Pimelea species resprout or recruit from seed after fire, and <i>P. pagophila</i> is also likely to require some disturbance to regenerate. Due to the small population sizes this species is susceptible to stochastic events and unlikely to recover without intervention. The risk of disease spread during fire management operations (Reiter, et al., 2004). Due to the small population sizes and susceptibility to <i>Phytophthora</i>, regeneration may be affected with small seed set and germinating seedlings post fire being affected by disease.
	Drought	Prolonged drought can impact flowering, seed set and recruitment.	High	This species already faces significant threats (Carter, 2006). Due to low numbers of individuals and a small number of disjunct populations, recovery without intervention is unlikely.

Williamsons Bush-pea (Pultenaea williamsoniana)

Environment Protection and Biodiversity Conservation Act (1999) status – Vulnerable Flora and Fauna Guarantee Act (1988) status - Endangered

Description

Williamsons Bush-peak is a slender, erect shrub that typically grows up to 3m high with stems covered with white hairs. Leaves are cylindrical with a groove along the upper surface, 6–15mm long, 0.2–0.5mm wide, tapering to a sharp point and with brown stipules at the base. Flowers are yellow to orange and red, arranged in clusters of three to five on the ends of short side branches Flowering occurs from September to October (Threatened Species Scientific Committee, 2016).

Location in the Wimmera

Williamsons Bush-pea is endemic to the Gariwerd (Grampians) region of western Victoria, where there are six populations containing about 1,000 plants. It occurs in northern Gariwerd (Grampians National Park) between Mount Zero and Halls Gap (Carter, 2006).

A map is included in Appendix 1, Figure 7.

Habitat

Occurs in sandy soil on rocky slopes, with associated overstorey species include *Callitris rhomboidea, Eucalyptus baxteri, Eucalyptus goniocalyx, Eucalyptus arenacea, Eucalyptus obliqua* and *Eucalyptus cypellocarpa*, while heathy shrubs including *Thryptomene calycina, Hibbertia riparia* and *Calytrix alpestris* dominate substrata (Threatened Species Scientific Committee, 2016).

Other considerations

The plant is likely to recruit after fire, germinating in response to high heat, as demonstrated for other hardseeded *Pultenaea* species. Populations tend to be most abundant close to roads, although it is not clear if this relates to some ecological preference such as increased light availability or disturbance regime or is purely coincidental (Threatened Species Scientific Committee, 2016).

Asset	Emergen cy scenario	Why it poses a threat	Susceptibili ty	Why
Williamsons Bush-pea	Bushfire	Too frequent fires can impact plant maturity and seed set.	Medium/Low	As with many species of Fabaceae, this species is likely to germinate in response to fire. Fire frequency is important, for plants to have time to mature and set seed, and also before populations become senescent and die out.

Wimmera Nationally Threatened Grassland Species

Threatened grassland communities occur as isolated remnants scattered across the agricultural landscape of the northern Wimmera plains, central Wimmera, and upper Wimmera River catchment area.

Several threatened plant and animal species rely on these grassland ecosystems for habitat, including the Wimmera Rice-flower, Turnip Copperburr, and Striped Legless Lizard.

Wimmera Rice-flower (Pimelea spinescens supsp. Publiflora)

Environment Protection and Biodiversity Conservation Act (1999) status – Critically Endangered Flora and Fauna Guarantee Act (1988) status - Critically Endangered

Description

The Wimmera Rice-flower is a small native shrub that can grow to 50 centimetres in height (*DSE*, 2008). It is one of two subspecies of Spiny Rice-flower (*Pimelea spinescens*). Stems are smooth and have a spiny tip and leaves are arranged opposite each other along the stem, have short hairy stalks, elliptic in shape, smooth, uniform green in colour, and about 7mm long and 2mm wide. During flowering, it has a profusion of small creamy-yellow flowers with each flower head usually having 6–12 individual flowers.

Location in the Wimmera

The Wimmera Rice-flower is endemic to the Wimmera with restricted geographic distribution. It is known to occupy three locations at Natimuk, Minyip and near Kalkee.

A map is included in Appendix 1, Figure 8.

Habitat

The Natimuk population occurs on a roadside reserve in a grassland dominated by spear grasses and wallaby grasses (*Austrostipa* and *Austrodanthonia* species respectively), with scattered shrubs of *Bursaria spinosa* (Sweet Bursaria) and *Senna artemisioides* (Cassia). The population at Minyip occurs on Crown Land within a Buloke grassland area (DSE, 2008).

Other considerations

The Wimmera Rice-flower was presumed to be an extinct subspecies. It previously occurred in Victoria from the Dimboola, Wimmera and Borung districts, approximately 300 km north-west of Melbourne. The type specimen was collected from Wimmera in 1890 and prior to 2005, the last specimen was recorded from the Dimboola and Borung districts in 1901 (DEWHA, 2009).

The two populations were then subsequently rediscovered at Natimuk in 2005 and Minyip, 2007.

Spiny Rice-flower (Pimelea spinescens subsp. Spinescens)

Environment Protection and Biodiversity Conservation Act (1999) status – **Critically Endangered** Flora and Fauna Guarantee Act (1988) status - **Critically endangered**

Description

Spiny Rice-flower is a small shrub endemic to grasslands and grassy woodlands in western and northern Victoria. It, with Wimmera Rice-flower (*Pimelea spinescens supsp. Publiflora*), are subspecies of *Pimelea spinescens*. While Spiny Rice-flower has smooth and hairless flowers, the flowers of Wimmera Rice-flower are covered with soft short hairs.

Location in the Wimmera

Spiny Rice-flower occurs in the central and southeast Wimmera as well as on basalt-derived soils west of Melbourne across the central Victorian volcanic plains, and on alluvial soils across north-west Victoria. Spiny Rice-flower populations mostly occur in tiny patches of remnant habitat such as on roadsides and rail easements that support small to medium-size populations (<500 individuals), although a few large populations (consisting of >1,000 individuals) are also known. The population is severely fragmented, with subpopulations geographically isolated from each other.

The draft National Recovery Plan for the species lists large populations of particular importance. In the Wimmera this includes:

- McLeods Road near Rupanyup, a roadside population containing >11,000 plants.
- Deep Lead flora Reserve, a relatively small population in high quality vegetation.

Other Wimmera sites are roadsides near Rupanyup, Banyena, Karnak, Marnoo and Glenorchy.

A map is included in Appendix 1, Figure 8.

Habitat

Spiny Rice-flower prefers intact grassland remnants, lowland grasslands, grassy woodlands and open shrublands. Spiny Rice-flower populations are predominantly associated with the Natural Temperate Grassland of the Victorian Volcanic Plain, and the Natural Grasslands of the Murray Valley Plains threatened ecological communities. They are also associated with *Allocasuarina luehmannii* (Buloke) open grassy woodland in the Wimmera.

Most populations are restricted to small, isolated grassland habitat on roadsides and railway lines in highly fragmented landscapes.

Other considerations

In 2022, it was known from more than 350 wild populations across its range containing a total of 70,000 to 90,000 mature individuals.

Fire during the flowering and seed production season reduces the potential for seed accumulation in the soil. Burning over the summer months Burning from late spring (November) through summer or into early autumn (April) is recommended. Adult individuals are quite tolerant of fire due to the large taproot which can resprout after fire. Fire also provides an opportunity for the Spiny Rice-flower to recruit from the soil seed bank as it creates openings and gaps in vegetative cover, reducing competition. Good seasonal rainfall promotes successful recruitment. Conversely, recruitment post-fire can be low, particularly following hot summers and low rainfall (DCCEEW, 2022).

Turnip Copperburr (Sclerolaena napiformis)

Environment Protection and Biodiversity Conservation Act (1999) status – Endangered Flora and Fauna Guarantee Act (1988) status - Critically Endangered

Description

The Turnip Copperburr is an erect perennial chenopod shrub growing to 30cm tall with multiple branches sparsely covered with small hairs. Blue-green Leaves are sparse, 10-15mm in length x 4mm wide with hairs. Singular flowers to 3mm are at the base of the leaf axils. The fruiting perianth is turnip-shaped, green and woody with hairs and 5 or 6 spines, usually 4 long spines and 2 minor spines.

Location in the Wimmera

This member of the saltbush family is endemic to south-east Australia. It is in the Riverina areas of northern Victoria and southern New South Wales as well as the Wimmera, where it occurs in the southern part of Yarriambiack Shire in Rupanyup North, Marnoo and Avon Plains areas.

A map is included in Appendix 1, Figure 8.

Habitat

The Turnip Copperburr grows in native grasslands and grassy Box/Buloke woodlands on clay-loam soils where it colonises small bare areas, sometimes in wet conditions. Associated species include Common Wallaby-grass (*Austrodanthonia caespitosa*), Rough Spear-Grass (*Austrostipa scabra*), Spurred Spear-Grass (*Austrostipa gibbose*), Common Everlasting (*Chrysocephalum apiculatum sens.lat.*), various bluebush (*Maireana species*) and Buloke (*Allocasuarina luehmannii*). Anecdotal evidence suggests Turnip Copperburr can tolerate waterlogging in the spring, and all remaining populations are in close vicinity to a water course or swamp. Most of its habitat has been cleared for agriculture, and remaining populations are mostly small and isolated, and at risk from a variety of threats including weed invasion, grazing and road works.

Other considerations

Associations between seed-harvesting ants and some species of *Sclerolaena* have been noted where ants (*Rhytidoponera* species B and *Monomorium whitei*) have been observed collecting and taking fruit to nests where seeds are removed and stored. This might assist distribution and placement of seeds to aid germination at a later date when conditions are favourable.

Relationships between burning and Turnip Copperburr are not fully understood. It is not clear if burning is advantageous or a threat to this species. Burning might be detrimental because chenopods have been observed to have generally low sprouting proportions after clipping and extremely low sprouting following burning. However, an observation of a population near Marnoo showed good growth after a burn, though no formal surveys have been undertaken on the species response to fire (Mavromihalis, 2010).

Assets	Emergency scenario	Why it poses a threat	Susceptibility	Why
 Wimmera Rice flower Spiny Rice Flower Turnip Copperburr 	Bushfire	Inappropriate regimes can impact regeneration.	Low/medium	Absence of fire and fire suppression threatens native grasslands, as fire plays an important role in reducing competition and increasing seedling emergence.
				as burning when species are flowering or germinating may decrease recruitment of some species.
	Drought	Stress from prolonged drought can impact on flowering and propagation. Prolonged drought can cause local extinctions.	Medium	Drought, in combination with fire, may result in mortality of some wallaby grass species. The Spiny Rice-flower is sensitive to prolonged drought, and populations have been observed to significantly decline over relatively short periods of time following drought.

Striped legless lizard (Delma Impar)

Environment Protection and Biodiversity Conservation Act (1999) status – Vulnerable Flora and Fauna Guarantee Act (1988) status - Endangered

Description

The Striped legless lizard is a thin, snake-like lizard, growing up to 300mm. It lacks forelimbs and has reduced vestigial hind limbs. It typically has a pale grey-brown dorsal surface and cream ventral surface, with a series of dark-brown or blackish dorso lateral and lateral stripes along the length of the body and tail. It can vary considerably in colour and pattern.

Location in the Wimmera

The Striped legless lizard is patchily distributed throughout south-eastern New South Wales, the Australian Capital Territory, north-eastern, central and south-western Victoria, and south-eastern South Australia. Important populations are known to occur on privately owned lands or in reserves (including rail, road and stock routes reserves). Wimmera populations are east of Gariwerd (Grampians National Park and surrounds), near Horsham and in the south-west Wimmera.

A map is included in Appendix 1, Figure 8.

Habitat

The Striped legless lizard is a grassland specialist, living only in areas of native grassland and nearby grassy woodland and exotic pasture. The lizard's primary habitat coincides with four nationally threatened ecological communities:

- Natural Temperate Grassland of the Victorian Volcanic Plain
- Grassy Eucalypt Woodland of the Victorian Volcanic Plain
- Natural Temperate Grassland of the South Eastern Highlands
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Other considerations

The Striped Legless Lizard is rarely seen as it shelters in soil cracks, crevices under rocks, or in the base of grass tussocks. It can be distinguished from snakes because no juvenile snakes in south-east Australia have stripes along the entire length of the body (Threatened Species Scientific Committee, 2016).

Assets	Emergency scenario	Why it poses a threat	Susceptibility	Why
Striped legless lizard	Bushfire	Fire can cause mortality. Burning at an intensity of greater than once every three years could be detrimental as it can reduce vegetation cover and complexity, thus reducing prey availability and potentially increasing the risk of predation. Lack of fire or other disturbance can also threaten populations through a reduction in inter-tussock space and senescence of tussock-forming species (Threatened Species Scientific Committee, 2016).	Medium	Extensive fires over large areas are thought to cause direct mortality, as well as reducing cover for the species and its prey and exposing animals to increased predation. It is likely that survivors would either move into unburnt areas or remain relatively inactive in the soil or under rocks until the vegetation recovers enough to provide shelter.

Plains-wanderer (Pedionomus torquatus)

Environment Protection and Biodiversity Conservation Act (1999) status – Critically Endangered Flora and Fauna Guarantee Act (1988) status – Critically Endangered

Description

A small, quail-like bird that, when fully grown, measures 15-19cm in length, has a wingspan of 28-36 cm, and a mass of 40-80 grams in males and 55-95 grams in females. In adult plumage, males are light brown or buff above and mostly buff to orange-buff below. They have white and blackish markings over the body, spots and streaks on the head and neck and a white unmarked belly. Females have a broad black collar, with white streaks and spots, and a broad rufous patch on the upper breast. The females are also more brightly coloured than the males, and tend to be more yellow on the bill, iris, legs and feet, especially during the breeding season.

Location in the Wimmera

Plains-wanderers have in the past been observed in central Wimmera broadacre farmland near Horsham up to the 1990s and more recently, 2000s in similar landscape areas to the region's north north-east. As well as Victoria, they occur at scattered sites in Queensland, New South Wales, and South Australia.

A map is included in Appendix 1, Figure 8.

Habitat

Plains-wanderers inhabit sparse, treeless, lowland native grasslands which usually occur on hard red-brown clay soils. Grassland structure is more important than floristic composition - the species shows a strong preference for sites with approximately 50% bare ground and most vegetation less than 5 centimetres in height and some widely spaced plants up to 30 centimetres. The Plains-wanderer occasionally occurs in other types of habitat, such as in stubble; in low cereal crops; and in low, sparse chenopod shrubland (DoE and SA DEWNR, 2016).

Assets	Emergency	Why it poses a threat	Susceptibility	Why
	scenario			
Plains wanderer	Floods, storms	An absence of grazing, or insufficient grazing, when followed by, or following, widespread rainfall and prolific grass growth, can also be deleterious to the species because it allows the density and/or height of grasses to increase which, consequently, can render native grasslands unsuitable for inhabitation by the Plains-wanderer. Under prolonged wet conditions, a substantial increase in grazing intensity is required. It has been hypothesized that unusually heavy rainfall in winter may be particularly problematic for Plains-wanderers as it can result in a proliferation of dense introduced grasses and weeds. Whereas heavy rainfall in summer may not always lead to the creation of dense grasslands that are unsuitable for Plains-wanderers as it is more likely to cause increased growth of native grasses which the birds may tolerate. Some grassland habitats may become inundated for prolonged periods following significant rainfall events with grassland structure potentially taking three years to return to a suitable condition for	Medium	Not all ecosystems are at threat of inundation.

Assets	Emergency scenario	Why it poses a threat	Susceptibility	Why
		Plains-wanderers following flooding after heavy rainfall events.		
	Droughts	The overgrazing of native grasslands by domestic livestock and rabbits, particularly during drought conditions, can result in the temporary displacement of the species from areas of preferred habitat on a local or regional scale, and an increase in the rate of mortality.	Medium	Plains-wanderers can co-exist with light to moderate grazing, however during droughts and prolonged dry periods very light grazing, or no grazing, is required to maintain suitable habitat structure. The use of strategic grazing, including fenced stock containment or exclusion areas (which are particularly important during drought conditions), may optimise Plains- wanderer habitat cover.
	Bushfire	High-intensity, large-scale fires can degrade or destroy Plains-wanderer habitat, particularly following high rainfall when grassland habitat has become dense and tall and can provide increased fuel loads for wildfires of above-average severity and extent.	Medium	Plains-wanderers can recolonise grasslands post-fire and have been observed to do so within 18 months when the disturbance event has been combined with grazing. However, it is unclear how long it may take for grasslands to regenerate to a level which allows birds to recolonise and reach pre-fire abundances. Furthermore, the time required for habitat to become suitable post-fire in the absence of grazing is unknown, although associated avifauna have been observed in suitable habitat within six months of burning events.

Australasian Bittern (Botaurus poiciloptilus)

Environment Protection and Biodiversity Conservation Act (1999) status – **Endangered** Flora and Fauna Guarantee Act (1988) status – **Critically Endangered**

Description

The Australasian Bittern is a heavy-set, partially nocturnal heron with upper parts patterned dark brown, buff and black, and underparts streaked brown and buff. The eyebrow and throat are pale, and the side of the neck is dark brown. The bill is brown, the legs greenish, and the average size is 71 cm. It resembles an owl in flight, with broad wings that beat slowly, steadily, and shallowly with dangling legs on take-off.

Location in the Wimmera

These bitterns have been historically recorded widespread in the region with diminishing numbers contracting to Victoria's south and north-east. Most recently, the waterbird was identified at Lake Hindmarsh in the northern Wimmera during Lake Hindmarsh Bird Monitoring in 2023 (Starks, 2023).

A map is included in Appendix 1, Figure 9.

Habitat

Australasian Bitterns occur mainly in freshwater wetlands in temperate southeast and southwest of Australia. Their preferred habitat is densely vegetated wetlands, especially where there is a mosaic of cover, from 0.5–3.5 metres in height. Here they forage in still, shallow water up to 0.3m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. They favour permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and/or reeds (e.g. *Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus*) or cutting grass (*Gahnia*) growing over a muddy or peaty substrate, as well as rice crops.

Other considerations

The Australasian Bittern appears capable of moving between habitats as suitability changes. It can occur in high densities in temporary or infrequently filled wetlands during exceptionally wet years and will also use ephemeral wetlands when moving from areas that are drying out. Monitoring data provides evidence of seasonal movements and that they respond to favourable conditions at key wetlands (DCCEEW, 2022).

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Australasian Bittern	Bushfire	Intense and frequent bushfires or prescribed burning in wetlands reduces the density and cover of vegetation that forms core habitat for the bittern. Wetlands have lost vegetation habitat due to summer fires when wetlands are dry.	Medium	With a drying climate and the prediction of more intense fires, habitat is likely to be under increased susceptibility.
	Drought	Reductions in peak water level and peak area of wetting in wetlands, which reduces the quality and quantity of breeding wetlands and drought refuges available.	High	An increased frequency and intensity of droughts which is likely to exacerbate the already extreme fluctuations in wetland habitat availability combined with seasonal shifts in rainfall. Seasonal wetlands will also experience reduced inundation periods, increasing the risk of wildfire at these sites.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
	Pollution event	Pollution is likely to cause a decline in many of the prey species of the Australasian Bittern, such as eels, freshwater crayfish and frogs which in turn may have a negative effect on bittern populations and their health.	Low	Pollution events are extremely rare.

