2024

East Gippsland Biodiversity and Agricultural Natural Capital Emergency Preparedness and Response Plan

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EAST GIPPSLAND CATCHMENT MANAGEMENT AUTHORITY

Acknowledgements

We acknowledge the Traditional Owners and First Nations people of East Gippsland and recognise their continuing connection to Country, Culture and Community. We pay our respects to Elders past and present.

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EAST GIPPSLAND CATCHMENT MANAGEMENT AUTHORITY

Executive Summary

East Gippsland is the crown jewel of the region. With over 83% of its land being public, stretching from the alps to the sea, it hosts a long list of rare and threatened species and communities that are affected by various events.

This plan sets out to provide natural resource managers with details of East Gippsland's biodiversity and agricultural natural capital assets to prepare, respond and recover from emergencies and extreme events. With an increase in the frequency and intensity of environmental events due to our changing climate, there is an increasing need to plan for events of varying magnitude.

In recent years, East Gippsland has experienced some of the driest droughts, landscape scale fires, major flooding, severe thunderstorms; these unprecedented events are impacting communities, agricultural production and biodiversity. The compounded effects of these disasters are weakening the resilience of natural environments, making recovery more challenging and increasing the vulnerability of the region's assets to future events.

With strong relationships with regional agencies and communities, combined with extensive experience in emergency management in East Gippsland, the East Gippsland Catchment Management Authority is well-equipped to collaborate with local partners to synthesise a collective understanding and develop a comprehensive plan.

Assets have been identified aligning with the East Gippsland Natural Resource Management Plan which details species and threatened ecological communities of a high priority within the region. Key gaps have been identified by a number of agencies to further enhance this plan and create the best possible outcomes for the East Gippsland region.

Assets that are at highest risk for each emergency scenario.

Bushfire

Species
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Long-footed Potoroo (*Potorous longipes*)
- Southern Long-nosed Potoroo (*Potorous tridactylus trisulcatus*)
- Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus*)
- Threatened Mountain Galaxia spp. Including Dargo Galaxias, East Gippsland Galaxias, Yalmy Galaxias and McDowall's Galaxias
- Giant Burrowing Frog (*Heleioporus australiacus*)
- Southern Heath Frog, Watson's Tree Frog (*Litoria watsoni*)
- Alpine She-oak Skink (*Cyclodomorphus praealtus*)
- Leafy Nematolepis (*Nematolepis frondose*)

Threatened Ecological Communities
- Alpine sphagnum bogs and associated fens
- Natural Temperate Grasslands of the South-eastern Highlands
- Silurian Limestone Pomaderris Shrubland of the South East Corner and Australian Alps Bioregions (Threatened Ecological Communities)

Agricultural capital asset
- Soils
- Riparian areas, native vegetation, and environmental plantings on farms
- Water

Drought

Species
- Australasian Bittern (*Botaurus poiciloptilus*)
- Brush-tailed rock-wallaby *(Petrogale penicillate*)
- Long-footed Potoroo (*Potorous longipes*)
- Southern Long-nosed Potoroo (*Potorous tridactylus trisulcatus*)
- Eastern Dwarf Galaxias (*Galaxiella pusilla*)
- Green and Golden Bell Frog (*Litoria aurea*)
- Bog Willow Herb (*Epilobium brunnescens subsp. beaugleholei*)
- Dwarf Kerrawang (*Commersonia prostrata*)

Threatened Ecological Communities
- Alpine sphagnum bogs and associated fens
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (Threatened Ecological Community)

Storm Surge and Coastal Erosion

Species
- Australian Fairy Tern (*Sternula nereis nereis*)
- Eastern Curlew (*Numenius madagascariensis*)

Flood

Agricultural capital asset
- Soils

Blue-green Algae Blooms

Species
- Australasian Bittern (*Botaurus poiciloptilus*)

Biosecurity

A priority list of natural capital assets is not included for biosecurity as it would depend on the nature of the threat. Please refer to the body of the Plan for further information.

Image credit: **Sean Phillipson**

Contents

1 Background

Image credit: **Sean Phillipson**

Located in the south-east corner of mainland Australia, the East Gippsland Catchment Management Authority (CMA) region covers 2.2 million hectares of land, lakes, and coastal waters.

At the confluence of eastern and southern Australia (entirely south of the Great Dividing Range), East Gippsland is home to an abundance of significant flora and fauna, including marine life and migratory species. East Gippsland covers 10% of Victoria's land area, yet the southeast coast of Australia, including this region, is home to over 90% of the country's species diversity. The East Gippsland CMA is located on the lands of the Gunaikurnai, Bidwell and Ngarigo Monero people.

About 83% of the region is in public ownership, mainly as state forests, national, coastal, and marine national parks, and virtually all of this retains extensive native vegetation cover. East Gippsland is the only place on mainland Australia where such continuity of natural ecosystems – from the alps to the sea – still exists (EGCMA RCS, 2021) with catchment borders extending to the New South Wales border to the east, the heritage listed Mitchell River in the west, elevations of 1500 metres in the north, down to three nautical miles (5.5 kilometres) off the coast in the south.

The region contains significant natural assets like the declared 'heritage rivers' of the Mitchell, Snowy, Bemm and Genoa River catchments, the Ramsar listed wetlands of the Gippsland Lakes, and many national parks and reserves, stretching from sub-alpine environments to the coast. Private land covers 17% of the region and is "used mainly for pastoral and agricultural purposes, particularly forestry and grazing, with some vegetable growing" (REMPLAN Economy, 2024). Grazing occupies the largest area, and there are significant productive areas of irrigated horticulture and dairying on the floodplains of the Snowy and Mitchell rivers. Variability in rainfall across the region gives rise to droughts and floods that influence waterway health, fire frequency and intensity, and land management. This variability is likely to further increase under the influence of climate change.

Our region includes most of the East Gippsland Shire, the northern part of the Wellington Shire, and part of the Alpine Shire south of the Great Dividing Range. The East Gippsland CMA boundary adjoins that of the West Gippsland, North-East and Goulburn Broken CMAs. Working in partnership is a key approach within East Gippsland and 'cross border' relationships form an important part of the management of natural resources within our region. This approach recognises the ability of values and threats to move across administrative boundaries, and that the most effective way to manage this is through shared outcomes and a shared vision delivered in partnership. Examples of these partnerships include working with the West Gippsland CMA in the management of the Gippsland Lakes Ramsar Site; collaborating with the NSW Government on water and environmental management along the Snowy and Genoa River corridors; working together with land managers and adjoining CMAs to protect key values across the Victorian alps.

There is a growing need to enhance our preparedness for natural disasters and their impact on biodiversity and agricultural natural capital assets. Ensuring the survival of species and places helps to preserve key ecosystems services such as clean air, water, and climate regulation, all of which profoundly affect human wellbeing. Disaster preparedness bolsters the resilience of ecosystems, enabling them to recover and flourish following catastrophic events. Better preparation and response also contribute to stronger regional economies through sectors such as tourism and agriculture. For example, by investing in disaster preparedness, long-term costs for recovery and restoration post-disaster are reduced.

This Plan considers the most likely disaster scenarios for East Gippsland, which include bushfire, storm surge, drought, blue-green algae blooms, coastal erosion, biosecurity and flood events. The Plan was built on the lessons learned during these disasters experienced in East Gippsland, particularly over the last five years, including drought, the 2019–20 Black Summer bushfires, multiple major floods, thunderstorms and wind storms; and aligning to current regional planning documents (e.g. NRM Plans developed for the Regional Land Partnerships Program – RLP, Regional Catchment Strategy).

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

1 https://www.dcceew.gov.au/sites/default/files/documents/threatened-species-action-plan-2022-2032.pdf

2 & 3 Biodiversity assets refer to assets identified by jurisdictions, environment management agencies or environmental law as important to preserve during emergencies or natural disasters e.g., species, ecological communities, habitat features.

1.1 Extreme Weather Events in East Gippsland

Bushfire

On 21 November 2019, lightning strikes ignited numerous fires of a magnitude previously unseen in Gippsland, Victoria's north-east and adjacent NSW. The previous three years had seen drought conditions across East Gippsland. In late December, dry lightning started new fires west of Mallacoota which merged on New Year's Eve during extreme fire and weather conditions. Unfavourable conditions and remote locations meant the fires were difficult to contain and several other fires joined. These devastating conditions resulted in over 56% of the East Gippsland region being impacted. With three fatalities, over 450 residences and commercial properties destroyed or damaged, the immediate loss from the event was significant for the East Gippsland community. 46,000 residents and 118 communities were directly or indirectly impacted, and an estimated loss of visitor expenditure for Gippsland of $170–180 million placed further pressure on impacted communities. Following the fires, a range of bushfire recovery programs were implemented across a multitude of agencies throughout the region.

The 2019–20 season of fires across Victoria burnt mostly in areas that have high biodiversity value. There were 244 individual species with more than 50% of their modelled habitat within the burnt area, including 215 Victorian rare or threatened species. This includes four species listed under the *Commonwealth EPBC Act 1999*. The fire extent impacted at least 60% of the 75 National parks and nature conservation reserves in Victoria. 78% of the Warm Temperate Rainforest is within the fire extent, and majority of distribution of seven vegetation communities listed under the *Flora and Fauna Guarantee Act 1988* (FFG Act) are also within the burnt area.

A significant area of habitat across Victoria has now burnt multiple times since 2000. These repeated events can result in regeneration failure for many species and significant disturbance to breeding and feeding cycles.

Across East Gippsland, the 2019–20 bushfires impacted:
- 56% of national parks and conservation reserves, and
- 53% of water supply catchments

Large areas of high biodiversity rainforest (32% of Cool Temperate Rainforest and 78% of Warm and Dry Temperate Rainforest), and the species they contain, were affected by the fires.

Immediately following a bushfire, streamflows typically increase due to intensified runoff from bare surfaces. The loss of forest canopy and ground cover means less interception of rainfall as well as less evapotranspiration, meaning more runoff to streams. This increase in streamflows lasts until the forest vegetation recovers or regrows (5–10 years, or less for partial burns). As the forest regenerates, vigorous growth, and re-growth increases evapotranspiration above pre-fire conditions and younger, smaller overstorey growth increases water yield by 30%. In effect, streamflows decrease below what would be expected without fire. This reduction reaches a maximum at 20–30 years post-fire then slowly recovers as the forest ages (in the absence of any other further disturbances). Impacts on streamflow of the 2019–20 fires across East Gippsland CMA catchments will depend on areas of different fire severity; but it is apparent there will be significant impacts, particularly for the far eastern rivers where a very high percentage of catchments were burnt.

The impacts on water quality are more obvious following fire due to the immediate visual changes within waterways. Sediment, nutrients, and contaminants are mobilised because of loss of cover exposing soil, mobilisation of nutrients in soil, decaying vegetation and ash, and increased likelihood of landslips and debris flows. The increased runoff immediately following fires exacerbates these problems.

Consequences for waterways include:
- smothering of in-stream plants and animals,
- reduction of in-stream dissolved oxygen levels,
- eutrophication (over-load of nutrients), and
- coarse sediment slugs and pulses.

Impacts experienced immediately after the fires are generally the most significant, and declining as forest cover is re-established, but some impacts continue for many years and will be exacerbated by multiple burns. The effects of multiple burns can be readily seen after each rain event.

Drought

Drought stands as the most critical natural disaster impacting regional communities and has a significant impact on natural environments, periods of drought often trigger subsequent disasters such as fires and floods, exacerbating the impact on the region. Drought can lead to soil degradation, loss of biodiversity, and reduced water quality. It can also cause vegetation die-off, which increases the risk of erosion and desertification. Additionally, prolonged droughts can alter ecosystems, making it difficult for native species to survive and thrive.

On 19 September 2023 the Bureau of Meteorology declared an El Niño weather event and is forecasting an increased risk of drier and hotter conditions over coming months for most of Australia. This follows a period of below average rainfall, higher temperatures, and the warmest recorded winter in 2023. Climate scientists predict Australia will see an increase in extreme temperature shifts, such as heatwaves and hotter days, reduced or altered rainfall patterns, and increased fire danger.

East Gippsland has experienced drought of various severity in the following years:

- 1877
- 1880–1866
- 1888
- 1895–1902 (Federation drought)
- 1937–1945 (World War II drought)
- 1965–1968
- 1982–1983
- 1996–2000 (irregular drought events)
- 2001–2009 (Millenium drought)
- 2017–2019 (exacerbating the 2019–20 bushfires)

It is forecasted that the East Gippsland region will spend more time in drought conditions due to changes to average rainfall, and the frequency and duration of extreme droughts will increase.

Storm surge and coastal erosion

Strong south westerly winds can increase the water levels in the Gippsland Lakes by up to 50 centimetres. Peaks coinciding with high tide, including peaks of up to 71 centimetres on the coast of East Gippsland can also occur due to storm surge events. CSIRO have also determined that communities and assets along the eastern Victorian coastline will increasingly come under threat from coastal flooding due to rising mean sea levels, possible changes in weather patterns that drive sea level extremes such as storm surges and land subsidence. The table below describes the predicted increases due to storm surges across the Gippsland Lakes. It outlines storm tide return levels for selected locations around the Gippsland Lakes under current climate and 2030 and 2070 low, mid, and high scenarios including corresponding mean sea level rise scenarios.

The coastline of East Gippsland is susceptible to erosion, with only a small fraction of the coastline consisting of rocky shorelines that are resistant to this impact. The combined actions of storm surges, high tides and sea level rise not only result in coastal flooding but accelerate coastal erosion. The areas that are most at risk from these events along the shoreline are often areas of high biodiversity and environmental value such as nesting or feeding habitat, such as wetlands and saltmarsh. Rising sea levels also impact saltmarsh and fringing vegetation subjecting these communities to deeper water. This will be a particular problem in areas where there are barriers such as roads preventing landward migration of saltmarsh and paperbark communities.

Floods

Flooding within the Gippsland Lakes is caused by flooding of the Latrobe, Thomson, Macalister, Avon, Mitchell, Nicholson and/or Tambo Rivers that flow into the Lakes. Flooding typically takes one to three days to travel from these rivers into the lakes system. Flood records for some major rivers in East Gippsland extend back to the late 1800s and indicate that flooding is a relatively regular occurrence in the region. It is not unusual for East Gippsland catchments to experience multiple floods within a single year. In contrast with much of the rest of the State of Victoria, there is no "flood season" in East Gippsland: large floods can and do occur within any month of the year. Floods in East Gippsland are most often brought about by the development of East Coast Lows (ECLs). ECLs are intense low-pressure systems that occur off the eastern coast of Australia, including the East Gippsland region. They can form during a variety of weather conditions and at any time of the year, including the decay of tropical cyclones, or in the wake of a cold front moving into the Tasman Sea. ECLs are slow moving and bring widespread and intensive rainfall, high winds, and very rough seas. They can be responsible for both floods in the catchments, as well as coastal inundation and flooding along the towns of the Gippsland Lakes. Less frequently, floods in East Gippsland can be the result of frontal systems that deliver heavy rainfall along and to the south of the Great Dividing Range. Flooding from these latter events tends to be less severe (i.e., smaller floods) than from ECLs. The differences in these main rain-producing weather systems, in combination with the geography and topography of the catchment, results in highly variable temporal and spatial patterns of flooding in the region. Floods may be wide scale - such as in June 1998 - or more localised. This means that comparable rainfall depths and intensities at different times of the year and/or at different locations can result in a wide variety of flood responses.

During June 2007, four major ECLs formed consecutively off the coast of New South Wales and eastern Victoria, with each one producing heavy rainfall. The last ECL brought up to 300 millimetres of rainfall in the Gippsland Lakes catchment resulting in lake levels rising 1.3 metres above normal levels. This flooding closed roads and inundated properties in Lakes Entrance.

Location	Return Period (yr)	Current Climate (m)	2030				2070			
			Low (m)	Mid (m)	High (m)	High JJA (m)	Low (m)	Mid (m)	High (m)	High JJA (m)
Lakes Entrance	100	0.98	1.00	1.09	1.17	1.18	1.02	1.25	1.56	1.57
Metung	100	0.59	0.61	0.70	0.78	0.80	0.63	0.86	1.16	1.18
Tambo Bay	100	0.57	0.65	0.61	0.57	0.58	0.81	0.65	1.16	1.17
Paynesville	100	0.35	0.37	0.45	0.53	0.53	0.40	0.61	0.88	0.89

Figure 1 Storm surge predicted implications on Gippsland Lake communities. Source: Mcinnes, Kathleen & Abbs, Deborah & Bathols, J.. Climate Change in Eastern Victoria.

Below is a summary of floods recorded in recent history across the river systems in East Gippsland:

Catchment	Largest recorded Flood	Other Significant Flood Events
Far East Gippsland Basin		
Genoa River	June 1978	
Cann River	February 1971	June 1974, June 1978, 1983 (March, May & October), September 1985, June 1998, June 2011, April 2022, October 2022, December 2023
Bemm River	June 1998	June 1978, June 2011, June 2012
Snowy Basin		
Suggan Buggan River	March 2011	August 1974. April 1990, March 2011
Buchan River	June 1978	February 1971, November 1988, June 1998, June 2012, July 2016, December 2023, January 2024
Brodribb River	June 1998	July 1925, June 1960, April 1978. December 1985, November 1988. June 2012. June 2014, July 2016
Snowy River	February 1971	February 1952. August 1974, June 1978. March 1983. November 1985, July 1991, June 1998, July 2011, March 2012, June 2012, June 2016, August 2016, December 2021, September 2022, April 2022
Tambo Basin		
Timbarra River	June 2012	July 1984, October 1985, November 1988, June 1998, June 2007, July 2011, June 2012,
Tambo River	June 1998	December 1893, June 1978, October 1985, November 1988, October 1993. June 2007, June 2012, July 2016, July 2020
Nicholson River	June 2012	June 1978, April 1990, June 1998, June 2007, July 2016, July 2020
Mitchell Basin		
Wonnangatta River	April 1990	September 1998, June 2007, June 2012, July 2016, June 2021 October 2023
Wentworth River	June 1998	July 1974, April 1990, June 2007, June 2012, July 2016, October 2023
Dargo River	April 1990	July 1974, October 1993, 1998 (June & September), June 2007, June 2012, October 2023
Mitchell River	December 1893	1936, December 1952, January 1971, June 1978, April 1990, June 1998, June 2007, June 2012, July 2016, October 2023
Gippsland Lakes		
Lakes communities	1893	1952, 1978, 1998, 2007
Lakes Entrance	1952	1978, 1998, 2007

Figure 2 A summary of East Gippsland floods. Source: East Gippsland Flood Management Plan 2017 (with updated information pre-2023).

Blue-green algae blooms

Decreased freshwater inflows and rising sea levels will impact the Gippsland Lakes, with increasing salinity across the system becoming more common. Hotter conditions coupled with reduced dilution of nutrients in the system will also result in increased frequency and duration of algal blooms in the Lakes. This can be extreme following bushfires, where excess nutrients wash into the system and vegetation across the landscape becomes less effective in filtering run-off and sediment as an ecosystem service. Algal blooms may occur more frequently in Lake Victoria and Lake King in the Gippsland Lakes affecting not only the ecology of the system, but amenity values, impacting tourism and community wellbeing.

Biosecurity

Across East Gippsland one of the major threats to natural capital assets is invasive plants and animals. Alpine peatlands and upland pristine streams are at extreme risk from deer and feral horses, with hard hooves causing significant and often irreversible damage to fragile communities, including peatlands and rainforests.

Feral animals such as pigs, goats, and deer all pose a threat to natural capital values and increased introduced predators such as foxes and cats impact threatened species.

Pathogenic diseases such as avian influenza (H5N1), chytrid fungus and myrtle rust can pose significant risks to biodiversity in East Gippsland. Viruses can devastate bird populations, disrupting local ecosystems and food chains.

Plant diseases which affect crops and native vegetation if not controlled can lead to reduced productivity, plant diversity and habitat loss. These threats are exacerbated by climate change and increased human activity, making it crucial to implement robust biosecurity measures to protect the region's unique biodiversity. East Gippsland-based organisations actively manage current biosecurity threats through Victoria's Biosecurity Strategy 2023.

Future emergency events

Given the critical role of Regional Delivery Partners in supporting NRM preparedness and response, East Gippsland CMA was invited to deliver a 'Biodiversity and Agricultural Natural Capital Emergency Preparedness & Response Plan' (the Plan) in advance of the 2023–24 severe weather season. CSIRO Gippsland climate projections 2019 predict an increase in storm surges, blue-green algae blooms, flooding, and windstorms. These events occur frequently in East Gippsland and with climate predictions, will occur more frequently and with higher intensity than previously experienced.

Cumulative natural disasters, which often occur in East Gippsland, such as repeated bushfires, floods and storms, can have profound and lasting impacts on the environment. These events can lead to severe soil erosion, loss of biodiversity, and degradation of ecosystems. The compounded effects of these disasters can weaken the resilience of natural environments, making recovery more challenging and increasing the vulnerability of the regions biodiversity and agricultural natural capital assets to future events.

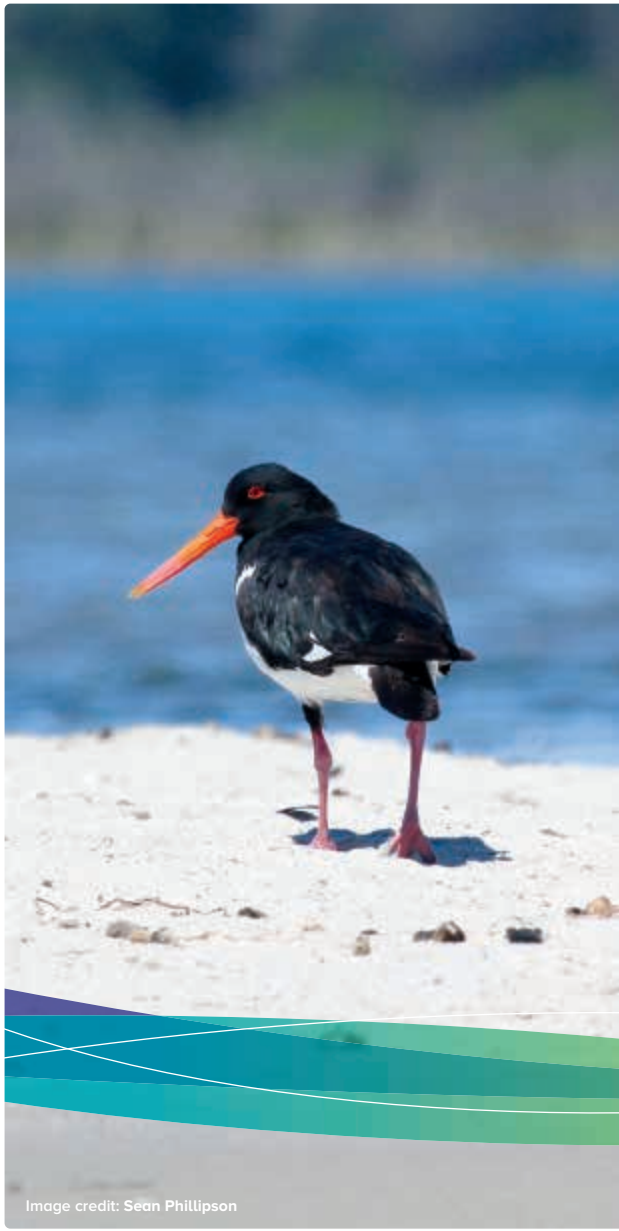


Image credit: **Sean Phillipson**

2 Objectives of this plan

This plan will be a key, actionable plan to improve preparedness for, and response to, emergency events.

The objectives of this plan will be to integrate biodiversity and agricultural natural capital assets in the East Gippsland region, across multiple stakeholders and organisations.

This plan will focus on emergency planning and response to ensure natural capital assets are integrated into emergency situations of varying scales. Understanding potential threats will assist in improving the resilience of biodiversity and agricultural assets prior to facing any natural disaster of any scale.

This plan will also contribute to increasing effective and efficient response times and resourcing to mitigate impacts during an emergency event. Through risk analyses of potential natural disasters in the East Gippsland region, The East Gippsland CMA will increase its capacity to prioritise key landscapes, vegetation, and species to focus efforts on in the recovery phase and through multiple recovery phases due to climate change impacts.

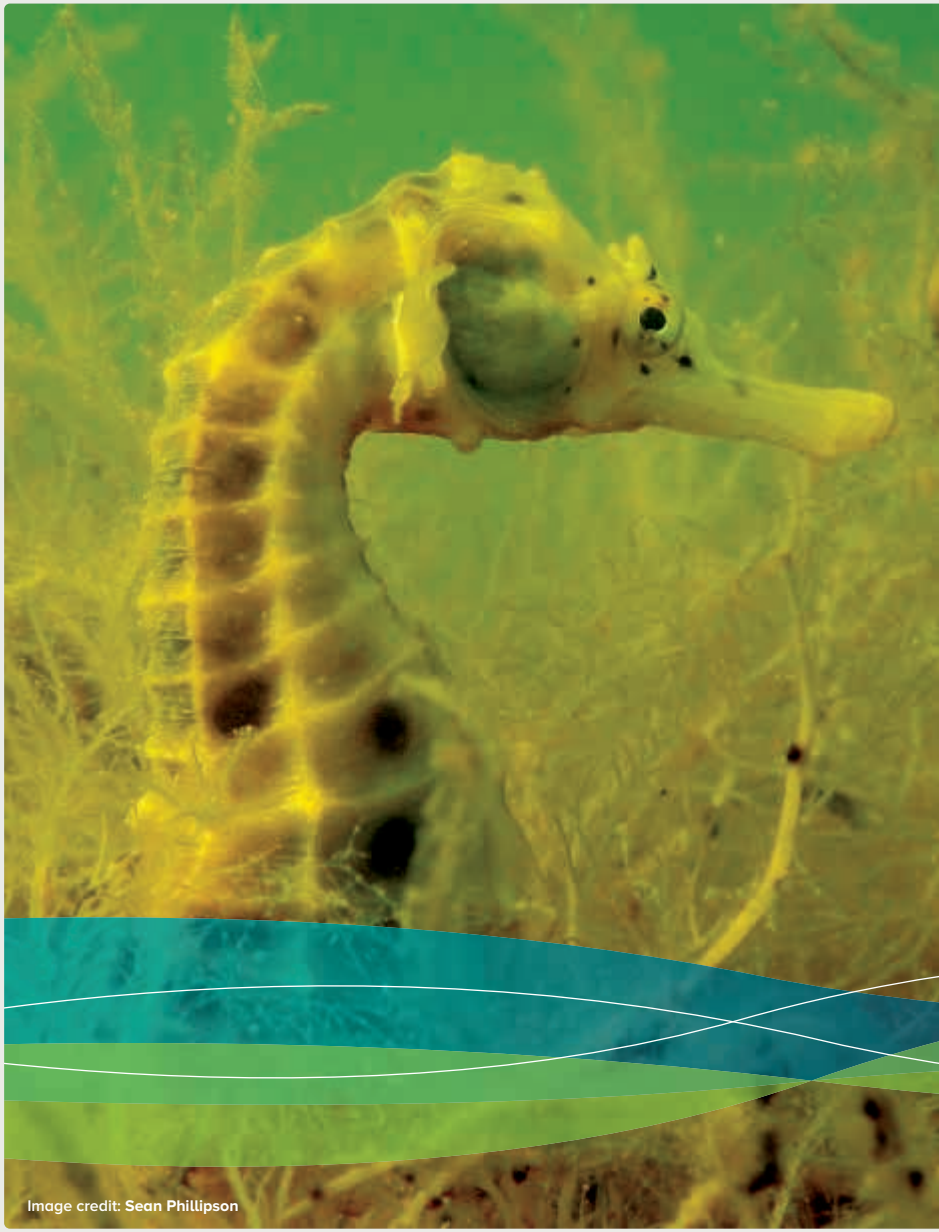


Image credit: **Sean Phillipson**

3 Scope

This Plan seeks to reduce the impact of emergency events on biodiversity and agricultural natural capital assets within East Gippsland.