Eltham Copper Butterfly (Paralucia pyrodiscus lucida)

Environment Protection and Biodiversity Conservation Act (1999) status – Endangered Flora and Fauna Guarantee Act (1988) status - Endangered

Description

The Eltham Copper Butterfly has a wingspan of 25 to 27mm. Its wing tops are dark brown with bright copper colouring. The wings' undersides are brown, with a series of irregular dark-brown 'zig zagging' lines (Threatened Species Scientific Committee, 2016).

The butterfly can only be seen during summer months when it is an adult. It lives predominantly underground during the rest of the year, coming out at night escorted by ants to feed exclusively on Sweet Bursaria leaves (Wetland Revival Trust, 2024).

Location in the Wimmera

Eltham Copper Butterflies are known from at least five Wimmera sites on Crown land at the time of writing (February 2024):

- 1. Kiata Flora Reserve
- 2. Wail Reserve Road roadside
- 3. Gerang Gerung Mallee Dam 171 Flora Reserve (also known as Cattle Dam)
- 4. Gerang Gerung North Reserve
- 5. DEECA Natural Interest Reserve Dimboola.

However extensive searches have not been undertaken and they may occur wherever dense patches of Sweet Bursaria persist.

An additional population at Salisbury Bushland Reserve is now considered extinct.

Wimmera populations are found predominantly in vegetation communities that are listed as endangered under the Victorian *Flora and Fauna Guarantee Act* 1988 (FFG). These include Plains Woodland (EVC 803 - Endangered), Low Rise Woodland (EVC 66 – Endangered) and occasionally in Shallow Sands Woodland (EVC 882_62 – Vulnerable under FFG) and Ridged Plains Mallee (EVC 96 - Endangered).

The Gerang Gerung area contains the highest number of records known in Victoria and is the most important site for this species in the world (SWIFFT, 2024).

A map is included in Appendix 1, Figure 10.

Habitat

The butterfly occurs in dry open woodlands containing its food and host plant, the shrub Sweet Bursaria (*Bursaria spinosa*). It is only found where ants from the genus *Notoncus* are present due to their close symbiotic association.

The Eltham copper breeds only on Sweet Bursaria and is usually found on juvenile plants or small, stunted plants with juvenile foliage.

Other considerations

All five Wimmera populations are at risk of extinction from a range of threats including fire and drought. It is highly likely that undiscovered butterfly populations exist in unsurveyed remnant Wimmera habitat. Finding them will increase their chance of survival (Wetland Revival Trust, 2024).

Little is known about the effects of fire on the butterfly (SWIFFT, 2024). Researchers do not know if colonies can survive fire.
Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Eltham Copper Butterfly	Bushfire	The butterfly is extremely vulnerable to the impacts of wildfire as it has a low dispersal capability and occupies discrete patches of Sweet Bursaria. It is especially vulnerable during middle to late summer, when fire would destroy adults, eggs, and plants, removing the larval food source and adult egg-laying sites (Threatened Species Scientific Committee, 2016). Frequent fires are also problematic, particularly when the butterfly is in its larval phase, due to impacts on the Sweet Bursaria food plant (SWIFFT, 2024).	High	A hotter, drier climate may increase the likelihood or frequency of fire impacting habitat, with the potential to reduce habitat extent and/or condition (DEECA, 2023). Bushfires have the potential to cause local extinctions (DEECA, 2023). Adults have a very specific flying and mating period of a few months which may align to when plants are flowering. Weather impacts on breeding success and numbers.
	Drought	Reduced rainfall and increased temperatures are likely to reduce the condition of the butterfly's host plant, Sweet Bursaria. This could impact on feeding, growth rates, reproduction and/or mortality, and persistence at some sites (DEECA, 2023).	High	The Eltham Copper Butterfly is particularly vulnerable to altered rainfall and temperature due to its sedentary nature and very specific habitat requirements (DEECA, 2023).

Wimmera Threatened Ecological Communities

Seven nationally threatened ecological communities occur in the Wimmera (Table 2). They are patchy, highly fragmented and often degraded remnants significantly reduced from their former range.

These communities typically live on fertile soils suitable for agriculture. As a result, they have been extensively cleared to make way for agriculture, leaving isolated remnants scattered through a grazing and broadacre cropping landscape.

Most remnant patches of all threatened ecological communities are on private land, with relatively small amounts also on public land and roadsides.

Table 2. Nationally threatened ecological communities in the Wimmera region.

Threatened ecological community	Environment Protection and Biodiversity Conservation Act (1999) status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregion	Endangered
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered
Mallee Bird Community of the Murray Darling Depression Bioregion	Endangered
Natural Grasslands of the Murray Valley Plains	Critically Endangered
Plains Mallee Box Woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Critically Endangered
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered

Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregion

Environment Protection and Biodiversity Conservation Act (1999) status - Endangered

Description

The 'Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions' ecological community (henceforth called Buloke Woodlands) includes several closely related woodland communities where Buloke (*Allocasuarina luehmannii*) is usually a dominant or co-dominant tree. Other trees that may be prominent include Slender Pine (*Callitris gracilis*), White/Murray Pine (*Callitris glaucophylla*), Black Box (*Eucalyptus largiflorens*), Yellow/Blue Gum (*Eucalyptus leucoxylon subsp. pruinosa*) and Grey Box (*Eucalyptus microcarpa*) (Cheal, et al., 2011).

Location in the Wimmera

Buloke Woodlands occur from south-eastern South Australia through north-western and north- central Victoria into south-central New South Wales. The community occurs across as fragmented remnant patches across the Wimmera region, excluding Gariwerd (Grampians National Park) and the upper catchment region.

A map is included in Appendix 1, Figure 11.

Other considerations

Buloke Woodlands provide critical habitat for the Red-tailed Black-Cockatoo (south-eastern). Actions to protect Buloke Woodlands are likely to benefit this species.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Buloke Woodlands of the Riverina and Murray- Darling Depression Bioregions	Bushfire	High-intensity fire can kill large trees and change the species composition of woodlands.	Medium/High	Wildfire can lead to a catastrophic change from woodland of Pine and/or Buloke to herbland where there is understorey or midstorey vegetation. Grazing by pests and stock following fire can make the outcome worse. Some woodlands lack understorey so have lower susceptibility to fire.
	Drought	Impacts regeneration from seed.	High	The National Recovery Plan suggests that Buloke Woodlands (Sands) are on suitable soil moisture in autumn to regenerate from seed. Many of the woodlands in the Wimmera require either high rainfall or floods for this to be realised.

Grassy Eucalypt Woodland of the Victorian Volcanic Plain

Environment Protection and Biodiversity Conservation Act (1999) status - Critically Endangered

Description

The 'Grassy Eucalypt Woodland of the Victorian Volcanic Plain' ecological community (henceforth called Grassy Eucalypt Woodlands) is an open eucalypt woodland with a tree canopy typically dominated by River Red Gum (*Eucalyptus camaldulensis*). Other eucalypt species can also be prominent including Swamp Gum (*Eucalyptus ovata*) or Manna Gum (*Eucalyptus viminalis*), Grey Box (*Eucalyptus microcarpa*) or Yellow Box (*Eucalyptus melliodora*). The understorey comprises a sparse shrub layer and a ground layer (DSEWPC, 2011).

Location in the Wimmera

Grassy Eucalypt Woodlands are located south of the Great Dividing Range, specifically limited to the southwestern Victorian basalt plain. Small areas can be found in the south-eastern corner of the Wimmera Management Unit in the Upper Catchment Local Area, Ararat Rural City Council area.

Across its range, this community is reduced to mostly small and highly fragmented remnant patches on private land with some patches on public land including roadsides, rail reserves and cemeteries (DSEWPC, 2011).

Asset	Emergency	Why it poses a threat	Suscepti	Why
	Scenario		Dility	
Grassy eucalypt woodlands of the Victorian volcanic plain	Bushfire	Fire is necessary for maintaining grasslands and grassy woodlands. Without fire or another disturbance dense grass can smother wildflowers, leading to habitat loss for native animals. However, the severity and frequency of fire can markedly affect the appearance, species composition and functionality of this woodland. The abundance of grass and herb species may alter depending on how sensitive species are to the burning regime. Burning that is poorly timed (whether infrequent, too frequent or in the wrong season) can result in the eventual loss of fire- sensitive species (Threatened Species Scientific Committee, 2000)	Medium	Fire is necessary for maintenance to reduce competition and enable groundcover species to generate. Severe and frequent fire pose a risk to fire sensitive species and overall species composition.
	Drought	The suite of typical spring- flowering herbs may be largely absent or less conspicuous during very dry seasons (Threatened Species Scientific Committee, 2009).	Medium	Climate change and drought directly threaten species that cannot adapt, and exacerbates existing threats, including loss of habitat, altered hydrological regimes, altered fire regimes and invasive species. This can influence the species composition and possibly influence the future distribution and extent of the ecological community (Threatened Species Scientific Committee, 2009).

A map is included in Appendix 1, Figure 12.

Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

Environment Protection and Biodiversity Conservation Act (1999) status - Endangered

Description

The 'Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia' ecological community (henceforth called Grey Box Grassy Woodlands) is an open woodland with a tree canopy dominated or co-dominated by grey box over an open to sparse ground layer of grasses and herbs (DSEWPC, 2012).

Location in the Wimmera

Grey Box Grassy Woodlands mostly occur from central NSW through northern Victoria into eastern South Australia. The EPBC Act listing advice for Grey Box Grassy Woodlands identifies Victorian Ecological Vegetation Classes (EVC) that correlate with the ecological community. These EVCs are in the south-east of the Wimmera region in the Upper Catchment Local Area, scattered east of the Barringgi Gadjin (Wimmera River) in the north, adjacent to the Barringgi Gadjin (Wimmera River) near Lubeck and Longerenong and near Lower Norton.

Grey Box Grassy Woodlands have suffered extensive clearing for agricultural and pastoral purposes. Most remnants are on private land, with a small proportion remaining on public land and road casements (DSEWPC, 2012; DEWHA, 2010).

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South- eastern Australia	Bushfire	Fire is necessary for the maintenance of some grasslands and grassy woodlands. Without fire or another disturbance dense grass can smother wildflowers, and result in a loss of habitat for some native animals.	Low/Medium	Considered low as these ecosystems need fire. However the impact of repeated high-intensity fires boosts susceptibility to medium. Too frequent fire could threaten recruitment in slow to moderate growing eucalypts such as Yellow Box, Grey Box and White Box which may not reach reproductive maturity before the next fire. However, species can recover vegetatively so this may not pose a substantial threat.
	Flood	Riverine flooding can impact these ecosystems through the spread of weeds.	Medium	Mapping indicates some remnants of this community occurs in floodplain areas in the Wimmera Upper Catchment region.
	Drought	This community exhibits some resilience to drought (DSEWPC, 2012). However, lack of long-term rainfall is likely to contribute to reductions in extent, changed species composition, loss of species diversity due to fragmentation and isolation of remnants and changes in understorey structure.	Low/medium	Impacts are based on climate-change predictions.

A map is included in Appendix 1, Figure 13.

Mallee Bird Community of the Murray Darling Depression Bioregion

Environment Protection and Biodiversity Conservation Act (1999) status - Endangered

Description

The 'Mallee Bird Community of the Murray Darling Depression Bioregion' (henceforth called Mallee Bird Community) comprises an assemblage of 21 bird species considered dependent on the Mallee vegetation that characterises the Murray Darling Depression bioregion (DAWE, 2021). The species are listed in Table 3 along with their conservation status.

Six species are listed as nationally threatened under the *Environment Protection and Biodiversity Conservation Act 1999*, and 10 are listed under the Victorian *Flora and Fauna Guarantee Act 1989* (FFG Act). At the time of writing, seventeen species are part of the Victorian Mallee Bird Community listed as threatened under the Victorian FFG Act (DAWE, 2021).

Location in the Wimmera

The Mallee Bird Community's distribution is limited to the Murray Mallee of north-western Victoria and southeastern South Australia.

The community's indicative distribution and suitable habitat in the Wimmera includes:

- The Little Desert National Park.
- Remnant habitat south of the Little Desert National Park.
- The southern fringes of the Big Desert National Park along Wimmera CMA's northern boundary.
- Remnant habitat surrounding Gurru (Lake Hindmarsh) and Ngalpakatia/Ngelpagutya (Lake Albacutya).

A map is included in Appendix 1, Figure 14.

Other considerations

Mallee ecosystems face severe summer water deficits, nutritional poverty, and fire regimes that govern their responses and traits (DAWE, 2021).

Two groupings of species (specialists and dependents) are broadly recognised within the assemblage, based on species' reliance on mallee habitats.

- 1. **Mallee specialists** are found almost exclusively in Mallee habitats. The loss of these habitats can potentially lead to extinction, particularly at a local or regional scale. These species are uncommon, with low reporting rates, and difficult to detect.
- Mallee dependents are dependent on Mallee where it is present but have a wider range extending into non-Mallee woodland and shrubland habitats that intergrade with Mallee vegetation. The loss of all suitable Mallee habitats for these species may not lead to extinction but could result in substantial declines in abundance and loss of ecological diversity.

Common name	Species name	Environment Protection and Biodiversity Conservation Act (1999) status	Flora and Fauna Guarantee Act 1988 status	Distribution in the Wimmera (Based on Victorian Biodiversity Atlas and Atlas of Living Australia records)
Mallee spec	ialists			
Black- eared Miner	Manorina melanotis	Endangered	Critically Endangered	Old records - Lake Albacutya, 1979 and 1986.
Chestnut Quail- thrush	Cinclosoma castanotum			Old records - Lake Albacutya, 1992 and 1966. Little Desert National Park, 1980.
Mallee Emu-wren	Stipiturus mallee	Endangered	Endangered	Old records - Lake Albacutya and far north- west Wimmera in 1970s and 1980s.
Malleefowl	Leipoa ocellata	Vulnerable	Vulnerable	Currently present in Little Desert National Park and surrounding habitat (see Malleefowl section in this Plan)

Table 3. Component bird	species of the Mallee	e Bird Communit	ty and their conservation st	atus.
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Common name	Species name	Environment Protection and Biodiversity Conservation Act (1999) status	Flora and Fauna Guarantee Act 1988 status	Distribution in the Wimmera (Based on Victorian Biodiversity Atlas and Atlas of Living Australia records)
Red-lored Whistler	Pachycephala rufogularis	Vulnerable	Vulnerable	No recent Wimmera records. Present in neighbouring Big Desert.
Scarlet- chested Parrot	Neophema splendida		Endangered	No Wimmera records.
Striated Grasswren	Amytornis striatus			No Wimmera records. Present in neighbouring Big Desert.
Western Whipbird (Mallee)	Psophodes nigrogularis leucogaster	Vulnerable	Critically Endangered	No Wimmera records.
Mallee depe	ndents			
Crested Bellbird	Oreoica gutturalis		Endangered	Multiple Little Desert National Park and north- west Wimmera records, 1970s and 1980s.
Grey- fronted Honeyeater	Ptilotula plumula		Endangered	No Wimmera records.
Jacky Winter	Microeca fascinans			Multiple records across the Wimmera.
Purple- gaped Honeyeater	Lichenostomus cratitius		Vulnerable	Multiple Little Desert National Park and north- west Wimmera and surrounds records, 1970s, 1980s, 2000s and 2010s.
Regent Parrot	Polytelis anthopeplus	Vulnerable	Vulnerable	Multiple Lake Albacutya and northern Wimmera River corridor records, 1970s, 1980s, 2000s and 2010s.
Shy Heathwren	Calamanthus cautus			Multiple records across the Wimmera.
Southern Scrub-robin	Drymodes brunneopygia			Multiple records across the Wimmera.
Splendid Fairy-wren	Malurus splendens			Multiple records, especially Lakes Hindmarsh and Albacutya. Also Little Desert National Park.
Spotted Pardalote	Pardalotus punctatus			Multiple records across the Wimmera.
White- eared Honeyeater	Nesoptilotis leucotis			Multiple records across the Wimmera.
White- fronted Honeyeater	Purnella albifrons			Multiple records across the Wimmera.
Yellow- plumed Honeyeater	Ptilotula ornata			Multiple records across the Wimmera.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Mallee Bird Community of the Murray Darling Depression Bioregion	Bushfire	Extreme fire seasons can have a major impact on some bird populations and habitat, especially old growth habitat, if burnt. Many birds have no adaptations to survive fire other than to flee to unburnt areas. Most fires initiate declines in bird populations due to exposure to heat or smoke during the event, or reduced availability of food and shelter in the early post-fire years. Mallee vegetation is adapted to fire, with many plant species able to recover by resprouting or germinating from a seed bank (DAWE, 2021).	High	Fire events are likely to increase under climate change scenarios. Mallee vegetation is fire-prone and frequently located in large reserves such as the Little Desert National Park where large areas can burn from wildfire.
	Flood	Flood is unlikely to pose a significant threat.	Low	Mallee habitat and associated bird populations are unlikely to occur in floodplain areas.
	Drought	Drought conditions affect the reproductive performance and survival of birds, and in extreme situations can suppress breeding of species like Malleefowl. Drought conditions impact on the growth and survival of many plant species and consequently food availability for birds such as invertebrates and nectar. This is exacerbated following a fire event (DAWE, 2021).	High	Drought and dry periods are expected to increase with climate change, compounding existing impacts from habitat loss, fragmentation, edge effects, invasive species and bushfires. Impacts on Mallee habitats, such as potentially more severe and frequent fires and constrained capacity for habitats to regenerate are likely to have negative impacts on the Mallee Bird Community (DAWE, 2021).

Natural Grasslands of the Murray Valley Plains

Environment Protection and Biodiversity Conservation Act (1999) status - Critically Endangered

Description

The 'Natural Grasslands of the Murray Valley Plains' ecological community (henceforth called Natural Grasslands) is a type of natural temperate grassland with semi-arid characteristics, due to its restricted-rain environment. The structure is an open grassland to forbland in which trees and tall shrubs are sparse to absent. The vegetation is dominated by a ground layer characterised by a range of perennial grasses, forbs and small shrubs.

Location in the Wimmera

Natural Grasslands occur across the southern parts of the Riverina Bioregion in NSW and Victoria, and plains across the northern part of the Wimmera. They predominately occur on flat, alluvial lowland plains with heavy-textured grey, brown and red clays.

Most patches occur as small and highly fragmented remnants on private land or roadsides where they are at risk of clearing or disturbance.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Natural Grasslands of the Murray Valley Plains	Fire	Fire is necessary for the maintenance of some grasslands. Without fire or another disturbance dense grass can smother wildflowers, and result in a loss of habitat for some native animals. Soil disturbance such as ploughing for fire prevention and suppression poses a threat to this community.	Low	The community responds well to fire.
	Drought	Long-term reduced rainfall in winter and spring from climate change may be a selection driver favouring more semi-arid species causing a shift in species composition and structure (DSEWPC, 2012).	Low - Medium	Changes in species composition and structure are expected from long-term climate change rather than single drought events.

A map is included in Appendix 1, Figure 15.

Plains Mallee Box Woodland of the Murray Darling depression and Riverina bioregions

Environment Protection and Biodiversity Conservation Act (1999) status - Critically Endangered

Description

'Plains Mallee Box Woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions' (henceforth called Plains Mallee Box Woodland) is open Mallee Eucalypt woodland. The canopy is typically dominated by 'Mallee Box' Eucalyptus species. Understorey tussock grasses are prominent in wet years, low chenopod shrubs occur in variable densities, and taller shrubs are generally sparse.

Location in the Wimmera

Plains Mallee Box Woodland primarily occurs on the northern Wimmera plains, extending east from the South Australian border between the Little Desert and the Big Desert. It can also occur within the Little Desert and Natimuk areas. More broadly, the ecological community occurs across south-west New South Wales, north-west Victoria, and south-east South Australia.

Plains Mallee Box Woodland is associated with relatively medium-heavy textured soils on near-level sandplains. It occasionally occurs on gently sloping terrain surrounding and within landscape depressions typically with clay-loam soils, or occasionally sandy clay-loams or light clays.

It was likely to previously be widespread across the Wimmera on fertile soils ideal for cropping. It is now reduced to scattered and isolated remnants. It is poorly represented in the public reserve system, with most remnants occurring on roadsides or as small, dispersed patches on farmland where they are at risk of clearing or disturbance. A map is included in Appendix 1, Figure 16.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Plains Mallee Box Woodland of the Murray Darling depression and Riverina bioregions	Bushfire	The community can become highly flammable in summers after very wet seasons promoting grass growth. This can also lead to the loss of the organic litter layer and may adversely affect fauna populations. Natural fire regimes may be altered such that some areas such as roadsides burn frequently due to increased ignitions from human sources. Patches are small so are more likely to burn uniformly rather than in a mosaic, or narrow so edge effects following burns are prevalent. Introduction of fire exposes regenerating seedlings to predation by rabbits and hares and feral predators can impact on fauna.	Low	Plains Mallee Box Woodlands typically have 'discontinuous and somewhat fire- retardant fuels and burn infrequently' due to the abundance of chenopod shrubs in the understorey.
	Drought	There is a high probability that climate change will constrain the regenerative capacity of remnant ecological communities.	High	The capacity of species to adapt by genetic selection or migration are less likely where ecological communities are fragmented. Species most at risk include those with restricted/specialised habitat requirements, poor dispersal abilities and small populations (DAWE, 2021).

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Environment Protection and Biodiversity Conservation Act (1999) status - Critically Endangered

Description

The 'Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains' ecological community (henceforth referred to as Seasonal Herbaceous Wetlands) are temporary freshwater wetlands that are inundated seasonally, typically filling after winter-spring rain, and then drying out. The vegetation is generally treeless and dominated by an herbaceous ground layer, often with a considerable graminoid component and with forbs present.

Location in the Wimmera

The Seasonal Herbaceous Wetlands ecological community occurs in Victoria, south-eastern South Australia and southern New South Wales. It specifically occurs within Interim Biogeographic Regionalisation of Australia bioregions associated with lowland plains, notably the Victorian Volcanic Plain, Southeast Coastal Plain, Naracoorte Coastal Plain and Riverina bioregions, and the Wimmera subregion of the Murray Darling Depression bioregion. They typically occur across the southern portion of the Wimmera Management Unit.

Seasonal Herbaceous Wetlands occur primarily on private land in the Wimmera, with the generally flat landscape and fertile soils being highly conducive to agricultural production including cropping and grazing. Seasonal Herbaceous Wetlands occur on fertile soils on poorly defined seasonal drainage lines and depressions, or terrain characterised by gilgais.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Seasonal herbaceous wetlands of	Bushfire	Not listed as a threat in the conservation advice (DSEWPC, 2012).	Low	Not listed as a threat in the conservation advice.
temperate lowland plains.	Drought	Increased drought through climate change is a threat to the Seasonal Herbaceous Wetlands ecological community. Declining rainfall and shifts away from regular rainfall patterns can impact ecosystem composition.	High	There are indications that changes in seasonal rainfall patterns are having an impact on the Seasonal Herbaceous Wetlands ecological community through more frequent drought.

A map is included in Appendix 1, Figure 17.

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Environment Protection and Biodiversity Conservation Act (1999) status - Critically Endangered

Description

The 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland' ecological community (henceforth called Box-Gum Grassy Woodlands) is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. The ecological community can occur either as woodland or derived native grassland, meaning a grassy woodland where the tree overstorey has been removed (DECCW, 2010).

Location in the Wimmera

Box–Gum Grassy Woodlands were previously widespread along the western slopes and tablelands of the Great Dividing Range from southern Queensland through New South Wales and the Australian Capital Territory to Victoria. Based on mapping of equivalent EVCs, remnants of this community can be found east of Gariwerd (Grampians National Park) in the Upper Catchment of the Wimmera Management Unit, for example around Lake Fyans and Illawarra Nature Conservation Reserve where previous land clearing has been less widespread.

Box-Gum Grassy Woodlands predominantly occur on privately owned land where it exists as isolated patches within an agricultural landscape of cropping, improved pastures, and/or disturbed vegetation communities.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Bushfire	Many ground-layer plants in the ecological community require spaces between the grassy tussocks to germinate and grow successfully. These gaps may be created by various disturbance sources including fire. Many plants recover quickly by re- sprouting. Cool burns can facilitate recruitment of some of the constituent plant species and increase ground layer diversity (DCCEEW, 2023).	Medium	Considered medium as the impact of repeated high intensity fires can impact on this ecological community. Too frequent fire could threaten recruitment in slow to moderate growing eucalypts such as Yellow Box, Grey Box and White Box which may not reach reproductive maturity before the next fire. However, species can recover vegetatively so this may not pose a substantial threat.
	Flood	Riverine flooding can impact these ecosystems through the spread of weeds.	Medium	Mapping indicates some remnants of this community occurs in floodplain areas in the Wimmera Upper Catchment region.
	Drought	Lack of long-term rainfall, is likely to contribute to reductions in extent, changed species composition, loss of species diversity due to fragmentation and isolation of remnants and changes in understorey structure	Low/medium	Impacts are based on climate change predictions.

A map is included in Appendix 1, Figure 18.

Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar Wetland

The Wimmera's sole Ramsar site is the Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar site.

Description

Ngalpakatia/Ngelpagutya (Lake Albacutya) was listed as a wetland of international importance under the Ramsar Convention in 1982. Ngalpakatia/Ngelpagutya (Lake Albacutya) is a large, 5,700-hectare seasonal intermittent freshwater lake and is one of a series of terminal lakes on the Barringgi Gadjin (Wimmera River), forming the largest land-locked riverine drainage system in Victoria.

Location in the Wimmera

The Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar Site is in the Wimmera's mid-north. Ngalpakatia/Ngelpagutya (Lake Albacutya) is filled from extremely large floods in the Barringgi Gadjin (Wimmera River) and the majority of its catchment is within the Wimmera Management Unit.

Other considerations

The lake is characterised by alternating wet and dry phases and can support stable, relatively unchanged communities (climax communities) in both states.

When dry, the lake supports grasslands and terrestrial fauna. When the lake holds water, an aquatic community develops which supports major breeding waterbird populations. There is an extensive eucalypt woodland surrounding the lake, dominated by river red gum (*Eucalyptus camaldulensis*) which is maintained by the lake's hydrological regime and provides habitat for waterbirds and the nationally vulnerable regent parrot (*Polytelis anthopeplus*).

The lake is highly valued for its social, economic and cultural history. Ngalpakatia or Ngelpagutya is recognised as a significant place in Barengi Gadjin Land Council's 'Growing What is Good' Country Plan. At Ngalpakatia/Ngelpagutya shell middens, oven mounds, scarred trees, artefacts and stories highlight the Wotjobaluk Peoples' deep and continuous connections (Barengi Gadjin Land Council, 2017).

Asset	Emergency	Why it poses a	Susceptibility	Why
	scenario	threat		
Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar Wetland	Bushfire	Bbushfire, and particularly repeated bushfires in short timeframes and following drought, have the potential to impact redgum woodland communities.	Medium	There have been situations in the past where fires following drought have impacted on woodland communities including redgum regeneration. These woodlands have taken time to recover. Repeated fire could impact the ability for the woodland to regenerate.
	Drought	10 years drought The ability for vegetation to regenerate is diminished. Lack of water for fauna. Could impact on ecological character.	Medium	Ngalpakatia/Ngelpagutya (Lake Albacutya) has experienced long-erm drought before and while some values declined it still maintained its ecological character.

When full, the lake attracts visitors to enjoy water skiing, fishing, yabbying, bird watching and camping.

6. BIODIVERSITY ASSET - PREPAREDNESS ACTIONS

This section outlines preparedness actions that could be undertaken for each biodiversity asset to reduce the threat of relevant emergency scenarios such as bushfires, drought, floods, diseases, and pests. Tables for each biodiversity asset include:

- Suggested preparedness actions.
- Where the action should be undertaken.
- The organisation or group that could undertake or is already undertaking the action.

Fire preparedness – biodiversity values assessments

DEECA and CFA conduct assessments to determine biodiversity values and measures to prevent impacts and enhance biodiversity outcomes prior to conducting fuel management activities.

DEECA's strategic bushfire management planning takes place within a legislative and policy context, including:

- The *Emergency Management Act 2013*, which mandates emergency management plans (state, regional, municipal) that cover mitigation, response and recovery from emergencies and define agency roles and responsibilities.
- The Conservation Forests and Lands Act 1987, which requires DEECA, through the Code of Practice for Bushfire Management on Public Land (2012), to develop a risk-based approach.
- Safer Together: A new approach to reducing the risk of bushfire in Victoria (2015), measures the effectiveness of actions reducing bushfire risk.

DEECA's regional bushfire management strategies (2020) inform the development of operational plans, primarily the Joint Fuel Management Program, which is a three-year rolling program conducted by Forest Fire Management Victoria and Country Fire Authority on public and private land. The program aims to reduce bushfire risk and to maintain the health of the environment and includes activities such as planned burning, slashing, establishment and maintenance of fuel breaks, and maintenance of fire infrastructure.

DEECA's Bushfire Risk, Engagement and Predictive Services team provided maps of relative bushfire risk in the Wimmera for this Plan (Appendix 1). These maps show the relative intensity and likelihood of bushfire in the Wimmera landscape, based on a worst-case scenario of maximum fuel loads and worst-case bushfire weather. Appendix 3 explains the mapping process, assumptions, and limitations. These maps form one of the many resources available in the region to guide strategic and operational planning.

Operational planning for the Joint Fuel Management Program requires DEECA's Natural Environmental Programs team to conduct Biodiversity Values Assessments or values checks to identify where planned works intersect with known values and to provide advice on risk mitigation measures. DEECA considers several pieces of legislation including the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), Victorian *Flora and Fauna Guarantee Act 1988* (FFG) and the Victorian *Planning and Environment Act 1987*.

Values checking is the process of identifying the most significant values based on existing legislative requirements. Consideration is given to known recorded biodiversity values and local or iconic species. Values meeting at least one of the criteria described below are considered for a risk assessment:

- All EPBC (national) and FFG listed (state) values. This includes all threatened species and communities that are Critically Endangered, Endangered and Vulnerable.
- All known records of breeding, roosting, or feeding sites.
- Fire sensitive Ecological Vegetation Classes (EVCs).
- Other taxa identified as at high fire risk based on their biology (from data sources such as Vital Attributes) and/or iconic or local species. The Flora Vital Attributes database curated by the Arthur Rylah Institute for Environmental Research identifies life history traits of plants that can be used to determine their susceptibility to fire.

All information is reviewed, and a risk-based approach is applied to avoid or mitigate potential impacts. Mitigation measures are text based 'prescriptions' developed for biodiversity values that DEECA consider in the context of planned burning. These mitigation measures are aimed at providing advice and information to protect or enhance recorded biodiversity values found within burn areas, by managing threats associated with planned burning.

Mitigations are not required for all species, only species that are sensitive to:

- · Earthworks, machinery, or soil disturbance.
- Direct impact from fire.
- Excessive frequency or intensity.
- Inappropriate season and timing of fire.
- Insufficient fire frequency.
- · Loss of structure or vegetation cover.

Threats may be direct, such as being scorched, crushed or disturbed, or indirect such as soil mobilisation causing sedimentation in nearby waterways and the potential for aquatic species deaths (DEECA, 2024).

Country Fire Authority staff in the Wimmera indicated that they follow a similar procedure to check for biodiversity values and implement mitigation measures when carrying out fire preparedness activities.

Preparedness actions requiring investment

The development of this Plan highlighted several priority areas requiring further investment to effectively protect biodiversity assets from the impacts of natural disasters and emergency events.

Several stakeholders contributing to Plan development expressed concern that many threatened species records in the Victorian Biodiversity Atlas are 20-50 years old or more and have not been resurveyed. Stakeholders also cited anecdotal evidence of community members reporting species sightings in new locations. Investment to undertake surveys to locate threatened species and ecological communities is needed to ensure that organisations undertaking emergency preparedness, response and recovery actions have the best possible information to guide management effort.

Stakeholders also highlighted the need for landscape-scale actions that build resilience, enabling multiple biodiversity assets to survive and recover from natural disasters and emergency events. Examples of landscape-scale actions include:

- Supporting habitat connectivity and other programs that enhance landscape resilience, especially in productive agricultural landscapes.
- Ensuring that fire preparedness actions are considered in habitat connectivity programs, for example preparing appropriate fire preparedness plans for protected areas of remnant native habitat or revegetated areas.
- Strategically protecting long un-burnt vegetation in the landscape.
- Identifying drought refuge areas for targeting water allocations to key wetlands, lakes, rivers and streams.

Common actions for biodiversity assets that require investment include:

- Surveys in suitable habitat to:
 - Confirm the persistence and characteristics of threatened species populations at previously recorded locations, especially where records are old.
 - o Identify new locations requiring protection.
- Surveys to improve mapping, known locations and understanding of the condition of threatened ecological communities.
- Regularly updating information in web-based information and mapping platforms used for emergency management. This includes the Victorian Biodiversity Atlas, Naturekit and eMap.
- Ensuring species location data and ecological information is available and considered in firemanagement activities.

South-eastern Red-tailed Black Cockatoo

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
SERtBC	Bushfire	Low intensity prescribed burns be undertaken within the West Wimmera Environmental Significance Overlay for RtBC habitat, or where Desert Stringybarks and Bulokes are present to reduce intensity of subsequent wildfires. Where possible avoid years with mature seed set. Follow the Fuel Management Procedures for the SERtBC in southwestern Victoria (DELWP, 2010). Follow CFA's 6 mitigations when burning on private land: 1. Dense stands of Bulokes (>10 individuals per 10m of roadside) are to be excluded from the burn, with no fire entering these areas via either a slash line or wetline. 2. Minimise canopy scorch when burning under Bulokes, Brown Stringybark and Desert Stringybark. 3. Do not burn when Bulokes, Brown Stringybark are	West Wimmera Stringybark forests. Buloke Woodland and Grassy Woodlands Where large dead or living hollow <i>Eucalyptus</i> trees are present Roadsides or private land where dense stands or isolated mature Bulokes are present. Within West Wimmera Shire's Environmental Significance Overlay for SERtBC habitat Buloke restoration sites	DEECA, CFA, BGLC, private landholders.	Yes

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
		flowering and seeding.			
		4. Isolated Bulokes with a diameter at breast height of >10cm to be protected via rackhoeing or wetting down.			
		5. Mature Red Gums with hollows to be protected by rackhoeing and/or wetting down as appropriate.			
		6. If SERtBC are observed nesting in the site, establish a 25m exclusion zone each side (50m total) of the nesting tree.			
		Construct fire breaks (either mechanically or via planned burning) around nest trees and feeding habitat.	Known nest tree locations in the west Wimmera.	DEECA, CFA, BGLC, private landholders.	Some
		Reduce the risk of mature Buloke stand loss where there are known food trees.	Known locations in the west Wimmera	DEECA, CFA, BGLC, private landholders.	Some
		Conduct a cool burn of a small patch of Buloke woodland to trial and monitor the response of understorey vegetation to cool fire and test if this type of burn has minimal impacts on overstorey.	Bank Australia's conservation reserve site at Minimay	CFA, BGLC, GA, TfN, Bank Australia	Yes
		Building resilience/improving habitat.	Known habitat locations.	Recovery team and partners.	No

Malleefowl

The Malleefowl's Wimmera habitat includes the Little Desert National Park. The park includes two Reference Areas referred to as the Little Desert (West) Reference Area (2,240 hectares) and Little Desert (East) Reference Area (3,200 hectares) (Appendix 1, Figure 2). The Reference Areas are proclaimed under the Victorian *Reference Areas Act 1978* and managed in accordance with Ministerial Directives.

The Little Desert's Reference Areas comprise relatively undisturbed land types and associated vegetation. Management aims are "to protect viable samples of one or more land types that are relatively undisturbed for comparative study with similar land types elsewhere, by keeping all human interference to the essential minimum and ensuring as far as practicable that the only long-term change results from natural processes."

Use of machinery and fire retardant for fire suppression should not be carried out within the Reference Areas other than in extreme circumstances (see map in Appendix 1, Figure 2) (National Parks Service, 1996).

Asset	Emergency scenario	Actions	Where	Who	ls action current
					underway?
Malleefowl	Bushfire	Undertake prescribed burns within Malleefowl habitat to reduce intensity of subsequent wildfires.	Little Desert National Park, known public and private land locations.	DEECA, CFA, BGLC, private landholders, TfN.	Yes, on public land.
			NOTE: Cool patch burning is viable for private land under covenant, with Trust for Nature (TfN) approval and inclusion in a management plan. TFN would not be lead fire agency but could help facilitate.		
		Construct fire breaks (either mechanically or via planned burning) along the boundary of known Malleefowl nesting sites to reduce the likelihood of wildfires moving into Malleefowl habitat. Building	At strategic locations	DEECA/PV TFN, CFA,	Yes but more
		resilience/improving habitat	on private land	WCMA, GA and private landholders	needs to be done.