This Plan considers the most likely disaster scenarios for East Gippsland, including:

This plan identifies mitigation measures in advance of emergency, response activities that may be undertaken during events as well as recovery actions post events. Implementation of actions and measures is out of scope for this plan unless funding and resources are made available for the relevant stakeholders.

This plan identifies biodiversity assets and agricultural natural capital assets with ecological or agricultural values which are susceptible to impact by natural disasters. The biodiversity assets include threatened species, threatened ecological communities, cultural sites and Ramsar wetlands.

Agricultural natural capital assets include natural resources which are features of the land that support agricultural production and remnant native vegetation. The plan focuses on the natural capital assets that support agriculture (e.g., soil health and river health) rather than the agricultural commodities themselves. The plan also includes geographical locations of high importance due to these containing multiple biodiversity and agricultural natural capital assets that are highly susceptible to natural disasters.

Australian state and territory governments have responsibility for coordinating and planning for the response to and recovery from a disaster within their borders. The protection of life and community is paramount during emergency response. There may be times when priorities outlined in the *Victorian Emergency Management Act 2013* take precedence over others identified in this Plan. This plan is developed on a catchment scale and focuses on natural capital assets. Community-based assets and relevant plans should be referred to the Local Government Emergency Management Plans.


Image credit: **Sean Phillipson**

4

Role of the East Gippsland CMA in Emergency Preparedness and Response

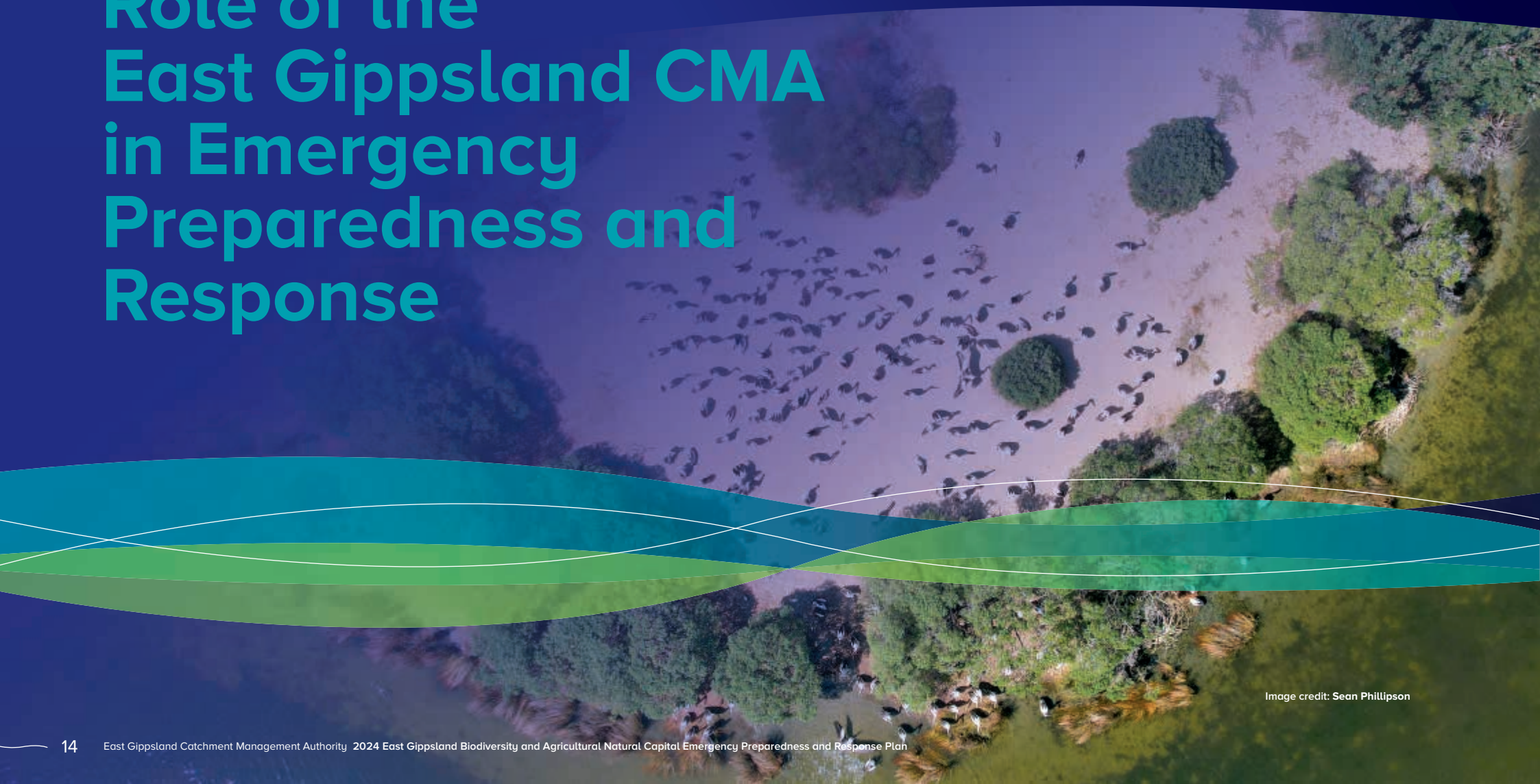


Image credit: **Sean Phillipson**

The East Gippsland CMA has extensive experience, knowledge, and expertise in natural emergency management.

Through the formation of the *Catchment and Land Protection Act 1994*, the East Gippsland CMA emerged and has been increasing its capacity ever since. Work has been undertaken over the last 30 years to better understand options for mitigating the effects of bushfires on water quality. The following summarises the current options available, and whilst they were developed with a focus on the Gippsland Lakes, they are generally applicable to catchments across East Gippsland. Our physical location increases our connectivity during an emergency, which increases our level of involvement through accessibility.

The East Gippsland CMA have 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. We also have extensive experience in response and recovery across the whole region following major events, such as the 2019–20 Black Summer fires. This experience changed the way the East Gippsland CMA view emergency preparedness to be able to respond to a mass-scale event in the future.

Framework

Our depth of experience is attributed to being actively engaged amongst the community during natural emergencies. The East Gippsland CMA have been actively engaged in co-developing strategies such as the East Gippsland Floodplain Management Strategy (2017) and providing feedback on other plans such as the East Gippsland Municipal Emergency Management Plan.

Emergency Management Victoria define Victoria's CMA's role in the emergency management framework as: "*...responsible for the integrated planning and coordination of land, water and biodiversity management in all catchment and land protection regions. CMAs 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.*"

The tasks required by the CMA currently focus on assisting, working in partnership with, supporting or advising Local Government with flood mitigation, response and recovery (see EMV website for complete table of tasks). The Victorian State Emergency Management Plan (SEMP) outlines the roles of different organisations, of which the East Gippsland CMA is in the Gippsland region.

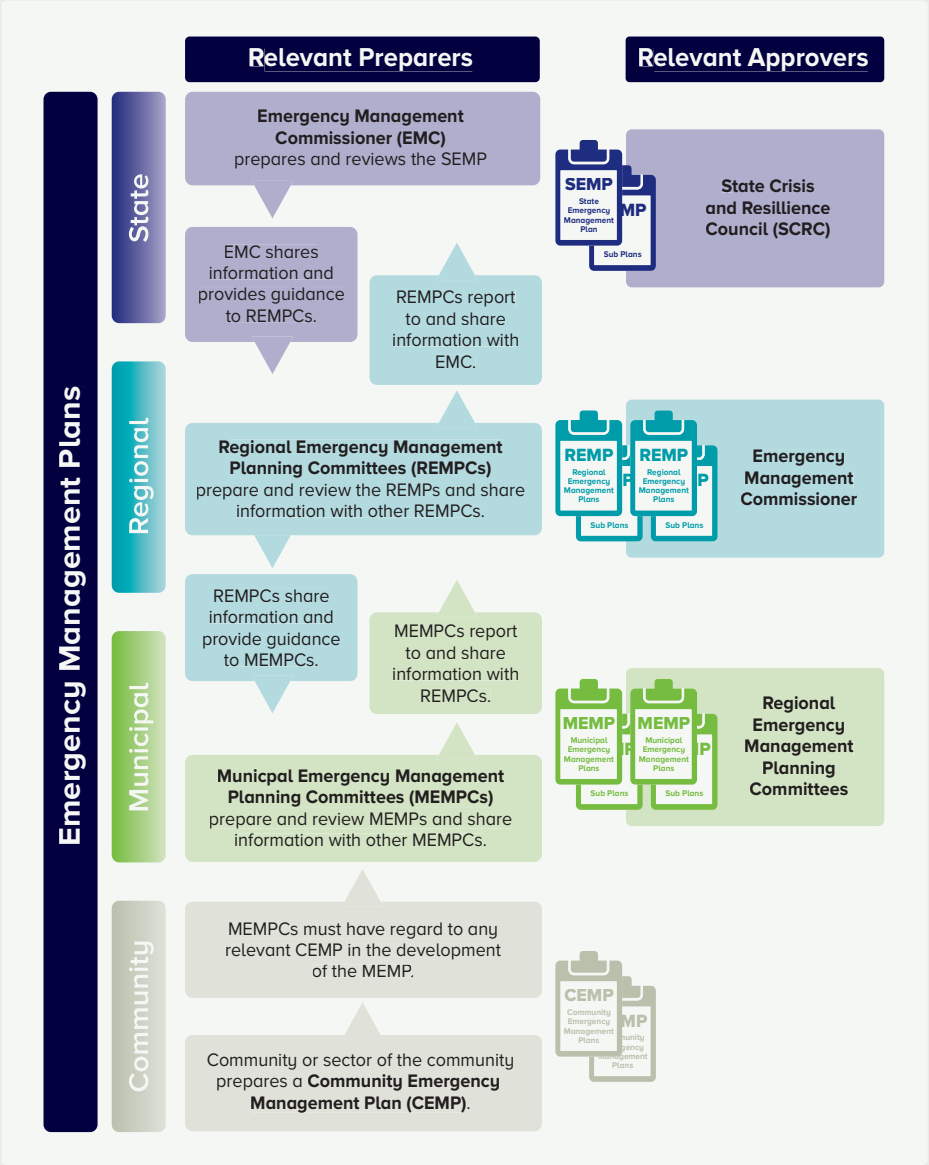


Figure 3 EMV framework for Emergency Management Planning. Source: EMV website.


Image credit: **Sean Phillipson**

The *Emergency Management Act 2013* requires the preparation of Regional Emergency Management Plans (REMPs) by Regional Emergency Management Planning Committees. The REMP 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.

Municipal Emergency Management Plans (MEMPs) are prepared by Municipal Emergency Management Planning Committees. At the local level, a MEMP contextualises its REMP and is informed by local and municipal risks.

Currently, the East Gippsland CMA's interaction with emergency framework lies in an advisory capacity. During events (predominantly floods), the East Gippsland CMA utilises their expertise to provide flooding modelling, mapping, and other information so the Regional Control Team have the best local information during a response effort. Opportunities for the East Gippsland CMA to improve include, strengthening the coordination and delivery of preparedness and recovery stages of emergency management. While preparing for emergency events, utilisation of the East Gippsland CMA could be improved, resulting in building resilient catchments and reducing the impact on catchments and waterways, not only for flood but bushfires, storm surge, drought, blue-green algae blooms, coastal erosion, biosecurity, windstorms, and avulsions.

Creating more interconnectivity with agencies who have greater focus on the other events will encourage greater biodiversity and agricultural outcomes. After an emergency event, the CMA's capacity to engage in response is beneficial for the region when supported with adequate funding opportunities. This has been evident in every flood recovery and post Black Summer fires when funding was made available to assist with catchment recovery. This plan will be a stepping-stone for the East Gippsland CMA to be able to identify areas in which we can further our support and advise on emergency management activities.

Governance

The governance arrangements for Victoria's emergency management planning framework involves:

- the Emergency Management Commissioner (EMC), who is responsible for state-level planning, and chairs the State Emergency Management Planning Committee (SEMPC)
- Regional Emergency Management Planning Committees (REMPCs) which are responsible for regional level planning – one for each emergency management region
- Municipal Emergency Management Planning Committees (MEMPCs) which are responsible for planning at the municipal level – one for each municipal district
- community level planning is optional and not a legislated requirement (there are no formal governance requirements).

The following table outlines potential emergency events in the Gippsland region and the pre-prepared groups according to Emergency Management Victoria. These groups have an agreed approach and outline of organisational approaches.

Preparation	
Form of Emergency	**Control Agency**
Bushfires	BoM / CFA / Councils / DEECA / DTP /EMV / FRV / PV / VBA / VICSES / VicPol
Flood	BoM / CMAs / Councils / DEECA / DH / DTP / EMV / Melbourne Water / VICSES
Storm Surge	Councils / DTP /EMV / Melbourne Water / Water Corporations / VBA
Drought	*Not noted*
Blue-green Algae Blooms	DEECA
Coastal Erosion	AMSA / DTP
Biosecurity	DEECA / VicPol
Windstorms	Councils / DTP / VBA
Avulsions	*Not noted*

Preparation	
Form of Emergency	**Control Agency**
Bushfires	CFA / FRV / DEECA
Flood	VICSES
Storm Surge	VICSES
Drought	*Not noted*
Blue-green Algae Blooms	DEECA
Coastal Erosion	*Not noted*
Biosecurity	DEECA
Windstorms	VICSES
Avulsions	*Not noted*

Preparation	
Recovery Environment	**Control Agency**
Social	N/A
Economic (Agriculture)	DEECA / Councils / RAC / FRV / CFA
Built	N/A
Natural (Public land and inland waters)	CMAS / DEECA / EPA / PV
Natural (Wildlife and threatened ecosystems and species)	DEECA

Figure 4 Roles and Responsibilities. Source: EMV.


Image credit: Sean Phillipson

5

Identification of Management Unit Assets and Susceptibility

Assets have been identified through their status as listed under the Environment Protection and Biodiversity Conservation Act (EPBC).

Their status is determined as either; critically endangered, endangered, threatened or vulnerable. Descriptions and distribution information is sourced from the Australian Government species profile and threats database, National Recovery Plans and where available *Victorian Flora and Fauna Guarantee Act (1988)* Action Statements.

Given the number of assets listed under the EPBC Act some prioritisation of assets was required to deliver a practical document. For consistency the same prioritisation process was used in developing the 2022 East Gippsland Catchment Management Authority Regional Land partnerships NRM Plan. A detailed description of the process is provided in (EGCMA 2022), but in summary assets were prioritised by filtering in relation to significance, condition, feasibility and impact.

Assets have been described under the following categories:

- **Birds**
- **Mammals**
- **Fish**
- **Frogs**
- **Reptiles**
- **Plants**
- **Threatened Ecological Communities**
- **Ramsar Sites**

Note: Two additional species were included within the plan, the Australasian Bittern and the Eastern Curlew as they are both Australian government priority species and vulnerable to the potential incursion of the Highly Pathogenic Avian Influenza (HPAI) strain H5N1 (clade 2.3.4.4 b).


Image credit: Sean Phillipson

Birds

Australasian Bittern (*Botaurus poiciloptilus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The 2022 *National Recovery Plan for the Australasian Bittern (Botaurus poiciloptilus)* describes the Australasian Bitterns as being large, stocky, thick–necked, heron–like birds. The species grows to a length of 66–76 cm and has a wingspan of 1,050–1,180 mm. With browns, blacks and buff colouring and complex patterning with mottles and scallops the species is well adapted to concealment in swamp and wetland vegetation. The species has a prominent black–brown stripe running down the side of the neck, the eyebrow is pale, and the chin and upper throat are white. The bill is straight, pointed and straw yellow to buff in colour with a dark grey ridge. The legs and feet are pale green to olive and the eyes are orange–brown or yellow. Darker and paler variants of the plumage have been observed in adults. Juveniles are generally paler than adults and have heavier buff flecking on the back. The estimated number of mature individuals is <2,000 globally with approximately 1,300 (range 750–1,800) in Australia (DCCEEW 2022).

Distribution

In addition to Australia, the Australasian Bittern occurs in New Zealand and New Caledonia. In Australia, the Australasian Bittern occurs from south-east Queensland to south-east South Australia as far as the Adelaide Region, southern Eyre Peninsula, Tasmania and in the southwest of Western Australia. Due to geographical isolation over 1,500 km of mainland without suitable habitat, the population can be divided into two subpopulations, the south-eastern and south-western subpopulations. In Victoria, the species is found along the southern coastline and also in the Murray River region.

The Australasian Bittern's preferred habitat is wetlands with dense vegetation from 0.5–3.5 metres in height. The Australasian Bittern favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds and is only rarely observed in estuarine or tidal wetlands (DCCEEW 2022). The Australasian Bittern forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water (DCCEEW 2022).

East Gippsland Location

With an extensive coastline and freshwater wetlands, the East Gippsland CMA region provides crucial habitat for this species. The VBA indicates the presence of the species in the Australian Government's Southeast Coastal Ranges priority place and the *Protecting the Best, Gippsland Lakes and Red Gum Plains* priority landscapes of the EGCMA Regional Catchment Strategy, with the most sightings around the Lower Snowy river and associated wetlands. The species has been recorded recently across several sites in the Gippsland Lakes including Macleod, Heart and Clydebank Morass and is known to breed at Macleod Morass. The Department of Energy, Environment and Climate Change (DEECA) identifies that the Gippsland Lakes supports 9% of the Victorian population of this species (DELWP 2020a).

Other Considerations

The Conservation Advice for this species indicates the species can move large distances between suitable habitat and that all natural and constructed suitable habitat should be considered critical to the survival of the species. As a waterbird this species may also be very vulnerable to the highly pathogenic avian influenza (HPAI) H5N1 (clade 2.3.4.4 b) disease. There is no effective treatment for the disease and the prognosis for species like the Australasian Bittern are poor. The disease could result in loss of species.

The Australasian Bittern is also an Australian Government priority species.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Australasian Bittern (***Botaurus poiciloptilus***)	 **Bushfire**	Intense and frequent bushfires or prescribed burning in wetlands reduces the density and cover of vegetation that forms the core habitat of the Australasian Bittern. Wetlands in southwest Australia have lost vegetation habitat due to summer fires when wetlands are dry.	**MEDIUM**	Many wetlands that support Australasian Bittern have deep peat beds. Severe fires can burn these peat beds and convert wetlands from shallow wetlands suitable for Australasian Bittern to deep wetlands with only minimal fringing vegetation which do not support Australasian Bittern.
	 **Drought**	A drying climate reduces the peak water level and peak area of wetting in wetlands, which effectively reduces the quality and quantity of breeding wetlands and drought refuges available. For example, the combination of a period of dry phases followed by fire resulted in the loss of an estimated 60–70 per cent of the reed beds in the Macquarie Marshes Ramsar site, New South Wales (Oct-Nov 2019).	**VERY HIGH**	Over the past 100 years, many suitable wetland sites in both eastern and south-western Australia have been lost because of the alteration of habitat. Across the range of the species, proposals to expand or create new irrigation schemes (dams) need to be mindful of the potential impacts to Australasian Bittern and its habitats, particularly during extended drought conditions. The species is dependent on emergent vegetation and is a shallow water feeder. Changes to the composition of vegetation communities by drought may impact on the available habitat for the Australasian Bittern.
	 **Blue-green Algae Blooms**	Reduced water quality is having an ongoing impact on the species' habitat. These changes can result from altered flows caused by water diversion, impoundment or sustained dry periods reducing run-off. Water quality can also be impacted by urban and agricultural run-off, which can lead to phytoplankton blooms, reduced oxygen levels and increased salinity.	**VERY HIGH**	Pollution in wetlands 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.
	 **Biosecurity**	Outbreak of Highly Pathogenic Avian Influenza (HPAI) strain H5N1 (clade 2.3.4.4 b)	**VERY HIGH**	HPAI H5N1 (clade 2.3.4.4 b) has at the time of writing not been detected in Australia. However, due to migratory bird movement there is concern that an outbreak will occur. Overseas, wild birds commonly affected by H5N1 2.3.4.4b include waterfowl, shorebirds, seabirds and predatory or scavenging birds (WHA 2024).

Birds

Australian Fairy Tern (*Sternula nereis nereis*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: **Sean Phillipson**

Description

The Australian Fairy Tern is a small bird of approximately 25cm length. It has a white body with light bluish-grey wings and a forked tail. The Australian Fairy Tern has a bright orange-yellow bill and dull yellow legs. A small black patch extends no further than the eye and not as far as the bill. In the breeding plumage both the beak and the legs are yellowish orange. The Fairy Tern habitat includes coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons. Nesting is above the high-tide mark on sandy beaches, spits or ridges, and they lay one or two speckled eggs in a shallow scrape in the sand, which may be lined with small shells or seaweed. It feeds almost entirely on fish which are swallowed head first. It is a key species in the Gippsland Lakes Ramsar Site Management Plan and an iconic species of the Gippsland Lakes (DEECA 2024).

Distribution

Australian Fairy Terns occur along the southern Australian coast from south of the Dampier archipelago Western Australia east to Botany Bay, New South Wales including Tasmania. The Great Australian Bight forms a gap in distribution between western and eastern subpopulations, and there are now substantial gaps amongst breeding colonies in eastern Australia, especially around the Victorian coastline. Australian Fairy Terns use a variety of habitats including offshore, estuarine, lacustrine (lake) islands, wetlands, beaches and sand spits (DAWE 2020a).

East Gippsland Location

In East Gippsland specific locations may vary but it is generally found along the coast in the *Protecting the Best - Far East Gippsland* and Gippsland Lakes priority landscapes. Specific locations include the entrance of the Snowy River at Marlo and Rigby Island, Pelican Island and other sandy islands in the Gippsland Lakes. (DEWLP 2022) also notes that both the Fairy tern and Litle Terns breed in significant numbers on these islands and nearby Lake Tyers, and these populations move to other locations in the Gippsland Lakes such as Jones Bay after breeding.

Other Considerations

The National Recovery Plan for the Australian Fairy Tern says that in Victoria there has been a significant decrease in successful breeding at many of the other known sites outside of East Gippsland such as the Westernport and Port Phillip Bay Ramsar sites. In comparison the Gippsland Lakes had 114 chicks fledge between 2015–2018, this successful breeding event was due to successful sand island rehabilitation projects providing suitable habitat for breeding to occur. However, since that time nesting success has been variable (DAWE 2020a).

As a waterbird this species may also be very vulnerable to the highly pathogenic avian influenza (HPAI) H5N1 (clade 2.3.4.4 b) disease. There is no effective treatment for the disease and the prognosis for species like the Australian Fairy Tern are poor. The disease could result in loss of species.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Australian Fairy Tern (*Sternula nereis nereis*)	 **Storm Surge**	One result of these changes is that some breeding sites on beaches or sand banks become exposed to tidal flooding (e.g. Peel-Yalgorup System Ramsar wetland) or storm surges.	**VERY HIGH**	Sites on accreting shorelines may become vegetated making them unsuitable nesting habitats. Pre-breeding aggregation sites have been abandoned due to the erosion of sand bars.
	 **Coastal Erosion**	Shoreline sites may be subject to rapid change due to sand erosion or accretion, tidal cycles and sea-levels, beach-wrack movement and deliberate modification.	**VERY HIGH**	Locations that have been used in the past may be lost, become less attractive to the terns or become subject to increased disturbance or predation.
	 **Biosecurity**	Outbreak of Highly Pathogenic Avian Influenza (HPAI) strain H5N1 (clade 2.3.4.4 b).	**VERY HIGH**	HPAI H5N1 (clade 2.3.4.4 b) has at the time of writing not been detected in Australia. However, due to migratory bird movement there is concern that an outbreak will occur. Overseas, wild birds commonly affected by H5N1 2.3.4.4b include waterfowl, shorebirds, seabirds and predatory or scavenging birds (WHA 2024).

Birds

Eastern bristlebird (*Dasyornis brachypterus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The National Recovery Plan for the Eastern Bristlebird (*Dasyornis brachypterus*) describes the bird as "*a small, well-camouflaged, ground-dwelling bird. It is dark cinnamon-brown above, with pale colouring around the eyes and base of the bill, an off-white chin and throat, and a rufous-brown panel on each wing. It is greyish-brown below, with an off-white centre to the belly. It has red to red-brown irises, an off-white to pinkish-white gape, and pinkish-brown legs and feet. The species spends most of its time in low, dense vegetation, rarely appearing in the open or flying. Due to its small wings the Eastern Bristlebird flies weakly, but sturdy feet and legs help it move through dense habitat. While its plumage provides excellent camouflage, other adaptations to its habitat include a low forehead profile with bristles near the eyes*" (DCCEEW 2022a).

Distribution

Nationally the species has three distinct populations along the eastern coastline of Australia. The northern population is found in the Border Ranges and Northern Rivers regions of Queensland and New South Wales respectively. A central population is located in NSW and the Australian Capital Territory, while the southern population's distribution is described below (DCCEEW 2022a).

East Gippsland Distribution

According to the 2022 National Recovery Plan for the Eastern Bristlebird (*Dasyornis brachypterus*) the southern population of the *Eastern Bristlebird* is found at Howe Flat in the Croajingolong National Park and in the Nadgee Nature Reserve in New South Wales. In the East Gippsland Management Unit this species occurs in riparian shrubland and heaths and is found in the EGCMA *Protecting the Best - Far East Gippsland* priority landscape and the Australian Government's *Southeast Coastal Ranges* priority place. (DELWP 2020b) states that 98% of the Victorian population occurs in this landscape.

There has been a major decline and range contraction in the Victorian portion of this southern population. This was identified during the 1990s when surveys failed to locate the species at nine confirmed former sites and two unconfirmed sites in Victoria.

Historically there are records from dispersed sites from the NSW border to near Lake Tyers, along with unconfirmed reports from Wilsons Promontory and Tarwin Lower-Walkerville. It is believed due to the presence of subfossil deposits that the species may have once extended as far west in Victoria to Nelson near the Victorian South Australia border.

Other Considerations

This species was identified as a high priority for action following the 2019–20 fires, there are between 50 and 100 breeding pairs at Howe Flat (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Eastern bristlebird (*Dasyornis brachypterus*)	 **Bushfire**	The Eastern Bristlebird is a cover-dependent and fire-sensitive species. Ground dwelling and weak fliers. Eastern Bristlebirds are vulnerable to fire. Larger and more intense fires which travel quickly may be difficult for birds to escape.	**HIGH**	Inappropriate fire regimes arising from wildfire may threaten Eastern Bristlebird population viability through direct and indirect impacts and synergisms with other threats, which could ultimately result in localised extinctions.
	 **Drought**	Australia's climate has warmed by about 1.4 °C since 1910, leading to an increase in the frequency of extreme heat events. Heatwaves also exacerbate drought, which in turn can also increase bushfire risk. Birds are also vulnerable to extreme heatwaves that overwhelm their physiological limits.	**HIGH**	Drought episodes may have contributed to Eastern Bristlebird population declines due to resultant loss, modification and/or degradation of habitat and reduced food availability (e.g., reduction in invertebrates suitable for feeding nestlings.
	 **Biosecurity**	Dieback, caused by pathogens e.g., *Phytophthora cinnamomi* and invasive weeds may modify Eastern Bristlebird habitat, reduce habitat quality, and limit the availability of suitable habitat.	**HIGH**	Hygiene measures and control of dieback and invasive weeds are important to maintain Eastern Bristlebird habitat availability and suitability. Hygiene measures will also help prevent the spread of other plant diseases such as Myrtle Rust (*Austropuccinia psidii*). In addition, Bell Miner associated dieback (BMAD) is present within northern Eastern Bristlebird habitat.

Birds

Eastern Curlew (*Numenius madagascariensis*)

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

Image credit: **Sean Phillipson**

Description

Eastern curlews are the largest migratory shorebird species in the world, they have a wingspan of approximately 110 cm, are 60–66 cm long, and weigh around 900 g and noticeably long blue grey legs. Males and females appear similar, but females are generally larger with a longer bill. The bill is long, decurved and dark brown, while the head and neck are buff brown with darker brown streaks. They generally have flecked brown and tan plumage with a dark underbody with creamy buff areas on the rear belly. This species has a small seasonal variation in plumage, however full breeding plumage is unlikely to be observed on the species whilst in Australia as it breeds in Russia and possibly north-eastern China (DCCEEW 2023).

Distribution

The Far Eastern Curlew is a listed migratory species under the EPBC Act, and it takes an annual migratory flight to Russia and north-eastern China to breed, arriving back home to Australia in August to feed on crabs and molluscs in intertidal mudflats. Within Australia they are found in all states and territories and are mostly found along the coast and rarely inland (DCCEEW 2023).

East Gippsland Location

The Gippsland Lakes supports 26% of the Victorian population of the eastern curlew, with other coastal wetlands around Lakes Entrance, Marlo and Mallacoota also hosting this species (DEWLP 2020a).

In the EGCMA this species can be found in the *Gippsland Lakes* and *Protecting the Best* priority landscapes and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

Over the last 30 years, Eastern Curlew numbers in Australia have dropped by 80%. There are currently an estimated 22,500 (range 22,000–24,100) mature individuals in the wild with a continued trend of decline (DCCEEW 2023).

This species is an Australian Government priority species.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Eastern Curlew (***Numenius madagascariensis***)	 **Storm Surge**  **Coastal Erosion**	Global sea level has risen by around 17 ± 5 cm during the 20th century. These increases in sea level are likely to submerge more than 20 percent of coastal wetlands worldwide (DCCEEW 2023). Climate change may increase occurrence of extreme storms and coastal flooding events.	**VERY HIGH**	Coastal wetlands in Australia may be particularly vulnerable to sea level rise, where a reduction in the area of land available for feeding and roosting is likely, and nutrient and sediment flows will likely be altered. This will produce greater storm erosion, and realignment of coastlines, resulting in threats to the feeding and roosting habitat and displacement of birds from mudflats. The loss of staging sites can have two consequences for migratory shorebird populations: 1) Birds may not be able to store sufficient energy reserves for the ongoing migratory flight, thus failing to arrive at their destination; or 2) birds may arrive at their destination but perform poorly because of the carry-over effects of inadequate refuelling during their migration, which could reduce reproductive success.
	 **Drought**	Predictions of decreasing precipitation in both winter and spring may lead to the drying out of breeding habitat and the loss of preferred nesting habitat around swampy ground.	**HIGH**	Depending on the exact geographical location and microclimate conditions, this could mean significant changes in key breeding habitats.
	 **Biosecurity** **Outbreak of Highly Pathogenic Avian Influenza (HPAI) strain H5N1 (clade 2.3.4.4 b)**	As a waterbird this species may also be very vulnerable to the highly pathogenic avian influenza (HPAI) H5N1 (clade 2.3.4.4 b) disease. There is no effective treatment for the disease and the prognosis for species like the Eastern Curlew are poor.	**HIGH**	HPAI H5N1 (clade 2.3.4.4 b) has at the time of writing not been detected in Australia. However, due to migratory bird movement there is concern that an outbreak will occur. Overseas, wild birds commonly affected by H5N1 2.3.4.4b include waterfowl, shorebirds, seabirds and predatory or scavenging birds (WHA 2024).

Birds

Eastern Hooded Plover (*Thinornis cucullatus cucullatus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: **Sean Phillipson**

Description

The 2014 approved conservation advice for the Eastern Hooded Plover describes it as follows; "*the hooded plover is a stocky, medium-sized wading bird about 20 cm long and approximately 100 g in mass. Adult males and adult females look alike and exhibit no seasonal variation. They have a black 'hood', a white 'collar' across the back of the neck bordered at the base by a thin strip of black, a black stripe that extends across the base of the neck and shoulders to the sides of the breast, pale brownish-grey upperparts and white underparts. When in flight, black and white colouring can be seen on the front and rear parts of the upper wing. Adults have a black-tipped red bill, red rings around the eyes, brown irises, and dull orange-pink legs and feet*" (TSSC 2014).

Eastern Hooded Plovers are most likely observed in pairs, sometimes in small groups on wide sandy ocean beaches and at mouths of rivers where wide sandy areas are formed. The species forages along the high-water mark on the beach and nests in foredunes (EGCMA 2022a).

Distribution

Hooded Plovers are a resident shorebird found along the southern and eastern coasts of Australia. Their range extends from Jervis Bay in New South Wales to Fowlers Bay in South Australia and includes Tasmania and various offshore islands such as Kangaroo Island, King Island and Flinders Island (TSSC 2014). They prefer wide beaches backed by dunes with large amounts of seaweed, creek mouths and inlet entrances, although are sometimes found around other coastal lakes and lagoons. They like to breed in the same place each year, which is about 1km of beach, and lay eggs in simple scrapes above the high-water mark.

East Gippsland Location

The eastern hooded Plover is resident along the Gippsland Coast, which supports 40% of the modelled Victorian distribution of the species. Important locations include Sydenham Inlet to Sandpatch Point and east of Mallacoota (EGCMA 2022a). In 2020–21 34 Hooded Plovers were observed in East Gippsland but with limited breeding success (EGCMA 2022a).

In the East Gippsland Management Unit they are located in the *Gippsland Lakes* and *Protecting the Best* priority landscapes and the Australian Government's *Southeast Coastal Ranges* priority place.

Other Considerations

As a shorebird this species may also be very vulnerable to the highly pathogenic avian influenza (HPAI) H5N1 (clade 2.3.4.4 b) disease. There is no effective treatment for the disease and the prognosis for species like the eastern Hooded plover is poor. The disease could result in loss of species. Although the eastern Hooded plover will form small flocks in non-breeding season they do not nest in colonies which may slow the spread of the disease.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Eastern Hooded Plover (*Thinornis cucullatus cucullatus*)	 **Storm Surge**	Storms and storm surges can cause erosion, habitat degradation and may also impact survival of nests and young (DEECA 2023a).	**HIGH**	Very low population of mature birds, and ongoing loss of eggs and fledglings contributes to further population decline.
	 **Biosecurity**	Outbreak of Highly Pathogenic Avian Influenza (HPAI) strain H5N1 (clade 2.3.4.4 b)	**VERY HIGH**	HPAI H5N1 (clade 2.3.4.4 b) has at the time of writing not been detected in Australia. However, due to migratory bird movement there is concern that an outbreak will occur. Overseas, wild birds commonly affected by H5N1 2.3.4.4b include waterfowl, shorebirds, seabirds and predatory or scavenging birds (WHA 2024).

Mammals

Broad-toothed Rat (*Mastacomys fuscus mordicus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The Broad-toothed Rat is a terrestrial and primarily nocturnal rodent. The species has a short tail and stocky body with a broad face, with small, rounded ears with hair tufts inside the ears. It has a round head with typically with large molars, well developed cheeks and jaw muscles. The fur of the Broad-toothed rat is fine and dense, brown tinged in colour, rufous on top merging to pale grey below. This species has brown feet both top and bottom of the feet and a lightly haired tail which is darker on the top than below the tail. Generally, it has a body length of 14–17 cm with a tail length of 10–13 cm (DCCEEW 2023cb).

Distribution

The mainland subspecies of the Broad-toothed rat has experienced significant decline, and now has a very fragmented distribution primarily across the alpine and sub-alpine regions of south-eastern Australia (DEECCW 2023b). This subspecies is known from records from the Otways in Victoria and extending across the Great Dividing Range from near Healesville, Victoria to Kosciuszko National Park in New South Wales and the Brindabella Range in the Australian Capital Territory. Two disjunct subpopulations also occur at Barrington Tops and Gloucester Tops in New South Wales (DCCEEW 2023b).

According to the Conservation Advice for this species in Victoria, subpopulations are poorly defined but contained in five geographically distinct regions:

1 Alpine Victoria – from the Yarra Ranges to the New South Wales border,
2 Western Coastal Victoria – The Otway Ranges to Port Campbell National Park,
3 Central Coastal Victoria – Leongatha to Wilsons Promontory,
4 Eastern Coastal Victoria – Far East Gippsland,
5 Melbourne Metropolitan – Dandenong Ranges (where it has not been detected since 1994) (DCCEEW 2023b).

East Gippsland Location

In East Gippsland the subspecies has been found in the Alpine and Mitchell River National Parks while unconfirmed reports have come from lowland forest in Central and East Gippsland (Tonghi and Reedy Creeks near Cann River) (EGCMA 2022a).

Other Considerations

Broad-toothed Rat was identified as a high priority for action following the 2019–20 fires (DAWE 2020). It is also susceptible to predation from feral animals such as cats and foxes, which can be exacerbated after bushfires. Habitat damage in unburnt areas is also increased post fire from feral herbivores such as deer and horses as they browse in unburned areas (DCCEEW 2023b).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Broad-toothed Rat (*Mastacomys fuscus mordicus*)	 **Bushfire**	Bushfire impacts on this subspecies through direct mortality, loss of habitat and forage and increases its vulnerability to predation (DCCEEW 2023b).	**HIGH**	This subspecies is found in alpine grasslands which are especially vulnerable to fire. Surveys indicate that post fire recolonisation is slow particularly as suitable habitat is slow to redevelop post fire. This reduces the level of recolonisation from unburnt refugia (DCCEEW 2023b).
	 **Drought**	The habitat of this subspecies may be impacted by droughts, and increased temperatures, including drying of drainage lines and bogs, changes to vegetation composition and structure of both alpine grasslands and alpine sphagnum bogs which are important to the species (DCCEEW 2023b).	**HIGH**	Drought impacts both water sources and vegetation which are considered important for habitat. Drought also potentially increases the frequency and severity of bushfires and the impact of feral pest species all of which are detrimental to this subspecies (DCCEEW 2023b).

Mammals

Brush-tailed Rock-wallaby (*Petrogale penicillate*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Vulnerable and Endangered Species.pdf

Description

As described in the Conservation advice (TSSC 2021) the Brush-tailed Rock-wallaby is "*a medium-sized marsupial, weighing between 6–8 kg. The females are smaller than males with a head-body length of 51–57 cm while males are 53–59 cm. The tails which are bushy in the last third measure 50–63 cm in length for females and 51–70 cm for males. The hind feet of the species are considered quite short and broad, and the feet have rough foot pads with a more flexible central toe compared to other wallabies. These features help them to be more agile, which allows rock-wallabies to move swiftly around their rugged rocky habitat. Colouration is generally brown above, grey on the neck and shoulders, tending to reddish-brown on the rump, with darker limbs and lighter colouration ventrally. The head is darker, with a distinct pale stripe from the upper jaw through the cheek to the base of the ears. Individuals may have a black dorsal head stripe and white chest blaze*" (TSSC 2021).

Distribution

Historically the Brush-tailed Rock-wallaby was widely distributed throughout eastern and south-eastern Australia. Following European colonisation, the species' range has declined by 50 to 90 per cent. Because of this decline, the species is now patchily distributed throughout areas of its historic range, extending from the Grampians in western Victoria, to Yarraman in south-eastern Queensland. Most of this distribution is along the eastern length of the Great Dividing Range, with two western New South Wales populations located in the Warrumbungle Ranges and Mount Kaputar. Declines in distribution have been particularly severe in Victoria, where only two very small and isolated populations remain, in East Gippsland and the Gariwerd-Grampians (TSSC 2021).

East Gippsland Location

A small, isolated population of the Brush-tailed Rock-wallaby is located in the Upper Snowy catchment, within the EGCMA Protecting the Best priority landscape and the Australian Government's Australian Alps priority place. This population is the only remaining wild population of the Southern Ecologically Significant Unit. The Upper Snowy River population makes up 95% of the Victorian population and current estimates indicate only 50 individuals remain in the Little River Gorge (DELWP 2022).

Other Considerations

The 2011 National Recovery Plan details that more research is needed to identify which threatening process are the most damaging to this species. The East Gippsland population, due to its small size and isolation from other populations, is susceptible to local extinction particularly from events such as fire, drought and disease (Menkhorst and Hynes 2010).

This species is an Australian Government priority species.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Brush-tailed Rock-wallaby (*Petrogale penicillate*)	 **Bushfire**	Fires have been recorded to cause mortality of medium-sized marsupials due to high temperatures, toxic smoke, oxygen depletion, starvation, predation following loss of habitat and increased abundance and activity of predators.	**MEDIUM**	Fire effects on habitat suitability may cause a reduction in food resources as well as a reduction in vegetation complexity, thereby further exposing the species to increased predation risk.
	 **Drought**	Drought and its impacts will be an ongoing, and likely increasing, threat to the Brush-tailed Rock-wallaby, noting there will be variability in drought impacts across the range.	**VERY HIGH**	Severe drought leads to extensive loss of vegetation and causes noticeable declines in Brush-tailed Rock-wallaby abundance and mortalities due to suspected starvation.
	 **Biosecurity**	The European red fox, feral dog and feral cat are highly successful predators and has been implicated in the decline and extinction of many terrestrial, non-volant, critical weight range, mammal species, including the Brush-tailed Rock-wallaby and other Petrogale species.	**VERY HIGH**	If predation of juveniles is greater than recruitment into a colony through breeding and dispersal from other colonies, then the colony will be unsustainable.
		Hydatid disease is a potentially fatal disease caused by Echinococcus granulosus (Hydatid tapeworm).	**MEDIUM**	Hydatid disease has been identified as a contributor to the deaths of Brush-tailed Rock-wallabies.

Mammals

Grey-headed Flying-fox (*Pteropus poliocephalus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Vulnerable and Endangered Species.pdf

Description

According to (DAWE 2021) the Grey-headed Flying-fox is one of the largest bats in the world. Generally, the adult males will weigh between 750g and 1,000g and some up to 1133g, while female adults range from 650g and 800g. Males and females mature at different rates and will have different body mass in different seasons they are similar in forearm length which ranges from 155 to 175mm (DAWE 2021).

The colouration of this species is generally medium to dark grey, with light tipped hairs on the body and variations from black through grey to silver on the head. An identifying feature of this species is its orange - russet neck collar. It also has leg fur right to the ankle, while its wing membranes are black (DAWE 2021).

Distribution

Nationally this species has traditionally occupied forests and woodlands in the coastal lowlands, tablelands and slopes of eastern Australia, from Bundaberg in Queensland to Geelong in Victoria, with some isolated camps and rare sightings outside this range. In more recent times the species has been found in camps in South Australia, the Australian Capital Territory and inland areas of central and southern New South Wales and Victoria with sightings also increasing in Tasmania (DAWE 2021).

East Gippsland Location

In the East Gippsland Management Unit, the population has been increasing mainly in summer. There are major populations (camps) of this species at Bairnsdale and Karbeethong (Mallacoota) with over 100,000 individuals recorded in some years. Other smaller camps may be found in or adjacent to towns. VBA records indicate it is found in the EGCMA's *Gippsland Lakes*, *Forested Foothills* and *Protecting the Best* priority landscapes along with the Australian Government's *Southeast Coastal Ranges* Priority Place (DELWP 2022).

Other Considerations

This species was listed as a priority animal species for interventions post the 2019–20 bushfires (DAWE 2020). They are seasonal breeders with only one breeding event each year, however, are known to forage over extensive areas flying as far as 40 km to feed, before returning to their roost the same night. They are known to migrate in response to changes in the quantity and location of food (DAWE 2021).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Grey-headed Flying-fox (*Pteropus poliocephalus*)	 **Bushfire**	Bushfire is a threat to this species as it results in loss of habitat in particular foraging habitat. They have no biological capacity to withstand food shortages and must migrate to deal with food shortages (DAWE 2021). The 2019–20 bushfires across southern and eastern Australia affected large areas of foraging habitat for the Grey-headed Flying-fox.	**VERY HIGH**	The impacts of the bushfires on this species will be significant, placing further pressure on the species through loss of foraging habitat and reduction in foraging resources.
	 **Drought**	Exposure to high temperatures results in mortality in Grey-headed Flying-foxes and is known to occur when the surrounding air temperature exceeds 40°C. This is especially true when the high temperatures are accompanied by low humidity and hot drying winds.	**HIGH**	Rates of mortality are lower at ambient temperatures of 41–43.5°C and increase rapidly at temperatures above 43.5°C. Currently, between 0–5 flying-fox die-offs occur per year, but these events are expected to increase in frequency under climate change.
	 **Biosecurity**	Myrtle rust affects plants in the family Myrtaceae, including the genera Eucalyptus, Angophora, Callistemon, and Melaleuca. Infection occurs on young growing shoots, leaves, flower buds and fruits. The Myrtaceae family provides a lot of the forage species for the Grey-headed Flying Fox.	**MEDIUM**	This species is able to migrate when food sources are low and is known to adapt when native species are low. They are also able to forage over extensive areas – up to 40 km per night (DAWE 2021)

Mammals

Long-footed Potoroo (*Potorous longipes*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The Long-footed Potoroo (*Potorous longipes*) is a ground-dwelling, mostly nocturnal marsupial and is regarded as one of the larger members of the rat-kangaroo family (Potoroidae) (DAWE 2022). It has a head and body length of about 400 mm, a tail about 320 mm long and weighs up to 2.2 kg (DSE, 2009). It has grey-brown fur above and grey fur underneath and Its larger size and longer hind-foot in relation to head length differentiate it from its closest relative, the Long-nosed Potoroo (*P. tridactylus*) (DAWE 2022).

Distribution

The Long-footed Potoroo is found in south-eastern Australia with only three known disjunct sub-populations of the species. These are as follows, one in East Gippsland north-east of Orbost, another in south-eastern New South Wales and a third centred on the Barry Mountains in north-eastern Victoria (Nunan, Henry and Tennant 2000). To date the East Gippsland sub-population seems to be the most extensive, with many separate sites across an area of about 1120 square kilometres in the catchments of the Brodribb, Bemm, Rodger and Yalmy Rivers (Nunan, Henry and Tennant 2000).

East Gippsland Location

There are two known subpopulations in Victoria and the East Gippsland Management Unit is a stronghold for the species, with the VBA holding several thousand records. The species is distributed across about 500,000 ha from Tulloch Ard to Cann River and Bonang to Cape Conran. The other subpopulation is found in the Upper Wonnangatta River, this subpopulation is continuous with populations in the upper Ovens, Buckland, Buffalo catchments in the North East Catchment Management Authority region (DEECA 2024a).

The 2020 Biodiversity Response Planning undertaken by DEWLP indicates that approximately 78 percent of the Victorian population is found in the EGCMA *Protecting the Best* priority landscape while another significant proportion is within the *Alpine Peaks* priority landscape. These correlate with the Australian Government's *Australian Alps* and *Southeast Coastal Ranges* priority places.

Other Considerations

Long-footed Potoroo was identified as a high priority for action following the 2019–20 fires (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Long-footed Potoroo (*Potorous longipes*)	 **Bushfire**	The long-footed potoroo is vulnerable to mortality during and after bushfires, due to its specialised habitat, limited ability to flee, use of understorey vegetation as shelter and high susceptibility to introduced predators.	**VERY HIGH**	Bushfires can lead to mortality of medium-sized marsupials directly or indirectly, and the long-footed potoroo is highly susceptible to predation by feral species after bushfires, as a result of the increased activity and hunting efficiency of introduced predators in burnt areas.
	 **Drought**	Climate change is projected to result in higher mean and median temperatures, reduced rainfall, and increased frequency and severity of drought across south-eastern Australia.	**VERY HIGH**	Reduced precipitation may impact available habitat for the long-footed potoroo through desiccation of the damp gullies, dense understorey and rainforests which are preferred by the species.
	 **Biosecurity**	Toxoplasmosis is an infectious disease caused by the parasite Toxoplasma gondii and is spread by feral cats. Toxoplasmosis is recognised as a cause of disease and mortality in Australian marsupials, including potoroos (DEPI 2013).	**MEDIUM**	Toxoplasmosis has been reported in the related Long-footed potoroo, though infection and mortality due to the disease has not been reported in the long-footed potoroo.
		Infection by Phytophthora cinnamomi leads to mortality, reduced fitness, reduced recruitment/reproduction, and local population declines of many plant species. Construction and maintenance of roads is a risk for spreading Phytophthora cinnamomi. The risk is greatest on private and rural roads. Phytophthora cinnamomi can cause forest dieback and therefore may impact on Long-nosed Potoroo habitat and food sources (DEPI 2013).	**MEDIUM**	The impact on long term habitat and food sources is unknown.

Mammals

Southern Long-nosed Potoroo (*Potorous tridactylus trisulcatus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Vulnerable and Endangered Species.pdf

Description

As described in the 2022 Conservation Advice the Southern Long-nosed Potoroo "*is a compact, medium-sized marsupial with a maximum body and head length of 31–34 cm, a tail length of 23 cm and a weight range of 660–1640 g (Johnston 2008). The species name 'tridactylus' translates to three-toed, although the long-nosed potoroo technically has five toes (the second and third digits are conjoined). The hind limbs are 85–88 cm long and well developed, enabling the animals to hop at great speeds. Their forearms are shorter and muscular with short, strong claws, well adapted to digging. The species has small, rounded ears, large eyes, and, as its name suggests, a long muzzle with a bare tip. The body has two fur layers, a soft, short dark grey fur on the back with coarser hair protruding from it and which can range in colour from yellow-white to brown with a black tip. The underside of the animal is covered in coarse white fur, with a grey base layer*" (DAWE 2022a).

Distribution

This species has an extensive but fragmented distribution, from the Great Dividing Range, up to 800 m above sea level through to coastal plains. It has been found to be confined to habitats with greater than 760 mm annual rainfall (DAWE 2022a). Generally, it occurs in isolated habitat pockets on the coastal plains of southern New South Wales and Victoria and inland to the slopes and foothills of the Great Dividing Range (DAWE 2022a). In Victoria it occurs in six discrete regions: the South-western region, Grampians, Otways, Western Port, Wilsons Promontory and East Gippsland (DEPI 2013).

East Gippsland Location

East Gippsland has the largest proportion of the Victorian population of the Southern Long-nosed Potoroo where it is found in coastal heaths and woodlands, right along the coast from Lake Tyers through to Cape Howe. Important sites include Coopracambra NP, Croajingolong NP, Lake Tyers Coastal Reserve and Ewings Morass (DEPI 2013, DAWE 2022a).

The 2020 Biodiversity Response Planning undertaken by DEWLP indicates that approximately 53% of the Victorian population is found in the EGCMA *Protecting the Best* priority landscape which correlates with the Australian Government's *Southeast Coastal Ranges* priority place.

Other Considerations

The Southern Long-nosed Potoroo was identified as a high priority for action following the 2019–20 fires (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Southern Long-nosed Potoroo (***Potorous tridactylus trisulcatus***)	 **Bushfire**	The long-nosed potoroo is vulnerable to mortality during and after bushfires, due to its specialised habitat, limited ability to flee, use of understorey vegetation as shelter and high susceptibility to introduced predators (DEPI 2013).	**VERY HIGH**	Bushfires can lead to mortality of medium-sized marsupials directly or indirectly, and the long-nosed potoroo is highly susceptible to predation by feral species after bushfires, as a result of the increased activity and hunting efficiency of introduced predators in burnt areas (DEPI 2013).
	 **Drought**	Climate change is projected to result in higher mean and median temperatures, reduced rainfall, and increased frequency and severity of drought across south-eastern Australia (DEPI 2013).	**VERY HIGH**	Reduced precipitation may impact available habitat for the long-nosed potoroo through desiccation of the damp gullies, dense understorey and rainforests which are preferred by the species (DEPI 2013).
	 **Biosecurity**	Toxoplasmosis is an infectious disease caused by the parasite Toxoplasma gondii and is spread by feral cats. Toxoplasmosis is recognised as a cause of disease and mortality in Australian marsupials, including potoroos (DEPI 2013).	**MEDIUM**	Toxoplasmosis has been reported in the related Long-nosed potoroo, though infection and mortality due to the disease has not been reported in the long-nosed potoroo (DEPI 2013).
		Infection by Phytophthora cinnamomi leads to mortality, reduced fitness, reduced recruitment/reproduction, and local population declines of many plant species. Construction and maintenance of roads is a risk for spreading Phytophthora cinnamomi. The risk is greatest on private and rural roads. Phytophthora cinnamomi can cause forest dieback and therefore may impact on Long-nosed Potoroo habitat and food sources (DEPI 2013).	**MEDIUM**	The impact on long term habitat and food sources is unknown.

Mammals

Southern Brown Bandicoot (*Isoodon obesulus obesulus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The Southern Brown Bandicoot is described in the 2016 Conservation advice for Southern Brown Bandicoot (*Isoodon obesulus obesulus*) as being "*a medium-sized, ground-dwelling marsupial with a head and body length of approximately 30 cm. Like other members of the family, the southern brown bandicoot has a long tapering snout, a naked nose, a compact body and a short tail generally 110–120 mm long. The head has small, rounded ears and small, black eyes. The dorsal surface of the body bears black spiny bristle-hairs and softer, dark grey underfur that appears brown at a distance. The softer underbelly is creamy-white. While the forelegs are short with curved claws on the digits, the hind limbs are much longer, resembling those of macropods. Males are heavier (mean weight 890 g) than females (mean weight 620 g)*" (TSSC 2016).

Distribution

The distribution of the Southern Brown Bandicoot is very fragmented with numerous disjunct subpopulations. It is found (generally in coastal areas) from the southern side of the Hawkesbury River in New South Wales to Kangaroo Island in South Australia. In Victoria records are clustered within several bioregions, including: the East Gippsland Lowlands, Gippsland Plain (Western section), Otway Plain (Anglesea section), Warrnambool Plain (Port Campbell section), Greater Grampians, Glenelg Plains and Wilsons Promontory. In South Australia it occurs along the coastline of the state's south-east corner (particularly the Mt Burr Range), in the Mt Lofty Ranges east of Adelaide, Fleurieu Peninsula and Kangaroo Island (TSSC 2016).

East Gippsland Location

In the East Gippsland Management unit the species stronghold is in the *Protecting the Best* priority landscape where according to DELWP's 2020 Biodiversity response planning it makes up 28% of the Victorian population (DELWP 2020b, 2020c, 2020d).

Other Considerations

This species has experienced a significant population decrease and estimated 50 to 90 percent decline in its range following European settlement (TSSC 2016).