Swift Parrot

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Swift Parrot	Bushfire	Controlled burns (patchy burns) in consultation with Swift Parrot experts.	Public and private land.	DEECA, CFA, BGLC, private landholders. Trust for Nature can support and facilitate fire on private land for asset management and threatened species purposes.	Νο
		Building resilience/improving habitat.	Known habitat	Best placed land manager or where private land partnership with land manager and relevant organisation eg Trust for Nature, Wimmera CMA.	No
	Psittacine beak and feather disease (PFBD)	Psittacine beak and feather disease.	Test any dead Swift Parrots for PBFD.	Where they occur.	Various

Threatened Orchid Species

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
All threatened Wimmera orchid species	Bushfire	Restrict controlled burning at existing sites to when orchid species are dormant. For most species this will be November to May. Do not burn when individuals are flowering.	At known locations	DEECA CFA Land Managers Private Land Holders	Partial
		Ensure all known sites are mapped on the VBA.	Known locations	DEECA	Partial
		Construct fire breaks (either mechanically or via planned burning) to protect populations from wildfires when flowering.	At known locations	DEECA CFA Land Managers Private Land Holders	Partial
		Restrict mechanical disturbance at sites.	At known locations	DEECA/CFA	
All threatened Wimmera orchid species	Bushfire	Develop a greater understanding of the impact of fire through monitoring and research.	At known locations	RBGV	No
All threatened Wimmera orchid species	Flood Drought Bushfire	Survey extant of existing populations and conduct demographic monitoring. Detailed mapping of populations to establish the number of surviving plants, allow comparison with past population estimates, and maximise the known plants available for seed collections.	Existing populations and likely suitable habitat	RBGV	No Except for <i>Thelymitra</i> <i>mackibbinii</i>
		Undertake genetic diversity study to inform seed collections and restoration. This will inform additional seed collections and ensure that genetic diversity is captured for ex situ collections and future translocation.	Existing populations	RBGV	No Except for <i>Thelymitra</i> <i>mackibbinii</i>
		Collect diversity of seed based on genetic study for restoration. For each species, seeds or spores	Existing populations	RBGV	No

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
		will be collected during the appropriate season, viability tested, and stored in a seed/sporebank at RBGV.			Except for Caladenia audasii, Thelymitra mackibbinii
		Ensure symbiotic fungi collected and stored ex- situ for restoration. Due to the obligate symbiotic relationship with mycorrhiza this will allow for symbiotic propagation.	Existing populations	RBGV	Yes, for all <i>Caladenia</i> (Reiter, et al., 2020) and <i>Thelymitra</i> (Reiter, et al., 2018) species. No for <i>Dipodium</i> <i>campanulatum</i> , <i>Pterostylis</i> <i>cheraphila</i> , <i>Pterostylis</i> <i>despectens</i> .

Forked Spyridium

Asset	Emergency scenario	Actions	Where	Who	Is action current underway?
Forked Spyridium	Bushfire	Ensure fire intensity is sufficient to promote seed germination if planned burns are carried out.	Known locations	DEECA, CFA	No
		Ensure all known sites are mapped on the VBA	Known locations	DEECA	Partial
		Restrict mechanical disturbance at sites	At known locations	DEECA/CFA	No
		Develop a greater understanding of the impact of wildfire through monitoring and research	At known locations	RBGV	No
	Flood/Drought/Bushfire	Survey extant of existing populations and conduct demographic monitoring. Detailed mapping of populations to establish the number of surviving plants, allow comparison with past population estimates, and maximise the known plants available for seed collections.	Existing populations and likely suitable habitat	RBGV	Spyridium furculentum detailed mapping and survey underway by RBGV, funded through DEECA Nature Fund.
		Undertake genetic diversity study to inform seed collections and restoration. This will inform additional seed collections and ensure that genetic diversity is captured for ex situ collections and future translocation.	Existing populations	RBGV	Genetic study underway by RBGV on <i>Spyridium</i> <i>furculentum.</i>

Asset	Emergency scenario	Actions	Where	Who	Is action current underway?
		Collect diversity of seed based on genetic study for restoration. For each species, seeds or spores will be collected during the appropriate season, viability tested, and stored in a seed/sporebank at RBGV.	Existing populations	RBGV	Detailed collections underway for <i>Spyridium</i> <i>furculentum</i> by RBGV funded by Nature Fund (DEECA)

Avenue Cassinia

Asset	Emergency scenario	Actions	Where	Who	Is action current underway?
Avenue Cassinia	Bushfire	Restrict controlled burning at existing sites.	At known sites	DEECA, CFA	Partial
		Ensure all known sites are mapped on the VBA.	Known locations	DEECA	Partial
		Restrict mechanical disturbance at sites.	At known locations	DEECA, CFA	Partial
		Identify appropriate intensity and interval of fire to promote seed germination or vegetative regeneration.	At known locations	DEECA, CFA, research organisations, Wimmera CMA, RBGV, other stakeholders.	No
	Bushfire Drought	Survey existing populations and conduct demographic monitoring.	Existing populations and likely suitable habitat	DEECA, CFA, research organisations, Wimmera CMA, RBGV, other stakeholders.	No
		Undertake a genetic diversity study to inform seed collections and restoration, ensuring that genetic diversity is captured for ex situ collections and future translocations.	Existing populations	DEECA, CFA, research organisations, Wimmera CMA, RBGV, other stakeholders.	No
		Collect a diverse range of seed based on the genetic study for restoration. Collect seeds during the appropriate season, test for viability, and store in a seedbank at Royal Botanic Gardens Victoria.	Existing populations	RBGV	No
	Drought	Build resilience and improve habitat by controlling weeds and pest herbivores.	At known locations	Land managers	No

Gariwerd and Surrounds – Threatened Species

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Spiral Sun- orchid (<i>Thelymitra</i> <i>matthewsii</i>), Candy Spider- orchid (<i>Caladenia</i> <i>versicolor</i>) Metallic Sun- orchid (<i>Thelymitra</i> <i>epipactoides</i>)	See table for	Threatened Orchid Species abov	e		
Grampians Pincushion Lily (Borya mirabillis)	Bushfire	Assess physiological performance of individual plants each year by comparing the proportions of new or resurrected shoots with dead material in autumn, spring and early summer. Transects divided into 20 x 1 cm intervals permanently are placed through each ramet in the population, and the number of 1 cm intervals with a living or dead shoot are recorded and ratios calculated. Conduct site surveys each year to monitor disturbance and habitat response using quantitative methods to measure erosion and post- fire recovery of associated vegetation and compare these against population performance.	Survey sites	DEECA, PV, RBGV.	
		Propagation		Royal Botanic Gardens Victoria (RBGV)	Partial, ex-situ collection exists but would need to be substantively larger for recovery efforts.
	Storm (erosion)	Mulching of soil, caging/fencing, control of pest animals.	At known sites	PV, DEECA	Partially/Cages not currently tended
		Propagation		RBGV	Partial, ex-situ collection exists but would need to be substantively larger for recovery efforts.

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
	Drought (soil moisture)	Matting or mulching to preserve soil moisture.	At known sites	PV, DEECA	No
Heath mouse	Bushfire	Fire regimes established support rather than degrade the habitat necessary to the heath mouse.	At known habitat where possible	DEECA, PV, CFA	
		Fire management authorities and land management agencies establish suitable maps and install fire markers to avoid damage to threatened species and their habitat during fire preparedness and suppression activities.	At known habitat where possible	DEECA, PV, CFA	
		Retain unburnt vegetation within burns to provide refuges and habitat.			
Grampians Globe-pea	Bushfire	Prescribed fire should be avoided due to the low intensity fires not germinating seed but at the same time depleting the seed bank.	At known sites.	DEECA	No
		Mechanical disturbance at all sites during fire operations should be avoided.			
		Fire management authorities and land management agencies establish suitable maps and install fire markers to avoid damage to threatened species and their habitat during fire preparedness and suppression activities.	At known sites where possible.	DEECA	No
	Bushfire and Drought	Undertake genetic diversity study to inform seed collections and restoration. This will inform additional seed collections and ensure that genetic diversity is captured for ex situ collections and future translocation.	At all known sites.	RBGV	Underway (State government Nature Fund)
		Collect diversity of seed based on genetic study for restoration. For each species, seeds will be collected during the appropriate season, viability	At all known sites.	RBGV	Underway (State government Nature Fund)

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
		tested, and stored in a seed/sporebank at RBGV.			
		Ensure symbiotic rhizobia collected and stored ex-situ for restoration. This will allow for symbiotic propagation.	At all known sites	RBGV	Underway (State government Nature Fund)
Williamsons Bush-pea	Bushfire	Prescribed fire should be avoided due to the low intensity fires not germinating seed but at the same time depleting the seed bank.	At known sites	DEECA	No
		Mechanical disturbance at all sites during fire operations should be avoided.			
	Bushfire and Drought	Undertake genetic diversity study to inform seed collections and restoration. This will inform additional seed collections and ensure that genetic diversity is captured for ex situ collections and future translocation.	At all known sites.	RBGV	No
		Collect diversity of seed based on genetic study for restoration. For each species, seeds will be collected during the appropriate season, viability tested, and stored in a seed/sporebank at RBGV.	At all known sites.	RBGV	No
		Ensure symbiotic rhizobia collected and stored ex-situ for restoration. This will allow for symbiotic propagation.	At all known sites	RBGV	No

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Wimmera rice flower, Spiny rice flower, Turnip Copperburr	Bushfire	Develop and implement appropriate fire management regimes.	Known locations.	Relevant land managers.	CFA, Horsham Rural City Council, Yarriambiack Shire Council, Northern Grampians Shire Council and Minyip Progress Association are working to undertake ecological burning in Wimmera Rice Flower and Spiny Rice Flower populations in the Wimmera. The Minyip population of Wimmera rice-flower - the area is periodically slashed by DEECA. But sometimes this is just the roadside and not the whole reserve area.
		Ongoing weed and pest control	Known locations	Relevant land managers	DEECA have recently provided landowner consent for Landcare to undertake weed control at the the Minyip population of Wimmera rice-flower.
	Drought	Weed control and pest control	Known locations	Relevant land managers	
	All	Monitor populations	Known locations	DEECA, Recovery team, TfN, private land managers.	
Striped legless lizard	Fire	Monitor populations	Known locations	DEECA	There are old tile sites that are no longer monitored.
		Work with fire authorities and private landholders to plan and undertake any burns proposed in areas of habitat critical to the survival of the species in a way that will maintain or improve the habitat for the species.	Known locations	DEECA, CFA, Land Managers	

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Plains Wanderer	All	Monitor populations and habitat.	Known locations	DEECA, PV, TFN	
	All	Design and implement habitat management strategy	Known locations	DEECA, academic/re search organisation s	
	Floods/Storms	Manage grazing to maintain and improve habitat.	Known locations	Land managers	
	Drought	Manage grazing to maintain and improve habitat.	Known locations	Land managers	
	Bushfire	Study the roles of burning and slashing in maintaining and improving condition of habitat. Possible ecological burns in Parks and reserves and other land managed for conservation	Known location managed for conservati on.	DEECA, PV, TFN, CFA.	
		Bushfire mitigation implemented to protect habitat.	Known locations	DEECA, CFA, TFN.	

Australasian Bittern

Asset	Emergency scenario	Actions	Where	Who	Is action current underway?
Australasian Bittern	Bushfire	Monitoring to determine locations frequented by the Bittern	Locations with previously recorded sightings. Waterways with suitable habitat.	Various	Ad hoc
		Controlled burning used to protect habitat wetlands and waterways, considering the following:	Known wetlands and waterways that support Australasian Bittern.	DEECA	Partially
		Exclude burning from riparian areas and vegetation adjacent to wetlands (10m buffer) during spring and summer.			
		Establish 10 m buffer around wetlands and waterways and prevent burns and works from impacting on these. Where burning of riparian vegetation is required, retain 60% of the reedy habitat.			
		Develop and implement fire- management guidelines for the maintenance of Australasian Bittern habitat.	For known locations	DEECA, TOs, CMAs	No
	Drought	Water managers are aware of the species' water requirements and have consideration for the requirements in water management.	Catchments with known habitat	Wimmera CMA, GWM Water	Partially

Eltham Copper Butterfly

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Eltham Copper Butterfly 	Bushfire	Survey areas in suitable and potential butterfly habitat to identify additional populations requiring emergency management.	Locations containing suitable habitat	Various organisations TfN can facilitate access to covenanted sites with suitable habitat	No – funding is required
	Ensure that maps and information about location data, ecological information and potential habitat is available to emergency-service staff and avoided in bushfire risk management and mitigation activities.	Locations with known records	DEECA Emergency service organisations	Yes – location records can be viewed in the Victorian Biodiversity Atlas, DEECA's Naturekit website and in EMAP. Habitat distribution models are also available on the Naturekit website.	
		Undertake on-ground biodiversity-values check prior to fuel management in areas of Eltham Copper Butterfly habitat, to confirm treatment suitability and timing.	Locations with known records	DEECA	Yes – DEECA conducts biodiversity values checks prior to fuel management activities.
		Construct fire breaks (either mechanically or via planned burning) along the boundary of known Eltham Copper Butterfly sites to reduce the likelihood of wildfires moving into their habitat.	At strategic locations near known Eltham Copper Butterfly sites	DEECA FFMV CFA	Partially
	Conduct a monitoring and research study to ascertain the fire response of the butterfly, ant, and larval food plant, to address lack of knowledge on the fire ecology of this species.	Strategic locations	Ecologist, academic organisation, CFA, DEECA, TfN, others	No	

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
		Conduct trial burns of Sweet Bursaria that is not inhabited by Eltham Copper Butterfly to identify optimal fire regimes for regeneration.	Strategic locations of Sweet Bursaria uninhabited by Eltham Copper Butterfly	Ecologist, academic organisation, CFA, DEECA, TfN, others	No
	Drought	Conduct weed and rabbit control to reduce competition and threats to the butterfly's food and host plant, Sweet Bursaria.	Known locations	Land managers, including PV, DEECA and local government	Partially

Wimmera Threatened Ecological Communities

Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregion

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Buloke woodlands of the Riverina and Murray- Darling depression bioregions	All	Establish long-term monitoring	Known locations	DEECA, PV, CMA	No
	Bushfire	Establish and maintain firebreaks where appropriate	At susceptible sites	Land manager	Partially on public land
		Trial ecological/fuel management burns	Selected public land sites	CFA, DEECA, TfN, GA, BGLC	Planned
		Establish adequate fuel-management programs	Public land locations	DEECA	No
	Drought	Restore flows along the Wimmera River as far as possible and to wetlands in accordance with Seasonal Watering Plans.	Terminal Lakes Northern Wimmera wetlands	Wimmera CMA	Partially

Grassy Eucalypt Woodland of the Victorian Volcanic Plain

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	All	Establish long-term monitoring	Known locations	DEECA, PV, CMA	No
		Avoid too frequent fire impacting recruitment of slow to moderate growing eucalypts such as Yellow, Grey and White box which may not reach reproductive maturity before the next fire.	Known locations	DEECA, CFA	Partially
		Avoid impacts on hollow nesting trees.	Known locations	DEECA, CFA	Partially

Grey Box (Eucalyptus microcarpa)	Grassy Wo	odlands and	Derived Native	Grasslands
of South-eastern Australia				

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South- eastern Australia	Bushfire	Implement ecological burning regimes based on recovery plan recommendations	Known locations	DEECA, CFA, Land managers, TFN, Wimmera CMA	No
	Drought	Control grazing	Known locations	DEECA, CFA, Land managers, TFN, Wimmera CMA	Partially
	Flood	Control grazing	Known locations	DEECA, CFA, Land managers, TFN, Wimmera CMA	Partially

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Mallee Bird Community of the Murray Darling Depression Bioregion	Bushfire Drought	Establish long-term monitoring of population abundance and distribution.	Known habitat locations	DEECA, PV, CMA	No
		Build resilience and improve habitat by controlling weeds, pest herbivores and predators, and revegetating areas to reduce habitat fragmentation.	In known habitat	PV, DEECA, TFN, CFA, WCMA, GA and private landholders	Yes, but more needs to be done.
	Bushfire	Construct fire breaks (either mechanically or via planned burning) along the boundary of known habitat, including Malleefowl nesting sites, to reduce the likelihood of wildfires moving into Mallee Bird Community habitat.	At strategic locations	DEECA/PV	Partially regarding public land
		Undertake prescribed burns within habitat areas to reduce the intensity of subsequent wildfires.	Little Desert National Park, known public and private land locations (see map, Appendix, Figure 14).	DEECA, CFA, BGLC, private landholders, TfN.	Yes, on public land.
			NOTE: Cool patch burning is viable for private land under covenant, with Trust for Nature (TfN) approval and inclusion in a management plan. TFN would not be lead fire agency but could help facilitate.		

Mallee Bird Community of the Murray Darling Depression Bioregion

Natural Grasslands of the Murray Valley Plains

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Natural Grasslands of the Murray Valley Plains	Drought	Monitor sites for species composition.	Known locations	NRM organisations	Partially

Plains Mallee Box Woodland of the Murray Darling depression and Riverina bioregions

Asset	Emergency scenario	Actions	Where	Who	Is action current underway?
Plains Mallee Box	All	Establish long-term monitoring.	Known locations.	DEECA, PV, CMA	No
Woodland of the Murray Darling depression and Riverina bioregions	Drought	Manage weeds and pests.	Known sites	Wimmera CMA. Relevant land managers.	Partially
Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
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Seasonal herbaceous wetlands of	Drought	Establish long-term monitoring.	Known sites	DEECA, PV, CMA	Partially
the temperate lowland plains.		Manage weeds and pests.	Known sites	Wimmera CMA. Relevant land managers	Partially
		Deliver water for the environment or other water where possible.	Where delivery points are available	Wimmera CMA	No

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
White Box- Yellow Box- Blakely's Red Gum Grassy Woodland	Bushfire	Implement ecological burning regimes based on recovery plan recommendations.	Known locations	DEECA, CFA, Land managers, TFN, Wimmera CMA	No
and Derived Native Grassland	Drought	Control grazing.	Known locations	DEECA, CFA, Land managers, TFN, Wimmera CMA	Partially
	Flood	Control grazing.	Known locations	DEECA, CFA, Land managers, TFN, Wimmera CMA	Partially

Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar Wetland

Asset	Emergency scenario	Actions	Where	Who	Is action current underway?
Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar wetland	Bushfire	Controlled fuel- reduction burns.	Lake Albacutya Regional Park, Wyperfeld NP	DEECA, BGLC	Yes – as part of fuel- management program
		Establish fire breaks, avoiding damage to biodiversity assets	Strategic locations	PV, DEECA	Partially
	Drought (long term)	Protect vegetation – rabbit and weed control.	Lake and surrounds	PV	Yes, but more effort required in droughts.

7. BIODIVERSITY ASSETS – RESPONSE AND RECOVERY ACTIONS

This section outlines response actions that could be undertaken for each biodiversity asset in response to relevant emergency scenarios such as bushfires, drought, floods, diseases and pests including:

- Where or when the action would need to be undertaken.
- Who could undertake the action.

The Response Control Agency in a bushfire emergency depends on where the fire starts. DEECA is generally the Response Control Agency for fires that ignite on public land, while the CFA takes on this role for fires that start on private land.

The Victorian State Emergency Management Plan (SEMP) identifies VICSES as the Control Agency during a flood emergency. Wimmera CMA is a support agency for flood. The SEMP states that catchment management authorities have "a key role to advise on flood mitigation, provide support to flood response, and lead flood recovery programs where they have the resources to conduct works."

Emergency response considerations impacting all biodiversity assets

It is important for the Wimmera region to have capacity for reducing impacts to biodiversity during an incident response. This involves having multiple trained and qualified technical biodiversity advisors available that can provide advice to an Incident Management Team during an emergency response.

The biodiversity advisor's role is to assess the biodiversity assets and values at risk of being impacted during an emergency event, identify appropriate mitigation measures, and communicate these to the Planning Officer to inform the development of an Incident Action Plan.

Emergency recovery considerations impacting all biodiversity assets

DEECA is the Recovery Coordinating Agency for the following areas related to this Plan (among other areas):

- Natural environment
- Public land and inland waters
- Wildlife and threatened ecosystems and species
- Agriculture.

Specialist Rapid Risk Assessment teams deploy immediately once it is safe post fire to inform emergency recovery actions.

Wimmera CMA is a support agency, providing advice and support related to areas of responsibility and expertise.