Southern Brown Bandicoot require fire intervals of 10–20 years to maintain a healthy diversity of flora and abundance and diversity of food sources for the species. Further research is needed to understand how Southern Brown Bandicoots use different habitat types with different fire histories.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Southern Brown Bandicoot (***Isoodon obesulus obesulus***)	 **Bushfire**	A major threat to the southern brown bandicoot (eastern) is too frequent and extensive burning. Fires including planned burns that are too frequent or intense have the potential to cause direct mortality and reduce habitat extent and/or condition by opening of understorey vegetation that the animal uses for nesting and protection from predators, as well as affecting food availability (DEECA 2023b). Wildfire and fuel reduction burning in southern Australia has become more frequent, intense and widespread.	**HIGH**	A hotter, drier climate may increase the likelihood, frequency, extent and/or intensity of fire and its impact on Southern Brown Bandicoot habitat and could lead to loss of refugia and local extinctions. This is exacerbated by the fragmented and smaller isolated populations which results in increased risk of genetic decline and associated changes to recruitment and/or mortality rates.
	 **Drought**	Drying and warming of the environment, including droughts, may lead to habitat changes, and impact resource availability, recruitment and/or mortality rates.	**HIGH**	Climate change models show an overall increase in temperature and a decrease in the average annual rainfall over the next four decades; this will have adverse effects on habitat quality and could lead to further local extinctions.

Mammals

Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The Spot-tailed Quoll *Dasyurus maculatus* is a cat sized, nocturnal marsupial carnivore. It has distinctive sandy to reddish-brown fur with characteristic white spots over its back, flanks and tail. It has a large and obviously spotted tail which helps differentiate it from other quoll species. Males are generally 380–759 mm in head and body length with a tail length of 370–550, while females are 350–450 mm in head and body and 340–420 mm in tail length. The mean weight range for male adults is 2.8–4.6 kg and 1.5–2 kg for females (DELWP 2016, TSSC 2020).

Distribution

The Southeastern mainland population of the Spot-tailed Quoll is found in eastern Australia from south-eastern Queensland to western Victoria. This species has suffered a major decline with estimates ranging from 50–90 percent for the mainland and 25–50 percent for the population in New South Wales since European settlement. This has resulted in fragmented and isolated populations (DELWP 2016). The species generally inhabits forested areas and may occur in many forest types such as lowland, foothill and montane moist and dry forests and woodlands (DSE 2003).

East Gippsland Location

The East Gippsland populations are found in the upper Snowy around Gelantipy, Wulgulmerang, Deddick, Suggan Buggan, where it is continuous across border into NSW. There are scattered records from Dividing Range west to Baw Baw. Very few recent records have been captured in East Gippsland (DELWP 2022).

These populations exist within the *Alpine Peaks* and *Protecting the Best* priority landscape areas of the East Gippsland Management Unit and within the Australian Government's *Australian Alps* and *Southeast Coastal Ranges* priority places.

Other Considerations

Distribution appears to be declining. The recent 2019–20 bushfires in eastern and southern Australia may have accelerated population decline, given that 29 per cent of the Spotted-tailed Quoll's distribution range overlaps with the fire-affected extent (TSSC 2020). It was identified as a priority for action following the fires (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (***Dasyurus maculatus maculatus***)	 **Bushfire**	Bushfire and in particular high frequency fire poses a threat because it can reduce the structural complexity of the habitat and the abundance of some of the preferred prey of the Spot-tailed quoll (TSSC 2020).	**VERY HIGH**	Research indicates the species does recover after initial population reduction from the direct impacts of fire. However, this is likely to depend on availability of rocky refugia. In areas with little or no rock, initial impacts are likely to be more severe and populations take longer to recover. As stated in the National recovery Plan "aspects of the biology and ecology of Spot-tailed Quolls render them especially susceptible to threatening processes. They are generally solitary and occupy large home ranges, and consequently occur at low population densities. They have a relatively short lifespan and a low overall reproductive output, with some females breeding only once or twice during their lives" (DELWP 2016).

Fish

Threatened Mountain Galaxia Species:

Dargo Galaxias *Galaxias mungadhan*
East Gippsland Galaxias *Galaxias aequipinnis*
Yalmy Galaxias *Galaxias sp. nov. 'Yalmy'*
McDowell's Galaxias *Galaxias mcdowalli*

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

Image credit: **Greg Wallis / iNaturalist**

Description

These four endemic East Gippsland Galaxias spp are part of the mountain galaxias species complex of freshwater galaxiid fish found in southeast Australia. They are small bodied native fish unique to the East Gippsland stream and river systems in which they are found. Most of the habitat of these four species was severely impacted by the 2019–20 bushfires.

Dargo Galaxias *Galaxias mungadhan*
The Dargo Galaxias is a small, tubular, elongated, scaleless freshwater fish. While generally growing to 70–80 mm in length it can grow to a maximum of 110 mm and 11 g in weight. Generally, the adult fish are brown on the back and upper parts, becoming lighter with a tan belly. A notable visible feature is diffuse, irregular, dark brown- black blotches on the back to lower sides, with a moderately wide mid-lateral band composed of gold spots or flecks. It has a small head and snout and a comparatively large mouth with small, silver to copper-gold eyes and soft-rayed, translucent and yellow-brown fins. It has been observed that individuals are slightly stockier at lower altitudes than at higher altitudes (DCCEEW 2023c).

East Gippsland Galaxias *Galaxias aequipinnis*
The East Gippsland Galaxias is a small, native freshwater fish. It has a tubular, elongate and scaleless body and generally grows to 70-80 mm but sometimes up to 110 mm length and 12.9 g in weight. Colouration in the adult fish is generally brown on the back and upper sides, becoming light brown to cream ventrally, while the belly is almost silvery white. The fish has a short head and snout, a large mouth and small coppery-gold eyes. Its fins are soft-rayed, translucent and slightly pale yellow to dusky (DCCEEW 2021).

Yalmy Galaxias *Galaxias sp. nov. 'Yalmy'*
The Yalmy Galaxias is also a small scaleless elongate, tubular native freshwater fish. It grows between 55–70 mm in length and occasionally up to a maximum length 78 mm (DCCEEW 2023d). As described in the National Conservation Advice "*the Yalmy galaxias is superficially similar to Galaxias mcdowalli (McDowall's galaxias), but tends to be smaller in overall size, has a unique snout and mouth morphology, distinctive dark brown pattern along sides and dorsal surface, over a yellow-brown body colouration, and yellow fins. The species also has a unique swimming style, usually laying on the substrate then darting very rapidly through the water column*" (DCCEEW 2023d).

McDowell's Galaxias *Galaxias mcdowalli*
McDowall's galaxias is a small, native freshwater fish, which has a tubular, elongate and scaleless body. It generally grows to 65–70 mm in length but has been known to reach a maximum length of 84 mm and 6 g in weight (DCCEEW 2023e).

The colouration of adults in this species is mainly olive-brown on the back and upper sides transitioning to light brown to cream ventrally, with an almost white belly. Dark brown to black irregular blotches and flecks, and a wide mid-lateral band of gold flecks are also found on the adults. This species differs from others in the mountain galaxias complex by having an extra pelvic fin ray, relatively short-rayed anal fin, which is similar in height and base-length to the dorsal fin, and distinctive pattern on the sides of its body (DCCEEW 2023e).

Distribution

Dargo Galaxias *Galaxias mungadhan*
This species is confined to to a very small number of streams in the headwaters of the Dargo River (including Lightbound Creek). It has been recorded in small cool, clear alpine creeks flowing through grassy plains of forest habitat (EGCMA 2022). This species is found in the EGCMA's *Alpine Peaks* priority landscape and the Australian Government's *Australian Alps* priority place.

East Gippsland Galaxias *Galaxias aequipinnis*
The East Gippsland galaxias is only known from the Arte River system (Arte River and Little Arte River)

at approximately 250–390 m above sea level in the Bemm River catchment in East Gippsland (EGCMA 2022). This species is found in the EGCMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Yalmy Galaxias *Galaxias sp. nov. 'Yalmy'*
The Yalmy Galaxias is only known from the mid-reaches of the Yalmy River system (including the Little Yalmy and Serpentine Creek) and the lower Rodger River in the Snowy River catchment. The species may also occur in the Snowy River near the confluence with the Rodger River (EGCMA 2022). This species is found in the EGCMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

McDowell's Galaxias *Galaxias mcdowalli*
The species is known from a single subpopulation in the Rodger River and is thought to be restricted to the known headwater (EGCMA 2022). This species is found in the EGCMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

These species already have low populations and genetic diversity. The Yalmy and East Gippsland Galaxias had already experienced a decline due to the 2014 Orbost / Snowy fire complex. All species suffered a further notable decline due to the impacts of the Black Summer bushfires and associated sedimentation and have been identified as high priority for action (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Threatened Mountain Galaxia spp. **Dargo Galaxias** **East Gippsland Galaxias** **Yalmy Galaxias** **McDowall's Galaxias**	 **Bushfire** **(and associated sedimentation)**	Bushfires impact on Galaxia habitat by increasing water temperature and sediment load, reducing dissolved oxygen levels and altering water chemistry, which can impact aquatic ecosystems up to 80 km downstream of burnt areas (DEECCW 2021). These mountain galaxias species are very susceptible to water quality changes with an upper thermal tolerance of approximately 33 °C, which declines with reductions in dissolved oxygen and mild exposure to ash and sediment (DEECCW 2021). Bushfires can also contribute to higher sedimentation as ash and other debris is washed into streams and rivers. This may result in suffocating fish and/or the stream substrate impacting on foraging and food availability along with spawning and refuge areas (DCCEEW 2021).	**VERY HIGH**	Each of these species have very restricted distribution and are experiencing ongoing decline in geographic range. Any event impacting on habitat (loss or damage) is considered a major threat to the overall population.
	 **Drought**	While historically these species have been able to survive droughts, further changes to rainfall patterns and temperatures due to climate change are predicted to cause decreased surface run-off, impacting small headwater streams (e.g., lower water levels and higher water temperatures) with increasing severity and frequency (DCCEEW 2021). An additional impact of severe and prolonged droughts is the possible creation of new instream barriers, increasing fragmentation and reducing spawning and recruitment (DCCEEW 2021).	**HIGH**	
	 **Flood**	Flooding because of extreme rainfall events may result in several detrimental impacts on habitat. These include increased stream bank erosion and sedimentation, altered water quality and drowned out instream barriers facilitating salmonid (brown trout) incursion, thus increasing predation (DCCEEW 2021).	**HIGH**	

Fish

Eastern Dwarf Galaxias (*Galaxiella pusilla*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: **Rudie Kuiter**

Description

The Dwarf Galaxias is a tiny, slender freshwater fish endemic to south-eastern Australia. This species grows to approximately 40mm for females and 34mm for males (Saddlier, Jackson and Hammer 2010). The Dwarf galaxias is scaleless with a single dorsal fin and soft rayed and transparent fins. It has a short and blunt head, large eyes and a small mouth. The species is olive in colour on its body and amber colour on its dorsal surface and sides with a silver to white belly (Saddlier, Jackson and Hammer 2010).

Distribution

The Dwarf Galaxias is endemic to south-eastern Australia and was previously thought to occur from the Mitchell River Basin in central Gippsland, Victoria, to the Cortina Lakes, near the Coorong in South Australia. However, a recent (2015) taxonomic review restricted the mainland population from the Mitchell river to Dandenong Creek (DCCEEW 2023f).

The populations are fragmented and patchy across the landscape. The species has likely suffered a significant decline in abundance due to habitat changes to shallow freshwater wetlands, especially wetland drainage (Saddlier, Jackson, & Hammer 2010).

East Gippsland Location

In the East Gippsland CMA region this species is found in the Mitchell River with a population in Cobblers Creek. The species is found in the Red Gum Plains and Gippsland Lakes priority landscapes of the EGCMA region.

Other Considerations

The *National Recovery Plan for the Dwarf Galaxias Galaxiella pusilla* (2010) describes the species as particularly susceptible to habitat degradation because it is found in lowland, shallow freshwater habitat often on private land. Many sites on private property are threatened by damage from unrestricted stock access. Stock access and trampling has a major impact on these wetlands, through disturbance and removal of instream and riparian habitat which may also have a flow on effect on water quality, and the habitat of critical food species (Saddlier, Jackson, & Hammer 2010).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Eastern Dwarf Galaxias (***Galaxiella pusilla***)	 **Bushfire** **(and associated sedimentation)**	Bushfires impact on Galaxia habitat by increasing water temperature and sediment load, reducing dissolved oxygen levels and altering water chemistry, which can impact aquatic ecosystems up to 80 km downstream of burnt areas (DEECCW 2021). Bushfires can also contribute to higher sedimentation as ash and other debris is washed into streams and rivers. This may result in suffocating fish and/or the stream substrate impacting on foraging and food availability along with spawing and refuge areas (DCCEEW 2021).	**HIGH**	The availability and quality of shallow freshwater habitats is expected to decline under these conditions, adding pressure to the dwarf galaxias population.
	 **Drought**	While historically these species have been able to survive droughts, changes to rainfall patterns and temperatures due to climate change are predicted to cause decreased surface run-off, impacting permanent or temporary wetlands with increasing severity and frequency (DCCEEW 2021).	**VERY HIGH**	Availability and quality of shallow freshwater habitats is less in drought conditions adding pressure to the dwarf galaxias population, as it has specific breeding requirements, these conditions may only be available for a brief period and any event that prevents breeding for over a year will have major impacts on the population (Saddlier, Jackson, & Hammer 2010). Droughts can also impact on recruitment through the loss (temporary or permanent) of waterbodies, or annually inundated areas, will result in decreased recruitment.
	 **Flood**	Flooding because of extreme rainfall events may result in a number of detrimental impacts on habitat. These include increased stream bank erosion and sedimentation, altered water quality and damaged or destroyed riparian vegetation. Severe flooding may also alter in stream hydrology impacting size and depth of freshwater wetlands.	**HIGH**	The availability and quality of shallow freshwater habitats is expected to decline under these conditions, adding pressure to the dwarf galaxias population. Loss of riparian vegetation, increased sedimentation and erosion all have a detrimental impact of food sources and breeding habitat and refugia.

Frogs

Giant Burrowing Frog (*Heleioporus australiacus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: **Matt Clancy**

Description

Heleioporus australiacus (Giant Burrowing Frog), family Myobatrachidae, is described in the 2014 Conservation listing advice as "*a large, rotund, slow-moving frog that grows to 10 cm long. It is a powerfully built species with muscular hind limbs and enlarged areas on the feet for burrowing. Adult males have enlarged forearms compared to females. Colour varies from steely blue grey to black on the limbs and upper body and paler on the sides, with a white belly. The body has numerous warts, with some along the flanks creamy white to canary yellow. It has prominent, large eyes with a vertical pupil and silvery iris.*" (DoE 2014).

Distribution

The Giant Burrowing Frog is found along the coast and adjacent ranges in both NSW and Victoria. There are thought to be two distinct populations, the northern population mostly confined to the sandstone geology of the Sydney Basin south to Ulladulla, while the southern population extends from north of Narooma through to Walhalla, Victoria (DoE 2014).

This frog species has been found at up to 1000 m and down to sea level, and in a range of habitat types, including heath, woodland and open dry sclerophyll forest, however all Victorian records have been from eucalypt forests (DoE 2014, DSE 2003a).

East Gippsland Location

There are scattered records in East Gippsland, the most recent records have been from the foothills north of Bairnsdale (Mt Alfred) and near Swifts Creek. Surveys conducted in 2015 found a total of nine males in the Mitchell River catchment (Zoos Victoria 2024). There are also older records from across far east Gippsland.
The 2020 Biodiversity response planning factsheets (DELWP 2020) identified that the East Gippsland Management Unit is home to 70% of this species Victorian range. Records from the Victorian Biodiversity Atlas (VBA) indicate that this species is found in the *Forested Foothills* and *Protecting the Best* EGCMA priority landscapes and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

The Giant Burrowing Frog is one of Victoria's most poorly understood species and is a difficult species to survey (Zoos Victoria 2024, DELWP 2022). It is thought to be in decline and that it uses small flowing streams as breeding sites. It was identified as a high priority for action following the 2019–20 fires (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Giant Burrowing Frog (*Heleioporus australiacus*)	 **Bushfire**	Inappropriate fire regimes, especially those that alter vegetation structure and composition and affect water attributes (sedimentation load, nutrient load and oxygenation).	**VERY HIGH**	Fire may significantly impact on this species' habitat.
	 **Biosecurity**	Chytridiomycosis caused by infection with chytrid fungus (*Batrachochytrium dendrobatidis*).	**MEDIUM**	Chytridiomycosis has been implicated in the decline and disappearance of a number of frog species and has the potential to impact on the Giant Burrowing Frog.

Frogs

Green and Golden Bell Frog (*Litoria aurea*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: **Bryce Watts-Parker**

Description

The Green and Golden Bell Frog is described in the 2014 Approved Conservation Advice for *Litoria aurea* (green and golden bell frog) as "*a large dull olive to bright emerald-green frog reaching 85 millimetres in length. It has a cream or yellow dorso-lateral skin fold (stripe) running from behind the eye to the lower back that is bordered by a black stripe that can extend through the eye to the nostrils. The hind toes of the frog are almost fully webbed, but the fingers of the front feet lack webbing. The frog also has a distinct tympanum (ear membrane)*" (DoE 2014a).

Distribution

The Green and Golden Bell Frog occurs mainly along coastal lowland areas of eastern New South Wales and Victoria. The most southern extent of the species' distribution is in the vicinity of Lake Wellington in the West Gippsland CMA region, at the western end of the Gippsland Lakes. Green and Golden Bell Frogs use a range of habitats during their life cycle which includes foraging, breeding, over-wintering and dispersal. They will also use different habitats or habitat components on a seasonal basis. The species has been recorded in a range of permanent/ephemeral and natural/manmade aquatic habitats but is primarily associated with still rather than flowing water (DoE 2014a).

East Gippsland Location

According to the 2020 DELWP Biodiversity Response planning process almost the entire Victorian population is found in the East Gippsland Management Unit. However, there are also some records from the West Gippsland CMA sections of the Gippsland Lakes and Red Gum Plains. Known locations in East Gippsland include Macleod Morass, Lake Tyers and other areas around the Gippsland Lakes (EGCMA 2022). Declines in East Gippsland have not been as severe as in New South Wales primarily due to the largely intact coastal habitat which exists to the east of Lakes Entrance (DoE 2014a).

The Victorian Biodiversity Atlas (VBA) records indicate that it is in all the East Gippsland CMA priority landscapes except the *Alpine Peaks* and it is also in the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

This species is now considered absent from 90% of its former range in NSW (DoE 2014a). In Victoria this species is found in *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia and Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains* EPBC Act-listed threatened ecological communities.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Green and Golden Bell Frog (***Litoria aurea***)	 **Drought** **(leading to hydrological change)**	The greatest threat to this species is loss of habitat including changes to the structure and diversity of aquatic vegetation (DoE 2014a). Drought, in particular long-term drought may cause hydrological changes including changes to water table levels and/or altered run-off, sedimentation, pollution or altered tide incursion.	**VERY HIGH**	The species has specific habitat requirements for breeding and foraging and may decline if these are not met.
	 **Biosecurity**	Australia's native amphibians are threatened by the pathogenic fungus, Batrachochytrium dendrobatidis, known as amphibian chytrid fungus, which causes the infection known as chytridiomycosis.	**HIGH**	Mortality as a result chytridiomycosis has been observed in New South Wales. However, despite its widespread infection across amphibian populations in New South Wales, some green and golden bell frog populations are free from or resistant to chytridiomycosis.
	 **Flood**	Possible threats to the green and golden bell frog include the artificial and natural opening of coastal lagoon estuaries, changes to flow/ flooding regimes of streams and associated wetlands, spring tides and storm and flood events which introduce predatory fish and result increases in salinity.	**MEDIUM**	Saltwater intrusion in coastal wetlands as a consequence of landscape changes as a potential threat to bell frog breeding sites; however, detailed field data is required to determine the extent of this threat.

Frogs

Southern Heath Frog, Watson's Tree Frog (*Litoria watsoni*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Stephen Mahony

Description

The Watson's Tree Frog (*Litoria watsoni*) has recently been identified due to a taxonomic revision of Little John's Tree frog (*Litoria littlejohni sensu lato*) into two species. It is described in the 2022 Conservation advice as being "*a medium-sized frog from the Family Hylidae ("tree frogs"). Females are larger than males, having a snout-to-vent length (SVL) to 64 mm, while males reach 59 mm SVL. The dorsal surface is weakly granular, becoming more granular laterally and on the venter and thighs. Dorsal surfaces of the body and limbs are a light brown, mottled with dark and light flecking of brown and yellow. The sides of the face are lighter still. The ventral surface is granular and white. Distinctive bright orange-red markings are present on the back of the legs and onto the foot, groin, and posterior flanks, and on the upper axial of the forelimbs. The head is longer than it is wide with a rounded snout. The eyes are large and yellowish-gold. The tympanum is circular and visible. A dark stripe extends from the tip of the snout to the eye, continues less intensely behind the eye and over the tympanum, and then onto the flank where it gradually dissipates. The legs are moderate to long. The fingers and toes are long with prominent terminal discs. The fingers are not webbed, while the toes have basal webbing*" (DAWE 2022b).

Distribution

The 2022 Conservation advice for Watson's Tree Frog (Litoria watsoni) states that it is "*distributed from the Budderoo National Park (NP) in south-eastern New South Wales (NSW) to the eastern side of the Snowy River NP in the East Gippsland region of Victoria. The species is found at elevations from near sea-level to 1100 m. The topography at the northern end of the distribution is recognised as a biogeographic barrier for several taxa, being characterised by steep escarpments and V-shaped valleys and marks the geographic delineation between Littlejohn's Tree Frog and Watson's Tree Frog*" (DAWE 2022b).

East Gippsland Location

Restricted to upland areas in East Gippsland, with a western most record near Brookville and eastern most record on the state border east of Gypsy Point. The core of the taxon's range in Victoria is the Erinunderra Plateau, north and north-east of Orbost (EGCMA 2022).

Recent VBA records indicate it has been found at 31 sites across the East Gippsland CMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place. In the East Gippsland CMA region it has been found in foothill and montane wet and damp forest and in ephemeral water bodies including puddles and drains (DELWP 2022).

Other Considerations

From recent surveys this species is suspected to be in ongoing decline, given there was limited individuals at suitable habitat. In addition, much of its range overlaps with burnt areas from the 2019–20 bushfires (DELWP 2022).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Southern Heath Frog, Watson's Tree Frog (*Litoria watsoni*)	 **Bushfire**	Climate projections will increase the scale, frequency, and intensity of bushfires. Bushfires can adversely affect pond and stream breeding habitat, increasing water temperature, altering water chemistry, and creating sediment/ash runoff 'slugs' that can form in waterways following rainfall.	**VERY HIGH**	Localised extinction of frogs has been observed through bushfire events. Frogs have little defence against fire. They are unable to flee and have a low tolerance of extreme temperatures and desiccation. As a non-burrowing species, Watson's Tree Frog faces a greater threat from fire, through both direct contact as well as a reduction in leaf-litter for foraging and shelter.
	 **Drought**	Climate projections for south-eastern Australia include reduced rainfall, increased average temperatures, and more frequent droughts.	**HIGH**	Droughts are expected to impact frog recruitment by reducing the availability and altering the seasonality of breeding sites.
	 **Biosecurity**	Chytridiomycosis is an infectious disease caused by the amphibian chytrid fungal pathogen *Batrachochytrium dendrobatidis*. Infected subpopulations exhibit diverse susceptibility to *Batrachochytrium dendrobatidis*. Some species do not show any apparent symptoms while others are extremely vulnerable, resulting in mass die-off and extinction. Mortality associated with *Batrachochytrium dendrobatidis* erodes the capacity of the population to sustain loss of recruitment associated with drought and reduces resilience to climate change.	**VERY HIGH**	The very similar species *L. littlejohni s.l.* is at a moderate risk of extinction from chytridiomycosis. Given their similarity it is possible that Watson's Tree Frog is also at moderate risk of extinction form this disease.

Reptiles

Alpine She-oak Skink (*Cyclodomorphus praealtus*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The Alpine She-oak Skink is a medium-sized lizard and grows to around 12–13 cm. The skinks four limbs are short but distinct with five fingers or toes. It has a moderately short tail, overlapping scales which have dark edges creating broken, wavy stripes and occasionally irregular, narrow bands. Other colouration includes olive green to reddish brown dorsal colours with the ventral surface usually orange to reddish (TSSC 2009).

They hibernate over winter and are known to live for more than five years in the wild. They inhabit subalpine woodlands, alpine grasslands, alpine heathland and alpine grassy heathland above 1500 m (EGCMA 2022).

Distribution

The species occurs in North and Eastern Victorian and Southern NSW and is associated with the Alpine Sphagnum Bogs and Associated Fens Ecological Community. Populations in Victoria include Dinner Plain/ Mt Hotham, Dargo High Plains and the Snowy Range. Generally, in Victoria it is found above 1500 m (TSSC 2009).

East Gippsland Location

Alpine She-Oak skink populations exist in the Dargo High Plain area in East Gippsland. This area falls within the East Gippsland CMA's *Alpine Peaks* priority landscape and the Australian Government's *Australian Alps* priority places (TSSC 2009).

Other Considerations

The species has a restricted geographic distribution and limited capacity for dispersal making it precarious for survival (TSSC 2009). Alpine She-oak Skink was provisionally identified as a high priority for action following the 2019–20 fires (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Alpine She-oak Skink (***Cyclodomorphus praealtus***)	 **Bushfire**	Alpine She-oak Skinks often shelter in ground-level vegetation, fire may cause direct mortality and/or degrade habitat, which exposes individuals to predation. Rates of post-fire vegetation succession in the habitat are comparatively slow, so post-fire vegetation may be unsuitable or suboptimal for long periods (DEECA 2023c). Alpine She-oak Skink are also known to retract from recently burnt areas (TSSC 2009). Bushfire has the potential to eliminate the species if it occurs frequently enough and exacerbates habitat fragmentation (TSSC 2009).	**VERY HIGH**	With a low population and restricted geographical distribution this species is susceptible to events such as bushfires.
	 **Drought**	This species is especially adapted to alpine conditions and depends on specific vegetation structures. Changes to these vegetation structures due to more frequent droughts and warming temperatures in response to climate change will potentially have negative impacts on the Alpine She-oak skink (TSSC 2009).	**HIGH**	This species already occurs on alpine plateaus and has little opportunity to migrate upslope in response to a warming climate. It is probably upslope migration of tussock grasslands may not happen quickly enough or at all to provide habitat for the Alpine She-oak Skink at higher altitudes (TSSC 2009).

Plants

Austral Toadflax (*Thesium austral*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Vulnerable and Endangered Species.pdf

Description

Thesium australe (austral toadflax), is a hairless yellow-green perennial herb, it has slender wiry stems up to 40 cm high and it has tiny white flowers with flowering generally occurring in Spring and Summer (DoE 2013).

Distribution

The Austral Toadflax has a wide distribution occurring in New South Wales, the Australian Capital Territory, Queensland, and Victoria. This species has a wide ecological tolerance with records from subtropical, temperate, and sub-alpine climates. However, it is largely confined to grasslands, grassy woodlands or sub-alpine grassy heathland. Once widespread across Victoria it appears to be restricted to highland areas in East Gippsland and is thought to be rare or extinct across most of its former range due to loss of habitat and grazing (DoE 2013, DEECA 2024b).

East Gippsland Location

In East Gippsland there are scattered records across alpine and sub-alpine locations around Omeo, Benambra, Bendoc, off Black Mtn Road and a cluster of sites west of Butchers Ridge (Green Hills).

This species is in the East Gippsland CMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

This species is semi-parasitic on roots of grassland species such as kangaroo grass (*Themeda triandra*) (DoE 2013).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Austral Toadflax (*Thesium austral*)	 **Bushfire**	Too frequent fire, and in some instances infrequent fire, may lead to population decline and alter vegetation structure and habitat quality. Specifically, being burnt prior to seed set may lead to a population decline.	**MEDIUM**	Fire intervals of less than 10-15 years may limit soil seed bank replenishment and lead to the loss of older age classes, and fire intervals greater than 20 years may diminish seedbank persistence. Fire management operations such as creation of fuel breaks (soil disturbance, slashing) may remove or degrade habitat, cause mortality of individuals, and reduce regeneration.
	 **Drought**	Changes to local hydrology, increased competition from other species and drying conditions can change structure and composition of habitat, or cause mortality of individuals, and reduce regeneration. A hotter, drier climate may increase the likelihood or frequency of fire impacting habitat, with the potential to reduce habitat extent and/or condition.	**HIGH**	Increasing likelihood and severity of extreme weather events as a result of our changing climate.

Plants

Betka Bottlebrush (*Callistemon kenmorrisonii*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Bryce Watts-Parker

Description

This species of Callistemon is an erect to spreading shrub, which generally grows to 3m tall and 1 to 4 m wide. It has a spongy, papery bark with narrow lanceolate leaves which are stiff, leathery and hairless. The leaves are generally 52 mm in length and 6 mm wide. The species produces bright red flowers which have purple anthers. The flowers form dense brush like spikes, with flowering occurring between November and February. Following flowering the woody cup shaped capsules are formed bunched lengthways on older stems. The capsules are generally around 9mm wide. (Carter and Walsh 2006).

Distribution

This is a rare plant with a very limited population and distribution. It only occurs at two known sites along the Betka River near Mallacoota.

The 2006 national Recovery Plan describes the species populations and locations as occurring in State Forest along the Betka River, with the 40 to 60 plants at the Stony peak road site and 50 to 70 plants at the Roger Track site. In 2007, a total of 63 plants were recorded at the two sites.

East Gippsland Location

As described above this species is wholly located in East Gippsland and the species is located in the *Protecting the Best* priority landscape and the *Southeast Coastal Ranges* Australian Government priority place.

Other Considerations

An assessment following the 2019–20 fires found the species to be at imminent risk of extinction because all of its known habitat was burnt (along with all the known individuals) and the interactive effects of fire and drought and fire severity (DAWE 2020).

Given some plants at one of the sites occur where the track crosses the river, there is risk of damage by vehicles.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Betka Bottlebrush (*Callistemon kenmorrisonii*)	 **Bushfire**	Loss of old growth and mature vegetation, habitat and landscape transformation, loss or simplification of habitat structure and composition, and changes to soil chemistry are caused by too frequent, infrequent, or wrong severity, season and scale of fire.	**HIGH**	The small and isolated populations are at risk from environmental conditions and episodic events. Increasing likelihood and severity of extreme weather events as a result of our changing climate. Multiple fires in quick succession are likely to destroy individuals in an already depleted population.
	 **Drought**	Drought reduces water availability for this plant, increases pest threats with less availability of other species for foraging pest fauna and more space for pest flora to encroach on this endemic site.	**HIGH**	Increasing severity of drought exceeds the resilience limitations for this plant, decrease individual plants present.
	 **Flood**	Increased frequency/severity of droughts and floods cause dieback, ecosystem encroachment, poor water quality through low dissolved oxygen, algal blooms and habitat contraction.	**HIGH**	Increasing likelihood and severity of extreme weather events as a result of our changing climate. This species occurs in the riparian zone and although has appeared tolerant of some flooding in the past severe flooding or modification to hydrological processes may damage plants.

Plants

Bog Willow Herb (*Epilobium brunnescens subsp. beaugleholei*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: **Andre Messina, CC BY-NC-SA 4.0**

Description

This species is a prostrate, mat-forming, perennial herb which has stems that root at the node and grow beyond the flowering sections (TSSC 2016). The Bog Willow Herb has elliptic or ovate opposite leaves 14 mm x 7 mm, which are sparsely hairy and the leaf margins are either smooth or with a few shallow teeth (TSSC 2016). The species flowers in summer with white flowers 8 mm wide on stalks to 7 cm long. The fruit produced is a narrow, cylindrical capsule, to 24 mm long, with small dark, granular seeds attached to long, silky hairs (TSSC 2016a).

Distribution

Bog Willow Herb is restricted to East Gippsland where it is known from a single population (riparian and in-stream) near confluence of Pieman and Conglomerate Creeks in the Snowy Range of the Alpine NP (SE from Mt Buller Alpine village) (DELWP 2022, TSSC 2016a).

It is found in *Alpine Peaks* priority landscape and the Australian Government's *Australian Alps* priority place.

Other Considerations

As there is only one small population which is located on moist moss-covered rocks (riparian and in stream), it is susceptible to being damaged or destroyed in a rock fall (Carter and Walsh 2006a).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Bog Willow Herb (***Epilobium brunnescens subsp. beaugleholei***)	 **Drought**	Increased frequency and/or length of droughts, drying and warming of the environment, could result in habitat changes, and impact recruitment and/or mortality rates (DEECA 2024c).	**VERY HIGH**	The total number of mature individuals is extremely low, the number is likely to continue to decline. Species with small, greatly reduced, and/or isolated populations are at increased risk of loss of genetic diversity, which in turn leads to a greater risk of reduced recruitment and/or increased mortality rates (DEECA 2024c).
	 **Bushfire**	A hotter, drier climate may increase the likelihood or frequency of fire impacting habitat, with the potential to reduce habitat extent and/or condition.	**MEDIUM**	Species with small, greatly reduced, and/or isolated populations are at increased risk of loss of genetic diversity, which in turn leads to a greater risk of reduced recruitment and/or increased mortality rates (DEECA 2024c).

Plants

Colquhoun Grevillea (*Grevillea celata*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Jon Hallam

Description

The 2016 National Conservation Advice describes this plant as "*an erect and open, to low and dense, root-suckering shrub growing to 1.8 m tall. The leaves are elliptic, alternate, to 44 mm x 18 mm, hairy, grey-green above, the lower surface almost white and densely hairy. The leaf margins are curved under, sometimes almost obscuring the lower surface. Flowers appear from July to February and are red and yellow with curved tubes about 12 mm long. Fruit is a leathery, hairy capsule with longitudinal ridges, which splits to release winged seeds*" (TSSC 2016b).

Distribution

The Colquhoun Grevillea (*Grevillea celata*) is endemic to the East Gippsland Management Unit where it is found in the Colquhoun State Forest between Nowa Nowa and Bruthen. A 2014 estimate had the number of plants numbering over one thousand (DELWP 2022).

Other Considerations

This species has a small population with few known locations across a limited extent (DELWP 2022).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Colquhoun Grevillea (*Grevillea celata*)	 **Bushfire**	This species is vulnerable to both unplanned fire and too many planned cool burns. A hotter, drier climate may increase the likelihood or frequency of fire impacting habitat, with the potential to reduce habitat quality and/or extent. Increased frequency and intensity of fire may cause mortality of adult plants before they reach maturity, damage the habitat and modify habitat processes (DEECA 2023d).	**HIGH**	This species responds slowly to fire with juveniles being severely browsed by native herbivores and another fire in quick succession might impact the survival of individual plants. Too many cool burns increase competition from fire promoted species such as Bracken (*Pteridium esculentum*) (TSSC 2016b, DEECA 2023d) . Small populations have lower resilience to the risk of stochastic events, and increased risk of genetic decline (DEECA 2023d).
	 **Drought**	Drying and warming of the environment, including droughts, is likely to lead to plant death and a lack of successful recruitment (DEECA 2023d).	**HIGH**	Small populations have lower resilience to the risk of stochastic events, and increased risk of genetic decline (DEECA 2023d).

Plants

Dwarf Kerrawang (*Commersonia prostrata*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Vulnerable and Endangered Species.pdf

Description

The 2010 National Recovery Plan for the Dwarf Kerrawang *Rulingia prostrata* describes the species as being "*a prostrate, mat-forming shrub with trailing branches to 2 m long and ovate to cordate leaves 10–35 mm long and 5–25 mm wide, with serrate to crenate margins, the upper leaf surface sparsely stellate hairy, more densely below, the petiole 3–20 mm long. The inflorescence consists of 3–12 pink, hairy, star-shaped flowers that appear in October and November. Petals are about 1.5 mm long, and the calyx about 3 mm long. A dry, hairy, spherical capsule develops from the centre of the flower and reaches 9 mm diameter at maturity*" (Carter and Walsh 2010)).

Distribution

This species is found in south eastern Australia where it is patchily distributed between Rosedale in Central Gippsland through to Newcastle (Carter & Walsh 2010). In Victoria approximately 80% of its distribution is in the West Gippsland Catchment Management Unit (DELWP 2022).

East Gippsland Location

In East Gippsland it is found in the Red Gum Plains and Gippsland Lakes priority landscapes from around Blond Bay through to the East Gippsland CMA boundary east of Providence Ponds, where there is a concentration of populations (DELWP 2022). Victorian populations of Dwarf Kerrawang tend to occur in lake margins and ephemeral wetlands (Carter & Walsh 2010). Dwarf Kerrawang tend to exist within or on the areas adjacent to Seasonal Herbaceous wetlands.

Other Considerations

Victorian populations have declined and are fragmented, having disappeared from several sites (DELWP 2022).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Dwarf Kerrawang (***Commersonia prostrata***)	 **Bushfire**	Increased frequency and intensity of fire may kill adult plants before they reach maturity, eventually depleting the soil seedbank.	**HIGH**	Climate change is expected to reduce rainfall and increase frequency and threat of bushfires. Small populations have lower resilience to the risk of stochastic events, and increased risk of genetic decline.
	 **Drought**	Long-term drying of habitat may stop or reduce recruitment and encourage shrub invasion.	**VERY HIGH**	Climate change is expected to reduce and alter rainfall patterns which may lead to more frequent droughts or extended dry periods. Small populations have lower resilience to the risk of stochastic events, and increased risk of genetic decline.

Plants

Forrester's Bottlebrush (*Callistemon forresterae*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Bryce Watts-Parker

Description

Forrester's Bottlebrush is described in the 2010 National Recovery Plan as being "*a small erect shrub to 1.2 m high, with grey papery stems and alternate, sessile; linear to linear-lanceolate leaves that are 33–43 mm long and 3–4 mm wide. The species has flower spikes often with leaf-like bracts at the tip, and mauve filaments with purple anthers. The seed capsules produced are generally 4–6 mm long, 5–8 mm wide*" (Sutter 2010).

Distribution

This species is only known from one population of approximately up to 3000 individuals found along the banks of the Genoa River. The species particularly favours rock bars or sand over rock substrate. It is thought to exist in five sub-populations, with subpopulations in the Coopracambra National Park, one sub-population in a Special Protection Zone in the Maramingo Forest Block and one sub-population on unreserved crown land at Wangarabelle near Genoa. The Genoa River rises in New South Wales and some of this species may also exist in the border section of the Genoa River where the required rocky conditions are found (Sutter 2010).

East Gippsland Location

As described above this species is predominantly located in East Gippsland with the possibility of a few individuals where the Genoa River passes through the NSW/Victoria border. Within East Gippsland the species is located in the *Protecting the Best* priority landscape and the *Southeast Coastal Ranges* Australian Government priority place.

Other Considerations

An assessment following the 2019–20 fires found the species to be at imminent risk of extinction as the entirety of its known habitat was burnt, combined with the interactive effects of fire and drought, short fire intervals and post-fire herbivore impacts (DAWE 2020).

The National recovery plan prepared in 2010 highlighted that little was known about this species but given its preference for riparian habitat it was suggested that it requires a higher moisture supply than available in the surrounding landscapes. With a drying climate this may result in the species withdrawing to even fewer suitable micro habitat locations (Sutter 2010).

Weed invasion, especially from Blackberry, Willow Salix and Sweet Briar Rose are also potential threats (Sutter 2010).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Forrester's Bottlebrush (***Callistemon forresterae***)	 **Bushfire**	Loss of old growth and mature vegetation, habitat and landscape transformation, loss or simplification of habitat structure and composition, and changes to soil chemistry are caused by too frequent, infrequent, or wrong severity, season and scale of fire.	**HIGH**	The small and isolated populations are at risk from environmental conditions and episodic events. Increasing likelihood and severity of extreme weather events as a result of our changing climate. Multiple fires in quick succession are likely to destroy individuals.
	 **Drought**	Drought reduces water availability for this plant, increases pest threats with less availability of other species for foraging pest fauna and more space for pest flora to encroach on this endemic site.	**HIGH**	Increasing severity of drought exceeds the resilience limitations for this plant, decrease individual plants present.
	 **Flood**	Increased frequency/severity of droughts and floods cause dieback, ecosystem encroachment, poor water quality through low dissolved oxygen, algal blooms and habitat contraction.	**HIGH**	Increasing likelihood and severity of extreme weather events as a result of our changing climate. This species occurs in the riparian zone, and severe flooding or modification to hydrological processes may damage plants.

Plants

Genoa River Correa (*Correa lawrenceana var. genoensis*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Bryce Watts-Parker

Description

In the 2010 National Recovery plan for the Genoa River Correa (*Correa lawrenceana variety genoensis*) Carter and Walsh describe this species as "*an erect to spreading shrub growing to 2 m tall. It has ovate leaves to 70 x 40 mm, the margins smooth, the upper surface dark green, glossy and hairless, while the lower surface is pale grey-green and densely covered with stellate hairs. The solitary, yellow-green flowers are about 25 mm long, drooping, tubular, hairy outside and have four curved, triangular lobes at the end of tube. The calyx is hemispherical, to 5 mm long, more or less hairless and has four teeth. The stamens protrude from the flower. Flowers appear mostly in spring. Correa lawrenceana var. genoensis differs from the type variety of C. lawrenceana in its prominently gland-dotted calyx with long acuminate lobes and a green and glabrescent calyx. There have been no specific ecological studies of C. lawrenceana var. genoensis*" (Carter & Walsh 2010a).

Distribution

Correa lawrenceana var. genoensis is restricted to a few very small populations in far eastern Victoria, with one population in south-eastern New South Wales, fringing Redstone Creek, in the IBRA South East Corner bioregion. Generally, the species is found at altitudes in the range of 60–380 m above sea level and it occurs in riparian forest or riparian scrub, areas between forest, or K*unzea ericoides* scrub, and treeless riparian scrub (Carter & Walsh 2010a).

East Gippsland Location

In Victoria it is restricted to Far East Gippsland at intervals (five known populations) along Genoa and Wallagaraugh Rivers mostly between Wangarabelle and Genoa. The combined population is estimated to be only a few hundred plants. This species is found in the East Gippsland CMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

There is risk of loss of genetic diversity by overplanting from material collected from comparatively few 'parent plants'. Browsing by deer and damage from insects are also potential risks. Fire may pose a threat to this species, but how well the species regenerates is uncertain (DELWP 2022).

An assessment following the 2019–20 fires found the species a high priority because of the interactive effects of fire and drought, post-fire herbivore impacts and cumulative exposure to high risks (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Genoa River Correa (***Correa lawrenceana var. genoensis***)	 **Bushfire**	Loss of old growth and mature vegetation, habitat and landscape transformation, loss or simplification of habitat structure and composition, and changes to soil chemistry are caused by too frequent, infrequent, or wrong severity, season and scale of fire.	**HIGH**	The small and isolated populations are at risk from environmental conditions and episodic events. Increasing likelihood and severity of extreme weather events as a result of our changing climate. Multiple fires in quick succession are likely to destroy individuals.
	 **Drought**	Drought reduces water availability for this plant, increases pest threats with less availability of other species for foraging pest fauna and more space for pest flora to encroach on this endemic site.	**HIGH**	Increasing severity of drought exceeds the resilience limitations for this plant, decrease individual plants present.
	 **Flood**	Increased frequency/severity of droughts and floods cause dieback, ecosystem encroachment, poor water quality through low dissolved oxygen, algal blooms and habitat contraction.	**HIGH**	Increasing likelihood and severity of extreme weather events as a result of our changing climate. This species occurs in the riparian zone, and severe flooding or modification to hydrological processes may damage plants.

Plants

Leafy Nematolepis (*Nematolepis frondosa*)

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

Image credit: Vulnerable and Endangered Species.pdf

Description

The Leafy Nematolepis (*Nematolepis frondose*) is described in the 2023 National Conservation Advice as being "*a dense, leafy conical shrub growing to seven metres. Branches emerge horizontally or arch downward. Branchlets are strongly angled and rust coloured, or covered with small, silvery, membranous scales. Leaves are broad-ovate, 8–23 mm long and 6–15 mm wide. The upper leaf surface is smooth, glandular, and often appears speckled white, while the lower surface is covered with silvery scales. Flowering occurs in winter and spring. Flowers are white and star-shaped, to 9 mm across. The five petals are ovate, hairless, and sparsely glandular around the centre. The stamens are slightly shorter than petals. The calyx is cup-like and hairless, to 2.5 mm long, with triangular lobes. Seeds are oblong and black, about 3 mm long, and slightly keeled dorsally*" (DCCEEW 2023g).

Distribution

This species is endemic to the East Gippsland Catchment Management unit where it grows at Mt Elizabeth between Bruthen and Ensay in varied habitat ranging from low rock outcrop scrub near the mountain summit, to tall open forest dominated by Mountain Ash at the lower altitudinal range (TSSC 2016c).

This species is found in the East Gippsland CMA's Forested Foothills priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

Surveys undertaken post 2019–20 bushfires found only one remaining adult subpopulation unburnt. This subpopulation is believed to have survived as it was adjacent to a helipad that had firebreaks around it (DCCEEW 2023).

An assessment following the 2019–20 fires found the species a high priority due to the cumulative exposure to high risks (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Leafy Nematolepis (*Nematolepis frondosa*)	 **Bushfire**	This species does not produce seed before 5 years of age so fire frequency of less than 5 years (before the seedbank can be replenished) may have catastrophic consequences for the survival of this species. However, there is no data/ observations on the tolerance of the seedbank to different intensity fires (DCCEEW 2023g).	**VERY HIGH**	The risk of decline from stochastic events is high due to the small population size and very restricted distribution of the species. The main threats to the species are stochastic events, high frequency and severity bushfires (DCCEEW 2023g).
	 **Drought**	Increasing fire weather severity and fire frequency combined with declining growth rates due to drying suggests that species, such as the leafy Nematolepis, may be exposed to increased pressure shorter periods between fire impacts (DCCEEW 2023g).	**HIGH**	The conditions created by climate change are expected to increase the number of fire weather days by an additional 5.8 days per year by 2050, increasing the duration of fire seasons in the East Gippsland region of Victoria (DCCEEW 2023g). Small and isolated populations are vulnerable to stochastic events and local extinction (DEECA 2023e).
	 **Biosecurity**	Climate change is projected to increase the frequency and severity of drought conditions across south-eastern Australia. Changes in frequency, magnitude and length of droughts may kill adults and reduce or cease recruitment (DEECA 2023e). Phytophthora sp. are introduced soil-borne pathogenic oomycetes that result in plant death through the destruction of root systems. Nematolepis species are known to be vulnerable to these pathogens, and in some cases, mortality has been attributed to infection. In particular, P. cinnamomi is listed as a KTP under the EPBC Act.	**HIGH**	Leafy Nematolepis's susceptibility is not known but it can be anticipated that this pathogen has either lethal or sublethal impact and should be considered a threat (DCCEEW 2023g).

Plants

Limestone Blue Wattle (*Acacia caerulescens*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Jon Hallam

Description

The Limestone Blue Wattle (*Acacia caerulescens*) is described in the 2016 National Conservation Advice as "*a pyramidal tree growing to 15m tall, with ovovate to oblanceolate, usually asymmetric, blue-green phyllodes (leaves) 40-80 mm long and 15-30 mm wide. Phyllodes have a gland 5-25 mm above the pulvinus (swelling at the base of phyllode) connected by a fine, oblique vein. Flowers appear in November-December and are clustered into globular, pale yellow heads, to 6 mm wide, that are arranged in short racemes or panicles arising from the leaf axils. Fruit is a more or less straight, oblong pod 50-120 mm long and 12-22 mm wide, sometimes constricted between the seeds* " (TSSC 2016d).

Distribution

Limestone Blue Wattle is endemic to eastern Victoria, in an area bounded by Buchan, Lake Tyers and Bairnsdale. Important populations include roadsides, private land, river frontages and reserves managed by Parks Victoria and GLaWAC including Buchan Caves, Lake Tyers Forest Park and Anticline Reserve (TSSC 2016d, DELWP 2022). This species is restricted to limestone soils (TSSC 2016d). Total plant numbers are unknown, but sub populations vary from around 15–20 to over 400 individuals (DELWP 2022).

This species is only found in the East Gippsland CMA's *Forested Foothills* and *Protecting the Best* priority landscapes and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

Parks Victoria is growing seedlings of this species ex situ.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Limestone Blue Wattle (*Acacia caerulescens*)	 **Bushfire**	Fire frequency may be important to survival of A. caerulescens. The role of fire in germination of A. caerulescens seed is not known, but, as many other Acacia species require fire for regeneration, fire may be important for this species as well (TSSC 2016d). Fires that do not allow plants to sexually mature, and replenish the seed bank may cause local extinction. Infrequent fire may not permit sufficient recruitment to replace plants that are lost and may cause local extinction. The role of fire in germination of A. caerulescens seed is imperfectly known, but, the roadside population on Buchan-Gelantipy Roads was burnt about five years ago. This caused good germination and the population approximately doubled (DSE 2008).	**HIGH**	Too frequent fires may be killing plants before they reach seed production age, and too infrequent fires may not permit sufficient recruitment to replace senescing plants (TSSC 2016d).

Plants

Marble Daisy-Bush (*Olearia astroloba*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Vulnerable and Endangered Species.pdf

Description

As described in the 2016 Conservation advice for this species the "*Marble Daisy-Bush is a small, perennial shrub growing to 0.5 m tall, with a dense covering of fine, star-shaped hairs. The stems are erect, smooth and pale green when young, turning brown when mature. The leaves are grey-green, spoon shaped with a hairy lower surface and 18 mm x 10 mm in size. The leaf margins are often lobed in the distal half. The leaves are crowded, alternate and sessile (lacking a leaf stalk). The inflorescence (cluster of flowers) is a solitary, terminal capitulum, 15 – 32 mm in diameter, and has a typical 'daisy' appearance. The inner disc florets (which make up the centre of the inflorescence) are bisexual with purple petals. The outer ray florets are female, with violet ligules (fused petals) that have three lobes at the apex. The yellow stigmas and stamens appear as a yellow 'button' in the centre of the inflorescence*" (TSSC 2016e).

Distribution

The Marble Daisy-Bush is endemic to East Gippsland, Victoria, as it is only known from a single site in the Marble Gully Nature Conservation Reserve, which is northeast of Swifts Creek and near the headwaters of the Tambo River in the East Gippsland Management Unit (TSSC 2016e). This population is found at 600 m above sea level on a steep slope with a northerly aspect (TSSC 2016e).

The species is found in the East Gippsland CMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

This species is found in association with the *Silurian Limestone Pomaderris Shrubland of the South East Corner and Australian Alps Bioregions* threatened ecological community.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Marble Daisy-Bush (***Olearia astroloba***)	 **Bushfire**	Increased frequency and intensity of fire may cause mortality of adult plants before they reach maturity, damage the habitat, and modify ecosystem processes (DEECA 2023f).	**HIGH**	Monitoring of the population following the 2003 bushfires showed that the species can regenerate through re-sprouting and seed germination and long-fire intervals are likely to be tolerated as, prior to 2003, the site may not have burned for over 100 years. However the species' response to varying fire frequency is unknown (TSSC 2016e).
	 **Drought**	Climate change is projected to increase the frequency and severity of drought conditions across south-eastern Australia.	**HIGH**	Drying and warming of the environment, including droughts, may lead to habitat changes, and impact recruitment and/or mortality rates (DEECA 2023f).

Plants

Matted Flax Lily (*Dianella amoena*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: **Vulnerable and Endangered Species.pdf**

Description

The Matted Flax Lily is a perennial lily which forms clumps of up to 5 m wide from rhizomes. It has grey-green leaves which are dull crimson at the base, narrow and tapering, to 45 cm long by 12 mm wide. In this species flowering occurs from October to April, the flower stems are 20–90 cm long and bear several bluish star shaped flowers. The fruit of this species consists of numerous purple oval shaped berries (SWIFT 2024).

Distribution

The Matted Flax Lily is endemic to Victoria, and it is found distributed from the south-west to the east of the State. It is generally within grasslands in small, scattered communities (Carter 2010).

East Gippsland Location

In the East Gippsland Management Unit there are scattered communities east of Munro near the West Gippsland CMA boundary (Carter 2010b).

This species occurs in East Gippsland CMA's *Forested Foothills*, *Gippsland Lakes* and *Redgum plains* priority landscapes and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Matted Flax Lily (*Dianella amoena*)	 **Drought**	May exacerbate weed invasion.	**LOW**	Not listed as a threat to this species.
	 **Bushfire**	May contribute to habitat fragmentation and exacerbate weed invasion.	**LOW**	Not listed as a threat to this species.

Plants

Threatened Orchidaceae species

There are six threatened Orchidaceae species in the East Gippsland Management Unit, and as the threatening processes along with preparation, response and recovery actions are similar they have been presented together.