Response and recovery actions requiring investment

The development of this Plan highlighted several priority areas requiring further investment to effectively protect biodiversity assets from the impacts of natural disasters and emergency events and help them recover. This includes:

- Using seedbanks to store seed from threatened species and communities to provide a source of seed for key plant species to assist with post-fire recovery.
- Propagation and translocation of seedlings to supplement and bolster population numbers.
- Reduce the impact of threats on vulnerable populations by controlling weeds and pest herbivores.

Asset	Emergency scenario	Actions	Where	Who
While event is or	curring		L	
SERtBC	Bushfire	Allocate resources to suppress fires and/or undertake asset protection of known RtBC habitat.	Known locations.	Emergency services.
		Protect known populations and habitat from accidental damage during fire suppression. For example, prevent habitat trees being felled during control line construction or hazardous tree work. Do not backburn within desert stringybark forests or buloke woodlands.		
		Allocate resources to protect the most sensitive areas, including areas of known high seed food resource.	As required.	Emergency services in consultation with Recovery team.
		Monitor / assess impacts.	At known impact sites.	Recovery team.
After event has o	occurred			
SERtBC	Bushfire	Rapid assessment of impact.	At known impact sites.	Rapid Risk Assessment teams and support agencies.
		Plan for restoration.	At impact sites.	Recovery team and supporting organisations.

South-eastern Red-tailed Black Cockatoo

Malleefowl

As discussed in the Asset Preparedness section for Malleefowl, other than in extreme circumstances, use of machinery and fire retardant for fire suppression should not be carried out within the Little Desert National Park's two Reference Areas (see map in Appendix 1, Figure 2) (National Parks Service, 1996).

Asset	Emergency scenario	Actions	Where	Who
While event is oc	curring			
Malleefowl	Bushfire	Allocate resources to suppress fires and/or undertake asset protection of known Malleefowl nesting sites.	Known locations.	Best placed: Emergency services (DEECA or CFA)
		Protect nesting sites from accidental damage during fire suppression. For example, when constructing control lines using machinery or undertaking backburning.	Known locations.	Best placed: Emergency services organisations in consultation with recovery team.
		Monitor / assess impacts.	Impacted locations.	Recovery team.
After event has o	ccurred			
Malleefowl	Bushfire	Rapid assessment of impact.	At known impact sites.	Recovery team.
		Plan for restoration.	At impact sites.	Recovery team in partnership with land managers and other partners.

Swift Parrot

Asset	Emergency	Actions	Where	Who
	scenario			
While event is oc	curring			
Swift parrot	Bushfire	Allocate resources to suppress fires and/or undertake asset protection of known Swift Parrot habitat.	Known locations.	Best placed: Emergency services
		Protect known habitat from accidental damage during fire suppression. For example, prevent habitat trees being felled during control line construction or hazardous tree work, do not backburn within habitat woodlands.		
		Protect the most sensitive areas.	Known locations.	Best placed: Emergency services organisations in consultation with recovery team.
After event has o	occurred			
Swift parrot	Bushfire	Rapid assessment of impact.	At known impact sites.	Recovery team.
		Plan for restoration.	At impact sites.	Recovery team in partnership with land managers and other partners.
	Psittacine beak and feather disease (PBFD)	Test any dead Swift Parrots for PBFD.	Where they occur.	Various

Threatened Orchid Species

Asset	Emergency scenario	Actions	Where	Who		
While event is	occurring					
All threatened Wimmera orchid species	Bushfire	Allocate resources to suppress fires and/or undertake asset protection when species are flowering. Ensure no mechanical disturbance at sites and no chemical retardant. Protect known populations from accidental damage during fire suppression. For example, when constructing control lines using machinery or undertaking backburning.	Known locations.	Best placed: Emergency services.		
After event has occurred						
All threatened Wimmera orchid species	Bushfire/Flood/Dro ught	Rapid assessment of impact.	At known impact sites and non- impacted sites for comparison	RBGV/DEECA.		
		Plan for restoration.	At impact sites.	RBGV/DEECA.		
		Propagation using seed and mycorrhiza collected pre- event using genetic assessment pre-event.	Ex-situ RBGV.	RBGV.		
		Seed collections to bolster diversity in restoration effort where possible.	At impact sites and other known sites of the species.	RBGV.		
		Translocation/Supplementatio n to bolster population numbers.	At impact sites.	RBGV/Landholders/Park s Victoria.		

Forked Spyridium

Asset	Emergency scenario	Actions	Where	Who
While event is oc	curring			
Forked Spyridium	Bushfire	Avoid suppressing bushfire of sufficient intensity to promote seed germination.	Known locations.	Best placed: Emergency services.
		Avoid damaging plants during fire suppression activities.	Known locations.	Emergency services in consultation with DEECA.
After event has o	ccurred			
Forked Spyridium	Bushfire	Rapid assessment of impact.	At known impact sites.	DEECA.
		Plan for restoration.	At impacted sites.	DEECA.
		Propagation for Restoration	Ex-situ and then at impact sites	RBGV

Avenue cassinia

Asset	Emergency	Actions	Where	Who
	scenario			
While event is oc	curring			
cassinia	Bushfire	Avoid suppressing bushfire of sufficient intensity to promote seed germination.	Known locations.	Best placed: Emergency services.
		Avoid damaging plants during fire suppression activities.	Known locations.	Emergency services in consultation with DEECA.
	Drought	Monitor for impacts.	Known locations.	Natural resource management organisations.
		Reduce the impact of other threats by controlling weeds and pest herbivores.	Known locations.	Natural resource management organisations.
After event has o	ccurred			
Avenue cassinia	Bushfire	Rapid assessment of impact.	At known impact sites.	DEECA.
		Plan for restoration.	At impacted sites.	DEECA.
		Propagation for Restoration.	Ex-situ and then at impacted sites.	RBGV.
	Drought	Rapid assessment of impact.	Known locations.	Natural resource management organisations.
		Plan for restoration.	Known locations.	Natural resource management organisations.
		Reduce the impact of other threats by controlling weeds and pest herbivores.	Known locations.	Natural resource management organisations.

Gariwerd and Surrounds – Threatened Species

Drought/Strom

(erosion)

Grampians

pincushion

(Borya mirabillis)

Asset	Emergency scenario	Actions	Where	Who	
While event is or	curring				
Grampians pincushion (<i>Borya mirabillis</i>)	Bushfire	Protect sensitive areas, avoiding impacts on the Grampians pincushion and other biodiversity assets.	Known locations.	DEECA.	
After event has o	occurred	·			
Grampians pincushion (Bonya mirabillis)	Bushfire	Rapid assessment of impact.	At known impact sites.	PV/DEECA/RBGV	
(Dorya mirabilits)		Plan for restoration.	At impact sites.	PV/DEECA/RBGV	
		Reintroduce plants (see preparedness actions).	At impact sites	RBGV/PV	
	_				
Asset	Emergency scenario	Actions	Where	Who	
While event is or	curring	·	·		
Grampians pincushion	Drought/Storm (erosion)	No action feasible.	n/a	n/a	
(Borya mirabillis)		Monitor erosion/drought impacts. Water plants if feasible	At known locations	PV/DEECA	
		Propagate plants (see preparedness)	Ex-situ	RBGV	
After event has occurred					

Rapid assessment of

Plan for restoration.

preparedness)

Reintroduce plants (see

impact.

PV/DEECA/RBGV

PV/DEECA/RBGV

RBGV/PV

At known impact sites.

At impact sites.

At impact sites

Asset	Emergency scenario	Actions	Where	Who
While event is or	curring			
Heath mouse	Bushfire	Protect sensitive areas - physical and chemical damage (such as use of fire retardants) to habitat and individuals of the heath mouse must be avoided during and after fire operations.	Known locations.	DEECA, CFA.
	Drought	Investigate the impacts of drought on the Heath mouse.	Known locations.	DEECA, PV, research organisations.
After event has c	occurred			
Heath mouse	Bushfire	Rapid assessment of impact.	At known impact sites.	DEECA, PV.
		Ensure immediate and ongoing post-fire predator control within known habitat when fire events occur.	At impact sites	DEECA, PV.
		Plan for restoration.	At impact sites.	DEECA, PV.
	Drought	Assess impact on species.	At impact sites.	DEECA, PV.
		Plan for recovery.	At impact sites.	DEECA, PV.

Asset	Emergency scenario	Actions	Where	Who				
While event is or	While event is occurring							
Grampians Globe-pea	Bushfire	Avoid physical damage to the habitat and individuals of the Grampians globe-pea during and after fire operations.	Known locations.	DEECA, CFA.				
After event has o	occurred							
Grampians Globe-pea	Bushfire/Drought	Rapid assessment of impact -	At known impact sites	RBGV,DEECA, PV				
		Plan for restoration	At impact sites	RBGV,DEECA, PV				
		Propagate plants for restoration using stored seed and rhizobia (see prepare section)	At all impacted sites	RBGV				
		Reintroduce plants	At impact sites	RBGV/PV				

Asset	Emergency scenario	Actions	Where	Who		
While event is or	While event is occurring					
Williamsons Bush-pea	Bushfire	Avoid physical damage to the habitat and individuals of the Williamsons Bush-pea during and after fire operations.	Known locations.	DEECA.		
After event has c	occurred					
Williamsons Bush-pea	Bushfire	Rapid assessment of impact	At known impact sites	RBGV,DEECA, PV		
		Plan for restoration	At impact sites	RBGV,DEECA, PV		
		Propagate plants for restoration using stored seed and rhizobia (see prepare section)	At all impacted sites	RBGV		
		Reintroduce plants	At impact sites	RBGV/PV		

Wimmera Nationally Threatened Grassland Species

Asset	Emergency scenario	Actions	Where	Who			
While event is oc	While event is occurring						
Wimmera rice flower, Spiny rice flower, Turnip Copperburr	Bushfire	Allocate resources to suppress fires and/or undertake asset protection if burn frequency and timing are not compatible with increased species richness or biodiversity. Protect known populations and habitat from accidental damage during fire suppression. For example, do not drive tankers onto the soil or put mineral earth control lines through known populations.	At known impact sites.	DEECA, CFA.			
After event has a	Drought	Weed and pest control.	At known impact sites.	Land managers			
Alter event has o	ccurred						
Wimmera rice flower, Spiny rice flower	All	Weed and pest control.	At known impact sites.	Land manager, Wimmera CMA.			
Turnip Copperburr	Bushfire	Rapid assessment of impact.	At known impact sites.	DEECA.			
		Plan for restoration.	At known impact sites.	DEECA.			
	Drought	Monitor impact.	At known impact sites.	DEECA.			
		Plan for restoration.	At known impact sites.	DEECA.			

Wimmera Rice flower, Spiny Rice Flower, Turnip Copperburr

Striped legless lizard

Asset	Emergency	Actions	Where	Who
	scenario			
While event is or	curring			
Striped legless lizard	Bushfire	Allocate resources to suppress fires and/or undertake asset protection if burn frequency and timing are not compatible with increased species richness or biodiversity. Protect known populations and habitat	Known locations.	CFA, DEECA.
		from accidental damage during fire suppression. For example, do not drive tankers onto the soil or put mineral earth control lines through known populations.		
		Protect the most sensitive areas.	Known locations.	DEECA, CFA.
After event has o	occurred			
Striped legless lizard	s Bushfire	Rapid assessment of impact.	At known impact sites.	DEECA.
		Ensure immediate and ongoing post-fire predator control within known habitat when fire events occur.	At impact sites.	DEECA.
		Plan for restoration.	At impact sites.	DEECA.

Plains wanderer

Asset	Emergency scenario	Actions	Where	Who
While event is or	curring	l	1	
Plains	Floods/storms	No action possible.		
wanderer	Bushfire	Allocate resources to suppress fires and/or undertake asset protection if burn frequency and timing are not compatible with increased species richness or biodiversity.	Known locations.	Best placed: Emergency services.
		Protect known populations and habitat from accidental damage during fire suppression. For example, do not drive tankers onto the soil or put mineral earth control lines through known populations.		
		Protecting most sensitive areas.	Known locations.	DEECA, CFA.
	Drought	Protect vegetation – rabbit and weed control.	Known locations.	Relevant land managers.
				Wimmera CMA.
		Where possible deliver water for the environment.	Known location where water can be delivered.	Wimmera CMA.
After event has o	occurred	1	1	
Plains wanderer	All	Conducted immediate and ongoing pest plan and animal control.	At impacted sites and surrounds.	Land managers, Wimmera CMA.
	Floods/storms	Monitor impact on vegetation.	At known impact sites.	Land managers, Wimmera CMA.
		Plan for restoration.	At known impact sites.	Land managers, Wimmera CMA.
	Bushfire	Rapid assessment of impact.	At known impact sites.	Land managers, Wimmera CMA.
		Ensure ongoing post-fire pest plant and animal control.	At impact sites.	Land managers, Wimmera CMA.
		Plan for restoration.	At impact sites.	Land managers, Wimmera CMA.
	Drought	Monitor impact on vegetation.	At impact sites.	Land managers, Wimmera CMA.
		Plan for restoration.	At impact sites.	Land managers, Wimmera CMA.

Australasian Bittern

Asset	Emergency	Actions	Where	Who
	Scenario			
While event is oc	curring			
Australasian Bittern	Bushfire	Avoid impacts on habitat during fire management activities.	Known locations.	Best placed: Emergency services.
		Protect the most sensitive areas.	Known locations.	DEECA, CFA.
	Drought	Protect vegetation – rabbit and weed control.	Known locations.	Relevant land managers, Wimmera CMA.
		Where possible deliver water for the environment.	Known location where water can be delivered.	Wimmera CMA.
After event has o	ccurred			
Australasian Bittern	Bushfire	Rapid assessment of impact.	At known impact sites.	Land managers, Wimmera CMA.
		Ensure ongoing post-fire pest plant and animal control.	At impact sites.	Land managers, Wimmera CMA.
		Plan for restoration.	At impact sites.	Land managers, Wimmera CMA.
	Drought	Monitor impact on vegetation.	At impact sites.	Land managers, Wimmera CMA.
		Ensure immediate and ongoing post-drought pest plant and animal control.	At impact sites.	Land managers, Wimmera CMA.
		Where possible deliver water for the environment.	Known location where water can be delivered.	Wimmera CMA.

Eltham Copper Butterfly

Asset	Emergency scenario	Actions	Where	Who
While event is or	curring		1	1
Eltham Copper Butterfly	Bushfire	Allocate resources to suppress fires and/or undertake asset protection of known Eltham Copper Butterfly sites.	Known locations.	Best placed: Emergency services (DEECA or CFA).
		Protect Eltham Copper Butterfly habitat from accidental damage during fire suppression. For example, when constructing control lines using machinery or undertaking backburning.	Known locations.	Best placed: Emergency- service organisations.
		Survey, monitor and assess impacts.	Impacted locations.	DEECA
	Drought	Conduct weed and rabbit control to reduce competition and threats to Sweet Bursaria plants.	Known locations.	Land managers, Wimmera CMA.
After event has o	occurred	·		
Eltham Copper Butterfly	Bushfire	Survey, monitor and assess impacts.	Impacted locations.	Land managers, Wimmera CMA.
		Plan for restoration.	Impacted sites.	Land managers, Wimmera CMA.
		Conduct ongoing post-fire rabbit and weed control to protect Sweet Bursaria plants.	Impacted sites.	Land managers, Wimmera CMA.
	Drought	Survey, monitor and impacts on Sweet Bursaria plants.	Known locations.	Land managers, Wimmera CMA.
		Conduct immediate and ongoing post-drought pest plant and animal control.	Known locations.	Land managers, Wimmera CMA.

mergency Preparedness and Response Plan for Biodiversity and Agricultural Natural Capital Assets in the Wimmera region

Wimmera Threatened Ecological Communities

Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregion

Asset	Emergency scenario	Actions	Where	Who
While event is or	curring			
Buloke Woodlands of the Riverina and Murray- Darling	Bushfire	Allocate resources to suppress fires and/or undertake asset protection of known sites.	Known impact sites.	DEECA, CFA.
Depression Bioregion		Protect from accidental damage during fire suppression. For example, when constructing control lines using machinery or undertaking backburning.	Known impact sites.	DEECA, CFA.
	Drought	Protect vegetation – rabbit and weed control.	Known impact sites.	Relevant land managers, Wimmera CMA.
		Where possible deliver water for the environment.	Known locations where water can be delivered.	Wimmera CMA.
After event has o	occurred			
Buloke Woodlands of the Biverina	Bushfire	Rapid assessment of impact.	At known impact sites.	Land managers, Wimmera CMA.
the Riverina and Murray- Darling Depression Bioregion		Ensure ongoing post-fire pest plant and animal control.	At impact sites.	Land managers, Wimmera CMA
		Plan for restoration.	At impact sites.	Land managers, Wimmera CMA.
	Drought	Monitor impact on vegetation.	At impact sites.	Land managers, Wimmera CMA
		Ensure immediate and ongoing post-drought pest plant and animal control.	At impact sites.	Land managers, Wimmera CMA.
		Where possible deliver water for the environment.	Known locations where water can be delivered.	Wimmera CMA.

Asset	Emergency scenario	Actions	Where	Who
While event is or	curring		·	·
Grassy Eucalypt Woodland of the Victorian	Bushfire	Rapid fire suppression if burn frequency and intensity does not match requirements.	Known impact sites.	DEECA, CFA.
voicanic Plain	Drought	Exclude stock and other grazers where possible.	Known impact sites.	Land managers, Wimmera CMA.
		Monitor impact on vegetation.	Known impact sites.	DEECA, CFA.
After event has o	occurred	1	1	1
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Bushfire	Monitor changes in species composition and habitat elements post- burning is essential to ensure fire regimes are maintaining or improving remnant quality, rather than contributing to further degradation.	At known impact sites.	DEECA, Wimmera CMA.
		Plan for restoration.	At known impact sites.	DEECA, Wimmera CMA.
	Drought	Exclude stock and other grazers where possible.	At known impact sites.	Land managers, Wimmera CMA.
		Monitor impact on vegetation	At known impact sites.	DEECA, Wimmera CMA.
		Plan for restoration.	At known impact sites.	DEECA, Wimmera CMA.

Grassy Eucalypt Woodland of the Victorian Volcanic Plain

Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

Asset	Emergency scenario	Actions	Where	Who
While event is oc	curring	·	·	·
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and	Bushfire	Rapid fire suppression if burn frequency and intensity does not match requirements.	Known impact sites.	DEECA, CFA.
Derived Native Grasslands of South-eastern	Drought	Exclude stock and other grazers where possible.	Known impact sites.	Land managers, Wimmera CMA.
Australia		Monitor impact on vegetation.	Known impact sites.	DEECA, CFA.
	Flood	No action feasible.		
After event has o	ccurred			·
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Bushfire	Monitor changes in species composition and habitat elements post- burning is essential to ensure fire regimes are maintaining or improving remnant quality, rather than contributing to further degradation.	At known impact sites.	DEECA, Wimmera CMA.
		Plan for restoration.	At known impact sites.	DEECA, Wimmera CMA.
	Drought	Exclude stock and other grazers where possible.	At known impact sites.	Land managers, Wimmera CMA.
		Monitor impact on vegetation	At known impact sites.	DEECA, Wimmera CMA.
		Plan for restoration.	At known impact sites.	DEECA, Wimmera CMA.
	Flood	Weed control	At known impact sites.	Land managers, Wimmera CMA.