1. Maroon Leek-orchid *Prasophyllum frenchii*
***Environment Protection and Biodiversity Conservation Act (1999)* status – Endangered**

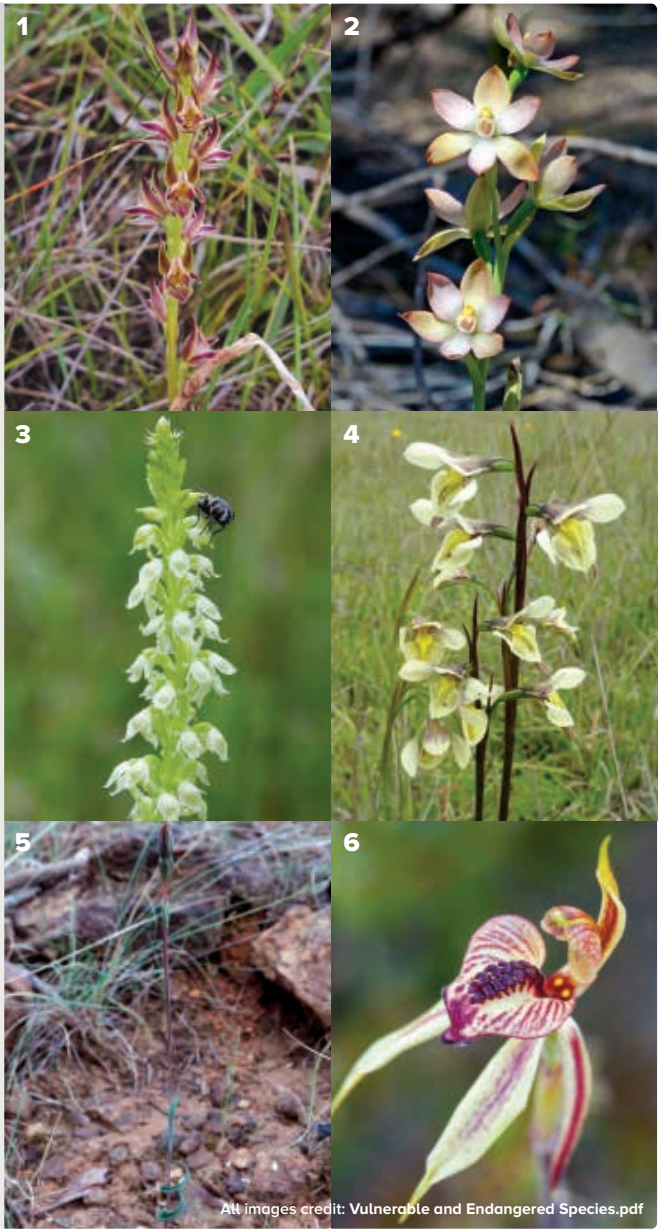
2. Metallic Sun-orchid *Thelymitra epipactoides*
***Environment Protection and Biodiversity Conservation Act (1999)* status – Endangered**

3. Mignonette Leek-orchid *Prasophyllum morganii*
***Environment Protection and Biodiversity Conservation Act (1999)* status – Vulnerable**

4. Pale Golden Moths *Diuris ochroma*
***Environment Protection and Biodiversity Conservation Act (1999)* status – Vulnerable**

5. Spiral Sun-orchid *Thelymitra matthewsii*
***Environment Protection and Biodiversity Conservation Act (1999)* status – Endangered**

6. Thick-lip Spider orchid *Caladenia tessellata*
***Environment Protection and Biodiversity Conservation Act (1999)* status – Vulnerable**



All images credit: Vulnerable and Endangered Species.pdf

Description

Maroon Leek-orchid *Prasophyllum frenchii*
The Maroon Leek-orchid is a tall, slender, deciduous terrestrial orchid. It occurs in grassland and grassy woodland habitats, on sandy to black clay loams that are generally damp but well drained, although some sites may be seasonally waterlogged (Duncan 2010).

Metallic Sun-orchid *Thelymitra epipactoides*
The Metallic Sun-orchid is a rare orchid growing 21–52 cm tall which produces one long, fleshy, narrow leaf, tubular at the base. Typically, the metallic sun-orchid bears between seven and 31 flowers, with colour groups including brown, copper, blue and green with infusions of red, blue or green cells, giving a bronzy or metallic appearance. (TSSC 2016f, DELWP 2022).

Mignonette Leek-orchid *Prasophyllum morganii*
The Mignonette Leek-orchid is one of a group of orchids commonly known as leek-orchids because the erect hollow leaf has some resemblance to a leek. It is an herbaceous terrestrial orchid that dies back annually to spherical or ovoid underground tubers. It produces a single, hollow and tapering leaf up to 25 cm long. It has an erect flower stem which emerges through a slit in the leaf, growing to 25 cm high with up to 80 small, fragrant, upward facing (non-resupinate) flowers arranged in a dense, crowded spike. Flowers are generally greenish with purplish stripes and toning, while the labellum (central petal) is white, pink or purple with a green callus (TSSC 2016g).

Pale Golden Moths *Diuris ochroma*
This species is an herbaceous perennial geophyte that dies back annually to one or two oblong underground tubers. It has a tuft of three to five slender, grasslike leaves growing to 18cm from its base. It has a slender flower stem which grows to 25–37 cm supporting one to three pale yellow cream flowers with variable maroon stripes on the dorsal sepal and labellum (central petal) (TSSC 2016h).

Spiral Sun-orchid *Thelymitra matthewsii*
The Spiral Sun-orchid is a deciduous, perennial, terrestrial orchid which emerges annually from a tuber. It has a single, linear, dark green leaf which is spirally twisted, ovate with sheathing at the base. The spiral leaf is diagnostic which allows identification on non flowering plants. It has a slender, purple flower stem which grows to 20 cm and has a single small sheathing bract, which produces a single (rarely two) deep bluish to reddish purple flower with darker stripes (DCCEEW 2024).

Thick-lip Spider orchid *Caladenia tessellata*
This orchid species is a perennial, terrestrial, herbaceous orchid, which emerges annually from a tuber. It produces a single, hairy, linear-lanceolate leaf which grows to 10 cm and emerges in autumn. When flowering it produces a slender, hairy, wiry flower stem up to 30 cm with one or two small yellowish-green flowers with maroon stripes and suffusions. The flowers have two lateral sepals and two petals, each 14–16 mm long, decurved at the base of the flower (DCCEEW 2023h).

Distribution

Maroon Leek-orchid *Prasophyllum frenchii*
The Maroon Leek-orchid is endemic to south-eastern Australia and occurs from south-eastern South Australia to eastern Victoria. In Victoria it is found mostly in the lowlands but with rare occurrences in the foothills.

The Maroon Leek-orchid has disappeared from many locations including several in East Gippsland.

In East Gippsland a population remains at Greenhills Nature Conservation Reserve (Duncan 2010, DELWP 2022) in the EGCMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Metallic Sun-orchid *Thelymitra epipactoides*
The Metallic Sun-orchid occurs across south-eastern Australia from the South Australia to west of Bairnsdale. In Victoria the majority of its range is in the South West. In East Gippsland it is found in coastal areas and near coastal areas within coastal heathlands, grasslands and woodlands with populations around the Gippsland Lakes Coastal Park and Blond Bay Wildlife Reserve (DELWP 2022).

Mignonette Leek-orchid *Prasophyllum morganii*
This species is found in open Snow Gum Forest at about 1000 m above sea level (TSSC 2016g) and is endemic to Victoria.

Historically it has only been known from subalpine herbfields on the Nunniong Plateau and near Cobungra (TSSC 2016g, DELWP 2022). However recent surveys have not been able to locate the Cobungra population with only the Nunniong population in East Gippsland remaining (DELWP 2022). This species is located in the in the EGCMA's *Alpine Peaks* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Pale Golden Moths *Diuris ochroma*
Pale Golden Moths has a disjunct distribution between NSW and Victoria. In Victoria it is confined to the Wonnangatta Valley in the East Gippsland management unit where it grows at 400 m–500 m altitude in sub-alpine grassland and sparse woodland with an herbaceous understorey (TSSC 2016h).

This species is found in the in the EGCMA's *Alpine Peaks* priority landscape and the Australian Government's *Australian Alps* priority place.

Spiral Sun-orchid *Thelymitra matthewsii*
The Spiral Sun-orchid occurs in Victoria and South Australia. Other Victorian sites include Anglesea and the Wimmera around the Grampians NP.

It grows in heathy open forest and woodlands, on well-drained sand, gravel, and clay loam soils, especially areas where there has been some soil disturbance (DCCEEW 2024).

In East Gippsland known populations include Genoa and Cann River (DCCEEW 2024, DELWP 2022).

This species is found in the EGCMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

At least two sites at Genoa were burnt in the 2019–20 fires, burning which burnt approximately 5% of the species' modelled range.

Thick-lip Spider orchid *Caladenia tessellata*
This species is endemic to mainland south-eastern Australia, and is distributed from the south coast of NSW to the eastern outskirts of Melbourne (DCCEEW 2023h). In the East Gippsland Management Unit it is commonly found in coastal and near-coastal woodland and open forest environments. Specimens are known from around Bairnsdale and Lakes Entrance, near Genoa, near Maramingo Creek Streamside Reserve and along the Betka and Old Coast Roads, west of Mallacoota (DELWP 2022).

This species is found in the East Gippsland CMA's *Red Gum Plains*, *Gippsland Lakes* and *Protecting the Best* priority landscapes and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

The population of Pale Golden Moths orchids was severely impacted by a 2006 bushfire in the Wonnangatta valley (DELWP 2022).

The Spiral Sun-orchid is estimated to have declined by approximately 32% over the past two generations, with the decline expected to continue (DCCEEW 2024).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Threatened Orchidaceae Species	 **Bushfire**	**High severity fire** Most terrestrial orchids can withstand fire due to their underground tubers. However, extremely severe fire is likely to be a threat to some species. **Out of season fire** Terrestrial orchids are sensitive to fires during the growing season (mid-autumn to late spring for the spiral sun-orchid) which disrupt growth phenology and deplete tuber resources. If fires occur soon after leaf emergence, there may be insufficient resources in the tubers to sustain a second flush of leaf production, leading to tuber mortality Repeated fires in the growing season of these orchids will cause declines in plant health and population size (DCCEEW 2024). For some species too frequent fire may pose a threat by altering the habitat, removing organic surface materials and negatively impacting pollinators and mycorrhizal agents. Fires may also exacerbate herbivore activity.	**HIGH**	Spiral Sun Orchids appear to have been impacted by the 2019–20 fires at the Genoa subpopulation in areas that were burnt at extreme severity, while Pale Golden Moths have also been shown to be susceptible to fire (DELWP 2022). As these species are already in low numbers and sparsely distributed any reduction in survival or recruitment will severely impact already low populations.
	 **Drought**	More frequent droughts may impact orchid species through mortality of adult plants or lower recruitment (DCCEEW 2023h). An increasing frequency of droughts may negatively affect terrestrial orchids through direct mortality of adult plants and reduced recruitment. Increased temperatures and changes in precipitation patterns may also lead to a decrease in growing period length for terrestrial orchids.	**HIGH**	As climate changes progresses east Gippsland is expected to experience changing rainfall patterns, which may result in more frequent and/or longer lasting droughts.

Plants

Snowy Colobanth (*Colobanthus curtisiae*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: **Threatened Species Link (www.threatenedspecieslink.tas.gov.au)**

Description

The Snowy Colobanth (Colobanthus curtisiae) is described in the 2014 Conservation advice as being "*a glabrous tufted perennial herb to 40 mm high, forming small clumps from laterally branching short stems. Leaves are soft, narrow and crowded at the base that spreads to form circular tufts. The flowers are solitary on the end of the stalk. Capsules are oval and seeds are red-brown. Flowering from November to February and is largely self-pollinated*" (DoE 2014b).

Distribution

Snowy Colobanth is found in Tasmania, Victoria and New South Wales. The majority of the populations are based in Tasmania where it was once thought to be endemic (DoE 2014b).

This species is rare in Victoria, and it's range has been further restricted across the Snowy Range based on old records (DELWP 2022).

East Gippsland Location

This species is found in the East Gippsland CMA's *Alpine Peaks* priority landscape and the Australian Government's *Australian Alps* priority place.

Other Considerations

Records for this species are quite old, and the current condition could not be ascertained and requires further engagement with relevant experts (DELWP 2022). This species is found on very inaccessible landscapes such as sandy scree slopes between mudstone cliffs (DoE 2014b).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Snowy Colobanth (***Colobanthus curtisiae***)	 **Drought**	Increased drying and warming of alpine environments is likely to have a negative impact on this rare alpine species.	UNKNOWN	Requires further assessment to determine both current condition and susceptibility to this scenario.

Plants

Swamp Everlasting (*Xerochrysum palustre*)

***Environment Protection and Biodiversity Conservation Act (1999)* status: Vulnerable**

Image credit: Australian Network for Plant Conservation (www.anpc.asn.au)

Description

The 2011 National Recovery Plan for the Swamp Everlasting (Xerochrysum palustre) describes it as "*a perennial, erect herb growing to 30–100 cm tall. Leaves are narrow, alternate, sessile, partially stem clasping and lanceolate, to 10 cm x 8 mm, and more or less hairless except for cobweblike hairs along their margins. The large yellow 'daisy' flowers are up to 50 mm across, terminal at the ends of branches, and consist of numerous small tubular florets in a central 'button', surrounded by a ray of numerous overlapping, broad papery bracts. Flowering occurs from November to March. The fruit is a narrow dry seed to 3 mm long with a crown of yellow bristles about twice as long as the seed. Plants are rhizomatous in habit*" (Carter and Walsh 2011).

Distribution

Swamp Everlasting occurs in Tasmania, Victoria, and New South Wales. In Victoria this species occurs in lowland swamps and swampy grassland areas, usually on black cracking clay soils, scattered from near the South Australian border north-west of Portland to the Bairnsdale district, it is widespread but rare (DELWP 2022).

East Gippsland Location

In the East Gippsland Management Unit it is generally found below 500 m altitude, at locations such as Blond Bay Wildlife Reserve, Moormurng Nature Conservation Reserve, but it is also found near the Cobberas and Nunniong Plateau in subalpine woodland (DAWE 2021a, DELWP 2022).

This species is found in the *Gippsland Lakes*, *Red Gum Plains* and *Alpine Peaks* priority landscapes and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

It can be associated with Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains, Alpine Sphagnum Bogs and Associated Fens and Gippsland Red Gum Grassy Woodland and Associated Native Grassland Ecological Communities (DAWE 2021a).

Approximately 12% of the range of the species was within the extent of the 2019–20 bushfires.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Swamp Everlasting (***Xerochrysum palustre***)	 **Bushfire**	Climate projections for south-eastern Australia include reduced rainfall, increased average temperatures, and more frequent droughts (DAWE 2021a).	**MEDIUM**	As Swamp Everlasting can reshoot from an underground rootstock following fire and is unlikely to threaten subpopulations under normal hydrological conditions. However, the swamps in which it grows often occur on a substrate with a high peat content and fires occurring during very severe droughts are likely to increase the risk of peat fires which would kill underground rootstocks of this species (DAWE 2021a).
	 **Drought**	Given its preference for ephemeral wetlands, climate change may pose a substantial threat to Swamp Everlasting, through increased drying of sites, leading to a reduction in suitable habitat (Carter & Walsh 2011). Increased drying of sites may also potentially facilitate weed invasion. A serious potential impact of drought is likely to be its interaction with fire, as fires that occur in swamps dried out by drought are more likely to burn.	**MEDIUM**	Climate projections for south-eastern Australia include reduced rainfall, increased average temperatures, and more frequent droughts (DAWE 2021a).

Threatened Ecological Communities

Alpine Sphagnum Bogs and Associated Fens

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: Sean Phillipson

Description

The Alpine Sphagnum Bogs and Associated Fens ecological community (Alpine Peatlands) is an ecological community with two specific high mountain wetland elements, bogs and fens. These may occur separately or together across alpine, subalpine and montane landscapes and either in permanently wet areas like streams, drainage lines and valleys, or in waterlogged soils on slopes (DoE 2015).

The *Commonwealth Listing Advice on Alpine Sphagnum Bogs and Associated Fens* (TSSC 2009a) indicates this is a complex ecological community with a recognised progression in composition depending on its position in the landscape, specifically from hillside slopes to valley floors. The bogs component generally has a visual presence of Sphagnum spp, and tend to be near or surrounding the shallow open water pools which make up the fen component of the Threatened Ecological Community.

Distribution

The Alpine Peatlands have a dispersed distribution across permanently wet sites primarily within the Australian Alps, the Tasmanian Central Highlands and the Tasmanian Southern Ranges Interim Biogeographic Regionalisation for Australia (IBRA) bioregions. The ecological community consists mostly of scattered, isolated patches, and its geographic extent is restricted. Most examples of the ecological community are situated within national parks and other conservation-related land tenure.

This ecological community is typically found in alpine, sub-alpine and montane (mountainous, or of higher elevation) environments, on gentle to moderate slopes amongst trees, in frost-prone valleys and plains, and sometimes above the climatic tree line. From a geographical perspective, alpine and subalpine regions generally occur above 1,400 metres above sea level (ASL) on the mainland and above 800 metres ASL in Tasmania. However, Alpine peatlands may occur in isolated pockets as low as 800 to 1,000 metres ASL in parts of the mainland, and 650 metres ASL in Tasmania.

East Gippsland Location

The Victorian locations of this ecological community are described in the *Victorian Alpine Peatland Spatial Action Plan* (McMahon, et al., 2015). Five main regions across the Victorian Alps are designated: Baw-Baw & Lake Mountain, Wonnangatta-Moroka, Bogong & Dargo High Plains, Buffalo and East Alps. Of these the Wonnangatta-Moroka, Bogong and Dargo High plains and the East Alps regions are partly located in the East Gippsland Management Unit. These regions are in the *Alpine Peaks* and *Protecting the Best* priority landscape areas of the East Gippsland Regional Catchment Strategy (EGCMA RCS) and within the Australian Government's *Australian Alps* and *Southeast Coastal Ranges* priority places.

Other Considerations

The *2015 National recovery plan for the Alpine Sphagnum Bogs and Associated Fens ecological community* states, "*The ecological community occurs as part of a mosaic of alpine and subalpine communities with close hydrological and ecological connections. By necessity and cost effectiveness, the management of threats such as fire and exotic fauna are likely to be enacted at a landscape scale with benefits for the full range of catchment flora and fauna*" (DoE 2015).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Alpine Sphagnum Bogs and Associated Fens	 Bushfire	Most of the detrimental changes to this ecological community that can follow a fire, such as loss of vegetation cover and subsequent soil loss, are also associated with the impacts of grazing and exotic weed invasion. Although the ecological community has evolved with fire, fire is not a process that supports the ecosystem function of the Alpine Sphagnum Bogs and Associated Fens (e.g. the vegetation does not require fire for germination processes). Therefore, a fire regime with long intervals between disturbances is unlikely to result in the long-term decline in the condition of the ecological community.	VERY HIGH	Increasing likelihood and severity of extreme weather events as a result of our changing climate. Multiple fires in quick succession are likely to destroy this Threatened Ecological Community. The impacts of threats acting on the ecological community may be exacerbated by the interaction of more than one threat: for example, bushfires, particularly frequent bushfires render the ecological community more susceptible to weed invasion.
	 Drought	The effects of a range of threats impacting on the integrity of the ecological community are complex, long lasting and may have serious implications for persistence of the ecological community in some locations. Where damage has occurred, the recovery of structure and function is likely to take several decades.	VERY HIGH	If Sphagnum has been completely lost from a site, both the Sphagnum and the bogs that depend on it for the development of permanently moist conditions, may become locally extinct unless new Sphagnum plants can be introduced.
	 Biosecurity	Pathogens likely to emerge or become introduced to alpine, sub alpine and montane areas include Phytophthora, myrtle rust and didymo. The emergence of Phytophthora and potentially other diseases and pathogens in areas where they have been previously absent may be linked to a changing climate.	VERY HIGH	Containment or control of a pathogenic infestation in isolation is always likely to be difficult but is recommended given the consequences of a pathogenic outbreak in combination with other threats facing the ecological community could be very high.

Threatened Ecological Communities

Gippsland Red Gum Grassy Woodland and Associated Native Grassland

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

Image credit: **Greening Australia**

Description

The Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland and Associated Native Grassland is a form of eucalypt woodland with grassy understory that is now a critically endangered ecological community. The 2008 Conservation advice for this species describes how in this community the tree canopy is dominated by the Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) while the ground layer is dominated by grasses or grass like plant (TSSC 2008). The Conservation Advice describes how this ecological community has two forms with a Grassy woodland being the most common, while the second form is the grassland form. The Grassy woodland form has a tree canopy with a graminoid ground layer, while in the grassland form, the tree cover is mostly absent, with many sites having been managed as grasslands for decades, resulting in a divergence in the floristic composition of the two forms (TSSC 2008).

Distribution

According to the 2010 policy statement on the Gippsland Red Gum Grassy Woodland and Associated Native Grassland ecological community is endemic to Victoria. Whilst formally extensive it now has a restricted range predominantly on the Gippsland Plains between Morwell and Swan Reach, where it is found in small, fragmented patches, good quality remnant is generally found on public land and to a lesser extent in informal and formal conservation reserves (DEWHA 2010).

East Gippsland Location

As described above this Threatened Ecological Community is endemic to eastern Victoria and in The East Gippsland CMA region it is found in the *Red Gum Plains* and *Gippsland Lakes* priority landscapes. Known locations of the Threatened Ecological Community include Fernbank Recreation Reserve, Moormurng Flora and Fauna Reserve, Blond Bay Reserve, covenanted properties around the Forge Creek Protected Area Network and some rail-trails and road reserves also hold some remnant patches of grassland and grassy woodland (DELWP 2020e).

Other Considerations

This Threatened Ecological Community is highly fragmented and suffered a major decline in extent and community integrity and has been the focus of much work in the past decade particularly on private land with the support of private landholders.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Gippsland Red Gum Grassy Woodland and Associated Native Grassland	 **Bushfire**	Uncontrolled bushfire is a threat to this Threatened Ecological Community as it may result in damage or destruction of key species and encourage growth and dispersal of competing species, either native plants or invasive weed species. Another potential threat to the Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland and Associated Native Grassland is climate change. Historically, management of the ecological community has involved grazing and/or burning.	**HIGH**	Although the grassland and woodland forms have many species in common, different land use histories have resulted in some differences in plant species between the two forms of the ecological community. This is particularly important in terms of response to fire with some of the communities' species being more vulnerable to fire damage.
	 **Biosecurity**	Dieback is a progressive decline in the health and vigour of canopy trees. Affected trees show defoliation and death of twigs, branches and, ultimately, the entire tree. Rural tree dieback affects native eucalypts across much of the Gippsland plain, including Gippsland red gum trees.	**HIGH**	Progressive decline in the health and vigour of canopy trees. Loss of native trees or stands of woodland trees that provide habitat for native plants and animals.

Threatened Ecological Communities

Littoral Rainforest and Coastal Vine Thickets of Eastern Australia

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

Image credit: **Sean Phillipson**

Description

The 2019 National Recovery plan for this Threatened Ecological Community describes the Littoral Rainforest as "*comprised of a complex of wet or monsoon tropical to warm temperate rainforests and coastal vine thickets varying in structure, dominant species leaf size and deciduousness (Webb 1959). Littoral Rainforest differs from other types of rainforest (such as lowland or upland rainforest) in its location; it is typically located within two kilometres of the coast or adjacent to a large salt water body, such as an estuary. The unifying feature of Littoral Rainforest is the adaptation of the rainforest and vine thicket community to the often harsh coastal environments through adaption to the saline conditions delivered via salt-laden winds, saline water tables and occasional inundation*" (DoEE 2019).

Distribution

A key feature of the Littoral Rainforest and Coastal Vine Thickets of Eastern Australia Threatened Ecological Community is its occurrence mainly within two kilometres of the coast or large saltwater body. The national distribution as its name implies is along the eastern seaboard from Princess Charlotte Bay on southern Cape York, Queensland to East Gippsland in Victoria, including on estuarine and offshore islands (DoEE 2019).

The extent of this Threatened Ecological Community is not fully understood with a 2008 mapping estimate of 18,000 hectares thought to underestimate the full extent. However, a feature of this Threatened Ecological Community is that it is fragmented and scattered often due to coastal developments particularly in NSW and Queensland (DoEE 2019).

East Gippsland Location

As described in the National recovery plan the East Gippsland catchment region supports the only known populations of this Threatened Ecological Community in Victoria along the coastal margin from the NSW border through to the Nicholson River east of Bairnsdale. As with other populations of this Threatened Ecological Community it is fragmented and generally found in small, scattered pockets within its range (DoEE 2019).

This Threatened Ecological Community is found in the East Gippsland CMA's *Protecting the Best*, *Forested Foothills* and *Gippsland Lakes* priority landscapes and the Australian Government's *Southeast Coastal Ranges* priority place.

Other Considerations

This Threatened Ecological Community is highly fragmented in part due to agriculture and coastal development and is vulnerable to disturbance. Although it is to some extent tolerant of saline conditions due to its coastal locations, natural disturbances through storms may increase in intensity and frequency due to climate change, resulting in a more open canopy exposing less salt tolerant understorey species.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	 Bushfire	Fire events have been demonstrated to seriously impact on the structure and species composition of the ecological community (TSSC 2008a). The 2019–20 bushfires affected the majority of stands east of Cape Conran (EGCMA 2022). Generally, Littoral Rainforest is a fire-sensitive class of vegetation, with high intensity fires posing a risk to both mature trees and seedlings (DoEE 2019).	HIGH	Depending on the intensity and frequency of fire and the species composition and age structure of the ecological community, regeneration of the full suite of species may not occur. The fragmented nature of Littoral Rainforest, and the relatively small-sized patches, increases the risk of irreversible damage from fire (TSSC 2008a).
	 Storm Surge  Coastal Erosion  Windstorms	Severe storms can cause coastal erosion and canopy and ground layer disturbance. This may in return exacerbate weed invasion as the canopy and ground layer are disturbed (TSSC 2008a).	HIGH	This is expected to result in transformative changes to the structure, function and composition of Littoral Rainforest. All of which make the Threatened Ecological Community more vulnerable to further damage, reductions in diversity and changes in community composition.
	 Biosecurity	Myrtle rust (*Puccinia psidii*) is a potential threat to this Threatened Ecological Community as it infects species in the Myrtaceae family, which is a significant plant family in Littoral Rainforest. Unfortunately, the spread of myrtle rust is difficult to control given it is wind dispersed. But fungicides can be used effectively to treat individual infected plants (DoEE 2019).	MEDIUM	Myrtle rust mainly impacts new plant growth and doesn't seem to kill many of its host species. Rather it can impact recruitment and change patterns of species dominance which may become evident over longer timeframes. It is possible some species may evolve resistance to the effects of myrtle rust over time, limiting the scope of potential impacts (DoEE 2019).

Threatened Ecological Communities

Natural Temperate Grasslands of the South-eastern Highlands

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

Image credit: Sean Phillipson

Description

The Natural Temperate Grassland of the South-eastern Highlands (Natural Temperate Grassland) threatened ecological community is dominated by perennial tussock grasses, naturally treeless, or sparsely treed and is found on the plains of the south eastern highlands. It can occur on a wide range of topographic positions and soils. The grasses tend to occur in 2 to 3 stratums, with the tallest up to 1 m high, with mostly a second stratum of shorter perennial and annual grasses and forbs which grow between the taller tussocks, and there may be a third discontinuous stratum of even smaller forbs, grasses and cryptogams (TSSC 2016i).

Distribution

The Natural temperate grasslands are found in and adjacent to the South-eastern Highlands region, across New South Wales, the Australian Capital Territory and Victoria (DoEE 2016).

East Gippsland Location

Natural Temperate Grassland now exists largely as scattered remnants, many of which are small and isolated from other areas of grassland. Known locations in East Gippsland include Bendoc Conservation Reserve and Greenhills Nature Conservation Reserve. The total area of occurrences in Victoria is likely to be relatively small, due to restricted habitat for this ecological community in that region (TSSC 2016i). These locations are within the East Gippsland CMA's *Protecting the Best* priority landscape and the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

The Ecological Community was identified as a high priority for recovery action following the 2019–20 fires (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Natural Temperate Grasslands of the South-eastern Highlands	 **Bushfire**	Fragmentation has resulted in substantial changes to ecosystem function, with the result that there are increased edge effects, such as disturbance from fire and human interference (TSSC 2016i).	**VERY HIGH**	The resilience of grassy ecosystems to fire is likely to have changed because of floristic compositional changes resulting from other disturbances, or from the long-term exclusion of fire. Pre-settlement burning regimes are now likely to have largely been replaced by grazing as the dominant form of biomass removal.