Asset	Emergency scenario	Actions	Where	Who
While event is or	curring			
Mallee Bird Community of the Murray Darling Depression Bioregion	Bushfire	Allocate resources to suppress fires and/or protect assets.	Known sites.	DEECA, CFA.
		Protect Mallee habitat from accidental damage during fire suppression. For example, when constructing control lines, using machinery or undertaking backburning.	Known sites.	DEECA, CFA.
	Drought	Exclude stock where possible.	Known locations.	Land managers, Wimmera CMA.
		Control problem herbivores like rabbits and deer.	Known locations.	Land managers, Wimmera CMA.
		Control predators like foxes and cats.	Known locations.	Land managers, Wimmera CMA.
		Monitor impacts on vegetation and bird populations.	Known locations.	DEECA, PV, land managers.
After event has o	occurred			
Mallee Bird Community of the Murray Darling	Bushfire	Rapid assessment of impacts.	Impacted areas.	PV, DEECA, TFN, CFA, WCMA, GA and private landholders
Depression Bioregion		Plan for recovery actions.	Impacted areas.	PV, DEECA, TFN, CFA, WCMA, GA and private landholders
		Control weeds, pest herbivores and predators, and revegetate areas.	Impacted areas.	PV, DEECA, TFN, CFA, WCMA, GA and private landholders
	Drought	Exclude stock where possible.	Known locations.	Land managers, Wimmera CMA.
		Control problem herbivores like rabbits and deer.	Known locations.	Land managers, Wimmera CMA.
		Control predators like foxes and cats.	Known locations.	Land managers, Wimmera CMA.
		Monitor the recovery progress of vegetation and bird populations.	Known locations.	DEECA, PV, land managers.

Mallee Bird Community of the Murray Darling Depression Bioregion

Natural Grasslands of the Murray Valley Plains

Asset	Emergency scenario	Actions	Where	Who	
While event is occurring					
Natural Grasslands of the Murray	Drought	Exclude stock and other grazers where possible.	Known locations.	Land managers, Wimmera CMA.	
Valley Plains		Monitor impact on vegetation.	Known locations.	DEECA, CFA.	
After event has o	ccurred				
Natural Grasslands of the Murray	Drought	Exclude stock and other grazers where possible.	At known impact sites.	Land managers, Wimmera CMA.	
Valley Plains		Monitor impact on vegetation.	At impact sites.	DEECA.	
		Plan for restoration.	At impact sites.	DEECA.	

Plains Mallee Box Woodland of the Murray Darling depression and Riverina bioregions

Asset	Emergency scenario	Actions	Where	Who	
While event is occurring					
Plains Mallee Box Woodland of the Murray Darling depression and Riverina bioregions	Drought	Protect vegetation – rabbit and weed control.	Known impact sites.	Relevant land managers, Wimmera CMA.	
After event has o	ccurred				
Plains Mallee Box Woodland of the Murray Darling depression and Riverina bioregions	Drought	Monitor impact on vegetation. Ensure immediate and ongoing post-drought pest plant and animal control.	At impact sites. At impact sites.	Land managers, Wimmera CMA. Land managers, Wimmera CMA.	

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Asset	Emergency scenario	Actions	Where	Who
While event is oc	curring			
Seasonal herbaceous wetlands of the temperate	Drought	Protect vegetation – rabbit and weed control.	Known impact sites.	Relevant land managers, Wimmera CMA.
		Where possible deliver water for the environment.	Known location where water can be delivered.	Wimmera CMA.
After event has o	ccurred			
Seasonal herbaceous wetlands of the	Drought	Monitor impact on vegetation.	At impact sites.	Land managers, Wimmera CMA.
temperate lowland plains.		Ensure immediate and ongoing post-drought pest plant and animal control.	At impact sites.	Land managers, Wimmera CMA.
		Where possible deliver water for the environment.	Known location where water can be delivered.	Wimmera CMA.

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Asset	Emergency scenario	Actions	Where	Who
While event is oc	curring			
White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Bushfire	Rapid fire suppression if burn frequency and intensity does not match requirements.	Known impact sites.	DEECA, CFA.
	Drought	Exclude stock and other grazers where possible.	Known impact sites.	Land managers, Wimmera CMA.
		Monitor impact on vegetation.	Known impact sites.	DEECA, CFA.
	Flood	No action feasible.		
After event has o	occurred			
White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Bushfire	Monitoring changes in species composition and habitat elements post- burning is essential to ensure fire regimes are maintaining or improving remnant quality, rather than contributing to further degradation.	At known impact sites.	DEECA, Wimmera CMA.
		Plan for restoration.	At known impact sites.	DEECA, Wimmera CMA.
	Drought	Exclude stock and other grazers where possible.	At known impact sites.	Land managers, Wimmera CMA.
		Monitor impact on vegetation.	At known impact sites.	DEECA, Wimmera CMA.
		Plan for restoration.	At known impact sites.	DEECA, Wimmera CMA.
	Flood	Weed control.	At known impact sites.	Land managers, Wimmera CMA.

Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar Wetland

Asset	Emergency scenario	Actions	Where	Who
While event is occurring				
Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar wetland	Bushfire	Allocate resources to suppress fires and/or undertake asset protection of sensitive areas.	Known locations.	Best placed: Emergency services.
		Protecting areas of stressed vegetation and revegetation.	Known locations.	DEECA.
	Drought	Protect vegetation – rabbit and weed control.	Whole site.	Parks Victoria (PV).
After event has occurred				
Ngalpakatia/Ngelpagutya (Lake Albacutya)	Bushfire	Rapid assessment of impact.	At known impact sites.	PV.
Ramsar wetland		Ensure ongoing post- fire pest plant and animal control.	At impact sites.	PV.
		Plan for restoration.	At impact sites.	PV.
	Drought	Monitor impact on vegetation.	At impact sites.	PV.
		Ensure immediate and ongoing post-drought pest plant and animal control.	At impact sites.	PV.

8. AGRICULTURAL NATURAL CAPITAL ASSETS - IDENTIFICATION AND SUSCEPTIBILITY

Almost 80% of the Wimmera's landscape supports a large agricultural industry which significantly contributes to the region's economy and food security at a global and national scale. Grain production is the Wimmera and southern Mallee's biggest industry, providing 26% of Victoria's grains, including cereals, legumes and oilseeds.

This is followed by 16% of Victorian sheep meat production and 17% of Victoria's wool production (Agriculture Victoria, 2018). Viticulture, olives and native flowers are also significant primary industries in the region.

"Natural capital in agriculture refers to the natural resources that producers manage for the benefit of their businesses, their families and for future generations' producers" (Farming for the Future , 2024).

Agricultural natural-capital assets are the natural resources on farms that support food and fibre production. This includes soil, air, water, riparian areas, remnant native vegetation including patches and large hollow-bearing trees, agroforestry and environmental plantings.

This Plan focuses on the natural-capital assets on Wimmera farms that support agricultural production. Agricultural commodities themselves such as livestock, crops and their quality are outside the scope of this document.

Appendix 1, Figure 20 shows the location of agricultural land in the Wimmera, indicating where agricultural soils and native vegetation on farms are located.

Appendix 2 provides a multi-jurisdictional inventory of assets, outlining the relevant legislation and policies by jurisdiction.

Agricultural soils

Wimmera soils are an important natural-capital asset underpinning the region's valuable agricultural industry. Healthy soils support the production of food and fibre as well as the region's natural landscapes.

The management of soils influences the health of natural assets, such as native vegetation and waterways by providing a healthy foundation for plants and animals and acting as a buffer to prevent sediments entering waterways.

Stakeholders reported observations of inappropriate soil management occurring in the region, such as deep ploughing on sections of roadside and private land to form fire breaks. Slashing or controlled burning is preferred due to reduced impacts on soil health and erosion, as well as native species that may be present. A key action is to increase community knowledge around sustainable soil management practices, including the impacts of ploughing firebreaks and other options available.

Agricultural soilsBushfireWildfire on farms removes ground cover, exposing soils and making them susceptible to erosion by wind andHighExposed soil leading to win and water erosion are significant threats to soil he and function in the Wimme Wind and water erosion	Agricultural natural capital asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
rainfall runoff. Erosion impacts on soil fertility and productivity by removing productive topsoil, nutrients, and carbon.	Agricultural soils	Bushfire	Wildfire on farms removes ground cover, exposing soils and making them susceptible to erosion by wind and rainfall runoff. Erosion impacts on soil fertility and productivity by removing productive topsoil, nutrients, and carbon.	High	Exposed soil leading to wind and water erosion are significant threats to soil health and function in the Wimmera. Wind and water erosion following fires can occur across the catchment, especially in the northern Wimmera (wind) and Upper Catchment area (water). Water erosion is of particular concern in the Upper Catchment. Fires are challenging to manage in this hilly landscape and can burn large areas. The risk of paddock soils and waterways eroding during rainfall events increases

Agricultural natural capital asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
				substantially when ground cover is low or absent.
				Fires in the northern Wimmera are generally easier to control because of the relatively flat terrain and lack of heavy fuel loads.
	Flood	River and stream flooding and overland flow have the potential to erode agricultural soils in	Medium	Soils are more susceptible to erosion if ground cover is low or absent due to land management practices, wildfire, or drought.
	all soil types.		Soil erosion caused by flooding can occur across the catchment. It occurs most frequently in the Upper Catchment where hillslopes are steeper.	
			Soils with compaction and low soil carbon are more susceptible to erosion and are impaired in their ability to capture and absorb water.	
	Pest or disease emergency	Impacts on the ability to use soil due to quarantine or restrictions imposed, for example Anthrax, fire ants. Soil can be out of production for extended periods.	Medium	There are very few occurrences in the Wimmera. Consequences would be high, but likelihood is low. The Wimmera does not tend to be a hotspot for disease given the climate.

Riparian Areas, Native Vegetation, Agroforestry and Environmental Plantings on Farms

Native vegetation on farms occurs as remnant or revegetated patches large and small, isolated paddock trees, and in riparian zones beside waterways.

In general terms, thirty-one percent of the Wimmera's 2.3-million hectares is covered by natural habitat. Almost half of this (49%) occurs on private land (Wimmera CMA, 2021).

Agroforestry involves managing trees and shrubs on farms to provide benefits important to the farmer.

Riparian areas, native vegetation, agroforestry and environmental plantings on farms provide a variety of benefits to agricultural production and biodiversity conservation:

- Providing habitat for beneficial insects that support agricultural production as predators of pest insects and as pollinators.
- Providing shade and shelter to livestock, improving livestock health, and reducing stress.
- Storing carbon, offsetting against a farm business's greenhouse gas emissions.
- Producing timber.
- Rehabilitating unproductive land such as saline or eroded areas.
- Improving the amenity of a property.
- Providing habitat to native fauna, including hollows for nesting and shelter, food sources and shelt.

Native habitat on farms is extremely important in supporting and maintaining biodiversity across the Wimmera. It provides habitat for many species and ecosystems and acts as steppingstones and pathways for species to move through the agricultural landscape between patches of suitable habitat.

Agricultural natural capital asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Riparian areas Native vegetation Agroforestry Environmental plantings on farms	Bushfire	 Wildfire can burn vegetation, impacting on the benefits provided by these areas on farms. For example, it can: Displace birds and insects affecting pollination of adjacent agricultural plants. Remove ground cover making soil susceptible to erosion. Decrease their value as shelter and windbreaks, particularly for agroforestry and shelterbelts that may use species that are not necessarily adapted to fire 	Medium	Given the number and breadth of values these assets provide to agriculture the impacts can be high or vary. Some areas might recover over time, while others might be damaged beyond repair, depending on the degree of other stressors they face and their capacity to recover.
	Flood	A flood can disperse weeds along floodplains and threaten the benefits provided by these areas, including outcompeting flora that support agricultural natural capital.	Medium	Experience has shown weeds become prevalent in flooded areas following every flood in the Wimmera.
		Soil erosion can occur if ground cover is low or absent around trees and shrubs.	Medium	Soils are more susceptible to erosion if ground cover is low or absent due to land- management practices like overgrazing, fire, or drought. Soil erosion caused by flooding can occur across the catchment.

Agricultural natural capital asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
				It occurs most frequently in the Upper Catchment where hillslopes are steeper.

Water

Water is an essential resource for farms to grow food and fibre. Rainfall across the landscape is critical in the right amount and seasons for sustaining soil moisture to grow the Wimmera's productive broadacre crops and pastures that feed stock. Many catchment dams are also filled from rainfall and runoff.

Many Wimmera farming enterprises get their stock and domestic water supply from the Wimmera Mallee Pipeline, particularly in the central and northeastern part of the Wimmera region. Water-supply managers are continuing to supply new areas with piped water supply over time as pipelines are funded and constructed.

Many West Wimmera farmers use bore water for both stock and domestic supplies and irrigated agriculture. Some farmers, particularly in the Upper Catchment, have catchment dams or off-stream watering systems.

Many waterway tributaries are intermittent and can be dry during certain times of year or for extended periods depending on rainfall.

Agricultural natural capital asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Water	Bushfire	Bushfire can impact catchments that feed farm dams and waterways on farms. Fire removes ground cover, increasing the risk of soil erosion by wind and water in the initial period after a fire until vegetation recovers. Wind and water erosion can move ash, silt, debris, and organic material into the dams and waterways, making the water unattractive to livestock and possibly leading to toxic algal growth. The quantity of water running off into dams and waterways can decrease as vegetation regrows following bushfire, impacting on water availability.	High	Water quality can be impacted in the short term, following a bushfire, particularly if large rainfall or wind events occur. In the first few years of regeneration following a bushfire, water quantity can decline significantly before a gradual return. This can have a significant impact on water availability both in storage and for water in the landscape. Both are important in supporting agriculture.
Water - Stock and domestic water supply	Drought	Drought directly impacts on the amount of water in Grampians Headworks storages for supplying stock and domestic water to farms via the Wimmera Mallee Pipeline. Low rainfall and runoff during drought reduce the amount of water in natural waterways and catchment dams, which in turn affects the amount of water available for stock and other agricultural production. It can also lead to declines in water quality.	Medium	Drought is becoming more common under climate change. Most stock and domestic water in the region is supplied by the Wimmera Mallee Pipeline or groundwater in the west Wimmera. The Wimmera Mallee Pipeline has improved the security of water supply for many farmers

Agricultural natural capital asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
		This would impact a small number of farmers, mainly beside waterways in the Upper Catchment and Horsham Rural City Council area. The quality of water in waterways and dams can also decline, concentrating salt or leading to blue green algal blooms.		in the northern and central Wimmera. Drought and climate change are a significant risk to groundwater levels due to reduced recharge and the potential to drive an increase in extraction and use (Wimmera CMA, 2021).
Water – Rainfall and soil moisture	Drought	Drought is associated with reduced rainfall, soil moisture levels and water available in the landscape for growing food and fibre. Reduced rainfall during a drought impacts on crop growth, resulting in lower yields and quality and can lead to crop failure if rainfall timing and quantity is insufficient. Low rainfall during drought also leads to reduced pasture growth and quality, increasing the risk of reduced ground cover and soil erosion. A lack of water in the landscape can impact crop pollinators.	High	Rainfall can decline significantly during a drought period, impacting on soil moisture levels and water available in the landscape to grow crops and pasture. Drought is becoming more common under climate change.

9. AGRICULTURAL NATURAL CAPITAL ASSETS -PREPAREDNESS ACTIONS

This section outlines preparedness actions that could be undertaken for agricultural natural-capital assets in the Wimmera to reduce the threat of relevant emergency scenarios such as bushfires, drought, floods, diseases, and pests. Tables for each asset include:

- Suggested preparedness actions.
- Where the action should be undertaken.
- The organisation or group that could undertake or is already undertaking the action.

Agricultural soils

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Agricultural soils	Bushfire	Fuel-reduction burns in forests and woodlands.	All of catchment.	DEECA, private landholders, Traditional owners.	Yes, in parts.
		Develop and implement property fire plans.	All of catchment.	Private landholders.	Yes.
		Create and/or maintain strategic fuel breaks on private property that protect the asset.	All of catchment.	Private landholders.	Yes.
		Avoid ploughing due to impacts on soil health. Slashing or burning is preferred.			
		Maintain strategic fuel breaks. Avoid ploughing due to impacts on soil health. Slashing or burning is preferred	All of catchment.	FFMVic, CFA.	Yes – Forest Fire Management Victoria (FFMVic) and Country Fire Authority (CFA) coordinate strategic firebreaks.
	Flood	Support landholders to maintain ground cover, aiming for >70% cover.	All floodplain areas.	All land managers.	Yes – Wimmera CMA and partner organisations like Agriculture Victoria, farmer-led groups like Perennial Pasture Systems, Birchip Cropping Group, Landcare to promote this and monitor the outcomes. Funding has substantially reduced since completion of
					since completion of National Landcare Program (phase 2) projects in June 2023.

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
		Test soils and document soil health using Federation University's Visualising Australasia's Soils portal to improve understanding of how to improve soils with compaction and low soil carbon that are susceptible to erosion.	Strategic locations	Landowners	No - funding is required.
	Pest and disease outbreak	Maintain biosecurity provisions, including individual farm biosecurity plans and Agriculture Victoria's plans.	All of catchment.	All land managers, Agriculture Victoria.	Yes.

Riparian Areas, Native Vegetation, Agroforestry and Environmental Plantings on Farms

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
 Riparian areas Native vegetation Agroforestry Environmental 	Bushfire	Fuel-reduction burns in forests and woodlands.	All of catchment.	DEECA, private landholders, Traditional owners.	Yes, in parts.
plantings on farms		Develop and implement property fire plans.	All of catchment.	Private landholders.	Yes.
		Create and/or maintain strategic fuel breaks on farms that protect the asset.	All of catchment.	Private landholders.	Yes.
		Maintain strategic fuel breaks.	All of catchment.	FFMVic, Wimmera CFA.	Yes – FFFMVic and CFA coordinate strategic firebreaks.
		Controlled burns to reduce fuel loads in vegetated areas on farms.	All of catchment.	Landowners	Partially
	Flood	Control invasive weeds in floodplain areas.	Floodplain areas.	Wimmera CMA and partner organisations such as Landcare	Yes – partially.
				DEECA, Parks Victoria.	
		Maintain vegetation cover and groundcover, aiming for >70% cover.	All floodplain areas.	All land managers	Yes – Wimmera CMA and partner organisations like Agriculture Victoria, farmer-led groups like Perennial Pasture Systems, Birchip Cropping Group, Landcare to promote this and monitor the outcomes.
					Funding has substantially reduced since completion of National Landcare Program (phase 2) projects in June 2023.

Water

Asset	Emergency scenario	Actions	Where	Who	Is action currently underway?
Water	Bushfire	Fuel- reduction burns in forests and woodlands.	All of catchment.	DEECA, private landholders, Traditional owners	Yes, in parts.
		Maintain internal property firebreaks, considering catchment protection.	All of catchment.	Private landholders.	Yes.
		Maintain strategic fuel breaks.	All of catchment.	FFMVic, CFA.	Yes – FFFMVic and CFA coordinate strategic firebreaks.
		Controlled burns to reduce fuel loads in vegetated areas.	All of catchment.	Landowners	Partially
	Flood	Maintain groundcover and buffer zones to minimise erosion and poor water quality.	Floodplain areas, riparian areas, catchment areas.	Private landholders.	Yes – Wimmera CMA and partner organisations like Agriculture Victoria, farmer- led groups like Perennial Pasture Systems, Birchip Cropping Group, Landcare to promote this and monitor the outcomes.
					Funding has substantially reduced since completion of National Landcare Program (phase 2) projects in June 2023.

10. AGRICULTURAL NATURAL CAPITAL ASSETS – RESPONSE ACTIONS

This section outlines response actions that could be undertaken for each agricultural natural-capital asset in response to the relevant emergency scenarios such as bushfires, drought, floods, diseases and pests including:

- Where or when the action would need to be undertaken.
- Who could undertake the action.

Agriculture Victoria deploy rural recovery teams on-the-ground post fire and flood to make impact assessments at the individual property level to assess damage and emergency fodder requirements for stock, and offer ongoing support and advice for invasive plant and animal management.

Agricultural soils

Asset	Emergency scenario	Actions	Where	Who		
While event is occurring						
Agricultural soils	Bushfire	Allocate resources to suppress fires and/or undertake protection of known assets from fire and accidental damage during fire suppression.		Best placed: Emergency services and or private land managers.		
		Monitor / assess impacts.	Where fire occurs.	DEECA (Agriculture Victoria), Wimmera CMA.		
	Flood	Monitor / assess impacts.	At known impact sites.	Wimmera CMA.		
	Pest and disease	Monitor/assess impacts.	At known impact sites and other likely impact sites.	DEECA (Agriculture Victoria)		
		Implement biosecurity plans.	At known impact sites.	DEECA (Agriculture Victoria)		
After event has o	ccurred					
Agricultural soils	Bushfire	Rapid assessment of impact.	At known impact sites.	Private landholders, Agriculture Victoria		
		Plan for restoration - Reestablish ground cover as quickly as possible.	At impact sites	Private landholders, Wimmera CMA, Agriculture Victoria.		
	Flood	Rapid assessment of impact.	At known impact sites.	Wimmera CMA.		
		Reinstate damaged fences.	At impact sites.	Private landholders.		

Wimmera CMA – A healthy Wimmera catchment where a resilient landscape supports a sustainable and profitable community

Asset	Emergency scenario	Actions	Where	Who
		Plan for restoration – design of erosion control structures.	At priority impact sites.	Wimmera CMA.
		Construct erosion control.	At priority sites.	Wimmera CMA.
		Repair and maintain any damaged existing structures.	At impact sites.	Wimmera CMA.
	Pest and disease	Develop new and/or implement existing containment and eradication plan.	At known impact sites.	DEECA (Agriculture Victoria).
		Rapid containment and eradication implemented.	At priority sites.	DEECA (Agriculture Victoria).

Riparian Areas, Native Vegetation, Agroforestry and Environmental Plantings on Farms

Asset	Emergency scenario	Actions	Where	Who		
While event is occurring						
Riparian Areas, Native Vegetation, Agroforestry and Environmental	Bushfire	Allocate resources to suppress fires and/or undertake protection of known assets from fire and accidental damage during fire suppression.	Where fire occurs.	Best placed: Emergency services and or private land managers.		
Farms		Monitor / assess impacts.	Where fire occurs.	DEECA (Agriculture Victoria), Wimmera CMA.		
	Flood	Monitor / assess impacts.	At known impact sites.	Wimmera CMA.		
	Pest and disease	Monitor/assess impacts.	At known impact sites and other likely impact sites.	DEECA (Agriculture Victoria).		
		Implement biosecurity plans.	At known impact sites.	DEECA (Agriculture Victoria).		
After event has occurred						
Riparian Areas, Native Vegetation, Agroforestry and	Bushfire	Rapid assessment of impact.	At known impact sites.	Private landholders, Agriculture Victoria		
Asset	Emergency scenario	Actions	Where	Who		
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Environmental Plantings on Farms		Plan for restoration – Re- establish plants as quickly as possible. Reinstate fences.	At impact sites.	Private landholders, Wimmera CMA, Agriculture Victoria.		
	Flood	Rapid assessment of impact.	At known impact sites.	Wimmera CMA.		
		Reinstate damaged fences	At impact sites.	Private landholders.		
		Plan for restoration – design of erosion control structures.	At priority impact sites.	Wimmera CMA.		
		Construct erosion control.	At priority sites.	Wimmera CMA.		
		Repair and maintain any damaged existing structures.	At impact sites.	Wimmera CMA.		
	Pest and disease	Develop new and/or implement existing containment and eradication plan.	At known impact sites.	DEECA (Agriculture Victoria).		
		Rapid containment and eradication implemented.	At priority sites.	DEECA (Agriculture Victoria).		

Water

Asset	Emergency scenario	Actions	Where	Who
While event is oc	curring			
Water	Bushfire	Allocate resources to suppress fires and/or undertake protection of known waterways from fire and accidental damage during fire suppression.	Where fire occurs.	Best placed: Emergency services and or private land managers.
		Monitor / assess impacts.	Where fire occurs.	DEECA (Agriculture Victoria), Wimmera CMA.
	Flood	Monitor / assess impacts.	At known impact sites.	Wimmera CMA.

Asset	Emergency scenario	Actions	Where	Who
After event has o	ccurred			
Water	Bushfire	Rapid assessment of impact.	At known impact sites.	Private landholders, Agriculture Victoria.
		Plan for restoration – Re- establish ground cover as quickly as possible.	At impact sites.	Private landholders, Wimmera CMA, Agriculture Victoria.
	Flood	Rapid assessment of impact.	At known impact sites.	Wimmera CMA.
		Reinstate damaged fences to manage stock and allow ground cover and vegetative cover to reestablish.	At impact sites.	Private landholders.
		Plan for restoration – design of erosion control structures.	At priority impact sites.	Wimmera CMA.
		Construct erosion control	At priority sites	Wimmera CMA.
		Repair and maintain any damaged existing structures.	At impact sites.	Wimmera CMA.

11. EMERGENCY MANAGEMENT IN VICTORIA

This section describes Victoria's emergency-management planning framework and, together with Section 11 of this Plan, describes the roles and responsibilities of organisations involved in emergency management in Victoria including the role of Wimmera CMA.

Victorian Emergency Management Act 2013

The Victorian Emergency Management Act 2013 (EM Act) establishes Victoria's emergency management framework. This includes establishment of Emergency Management Victoria, an organisation supporting an Emergency Management Commissioner with overall responsibility for coordination before, during and after major emergencies including management of the consequences of an emergency.

The Emergency Management Commissioner is responsible for arranging for preparation of a state emergency management plan.

Victorian State Emergency Management Plan

The Victorian State Emergency Management Plan (2023) (SEMP) provides an integrated, coordinated, and comprehensive approach to emergency management at the state level. The SEMP contains provisions providing for mitigation of, response to and recovery from emergencies. It specifies the roles and responsibilities of agencies involved in emergency management.

Grampians Regional Emergency Management Plan

The *EM Act* requires the preparation of regional emergency management plans (REMPs) by Regional Emergency Management Planning Committees (REMPC) and approved by the Emergency Management Commissioner.

The Wimmera is part of the Grampians emergency management region. The Grampians emergency management region extends from the western edge of Melbourne to the South Australian border and includes two sub-regions – the Central Highlands; and Wimmera Southern Mallee. The region incorporates 11 Local Government Areas. Seven of these local government areas partially overlap with the Wimmera CMA region: Ararat, Hindmarsh, Horsham, Northern Grampians, Pyrenees, West Wimmera and Yarriambiack.

REMPCs are multi-agency collaborations with membership comprising organisation, industry and personal expertise relevant to regional emergency management planning. Wimmera CMA is an active member of the Grampians Regional Emergency Management Planning Committee.

The Grampians Regional Emergency Management Plan seeks to reduce the likelihood of emergencies, the effect of emergencies on communities, and the consequences of emergencies for communities. The REMP supports holistic and coordinated emergency-management arrangements within the region and is a subordinate plan to the SEMP.

This REMP documents the agreed emergency-management arrangements for mitigation, response, relief, and recovery and defines the roles and responsibilities of stakeholders at the regional level.

Municipal Emergency Management Plans

Municipal Emergency Management Plans (MEMPs) are prepared by Municipal Emergency Management Planning Committees. MEMPs document the agreed emergency-management arrangements for mitigation, response and recovery, and define the roles and responsibilities of stakeholders at the municipal level. At the local level, a MEMP contextualises its REMP and is informed by local and municipal risks.

Figure 1 depicts Victoria's emergency management planning framework.



Figure 1. Framework for emergency management planning in Victoria (EMV, 2023)

12. ORGANISATIONAL ROLES AND RESPONSIBILITIES (KEY CONTACTS)

The State Emergency Management Plan sets out roles and responsibilities for emergency management in Victoria for mitigation, response, relief and recovery.

A high-level overview of arrangements and specific details of agency roles and responsibilities in emergency management are available in the web-based State Emergency Management Plan document: <u>Roles and</u> <u>Responsibilities | Emergency Management Victoria (emv.vic.gov.au)</u>.

This Plan lists organisations involved in emergency preparedness, response and recovery and what their role is in relation to this Plan (Table 4). The Plan does not list contact names and details because they are subject to frequent change.

Table 4: Key lead and supporting organisations involved in emergency preparedness, response and recovery in the Wimmera that will help deliver on this plan.

Organisation	Role
Agricultural extension and industry groups including: Perennial Pasture Systems, Birchip Cropping Group, Victorian No-Till Farmers Association.	Farmer-led organisations supporting peer learning and practical information on best-management techniques for soil conservation and productivity benefits in local conditions. These organisations partner with Wimmera CMA on sustainable- agriculture projects and activities, including supporting farmers to retain ground cover to protect productive soils from wind and water erosion, including during and after bushfire, flood, and drought.
Barengi Gadjin Land Council.	Trustee for the Native Title rights and interests of the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagulk peoples, collectively known as the Wotjobaluk peoples as recognised in the Consent Determination in 2005. Registered Aboriginal Party under the <i>Victorian Aboriginal Heritage Act 2006</i> .
Country Fire Authority (CFA) / Fire Rescue Victoria.	The CFA is a large volunteer-based emergency-service organisation. The CFA works with Victoria's emergency services to fulfil its mission to protect lives and property through operational response and the promotion of community safety and education. The CFA plays a role in implementing this plan to protect biodiversity and agricultural natural-capital assets when performing its operations. The CFA works with Victorian fire-fighting agency Fire Services Victoria.
Eastern Maar Aboriginal Corporation.	Manages native title rights for the Eastern Maar people. Registered Aboriginal Party for Eastern Maar Country.
Grampians Wimmera Mallee Water corporation (GWMWater).	Responsible for managing groundwater and surface-water resources, including water and wastewater services and associated infrastructure.
Greening Australia.	Engages the community in vegetation management to protect and restore the health, diversity, and productivity of Australian landscapes.
Landcare Networks.	Hindmarsh Landcare Network, Horsham Landcare Network, Project Platypus and Yarrilinks Landcare Network are community-based organisations that provide support to Landcare Groups and landholders in their local areas through leadership, planning and resources.
Local farming, conservation, and waterway protection groups: Landcare groups, 'Friends of' groups, river- improvement committees.	Wimmera environmental volunteering groups whose focus includes capacity building and undertaking on-ground natural resource management works such as invasive plant and animal control, revegetation, waterway monitoring and improving farming practices at a local scale.

Organisation	Role
Local Government, municipalities of Ararat, Buloke, Hindmarsh, Horsham, Northern Grampians, Pyrenees, West Wimmera and Yarriambiack.	Responsible for localised services including emergency management such as response and recovery. Have a legislated role to assist with local planning and preparation for emergency events. This involves leading the preparation of Municipal Emergency Management Plans (MEMP) and coordinating MEMP Committee meetings involving local emergency-management agencies.
Parks Victoria.	A statutory authority established to protect, conserve and enhance Parks Victoria- managed land, including its natural and cultural values, for the benefit of the environment and current and future generations consistent with the Parks Victoria Act 2018. The Wimmera catchment includes almost 290,000 hectares managed by Parks Victoria. Parks Victoria plays a significant role in fire and emergency management as a support agency and partner in the whole-of-government planning and response program. Parks Victoria supports DEECA to prepare for, respond to and recover from bushfires on public land. Parks Victoria also has a key support role in other emergency events. Parks Victoria works in partnership with DEECA responding to bushfires and conducting planned burns and other fuel-management activities under the brand 'Forest Fire Management Victoria' (FFMVic). Parks Victoria also engages in a comprehensive monitoring and research program informing bushfire- management planning. This includes pre-fuel and post-fuel hazard monitoring, projects relating to ecosystem reliance, evidence-based management and application of ecological fire and post-fire regeneration in fire-sensitive bioregions (Parks Victoria, 2024).
Trust for Nature.	Responsible for helping people protect biodiversity on private land. This includes conservation covenants, land-management stewardship, Revolving Fund program, land ownership and management and assistance in arranging native-vegetation offsets. Trust for Nature can support and facilitate fire on private land for asset management and threatened species purposes.
Victorian Government Department of Energy, Environment and Climate Action (DEECA).	DEECA brings together Victoria's energy, environment, water, agriculture, forestry, resources, climate action and emergency-management functions into a single department to maximise connections between the environment, community, industry and economy. DEECA aims to improve Victoria's liveability with a population that is expected to almost double by 2050, while responsibly taking climate action and protecting the natural environment, infrastructure and heritage for future generations.
DEECA - Agriculture Victoria.	 Agriculture Victoria works with the agriculture industry on research, development, and extension to improve production, connect the sector with international markets, support development and maintain effective biosecurity controls. Agriculture Victoria works with Victorian farmers and industry to prepare for, respond to and recover from natural disasters, including floods and storms. This includes delivering technical information and supporting events to support farmbusiness recovery. Agriculture Victoria also works with industry, community, and other government agencies to respond to biosecurity outbreaks. Agriculture Victoria is a lead regulator for Biosecurity, including: The lead agency for managing biosecurity legislative outcomes and biosecurity threats within Victoria. Working with the Commonwealth and other state and territory governments to enhance Australian and Victorian biosecurity through national committees, working groups, production of standards and shared emergency management exercises.

Organisation	Role
	 Collaborating with other Victorian government departments to ensure the effective delivery of biosecurity outcomes and compliance and to ensure enforcement is delivered within this system. Working with local government and community groups to promote shared responsibility within our biosecurity system.
DEECA - Forest Fire Management Victoria (FFMVic).	FFMVic's core purpose is to protect people, property and the environment by managing bushfires and bushfire risk in Victoria's parks, forests and other public land, and by minimising the impact of fire on communities and the environment. This management includes: risk-based bushfire management and planning; fire prevention and preparedness; fuel-management programs (including planned burning); and emergency response and recovery.
Victorian Government Department of Transport and Planning (DTP).	DTP's key responsibility for emergency management is to minimise the impact of emergencies across its portfolio areas through effective preparation, coordination, response, and recovery. DTP's role in this Plan is in relation to biodiversity assets on roadsides managed by DTP.
Victoria Police (VicPol).	VicPol's role is to serve the Victorian community and uphold the law to promote a safe, secure and orderly society through preserving the peace, protecting life and property, preventing the commission of offences, detecting and apprehending offenders and helping those in need of assistance. VicPol has emergency-management control and coordination functions, as outlined in the <i>Emergency Management Act 2013</i> and the SEMP.
Victoria State Emergency Service (VicSES).	VicSES is a volunteer-based organisation that provides emergency assistance to minimise the impact of emergencies and strengthen the community's capacity to plan, respond and recover, when emergencies occur. VicSES is the control agency for storm, flood, earthquake, tsunami and landslide throughout Victoria.
Wimmera CMA.	Wimmera CMA is responsible for the integrated planning and coordination of land, water and biodiversity management in the Wimmera catchment and land- protection region. It is also responsible for coordinating regional investment in integrated catchment
	management. It also provides a link between the Wimmera community, Victorian and Australian Governments.
	It also carries out several statutory functions including floodplain management and delivery of water for the environment.
	Wimmera CMA has a key role to advise on flood mitigation, provide support to flood response, and lead flood-recovery programs where resources are available to conduct works. Wimmera CMA also provides support and advise to emergency-service organisations in areas of expertise.

There are a range of other organisations that play an important role in regional emergency management but are less involved in biodiversity and agricultural natural-capital preparedness, response and recovery.

This includes Ambulance Victoria, Australian Red Cross, Department of Families, Fairness and Housing, Department of Health, Grampians Health, Emergency Recovery Victoria, VCC Emergencies Ministry, West Wimmera Health Service, and Wimmera Emergency Management Team.

Wimmera CMA's role in emergency management

Wimmera CMA's primary role in relation to emergencies is to provide support and advice and to assist with recovery in areas where it can provide expertise.

An organisational Role Statement in the SEMP describes the support and advisory role of CMAs in mitigation, response, and recovery in relation to floods, the natural environment, and land (https://www.emv.vic.gov.au/responsibilities/state-emergency-management-plan-semp/roles-and-responsibilities).

A summary of Wimmera CMA's current role is provided here, noting that it's possible for roles to change over time:

Preparedness:

- Working in partnership with the community, stakeholders, government and partners to deliver advice, services and events to enhance the region's land, water and biodiversity, and prepare for and build resilience to natural disasters and emergency events.
- Improving flood information and providing it for specific properties such as flood-extent maps, flood heights and insurance enquiries.
- Developing strategic documents for land, water and biodiversity management based on local knowledge and leading science.

Response:

• Providing advice and support to emergency-service organisations as required, particularly specialist flood-intelligence advice to VicSES and incident controllers during floods.

Recovery:

- Providing assistance to landholders to aid recovery after environmental events such as floods, fire and drought.
- Environmental monitoring such as surface water, groundwater, salinity, and plant and animal species and communities.
- Managing environmental water releases to help water quality, vegetation, and animals, underpinning environmental health and recreational and social activities.
- Supporting Landcare groups, Landcare facilitators and other groups to plan and implement a wide variety of actions to meet community needs.

Wimmera CMA's experience, knowledge and expertise

Wimmera CMA is the leading natural-resource-management organisation in the Wimmera Management Unit. It has been the preferred service deliverer of environmental, natural-resource management and sustainableagriculture projects in the Wimmera for the Australian and Victorian Governments since 1997. This includes Natural Heritage Trust (NHT)-funded programs. It is recognised for delivering integrated, innovative, strategic, value-for-money projects, making significant contributions to the environment, sustainable agriculture and community, while aligning with investors' priorities.

Wimmera CMA has a long-standing relationship with the Australian Government and has delivered a variety of services through initiatives such as the National Disaster Relief and Recovery Arrangements, Future Drought Fund, National Landcare Program, and other Natural Heritage Trust funding iterations. It also has a long-standing relationship with the Victorian Government.

It has successfully delivered a range of Commonwealth and Victorian Government-funded programs for many years. Relevant activities include regional natural resource management planning, sustainable agriculture projects, drought, fire and flood recovery projects, floodplain management, biodiversity projects, and supporting Traditional Owner involvement in planning and projects.