Threatened Ecological Communities

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

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

Image credit: Martin Potts, Greening Australia

Description

The Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (Seasonal Herbaceous Wetlands) are described in the 2012 Conservation advice as being "*temporary freshwater wetlands that are inundated on a seasonal basis, typically filling after winter-spring rains, and then drying out. The vegetation is generally treeless and dominated by a herbaceous ground layer, often with a considerable graminoid component and with forbs present. The herbaceous species present are characteristic of wetter locations and are typically absent or uncommon in any adjoining dryland grasslands and woodlands. The dominant plants present are subject to seasonal and site conditions, and the diversity of the flora may range from relatively species-poor to species-rich composition*" (DSEWPaC 2012).

Distribution

The Seasonal Herbaceous Wetlands ecological community occur on the lowland plains of Victoria, south-eastern South Australia (SA), and southern New South Wales (NSW) where it is most extensive in Victoria (TSSC 2012). It is found on the IBRA bioregions associated with lowland plains, such as the Victorian Volcanic Plain, South East Coastal Plain, Naracoorte Coastal Plain and Riverina bioregions, and the Wimmera subregion of the Murray Darling Depression bioregion (DSEWPaC 2012).

East Gippsland Location

This Ecological Community is known to occur around the *Gippsland Lakes* and *Red Gum Plains* priority landscapes but further survey work is required in the broader East Gippsland region (EGCMA 2022).

Other Considerations

The main threats to this community are clearing of native wetland vegetation; altered hydrology of wetlands, altered water quality, increased fragmentation and landscape disconnection; weed invasion; and inappropriate grazing regimes (DSEWPaC 2012).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	 **Drought**	Drought poses a threat as it can directly threaten species in the Threatened Ecological Community that cannot adapt, it can exacerbate existing threats, including loss of habitat, altered hydrological regimes, altered fire regimes and invasive species. There are indications that changes in seasonal rainfall patterns are having an impact on the Seasonal Herbaceous Wetlands ecological community through more frequent drought.	**VERY HIGH**	The modelled impacts of climate change on temperature, rainfall and the severity and frequency of extreme weather events, such as prolonged droughts, are likely to directly affect the hydrological regimes that govern the nature and persistence of wetlands.

Threatened Ecological Communities

Silurian Limestone Pomaderris Shrubland of the South East Corner and Australian Alps Bioregions

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: https://www.dcceew.gov.au/sites/default/files/documents/silurian-limestone-pomaderris-shrubland.pdf

Description

The *Silurian Limestone Pomaderris Shrubland of the South East Corner and Australian Alps Bioregions (Silurian Limestone Pomaderris Shrubland)* threatened community is a temperate shrubland which is only found on a rare geological combination of limestone and marble. It is dominated by the Limestone Pomaderris (*Pomaderris oraria subsp. calcicole*) however Drooping Sheoak (*Allocasuarina verticillata*) and Silver Bundy (*Eucalyptus nortonii*) may also be present. The ground layer may include Kangaroo Grass (*Themeda triandra*) and Winged Everlasting (*Ozothamnus adnatus*) (Moorrees 2010). There have been two separate sub-communities recognised on the generally north to north-western facing slopes of Marble Gully near Bindi in East Gippsland (DCCEEW 2023h).

The community is structurally varied and includes grassland, shrubland and woodland forms with many rare, threatened or disjunct species including the Marble Daisy-bush (*Olearia astroloba*) which is listed as Vulnerable under the EPBC Act (1999) (Moorrees 2010).

Distribution

There is only one known occurrence of this community, which is approximately 40 hectares and and is located in Marble Gully – Mount Tambo Nature Conservation Reserve near Bindi in eastern Victoria (DCCEEW 2023h).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Silurian Limestone Pomaderris Shrubland of the South East Corner and Australian Alps Bioregions	 **Bushfire**	When this community was originally described it had not been burnt for over 100 years. The intense fires in 2003 resulted in seedling recruitment and resprouting throughout the existing vegetation which caused a change from the original community description. Repeated fires risk the decline in some characteristic species that depend on seed germination for persistence (DCCEEW 2023h).	**VERY HIGH**	There is only one known location of this community and therefore it is very vulnerable to degradation through repeated fires.

Threatened Ecological Communities

Subtropical and Temperate Coastal Saltmarsh

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Description

The Subtropical and Temperate Coastal Saltmarsh ecological community occurs within a narrow margin of the coast. Coastal Saltmarsh consists mainly of salt-tolerant vegetation including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate, and vegetation is generally of less than 0.5 m height. Many species of non-vascular plants are also found in saltmarsh, including epiphytic algae, diatoms, and cyanobacterial mats (DSEWPaC 2013).

Distribution

The Subtropical and Temperate Coastal Saltmarsh (hereafter Coastal Saltmarsh) ecological community occurs within a relatively narrow margin of the Australian coastline, within the subtropical and temperate climatic zones south of the South-east Queensland IBRA bioregion boundary at 23° 37' latitude along the east coast and south of (and including) Shark Bay at 26° on the west coast (DSEWPaC 2013).

East Gippsland Location

In East Gippsland coastal saltmarsh is associated with the Gippsland Lakes (~1836 ha) (Lakes Victoria and King) with a much smaller area associated with the inlets in the far east (235ha) (Boon, et al., 2015).

Other Considerations

The Ecological Community was identified as high priority for recovery action following the 2019–20 fires (DAWE 2020).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Subtropical and Temperate Coastal Saltmarsh	 Bushfire	Coastal saltmarsh vegetation is not well fire-adapted and fire is lethal to many species.	MEDIUM	Invasive problem species (e.g. *Juncus acutus* and *Baumea juncea*) may have high flammable fuel loads, putting Coastal Saltmarsh at risk.
	 Storm Surge  Coastal Erosion	Current and projected rises in temperature and sea level and increased storm events from climate change are considered severe threats to Coastal Saltmarsh.	HIGH	This could result in landward retreat, transgression by mangroves, fragmentation and loss of habitat or function.
	 Blue-green Algae Bloom	Coastal Saltmarsh is susceptible to a range of impacts from excess nitrogen from sewage, agriculture and land-derived sources.	HIGH	Nitrogen can change patterns of productivity and species distribution, stimulate algal growth, and encourages non-saltmarsh vegetation to invade.

Threatened Ecological Communities

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

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

Image credit: **Greening Australia**

Description

The *White Box – Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* threatened ecological community (Box-Gum Grassy Woodland) presents as either a woodland or a derived grassland which is where the trees have been removed. It generally consists of an open woodland structure where the dominant tree species are (or have been) dominated or co-dominated by one or more of these trees; White Box (*Eucalyptus albens*), Yellow Box (*E. melliodora*) or Blakely's Red Gum (*E. blakelyi*). The relatively open canopy supports a species rich understorey of native grasses particularly tussock grasses and a variety of herbs. Notably shrubs are limited and sparse (DECCW 2010).

Distribution

The Box–Gum Grassy Woodlands is found (and was 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 (DECCW 2010). This Threatened Ecological Community is not listed under the *Flora and Fauna Guarantee Act 1998* (FFG Act). However, the Box – Gum Grassy Woodlands generally compares to a range of Ecological Vegetation Classes (EVC) in the following Victorian Bioregions Central Victorian Uplands, Dundas Tablelands, East Gippsland Lowlands, East Gippsland Uplands, Goldfields, Greater Grampians, Highlands Northern Fall, Highlands Southland Fall, Murray Fans, Northern Inland Slopes, Otway Plain, Victorian Riverina.

East Gippsland Location

In the East Gippsland CMA region, the community exists within the Highland–Southern Fall, East Gippsland Lowlands, East Gippsland Uplands, bioregions extending from the Wonnangatta River Valley in the west to the upper parts of the Snowy River catchment within Victoria in the east. The Box – Gum Grassy Woodland broadly equates to Grassy Woodland, Rainshadow Grassy Woodland and Limestone Grassy Woodland EVCs which are all listed as Depleted (DECCW 2010).

In East Gippsland this community is found on the *Forested Foothills* and *Protecting the Best* priority landscapes which overlaps the Australian Government's *Southeast Coastal Ranges* Priority Place.

Other Considerations

The Box-Gum Grassy Woodland Ecological Community was identified as a very high priority for recovery action following the 2019–20 fires (DAWE 2020).

In East Gippsland the focus for protection of this Threatened Ecological Community is on private land.

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**	This Threatened Ecological Community is already fragmented and was impacted by the 2019–20 bushfires. Bushfire can kill species, change habitat conditions or degrade the structure and integrity of the community.	**HIGH**	In East Gippsland the more vulnerable patches of this Threatened Ecological Community are located on private land and adjacent to large tracts of forested public land.
	 **Drought**	Major droughts will limit plant growth and recruitment and may encourage weed incursions, which in turn may make the Threatened Ecological Community more susceptible to bushfires.	**MEDIUM**	In East Gippsland the more vulnerable patches of this Threatened Ecological Community are located on private land and adjacent to large tracts of forested public land.

Ramsar Sites

Gippsland Lakes Ramsar site

***Environment Protection and Biodiversity Conservation Act (1999)* status: Endangered**

Image credit: **East Gippsland CMA**

Description

The Gippsland Lakes Ramsar site contains an extensive system of estuarine, fresh and brackish coastal wetlands, with a diversity of wetland types present including lagoons, marshes and tree-swamps. Wetland categorisation under the Ramsar typology provides up to 12 marine/coastal wetland types, 20 inland wetland types and 10 human-made wetland types.

Distribution

The Gippsland Lakes Ramsar site is located east of the Latrobe Valley and south of the Eastern Highlands in the State of Victoria, approximately 300 kilometres east of the capital city of Melbourne. It consists of a group of coastal lagoons separated from the sea by a barrier system of sand dunes and fringed on the seaward side by the Ninety Mile Beach. The Gippsland Lakes system is linked to the sea by an artificial entrance, opened in 1889, where the town of Lakes Entrance is now situated. The main lagoons/lakes are fed by a number of river systems. The largest of the rivers are the Latrobe, Macalister, Thomson, Avon (flowing into Lake Wellington), Mitchell, Nicholson and Tambo.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Gippsland Lakes Ramsar site	 Bushfire	Wildfires can cause, indirectly, significant losses to wetland values. In one case, a lightning-started wildfire in Dowd Morass within the past approximately five years also caused localised direct impacts. Major wildfires in the Gippsland Lakes catchment occurred in 1939, 1965, 1978, and 1983, burning areas of up to 100 000 hectares in a single fire season. More recently, there have been major fires within the Gippsland Lakes catchment in 2006 and 2007, burning up to 600,000 hectares of land.	MEDIUM	Suppression of fire can have a significant impact on the environmental values of some wetland ecosystems, by adversely affecting the diversity of flora and its dependent fauna. Heathland communities require prescribed burning to produce mosaics of different aged heaths in order to maintain species diversity. The endangered metallic sun-orchid for example also requires sensitive management of fire regimes in its habitat.
	 Storm Surge	Climate change induced sea level rise (refer discussion below) and increased intensity of tidal storm surge has the potential to significantly increase foreshore/shoreline erosion and inundation processes.	HIGH	The Gippsland coast contains large areas of dunes that are vulnerable to erosion, which will be exacerbated by increases to sea level rise, more severe storm surges and high wave actions predicted under various climate change scenarios.
	 Coastal Erosion	For the Gippsland Lakes, there is the potential for increasing sea levels to increase rates of erosion along the Ninety Mile Beach, which could eventually lead to breaches in the coastal barrier system that separates the Lakes from the sea.	MEDIUM	The foreshores of the Gippsland Lakes Ramsar Site have been subject to periodic as well as long-term erosion in large part due to loss of fringing reed beds.
	 Biosecurity  Blue-green Algae Bloom	Flooding following significant fires in the western catchments in 2006–2007 transported large amounts of nitrogen during runoff leading to major algal blooms in the Lakes. The nutrient loads to the system from catchment flows are high enough to stimulate growth of phytoplankton blooms, which are regularly observed in the Gippsland Lakes. Aside from external supply of nutrients from the catchment, the sediments in the Gippsland Lakes provide another important internal source of nutrients supporting phytoplankton growth.	HIGH	While considerable work has been undertaken to describe the biogeochemical triggers for algal blooms, how these algal blooms affect the ecology of the Lakes in terms of habitat values remains a significant information gap. The frequency and severity of algal blooms remains a key threat to ecological character and continued research and monitoring is a priority in the Gippsland Lakes.


Image credit: Sean Phillipson

5.1 Agricultural capital assets identification

This section of the East Gippsland Biodiversity and Natural Capital Emergency Preparedness and Response Plan (EGBNCEPRP) is focused on the natural capital assets of East Gippsland.

Natural capital in agriculture is described as "*the natural resources that producers manage for the benefit of their businesses, their families and for future generations producers. It includes remnant native vegetation, productive pasturelands and croplands, riparian areas, water resources, agroforestry, environmental plantings and animals*" (Farming for the Future 2024).

This section will focus on the natural capital assets that underpin agriculture in our region but does not include agricultural commodities such as grains, pasture and livestock.

As described in the East Gippsland Regional Catchment Strategy "*the terrestrial environments of East Gippsland support our biodiversity, provide a productive landscape, and offer places to explore and enjoy. The East Gippsland region covers around 2.2 million hectares and represents around 10% of Victoria. The region is bounded by the Great Dividing Range to the north, where mountain peaks rise to 1870 metres and extends south to the coast*" (EGCMA 2022a).

The East Gippsland management unit includes vast areas of public land including state forests, national and coastal parks. Unlike many other Victorian regions private land makes up less than 20% of the East Gippsland Management Unit. Of this broadacre grazing occupies the greatest area of this private land, however there are also significant productive areas of irrigated horticulture and dairying on the floodplains of the Snowy and Mitchell Rivers (EGCMA 2022a).

The climate of East Gippsland is cool temperate and influenced by altitude and distance to the coast. However, variability in rainfall across the region gives rise to droughts and floods that effect waterway health, fire frequency and intensity, and land management. This variability is likely to further increase under the influence of climate change (EGCMA 2022a).

Soils

Description

The soil types in the region vary and as such so does the form of agriculture the soils support. Soils in the eastern part of the East Gippsland region are well structured and fertile with high organic matter content. In the region's west, soils are generally low in organic matter content, lightly textured and prone to erosion.

Across most of the region agriculture is limited to the river valleys and less steep slopes and floodplains across the *Forested Foothills* and *Protecting the Best* priority landscapes. These areas support livestock grazing, predominantly for beef cattle production along with limited sheep meat and wool production.

More intensive agriculture is found in the lower floodplains of the major rivers of the region, specifically the Mitchell, Nicholson, Tambo, Buchan and Snowy rivers, which with more fertile soils support intensive horticulture and cropping. The extensively cleared *Red Gum Plains* priority landscape also supports a range of agricultural enterprises including, cropping, grazing, dairy and horticulture.

East Gippsland soils are generally acidic and deficient in phosphorus but not potassium or sulphur, however molybdenum and boron micronutrient deficiency is also common (Crawford, Mitchard & Burton 2020). The risk of sheet and rill erosion, tunnel and gully erosion is high or very high in 50% of freehold land, particularly across the foothills while the risk of wind erosion is 36% (Sargant 2009).

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Soils	 Bushfire	Bushfire 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.	VERY HIGH	Exposed soil leading to wind and water erosion are significant threats to soil health and function across East Gippsland but especially on the river slopes and valleys. These areas often abut forested public land and have steeper drier slopes leading to more intense bushfires. The risk of paddock soils and waterways eroding during rainfall events following bushfire is high and may result in major deterioration in water quality. Across the Red Gum Plains bushfire is still a threat but may be easier to control due to lower fuel loads, and a flat terrain. There are also fewer drainage systems across the plains reducing the amount of runoff and sedimentation to the Gippsland lakes system.
	 Drought	Drought in East Gippsland has been found to contribute to many threatening processes including increased frequency and intensity of fires, loss of soil carbon, increased soil erosion caused by reductions in ground cover, increased soil run-off into rivers and estuaries, decreases in the water table, increased pressure on remaining wetlands and stream beds.	HIGH	While it is not possible to predict when drought will occur, climate change projections have shown that rainfall is expected to decline across all the region with the traditionally high rainfall alpine areas will have rainfalls closer to that historically experienced in the coast. There will also be a shift in the seasonality of rainfall, with minor increases in summer rainfall, but dramatic declines in winter and spring rain.
	 Flood	River and stream flooding and overland flow have the potential to erode and waterlog agricultural soils in all soil types.	VERY HIGH	The East Gippsland region is particularly prone to riverine flooding due in part to the development of intense low pressure systems called East Coast Lows (ECLs). It is not unusual for East Gippsland catchments to experience multiple floods within a single year. In contrast with much of the rest of the State of Victoria, there is no “flood season” in East Gippsland: large floods can and do occur within any month of the year. As most of the highly productive agricultural soils are located on the floodplains of the Mitchell, Snowy, Tambo, Buchan and Nicholson rivers these soils are particularly vulnerable to damage from flooding. Soil erosion caused by flooding can occur across the catchment. In the upper catchment areas, erosion is most likely to occur within riparian areas, where rivers and streams lack buffering vegetation that binds the banks of the waterway and makes it more resilient to erosion and movement. Extreme soil erosion can take place and interact with drought, bushfire and post-fire floods, resulting in “blackwater” events and causing widespread damage to farmland, waterways and water quality.
	 Windstorms	Agricultural soils are susceptible to erosion by windstorms and rainfall runoff. Erosion impacts on soil fertility and productivity by removing productive topsoil, nutrients, and carbon.	HIGH	Soil lost means nutrients lost – the fine particles removed by wind contain most of the fertility (phosphorous and nitrogen) and organic matter of that soil. Soil erosion leads to off-site damage such as drifting of sand onto fences, roadways and other infrastructure. Clearing of drift sand has a cost. Soil erosion can blow away valuable pasture seed, such as medic, which has a cost to replace.


Image credit: **Sean Phillipson**

Riparian areas, native vegetation, and environmental plantings on farms

Description

Native vegetation on farms occurs as remnant or revegetated patches large and small, isolated paddock trees, and in riparian zones beside waterways. These areas provide a variety of benefits to both agricultural production and biodiversity conservation.

These benefits are:

- Provision of habitat for beneficial insects that support agricultural production as predators of pest insects and as pollinators.
- Provision of shade and shelter to livestock, reducing stress and improving livestock health.
- Stabilisation of soils, particularly within riparian areas, slowing or preventing movement of streams and rivers
- Buffering of stream inflows into streams and rivers, improving water retention, preventing flash flooding and erosion, and improving water quality.
- Storage of carbon, offsetting against farm greenhouse gas emissions.
- Production of timber
- Rehabilitation of unproductive land such as saline or eroded areas.
- Improving the property amenity.

East Gippsland supports the conservation and restoration of riparian areas on private land, as well as other native vegetation and environmental plantings for landholders. The *Red Gum Plains* priority landscape is a particular focus area for implementing environmental plantings as it has been extensively cleared in the past.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Riparian areas, native vegetation, and environmental plantings on farms	 **Bushfire**	Bushfire removes riparian vegetation, making the bed and banks of streams and rivers prone to erosion during high flow events and threatening avulsion or movement of the stream or river channel, which can significantly reduce the area of productive land available. Due to the loss or of vegetation riverbanks and beds are more vulnerable to invasion from pest plants and damage from pest animals post a bushfire event. Bushfire can destroy or damage remnant vegetation or environmental plantings reducing their beneficial capacity in terms of supporting biodiversity, providing groundcover and shelter from the impact of wind.	**VERY HIGH**	The upland streams are especially vulnerable to invasion by willows following bushfire. In East Gippsland stock exclusion fencing of riparian areas is a key tool to protect waterways from a range of threatening process. This has also provided significant benefits to the landholder through more stable waterways and flow on biodiversity impacts. If this vegetation is destroyed by bushfire, subsequent erosion and sedimentation during post-fire flooding becomes a significant problem for downstream users, where flooding, excessive movement of sediment and poor water quality prevents water extraction for irrigation or use by stock and triggers major changes in river and stream geo-fluvial processes. These changes can involve river and stream movement, reducing the area of productive land available.
	 **Drought**	Drought can lead to a decrease or loss of vegetation, whether in plantings, remnants or riparian areas. It may also lead to a change to vegetation structure and complexity reducing its beneficial impacts.	**MEDIUM**	The susceptibility of vegetation is variable and will depend on the length of drought, condition going into the drought and location in the landscape and subsequent exposure to other threats such as pest plants and animals, wind or hydrological changes.
	 **Flood**	Floods often destroy fences protecting riparian vegetation. If fences are not replaced during the recovery phase, stock access will cause degradation to the beds and banks of streams and rivers, making them prone to erosion and movement during subsequent high-flow events. Floods may also exacerbate the spread of weeds along riparian corridors and onto floodway's where they may outcompete native vegetation in riparian vegetation, other remnant vegetation or in native plantings.	**HIGH**	Fenced riparian vegetation is a cost-effective and long-term solution to preventing land and waterway degradation. Much work has been completed across the East Gippsland region to exclude stock from riparian areas. Recent post-flood recovery has seen major reductions in funding available, leading to a reversal in the gains made over many years. Movement of weeds post flood is particularly an issue in the mid-section of river catchments which already carry a high weed load, and control is difficult due to accessibility issues.


Image credit: **Sean Phillipson**

Water

Description

Farming occurs mostly on the less steep slopes and flats at Dargo, Swifts Creek and Bonang, and the lower slopes and floodplains along the major rivers (Mitchell, Buchan, Tambo, Snowy, Cann and Genoa) and their tributaries. Our region is one of the few places on mainland Australia where continuity of natural ecosystems from the alps to the sea still exists. The waterways of East Gippsland support significant ecological, social and cultural values. Fresh water is critical to the productivity of the region and our aquatic habitats support many threatened species that depend on these ecosystems. Areas of irrigated agriculture (horticulture, dairy) exist around Orbost, Genoa, Cann River and Bairnsdale, using of the river systems and sub surface water in the region.

Asset	Emergency Scenario	Why it poses a threat	Susceptibility	Why
Water	 **Bushfire**	Bushfire, which removes vegetative cover, can interact with drought and post-fire flooding events, entraining huge amounts of ash, sediment and runoff into waterways, resulting in “Blackwater” events. These Blackwater events completely degrade the water quality in waterways, making it unpalatable for stock or domestic usage for up to several months, and can extend up to 80 km downstream. Landholders must either rely on surface catchment dams if available, or resort to transporting water from off-farm.	**VERY HIGH**	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.
	 **Drought**	Drought directly impacts the available water in the landscape which is vital for growing food and fibre. Water quality can also decline, concentrating salt or leading to blue green algal blooms. A lack of water in the landscape can impact crop pollinators.	**MEDIUM**	Drought is becoming more common under climate change. Maintaining adequate ground cover is an issue in some parts of region particularly over summer. Erosion in particular sheet and rill erosion is a risk in some areas such as Ensay, Swifts Creek, Tambo Crossing, Glenaladale and Lindenow.
	 **Blue-green Algae Bloom**	Irrigation water is vulnerable to blue-green algae blooms particularly during the peak summer months.	**MEDIUM**	Irrigation is used by farmers on the Lindenow valley of the Mitchell River, the Snowy River floodplain and parts of the Buchan, Tambo and Nicholson floodplains. It is not certain what the full effect of the use of irrigation water contaminated with blue-green algae is on plants, although scientific research suggests that the use of contaminated irrigation water can impact plants through; a reduction of the germination rate of seeds and the growth, reduced development of the seedlings and there may also be an alteration to the quality and the productivity of crop plants. Blue-green algae can also cause illness in animals, which most often come into contact with contaminated water from affected farm dams.

6 Asset Preparedness

Image credit: **Sean Phillipson**

6.1 Preparedness actions for protecting Biodiversity assets

Fire preparedness – biodiversity

The Gippsland Bushfire Management Strategy outlines the legislative and policy context that DEECA's strategic bushfire management planning takes place in, and includes:

The Emergency Management Act 2013, which requires state, regional and municipal emergency management plans, to provide for an integrated, coordinated and comprehensive approach to emergency management. These plans must cover mitigation of, response to and recovery from emergencies and to specify the emergency management roles and responsibilities of agencies.

The Conservation Forests and Lands Act 1987, which requires the Department of Energy, Environment and Climate Action (DEECA), through the Code of Practice for Bushfire Management on Public Land (2012), to develop a risk-based approach to bushfire management on public land.

Safer Together: A new approach to reducing the risk of bushfire in Victoria which focuses on how effective our actions are in reducing risk and not just the amount of activity undertaken.

DEECA is also required to undertake a due diligence Biodiversity Values Assessment (values checking) before any fuel management activities such as planned burns, non-burn fuel treatments or other programs and works. This ensures that DEECA complies with relevant legislation such as 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*.

The Biodiversity Values Assessment identifies where any planned works might overlap with biodiversity values (assets). DEECA is then responsible for determining the most effective way to avoid or mitigate potential impacts.

Values checking identifies the most significant values based on existing legislative requirements. Consideration is given to known recorded biodiversity values, species Habitat Distribution Models 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 are considered in the context of planned burning. They are aimed at providing advice and information to protect or enhance recorded biodiversity values found within burns, by managing threats and impacts 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
- Insufficient frequency and
- Loss of structure or vegetation cover

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


Image credit: **Sean Phillipson**

Preparedness actions for protecting Biodiversity assets

Birds | **Asset: Australasian Bittern (*Botaurus poiciloptilus*)**

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Incorporate national fire management guidelines for the protection of Australasian Bittern habitat into regional and local fire management planning. Work with Traditional Owners to ensure traditional burning practices consider ecological requirements for the species including using fire as a management tool to maintain the diversity of reeds and rushes. Wetlands known to support Australasian Bitterns have been protected from fire during hazard reduction burn activities.	Suitable habitat such as wetlands along coastline	DEECA, GLaWACPV, EGCMA, CFA	NHT Enhancing the biodiversity of the Red Gum Plains project in the Red Gum Plains Priority Landscape.
 **Drought**	Water authorities are aware of known locations and species requirements for habitat and these are incorporated into water management activities. • Activities that may result in adverse changes to water levels, salinity, sedimentation or pollution in known habitat have been identified and mitigation actions put in place • Management of wetlands includes adequate buffer zones in key locations for Australasian Bitterns	Suitable habitat such as wetlands along coastline Red Gum Plains Priority Landscape	EGCMA, EGW, GP	Delivering priority projects under the GDRP (Gippsland Drought Resilience Plan) and GLRSMP (Gippsland Lakes Ramsar Site Management Plan). NHT Enhancing the biodiversity of the Red Gum Plains project in the Red Gum Plains Priority Landscape.
 **Biosecurity**	Document the likely biodiversity conservation impacts of an HPAI (H5N1) outbreak and plan for ways to reduce this impact. Ensure relevant organisations and staff are aware of resources available through Wildlife Health Australia (WHA). Specifically relating to HPAI (H5N1) ensure staff, volunteers and community are aware of and understand the symptoms and can find advice and assistance.	All locations	DEECA, PV, Ag VIC, EGCMA, GLaWACBA	Organisations collaborating preparedness lead by Wildlife Health Australia.
 **Blue-green Algae Bloom**	Ongoing management of sediment and nutrient inflows.		DEECA, EGCMA, EGW	Delivering priority projects under the EGRCS (East Gippsland Regional Catchment Strategy) and GLRSMP.