Wimmera CMA has proven expertise in developing and implementing regional strategies and plans in collaboration with stakeholders and the regional community. It has strong working relationships with Barengi Gadjin Land Council and First Nations People.

Wimmera CMA fulfils its statutory role to provide support and expertise related to mitigation, planning, preparedness, response, and recovery from emergencies. It has excellent relationships with emergency-service organisations including Emergency Management Victoria, Victoria State Emergency Services, Country Fire Authority, Department of Energy, Environment and Climate Action, and local government authorities. It actively participates in Regional and Municipal Emergency Management Committee meetings.

Wimmera CMA has an adaptable, skilled and experienced workforce. it has a proven track record of adapting and responding quickly to emergency situations and natural disasters, with experienced staff able to reprioritise our activities and respond appropriately as needed.

13. STAKEHOLDER AND COMMUNITY ENGAGEMENT

This section outlines Wimmera CMA's approach to developing and communicating this Plan to stakeholders, including how we will support (and integrate this plan into) Commonwealth, state and territory government efforts to identify and incorporate biodiversity and agricultural natural-capital assets into emergency response management and planning systems.

Engagement, Collaboration and Coordination activities

Wimmera CMA has excellent relationships with emergency services, biodiversity, and sustainable agriculture stakeholders and First Nations People in the Wimmera. Working in collaboration with stakeholders and the regional community is a strength of its approach to delivering plans, strategies, and projects.

The approach used to develop and communicate this Plan to stakeholders and collaborate included:

- Providing stakeholders with early information at the commencement of Plan development in December 2023 and inviting feedback on their preferences regarding their involvement.
- Providing information via existing forums that emergency services, biodiversity and agricultural stakeholders are already involved with and meet regularly. This included the combined Wimmera Municipal Emergency Management Committee. Wimmera CMA briefed the committee and invited feedback at December 2023 and March 2024 meetings that discussed the Plan.
- Multiple meetings, phone discussions and emails with key stakeholders including DEECA Forest Fire Management Victoria and Natural Environment Programs, Country Fire Authority, Trust for Nature, Greening Australia, Landcare facilitators, Agriculture Victoria, Victorian CMAs, and South Australian Limestone Coast Landscape Board.
- Providing multiple and flexible opportunities for input, including targeted contributions provided to stakeholders early and at key points during the development process. This included Wimmera CMA inviting stakeholders to provide feedback on and contribute to:
 - A list of biodiversity and agricultural natural-capital assets proposed for inclusion in the Plan during December 2023 and January 2024.
 - Initial draft information describing each asset and appropriate preparedness, response and recovery actions during February 2024.
 - A full draft of the Plan and associated mapping provided at the end of February 2024 for comment and feedback during March.

Stakeholders provided valuable feedback vie email, phone calls and meetings, resulting in refinements and improvements incorporated into the Plan.

Community consultation occurred by consulting with representatives of community groups with an interest in biodiversity, sustainable agriculture and emergency management. Examples include Landcare Networks, farmerled sustainable agriculture groups such as Perennial Pasture Systems and Victorian No-till Farmers Association, local government, Victoria State Emergency Service and the Country Fire Authority.

Where relevant, Wimmera CMA used relevant existing information developed in partnership with stakeholders to guide Plan content. For example, the *Wimmera Regional Catchment Strategy* (2021) and its addendum, the *Regional Land Partnerships Program Action Plan* (2021) form the Wimmera's Natural Resource Management Plan. The plans describe the region's desired outcomes and priority assets of national and regional significance, identified in partnership with regional biodiversity, sustainable agriculture stakeholders and First Nations People.

Wimmera CMA discussed the Plan with emergency-service agencies via combined Municipal Emergency Management Planning Committee meetings. Discussions included the appropriateness of the Plan becoming a complementary plan or reference document to Regional or Municipal Emergency Management Plans. Future discussions with these Committees will continue to facilitate implementation of the Plan.

Wimmera CMA will also continue to discuss the Plan with relevant Victorian Government agencies including DEECA, Forest Fire Management Victoria and Agriculture Victoria.

Wimmera CMA will liaise with relevant incident control agencies to consider the Plan during emergency response and recovery activities.

Raising Public Awareness

After the Plan has been finalised and approved, Wimmera CMA will promote it to the public via Wimmera CMA's website and social-media platforms.

Beyond the life of this project, additional funding will be required to raise public awareness.

Education and Training

Wimmera CMA will encourage emergency-management authorities to make the Plan part of their training and educations programs.

Key gaps

Where possible, gaps in preparedness, response and recovery actions for assets have been identified in the tables included in Sections 4, 5 and 6 of this Plan. For example, actions such as research or monitoring tasks have been included that are designed to fill identified gaps.

General gaps identified by Wimmera CMA and stakeholders affecting many species include:

- There is a gap in up-to-date information regarding the locations of many species and/or the persistence
 of species where observation records are quite old. Further survey and monitoring work to identify the
 locations of threatened species and communities is required to feed into emergency preparedness,
 response, and recovery actions.
- There are some species where the impact of emergencies is unknown and further work is required to ensure appropriate management is implemented and unintended impacts are avoided (eg. Eltham Copper Butterfly).

Funding to support ongoing implementation of this Plan is also a key gap.

14. LEGAL FRAMEWORK

Emergency management

The Victorian Emergency Management Act 2013 (EM Act) establishes Victoria's emergency management framework. The State Emergency Management Plan (SEMP) is authorised through the EM Act which contains provisions providing for the mitigation of, response to and recovery from emergencies, and specifies the roles and responsibilities of agencies in relation to emergency management.

EM Act: https://www.legislation.vic.gov.au/in-force/acts/emergency-management-act-2013/021

SEMP: https://www.emv.vic.gov.au/responsibilities/state-emergency-management-plan-semp

Workplace Health and Safety

Wimmera CMA is committed to the most effective management of health, safety and wellbeing and providing a workplace culture where the health, safety and wellbeing of employees, contractors, volunteers, customers, and visitors is highly valued.

Wimmera CMA aims to minimise the risk of injury and disease to our employees and others by adopting a planned and systematic approach to the management of health, safety and wellbeing and providing the resources for its successful implementation and continuous improvement.

Wimmera CMA's Occupational Health, Safety and Wellbeing Program (the Program) provides the framework for managing occupational health and safety across the organisation. The current system has been in place since 2017 and independently audited.

The Program is designed to ensure that:

- All hazards and risks to health, safety and wellbeing are identified, assessed and where they cannot be eliminated are effectively controlled.
- Measures to control hazards and risks to health, safety and wellbeing are regularly monitored and evaluated with a philosophy of continual improvement.
- All employees, contractors, volunteers, customers and visitors are consulted and encouraged to
 contribute to the decision-making process on occupational health and safety matters affecting their
 health, safety and wellbeing at work.
- All managers, supervisors and employees receive the appropriate information, instruction, training and supervision to safely carry out their responsibilities.
- All employees are aware of issues that impact on health, wellbeing and safety and the importance of general health and wellbeing and its impact on safety and wellbeing in the workplace.

The Program is underpinned by Wimmera CMA's Occupational Health and Safety Strategy and Policy, supported by a range of policies and procedures, conditions of employment and relevant processes which enable employees to manage operational requirements within their personal needs and workplace obligations.

15. RISK MANAGEMENT INCLUDING MITIGATION STRATEGIES

This section outlines the key overarching risks associated with the implementation of this Plan's actions and how they can be mitigated.

Table 5 outlines the key overarching risks associated with implementation of preparedness, response and recovery actions for biodiversity and agricultural natural-capital assets, and risk mitigation actions.

Ratings for the likelihood, consequence and overall risk were assigned using Wimmera CMA's Risk Management Framework (Wimmera CMA, 2023).

Table 5: Key overarching risks associated with implementation of asset preparedness and response actions.

Risk	Likelihood	Consequence	Risk Rating	Risk mitigation action	Residual risk
The health, safety and wellbeing of employees or contractors is impacted by their role in responding to	Possible	Extreme	High	The philosophy of protecting lie and property will take precedence.	Moderate
event.				Emergency services training and accreditation pathways are implemented.	
Unintended ecosystem destruction occurs because of emergency response actions.	Unlikely	Moderate	Moderate	Preparedness plan is provided to emergency services agencies for use in incident control centres. The plan is socialised through REMPC and MEMPCs.	Low
Resources are not available to implement this Plan.	Unlikely	Moderate	Moderate	A partnership approach is used through REMPC and MEMPC to ensure actions are met.	Low.
Emergency services organisations are not aware of this Plan.	Unlikely	Moderate	Moderate	Wimmera CMA participates in Regional and Municipal Emergency	Low

Risk	Likelihood	Consequence	Risk Rating	Risk mitigation action	Residual risk
				Management Planning Committees.	
The Plan is not implemented by emergency services organisations.	Unlikely	Moderate	Moderate	Seek funding to implement the plan.	Low

16. MONITORING AND DATA

This section outlines the nature of data collected or used as part of this Plan and how it will be accessed, shared, analysed and stored in the Wimmera and accessible to the Australian Government.

The sections below describe how the data used can be viewed online, accessed and downloaded. Wimmera CMA has included maps in Appendix 1 for each of the assets and susceptibility to bushfire and flood.

Maps of the Locations of Biodiversity Assets

Threatened species locations

Wimmera locations inhabited by threatened species are key information informing where preparedness, response and recovery actions should occur.

Maps in this Plan

This Plan includes maps showing where priority Wimmera threatened species have been observed and recorded based on records in the Victorian Biodiversity Atlas (VBA) (Appendix 1).

VBA threatened species records included in this Plan are based on the most recent version of VBA data available when the maps were developed, dated 23 December 2023.

A small number of threatened species maps include locations where Wimmera CMA and stakeholders have recorded species, but records are not yet available in the VBA. Stakeholders reported that they have submitted these records to the VBA and they are awaiting verification by DEECA administrators. This data includes Swift Parrot records stored in Birdlife Australia's Birdata database, Australasian bittern sighting recorded by Wimmera CMA's Lake Hindmarsh bird monitoring project, and Eltham Copper Butterfly records provided by DEECA and the Wetland Revival Trust.

Maps included in this Plan provide an indication of species locations but will not remain current if new observations are recorded after this Plan is completed.

Victorian Biodiversity Atlas - data source, accessibility and availability

The VBA is the primary data source for flora and fauna sightings including threatened species across Victoria for the full period of record. Anyone observing a threatened species can submit their observations and have them uploaded to the atlas once verified by DEECA administrators.

Organisations implementing this Plan and undertaking emergency preparedness, response and recovery activities can access and view VBA species locations, which are publicly available online:

- VBA: https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas.
- DEECA's Naturekit Victoria mapping tool: <u>https://www.environment.vic.gov.au/biodiversity/naturekit</u>.
- The data can be downloaded from: <u>https://www.data.vic.gov.au/</u>.

These are the preferred sources of species observations as they are the most up-to-date and are user-friendly and fit for purpose.

The VBA is periodically updated, and administrators are working through a process to have all programs that use VBA data using the most current data. This includes NatureKit which is currently updated every 4-6 weeks or after major updates in the VBA (Cursio, 2024).

VBA data is also available on eMap, a web-based platform that provides access to various mapping and data services for emergency, fire, resource, and water management in Victoria. eMap is annually updated and provides access to species records after the year 1980. Pre-1980 records are not available.

Some species locations are sensitive due to risks such as illegal poaching or removal and landholder privacy. The VBA's general level of access shows an approximate site location for sensitive records. Applications for access to sensitive data can be made by emailing <u>vba.help@delwp.vic.gov.au</u>. DEECA's VBA administrators consider applications based on the type of data and the reason for the request. Accessing this data is important for emergency preparedness, response and recovery to ensure threatened species locations are managed appropriately.

Habitat Distribution Models - data source, accessibility and availability

Habitat distribution models predict and map where species are most likely to occur and where they might not occur using the best scientific information available. Arthur Rylah Institute's website (<u>https://www.ari.vic.gov.au/research/modelling/habitat-distribution-models-hdms</u>) provides the following information:

Habitat distribution models predict where suitable habitat may exist for a species, based in part on verified observations of the species in their natural environments. The models are mathematical relationships between confirmed species locations and sets of environmental predictors that provide detailed information on climate, terrain, local productivity, vegetation structure, and other parameters. The model's output is expressed as a mapped 'habitat suitability' index across Victoria.

The Arthur Rylah Institute and Victorian Government Department of Energy, Environment and Climate Action have developed habitat distribution models for almost all of Victoria's terrestrial flora and fauna species, with published versions currently available for all listed rare and threatened species.

New and relevant species observations along with continual improvements for information technology will provide opportunities to refine and maintain the usefulness of these products.

Organisations implementing this Plan and undertaking emergency preparedness, response and recovery activities can access, view and download species habitat distribution models, which are publicly available online:

 DEECA's Naturekit Victoria mapping tool: <u>https://www.environment.vic.gov.au/biodiversity/naturekit</u>.

Maps showing both habitat distribution models and Victorian Biodiversity Atlas species observations can be viewed and downloaded on Naturekit, making it a valuable planning tool.

Threatened ecological communities - locations

The locations in the Wimmera containing remnant patches of threatened ecological communities are key information informing where preparedness, response and recovery actions should occur.

Wimmera CMA has prepared maps showing likely locations of threatened ecological communities for this Plan (Appendix 1). The maps include the following data:

• The Australian Government's mapping of Ecological Communities of National Environmental Significance Distributions 2020 mapping (DAWE, 2021). This data can be downloaded from the Australian Government Department of Climate Change, Energy, the Environment and Water's 'Find Environmental Data' geoportal:

https://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7B184A379 3-2526-48F4-A268-5406A2BE85BC%7D.

 Mapping of Victorian Ecological Vegetation Classes (EVCs) considered to be likely equivalents to the EPBC-listed threatened ecological communities. This is consistent with EVCs identified in the Conservation Advice and National Recovery Plan for the ecological community (DSE, 2005). This data can be downloaded from Victoria's DataVic open data platform:

https://discover.data.vic.gov.au/dataset/native-vegetation-modelled-2005-ecological-vegetation-classes-with-bioregional-conservation-sta

Note that it is unknown whether all mapped EVC locations currently meet the criteria for the threatened ecological community. This depends on their species composition and condition and has not been assessed for most locations. These sites would require an on-ground assessment to determine if they meet the criteria for the threatened ecological community. The maps in Appendix 1 provide a guide for potential existing locations of the threatened community and sites that could be managed and improved to meet the criteria over time.

Ramsar sites – locations

The Ngalpakatia/Ngelpagutya (Lake Albacutya) Ramsar Site is in the Wimmera region. Figure 19 in Appendix 1 maps the location of the Ramsar site and its catchment area. The map uses the following data:

- The Australian Government's mapping of Ramsar Wetlands of Australia which shows the location and boundary of the Ramsar site. This data can be downloaded from the Australian Government Department of Climate Change, Energy, the Environment and Water's 'Find Environmental Data' geoportal: https://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7BF49BFC55-4306-4185-85A9-A5F8CD2380CF%7D.
- Wimmera CMA's mapping of wetland catchments created using elevation data supplemented by surface water features (SKM, 2006). This dataset is available from Wimmera CMA on request.

Maps of the Locations of Agricultural Natural Capital Assets

Wimmera CMA mapped all agricultural natural capital assets using a single map based on the methodology and assumptions described here. The map can be viewed in Appendix 1, Figure 20.

The map is based on Victoria's Land Cover Time series (VLCTS) data for the time period 2015-2019. DEECA's website describes the VCTLS data as a visual and analytical snapshot of the current and previous type of land cover over different areas. That cover can include native forests, bushland, wetlands, farmland, land used for recreation, and built up areas, including towns and cities (DEECA, 2024).

Agricultural soil assets

Wimmera CMA's mapping combines the 6 agricultural land uses from the VCLTS into a single category. This combines the following land use categories: Horticulture/irrigated pastures and crops, Dryland cropping, Exotic pasture/grassland, Hardwood plantation, Conifer plantation, Other exotic tree cover.

Riparian Areas, Native Vegetation, Agroforestry and Environmental Plantings on Farms

The mapping combines the VLCTS's 7 natural environment land uses found in the Wimmera into a single category. This combines the following land use categories: Treed native vegetation, Scattered native trees, Native shrubland, Native pasture/grassland, Natural low cover, Wetland – perennial, Wetland – seasonal.

Water assets

The mapping shows the location of Wimmera waterways including major rivers and streams, and wetlands based on statewide hydrology layers available from Victoria's DataVic open data platform: https://www.data.vic.gov.au/.

Rationale and assumptions

The reason Wimmera CMA combined VLCTS categories is to clearly map where agricultural natural capital assets occur based on the following assumptions:

- The risk to agricultural soils from natural disasters and catastrophic events like bushfire and flood are similar regardless of agricultural land use or production type. For example, the risk of soil erosion following removal of ground cover by bushfire is present irrespective of land use.
- The VLCTS clearly shows where native vegetation occurs in the landscape, including on agricultural properties. Data is not available to delineate between remnant patches of native vegetation, agroforestry and environmental plantings on farms. Hence, combining the VLCTS's vegetation categories provides a proxy map of where these areas are likely to occur. The preparedness, response and recovery actions included in this Plan are similar across the different categories of vegetation on farms.

The VLCTS datasets can be accessed via the following links:

- Can be viewed on DEECA's Naturekit Victoria mapping tool: <u>https://www.environment.vic.gov.au/biodiversity/naturekit.</u>
- Can be downloaded from Victoria's DataVic open data platform: <u>https://discover.data.vic.gov.au/dataset/victorian-land-cover-time-series</u>.

The map is available in Appendix 1 (Figure 20) and spatial layers can be provided by Wimmera CMA on request.

Maps of Susceptibility to Natural Disasters and Emergency Events

The main natural disasters and emergency events included in this Plan are bushfire or wildfire and flooding.

Bushfire risk

Wimmera CMA worked with DEECA staff to deliver a bushfire risk assessment and maps for this Plan. DEECA's Bushfire Risk, Engagement and Predictive Services team provided the information in Appendix 3 to inform bushfire risk mapping and assessments for this Plan. Maps are included at Appendix 1, Figures 21 and 22.

Areas subject to flooding

The flood map shows the probable maximum flood, or the largest flood that can occur in the Wimmera region from riverine flooding. The map combines data on maximum flood extent from flood investigations completed in the region (Appendix 1, Figure 23).

Flood investigations involve a detailed technical analysis of historic information to determine future flooding possibilities and their impacts. Community participation and ground-truthing are essential parts of investigations. The map is available from Wimmera CMA on request.

The flood map does not show stormwater or overland flooding that can occur because of rainfall events, because susceptibility or risk is not mapped for this parameter. All low-lying areas in the Wimmera are susceptible to localised flooding from rainfall events.

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18. APPENDICES

The following Appendices are provided as separate documents:

Appendix 1.	Mapping of Wimmera biodiversity assets, agricultural natural capital assets and susceptibility to natural disasters and emergency events		
Appendix 2.	Multi-jurisdictional Inventory of Assets		

Appendix 3. DEECA Bushfire Risk Assessment Metadata Statement Wimmera CMA