Birds

Asset: Australian Fairy Tern (*Sternula nereis nereis*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Storm Surge**  **Coastal Erosion**	Continue to increase available habitat and provide climate change adaptation pathways for priority bird species through sand renourishment of critical habitat sites. Continue to monitor and where possible, control, off-road vehicle uses at priority locations.	Gippsland Lakes	DEECA, PV, BA, GP	NHT Enhancing the ecological character of the Gippsland Lakes project Delivering priority projects under the GLRSMP.
 **Biosecurity**	Implement the Gippsland Lakes pest plant and animal strategy. Review the pest plant and animal strategy to ensure alignment with Biodiversity Response Plan for the Gippsland Lakes. Predator control at key sites will help maximise breeding success of shorebirds.	Gippsland lakes	DEECA, PV, EGCMA, GLaWAC, EGSC, TfN, GA, GP, BA, Landcare Networks / Groups	Implementing the Gippsland Lakes program, including NHT Enhancing the ecological character of the Gippsland Lakes project.
 **Biosecurity (HPAI H5N1)**	Document the likely biodiversity conservation impacts of an HPAI outbreak and plan for ways to reduce this impact. Consider ways to reduce pressures on the wider environment to improve wildlife resilience to disease or the need for enhanced protection of wild habitats and provision of additional or alternative breeding sites developing a system and SOP for recording numbers of animal deaths, species and locations, to ensure that the impact on a population can be measured effectively or any other means of supporting species recovery.	All locations	DEECA, Ag Vic, PV, BA	Organisations collaborating preparedness lead by Wildlife Health Australia.

Birds

Asset: Eastern bristlebird (*Dasyornis brachypterus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. *Ongoing species monitoring* to better understand the populations long term survival key sites (including reintroduction sites), and its extent. Deployment of sound recorders within the suitable broader coastal habitats of East Gippsland will help to better understand species extent. *Habitat mapping of heathland* to improve our understanding of the species habitat preferences, helping to inform on ground management actions to protect and improve this habitat type. Continuation of the translocation project to manage genetic diversity and extend the known range of the species in Victoria.	Howe Flat and other suitable habitat	DEECA, PV, Zoos Victoria, EGCMA, BA, University of Melbourne	Recovering the Eastern Bristlebird project and implementing Eastern Bristlebird Recovery Plan.
 **Drought**	Continue targeted pest plant and animal control to protect both habitat and population.		PV, DEECA	Implementing priority actions from the Parks Victoria Nature Conservations Strategy 2021–2031 (PV NCS).
 **Biosecurity**	Continue targeted pest plant and animal control to protect both habitat and population. Ensure hygiene measures are implemented including vehicle cleanliness are maintained to prevent incursions of plant pathogens.		PV, DEECA	Implementing priority actions from the PV NCS.

Birds

Asset: Eastern Curlew (*Numenius madagascariensis*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Storm Surge**  **Coastal Erosion**	Increasing available habitat and providing climate change adaptation pathways for priority bird species through sand renourishment of critical habitat sites.	Gippsland lakes	DEECA, PV, GP	Implementing the Gippsland Lakes program.
 **Drought**	Increasing available habitat and providing climate change adaptation pathways for priority bird species through sand renourishment of critical habitat sites.	Gippsland lakes	DEECA, PV, GP	Implementing the Gippsland Lakes program.
 **Biosecurity**	Document the likely biodiversity conservation impacts of an HPAI outbreak and plan for ways to reduce this impact. Consider ways to reduce pressures on the wider environment to improve wildlife resilience to disease or the need for enhanced protection of wild habitats and provision of additional or alternative breeding sites developing a system and SOP for recording numbers of animal deaths, species and locations, to ensure that the impact on a population can be measured effectively or any other means of supporting species recovery.	Coastal locations	DEECA, Ag Vic, PV, BA	Organisations collaborating preparedness lead by Wildlife Health Australia.

Birds

Asset: Eastern Hooded Plover (*Thinornis cucullatus cucullatus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Storm Surge**  **Coastal Erosion**	Increasing available habitat and providing climate change adaptation pathways for priority bird species through sand renourishment of critical habitat sites.	Gippsland lakes	DEECA, PV, GP	Implementing the Gippsland Lakes program.
 **Biosecurity**	Document the likely biodiversity conservation impacts of an HPAI (H5N1) outbreak and plan for ways to reduce this impact. Consider: ways to reduce pressures on the wider environment to improve wildlife resilience to disease or the need for enhanced protection of wild habitats and provision of additional or alternative breeding sites developing a system and SOP for recording numbers of animal deaths, species and locations, to ensure that the impact on a population can be measured effectively or any other means of supporting species recovery.	Coastal locations	DEECA, Ag Vic, PV, BA	Organisations collaborating preparedness lead by Wildlife Health Australia.

Mammals

Asset: Broad-toothed Rat (*Mastacomys fuscus mordicus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Genetic sampling of known populations using non-invasive methods to improve understanding of the sub species. Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Continue targeted pest plant and animal control to protect both habitat and population.	Known locations	DEECA PV, DEECA, GLaWAC, NECMA, WGCMA, EGCMA,	Implementing the NHT Alpine Peatlands Protection project and Alpine Peatlands Fire Risk Mitigation Plan.
 **Drought**	Genetic sampling of known populations using non-invasive methods to improve understanding of the sub species. Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Continue targeted pest plant and animal control to protect both habitat and population.	Known locations	DEECA PV, DEECA, GLaWAC, NECMA, WGCMA	Implementing the NHT Alpine Peatlands Protection project.

Mammals

Asset: Brush-tailed rock-wallaby (*Petrogale penicillate*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Continue annual camera monitoring of Little River Gorge population. Continue captive breeding and captive to wild translocations, and genetic "rescue" program to provide animals to repopulate in event of catastrophic losses.	Known location and existing captive breeding sites	DEECA, PV, Zoos Vic	Partnership arrangement for captive breeding and genetic program, and implementation of Protecting East Gippsland's Critical Weight Range Mammals Project.
	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events.	Little River Gorge		Implementing actions in the Gippsland Bushfire Management Strategy 2020 and Regional Fire Management Plans.
 **Drought**	Continue annual camera monitoring of Little River Gorge population. Continue captive breeding and captive to wild translocations, and genetic "rescue" program to provide animals to repopulate in event of catastrophic losses.	Known location and existing captive breeding sites	DEECA, PV, Zoos Vic	Partnership arrangement for captive breeding and genetic program implementation of Protecting East Gippsland's Critical Weight Range Mammals Project.
	Continue targeted pest plant and animal control to protect both habitat and population including trialling cat control.	Little River Gorge	PV, DEECA	Ongoing.
 **Biosecurity**	Continue annual camera monitoring of Little river Gorge population. Continue captive breeding and captive to wild translocations, and genetic "rescue" program to provide animals to repopulate in event of catastrophic losses.	Known location and existing captive breeding sites	DEECA, PV, Zoos Vic, ACT Govt*	Implementing Protecting East Gippsland's Critical Weight Range Mammals Project.
	Continue targeted fox control to protect population from hydatid disease.	Little River Gorge	PV, DEECA	

Mammals

Asset: Grey-headed Flying-fox (*Pteropus poliocephalus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Identify and map key foraging habitats, camps and key movement paths. Initiate and support research that identifies causes of population influxes (e.g. large-scale success or failure in flowering or fruiting) and ultimately predict the timing, frequency and scale of future influxes. Tree planting and other habitat restoration works to enhance the conditions of the roost. Identify and map key foraging habitats, unknown camps and key movement paths.	Statewide	DEECA, ARI, EGSC	Implementing actions in the National Recovery Plan for the Grey-headed Flying-fox.
 **Drought**	Initiate and support research that identifies causes of population influxes (e.g. large-scale success or failure in flowering or fruiting) and ultimately predict the timing, frequency and scale of future influxes. Tree planting and other habitat restoration works to enhance the conditions of the roost.	Known locations	DEECA, ARI, EGSC	Implementing actions in the National Recovery Plan for the Grey-headed Flying-fox.
 **Biosecurity**	Ensure hygiene measures are implemented including vehicle cleanliness are maintained to prevent incursions of plant pathogens. Tree planting and other habitat restoration works to enhance the conditions of the roost.	Known locations	DEECA, PV, EGSC	

Mammals

Asset: Southern Brown Bandicoot (*Isoodon obesulus obesulus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Genetic analysis of known populations to inform the feasibility of genetic augmentation and translocation strategies. Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Targeted monitoring. Targeted predator control.	Known locations	PV, DEECA, LaTrobe University	Protecting East Gippsland's Critical Weight Range Mammals project.
 **Drought**	Genetic analysis of known populations to inform the feasibility of genetic augmentation and translocation strategies. Targeted monitoring. Targeted predator control.	Known locations	PV, DEECA, LaTrobe University	Protecting East Gippsland's Critical Weight Range Mammals project.
 **Biosecurity (Toxoplasmosis)**	Genetic analysis of known populations to inform the feasibility of genetic augmentation and translocation strategies. Targeted monitoring and targeted predator control.	Known locations	PV, DEECA, LaTrobe University	Protecting East Gippsland's Critical Weight Range Mammals project.

Mammals

Asset: Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Additional monitoring (Coordinated remote camera monitoring) and research to improve knowledge of distribution and habitat preferences and establish genomic database.	Known locations	PV, DEECA, TfN	Protecting East Gippsland's Critical Weight Range Mammals project.

Mammals

Asset: Long-footed Potoroo (*Potorous longipes*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Genetic sampling of additional known populations; habitat suitability and diet preference assessments across different habitats. Broad-scale remote camera monitoring in areas not previously sampled to assess current distribution and refine Habitat Distribution Models. Increase introduced predator control.	Where LFP are known to occur Locations not previously surveyed Tulloch Gorge population	DEECA, ARI, PV, Australian Museum, NSW Govt.	Implementing actions in the Gippsland Bushfire Management Strategy 2020 and Regional Fire Management Plans and Protecting East Gippsland's Critical Weight Range Mammals project.
 **Drought**	Genetic sampling of additional known populations; habitat suitability and diet preference assessments across different habitats. Broad-scale remote camera monitoring in areas not previously sampled to assess current distribution and refine Habitat Distribution Models. Increase introduced predator control.	Where LFP are known to occur Locations not previously surveyed Tulloch Gorge population	DEECA, ARI, PV, Australian Museum, NSW Govt.	
 **Biosecurity**	Genetic sampling of additional known populations; habitat suitability and diet preference assessments across different habitats. Broad-scale remote camera monitoring in areas not previously sampled to assess current distribution and refine Habitat Distribution Models. Increase introduced predator control.	Where LFP are known to occur Locations not previously surveyed Tulloch Gorge population	DEECA, ARI, PV, Australian Museum, NSW Govt.	

Mammals

Asset: Southern Long-nosed Potoroo (*Potorous tridactylus trisulcatus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Genetic analysis of known populations to inform the feasibility of genetic augmentation and translocation strategies. Ongoing remote camera monitoring to monitor species and inform future management.	Known locations	DEECA, PV, LaTrobe University	Implementing actions in the Gippsland Bushfire Management Strategy 2020 and Regional Fire Management Plans and Protecting East Gippsland's Critical Weight Range Mammals project.
 **Drought**	Genetic analysis of known populations to inform the feasibility of genetic augmentation and translocation strategies. Ongoing remote camera monitoring to monitor species and inform future management.	Known locations	DEECA, PV, LaTrobe University	
 **Biosecurity**	Genetic analysis of known populations to inform the feasibility of genetic augmentation and translocation strategies. Ongoing remote camera monitoring to monitor species and inform future management.	Known locations	DEECA, PV, LaTrobe University	

Fish

Asset: Eastern Dwarf Galaxias (*Galaxiella pusilla*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Targeted survey and monitoring to better understand the current and potential distribution of each species, aiding the recovery efforts in fire impacted waterways. Research into the ecological traits, dispersal, and population and genetic structure of each species to build our knowledge of each species and help inform feasible recovery strategies. Continued trout control to limit the impacts of these introduced predatory fish on these small bodied native species. Many streams in East Gippsland are trout free or have low numbers of trout, increasing the feasibility and potential for success of these works. Maintain flow regimes and habitat improvement such as reestablishment of aquatic vegetation and stock exclusion fencing.	All known locations	ARI ARI DEECA EGCMA	Continued research, monitoring and survey of species; implementing actions in the Gippsland Bushfire Management Strategy 2020 and Regional Fire Management Plans. Implementing environmental water program.
 **Drought**	Targeted survey and monitoring. Research into ecological traits, dispersal and population genetic structure. Continued trout control. Maintain flow regime and habitat improvement.		ARI ARI DEECA, VFA EGCMA	Continued research, monitoring and survey of species; and implementing environmental water program.
 **Flood**	Targeted surveys and monitoring. Research into ecological traits, dispersal and population genetic structure. Continued trout control. Maintain flow regimes and habitat improvement.		ARI ARI DEECA EGCMA	Continued research, monitoring and survey of species; and implementing environmental water program.

Fish

Asset: Threatened Mountain Galaxia Species:

Dargo Galaxias *Galaxias mungadhan*
East Gippsland Galaxias *Galaxias aequipinnis*
Yalmy Galaxias *Galaxias sp. nov. 'Yalmy'*
McDowell's Galaxias *Galaxias mcdowalli*

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Targeted survey and monitoring to better understand the current and potential distribution of each species, aiding the recovery efforts in fire impacted waterways. Research into the ecological traits, dispersal, and population and genetic structure of each species to build our knowledge of each species and help inform feasible recovery strategies. Ex-situ recovery actions, including translocations will help to continue the recovery of these unique species enabling the captive breeding and release of populations of these species into suitable nearby habitats. Continued trout control to limit the impacts of these introduced predatory fish on these small bodied native species. Many streams in East Gippsland are trout free or have low numbers of trout, increasing the feasibility and potential for success of these works.	All known locations	EGCMA, PV, DEECA, ARI	Protecting the Unique Mountain Galaxias of East Gippsland project and the ARI threatened galaxiids research and management programs.
 **Drought**	Targeted survey and monitoring. Research into ecological traits, dispersal and population genetic structure. Ex-situ recovery actions including translocations. Continued trout control.			
 **Flood**	Targeted survey and monitoring. Research into ecological traits, dispersal and population genetic structure. Ex-situ recovery actions including translocations. Continued trout control.			

Frogs

Asset: Giant Burrowing Frog (*Heleioporus australiacus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Undertake surveys in suitable habitat to confirm persistence at known locations and identify new locations. Include eDNA surveys of key streams and targeted broad scale species call recording to understand extent and travel distance from water. Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Continue targeted pest plant and animal control to protect both habitat and population.	Known locations and suitable habitat	Zoos Victoria, ARI, DEECA, PV, Uni of Melb, WU DEECA, PV, CFA, GLaWAC DEECA, PV, GLaWAC	Implementing actions in the Gippsland Bushfire Management Strategy 2020 and Regional Fire Management Plans; Southern Ark program.
 **Biosecurity**	Undertake surveys in suitable habitat to confirm persistence at known locations and identify new locations. Include eDNA surveys of key streams and targeted broad scale species call recording to understand extent and travel distance from water. Seek to better understand the factors influencing the spread and persistence of the Chytrid disease. Continue targeted pest plant and animal control to protect both habitat and population.		Zoos Victoria, ARI, DEECA, PV, University of Melbourne, WU	Southern Ark program.

Frogs

Asset: Green and Golden Bell Frog (*Litoria aurea*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Drought**	Surveys in suitable habitat to confirm the persistence and characteristics of threatened species populations at previously recorded locations, especially where records are old. Identify new locations requiring protection. Enhance wetland habitats through control of pest plants and animals, exclusion of grazing animals and protection of wetlands on private land.	Gippsland Lakes	PV, DEECA, GLaWAC, Greening Australia, Landcare, Private landholders, EGCMA, TFN	Implementing the Gippsland Lakes program, including the NHT Enhancing the Ecological Character of the Gippsland Lakes project.
 **Biosecurity**	Seek to better understand the factors influencing the spread and persistence of the Chytrid disease.	Known locations	ARI, DEECA, GA	
 **Flood**	Ensure estuary opening protocols are followed when artificially opening estuaries.	EGCMA estuaries	EGCMA, PV, GLaWAC, EGSC, DEECA	Estuary Opening Protocols implemented.

Frogs

Asset: Southern Heath Frog, Watson's Tree Frog (*Litoria watsoni*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Undertake more surveys in suitable habitat to confirm persistence at known locations and identify new locations. Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events.	Known locations and suitable habitat	DEECA, ARI, PV DEECA, PV, CFA	Implementing actions in the Gippsland Bushfire Management Strategy 2020 and Regional Fire Management Plans.
 **Drought**	Undertake more surveys in suitable habitat to confirm persistence at known locations and identify new locations.		DEECA, PV, ARI	
 **Biosecurity**	Undertake more surveys in suitable habitat to confirm persistence at known locations and identify new locations. Seek to better understand the factors influencing the spread and persistence of the Chytrid disease.		DEECA, PV, ARI	

Reptiles

Asset: Alpine She-oak Skink (*Cyclodomorphus praealtus*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Undertake further research and continue monitoring program. Continue ex-situ breeding. Coordinate with partner agencies to develop and implement appropriate fire regimes using planned burning plans and programs to protect the Threatened Ecological Community.	Known locations Melbourne Zoo Known locations	ARI Zoos Victoria DEECA, PV, Alpine Resorts, GLaWAC	Implementation of the NHT Alpine Peatlands Protection project and Regional Fire Management Plans.
 **Drought**	Increase species resilience through targeted control of pest plants and animals especially horses and deer.	Known locations	PV, Alpine Resorts, DEECA	Implementation of the NHT Alpine Peatlands Protection project.

Plants

Asset: Austral Toadflax (*Thesium austral*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities. Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing. Continue targeted pest plant and animal control to protect both habitat and population. Undertake planned burning for ecological outcomes. Undertake regular monitoring of this species.	Known sites Green hills NCR	PV, DEECA	Code of Practice for Bushfire Management on Public Land (2012) and through Conserving Threatened Plants and Communities of the Foothills and Mountains project.
 **Drought**	Continue targeted pest plant and animal control to protect both habitat and population. Undertake planned burning for ecological outcomes. Undertake regular monitoring of this species.	Known sites Green hills NCR	PV, DEECA	Conserving Threatened Plants and Communities of the Foothills and Mountains project.

Plants

Asset: Betka Bottlebrush *(Callistemon kenmorrisonii)*

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Continued monitoring of the known populations to better understand the genetics and dynamics of the species as well as the recovery of the species at the limited known sites following the impacts of the 2019–20 fires where all plants were burnt.	Betka river populations	PV, DEECA, EGCMA, LaTrobe University, FEVL, CSIRO, Snowy River Community Gardens, RBGV	Protecting the Threatened Flora of the Genoa River project and the Gippsland Bushfire Management Strategy 2020 and regional fire management plans.
 **Biosecurity**	Undertake ex-situ genetic mixing to help diversify the genetics of the species helping to manage future risk to disease or environmental susceptibility. Ensure hygiene measures are implemented including vehicle cleanliness are maintained to prevent incursions of plant pathogens.			

Plants

Asset: Bog Willow Herb (*Epilobium brunnescens subsp. beaugleholei*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Drought**	Manage and control access. Establish cultivated plants ex situ. Undertake survey and further research.	Known location	PV DEECA / ARI RBG	Implementation of the NHT Alpine Peatlands Protection project.
 **Bushfire**	Manage and control access. Establish cultivated plants ex situ. Undertake survey and further research.	Known location	PV DEECA / ARI RBG	

Plants

Asset: Colquhoun Grevillea (*Grevillea celata*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Survey extent of species off road footprint to determine true status and inform management. Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities.	Colquhoun SF	DEECA	Implementing Gippsland Bushfire Management Strategy 2020 and regional fire management plans.
 **Drought**	Survey extent of species off road footprint to determine true status and inform management.	Colquhoun SF	DEECA	

Plants

Asset: Dwarf Kerrawang (*Commersonia prostrata*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Improve species resilience through; • Development and implementation of better ecological burning practices to reduce biomass to encourage regeneration of target species, or exclusion of fire to favour other species. • Threat abatement (including pest animal control), habitat enhancement, and monitoring activities • Changing land management practises including controlling stock access, reinstatement of wetland hydrology, and development of management plans and land management agreements • Reintroduction of the species in selected sites.	Sites on the Red Gum Plains and Gippsland lakes	EGCMA, PV, DEECA, TfN, GLaWAC, GA, EGCMN, Landcare, Private Landholders	Implementing the Gippsland Lakes program, including the NHT Enhancing the Biodiversity of the Red Gum Plains and NHT Priority Actions for the Gippsland Lakes Ramsar site projects.
 **Drought**	Improve species resilience through; • Development and implementation of better ecological burning practices to reduce biomass to encourage regeneration of target species, or exclusion of fire to favour other species. • Threat abatement (including pest animal control), habitat enhancement, and monitoring activities • Changing land management practises including controlling stock access, reinstatement of wetland hydrology, and development of management plans and land management agreements • Reintroduction of the species in selected sites.	Sites on the Red Gum Plains and Gippsland Lakes	EGCMA, PV, DEECA, TfN, GLaWAC, GA, EGCMN, Landcare, Private Landholders	NHT Enhancing the Biodiversity of the Red Gum Plains and Enhancing the ecological Character of the NHT Gippsland Lakes projects.

Plants

Asset: Forrester's Bottlebrush (*Callistemon forresterae*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Continued monitoring of the known populations to better understand the genetics and dynamics of the species.	Genoa river population	PV, DEECA, EGCMA, LaTrobe University, FEVL, CSIRO, Snowy River Community Gardens, RBGV	Protecting the Threatened Flora of the Genoa River project and the Gippsland Bushfire Management Strategy 2020 and Regional fire management plans.
 **Drought**	Continue control of introduced browsers including feral pig and deer control using the now well-developed aerial control programs implemented following the 2019–20 fires in east Gippsland.		PV, DEECA	Protecting the Threatened Flora of the Genoa River project and PV NCS.
 **Flood**	Reduce non climate stressors including pest plants and animals which hinder the ability of ecosystems to withstand or adjust to changing climate.		PV, DEECA, EGCMA	Protecting the Threatened Flora of the Genoa River project and implementing the PV NCS.
 **Biosecurity**	Continue control of introduced browsers including feral pig and deer control using the now well-developed aerial control programs implemented following the 2019–20 fires in east Gippsland. Ensure hygiene measures are implemented including vehicle cleanliness are maintained to prevent incursions of plant pathogens.		PV, DEECA, FEVL	Protecting the Threatened Flora of the Genoa River project and PV NCS; implementing biosecurity measures as per national and state policy.

Plants

Asset: Genoa River Correa (*Correa lawrenceana var. genoensis*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Continue biannual surveys of the known populations to better understand the population and its dynamics with the limited spatial distribution. Continue to expand the species supplementation project through propagation and revegetation programs at suitable sites.	Genoa river catchment population	PV, DEECA, EGCMA, LaTrobe University, FEVL, CSIRO, Snowy River Community Gardens, RBGV	Protecting the Threatened Flora of the Genoa River project and the Gippsland Bushfire Management Strategy 2020 and Regional fire management plans.
 **Drought**	Continue biannual surveys of the known populations to better understand the population and its dynamics with the limited spatial distribution. Continue to expand the species supplementation project through propagation and revegetation programs at suitable sites.	Genoa river catchment population	PV, DEECA, EGCMA, LaTrobe University, FEVL, CSIRO, Snowy River Community Gardens, RBVG	Protecting the Threatened Flora of the Genoa River project.
 **Flood**	Continue biannual surveys of the known populations to better understand the population and its dynamics with the limited spatial distribution. Continue to expand the species supplementation project through propagation and revegetation programs at suitable sites.	Genoa river catchment population	PV, DEECA, EGCMA, LaTrobe University, FEVL, CSIRO, Snowy River Community Gardens, RBGV	Protecting the Threatened Flora of the Genoa River project .

Plants

Asset: Leafy Nematolepis (*Nematolepis frondosa*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities. Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing. Maintain seed storage. Ensure the material represents adequate genetic diversity from across its range; that seed is processed for long term storage; that adequate numbers are available for future reintroduction; and that essential information (such as dormancy) is known.	Sites on Mt Elizabeth NCR specifically helipad management activities on the Mt Elizabeth summit	PV, DEECA	Gippsland Bushfire Management Strategy 2020 and regional fire management plans. Seed has been collected and stored in the Victorian Conservation Seedbank at the Royal Botanic Gardens Victoria since 2008.
 **Drought**	Increase habitat resilience to disaster through conducting weed and pest control at habitat sites. Maintain seed storage. Ensure the material represents adequate genetic diversity from across its range; that seed is processed for long term storage; that adequate numbers are available for future reintroduction; and that essential information (such as dormancy) is known.	Sites on Mt Elizabeth NCR	PV, DEECA	Seed has been collected and stored in the Victorian Conservation Seedbank at the Royal Botanic Gardens Victoria since 2008.
 **Biosecurity (*Phytophthora cinnamomi*)**	Ensure hygiene measures are implemented including vehicle cleanliness are maintained to prevent incursions of plant pathogens. Maintain seed storage. Ensure the material represents adequate genetic diversity from across its range; that seed is processed for long term storage; that adequate numbers are available for future reintroduction; and that essential information (such as dormancy) is known.	Sites on Mt Elizabeth NCR	PV, DEECA	Seed has been collected and stored in the Victorian Conservation Seedbank at the Royal Botanic Gardens Victoria since 2008.

Plants

Asset: Limestone Blue Wattle (*Acacia caerulescens*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities. Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing. Work with private landholders to protect existing remnants and increase numbers through revegetation.	Known locations	DEECA, PV, GLaWAC, TfN, National Arboretum	Gippsland Bushfire Management Strategy 2020 and regional fire management plans and through the Conserving Threatened Plants and Communities of the Foothills and Mountains project. The species was planted in the National Arboretum (Forest 13) in Canberra in 2008 (TSSC 2016).

Plants

Asset: Marble Daisy-Bush (*Olearia astroloba*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities. Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing. Continue targeted pest plant and animal in particular deer control through exclusion fencing and shooting. Research genetic management & climate change adaptation / assessment of potential nearby sites.	Marble gully site	PV, DEECA, LaTrobe University	Conserving Threatened Plants and Communities of the Foothills and Mountains project and through the Gippsland Bushfire Management Strategy 2020 and regional fire management plans.
 **Drought**	Continue targeted pest plant and animal in particular deer control through exclusion fencing and shooting. Research genetic management & climate change adaptation / assessment of potential nearby sites.	Marble Gully site	PV, DEECA, LaTrobe University	Conserving Threatened Plants and Communities of the Foothills and Mountains project.

Plants

Asset: Matted Flax Lily (*Dianella amoena*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Drought**	Ensure that species distribution data and ecological information is available and considered in fire management activities. Stock exclusion fencing erected to prevent stock damage to remnant native vegetation.	Redgum Plains populations	DEECA, GA, TfN, EGLN	Implementing the Gippsland Bushfire Management Strategy 2020 and regional fire management plans and through the NHT Redgum Woodlands project.
 **Bushfire**	Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing.	Redgum Plains populations	DEECA	Implementing the Gippsland Bushfire Management Strategy 2020 and regional fire management plans and through the NHT Redgum Woodlands project.

Plants

Asset: Threatened Orchidaceae Species

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities. Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing. Maintain ex situ specimens where present (some species). Undertake planned ecological burning. Undertake monitoring for the Maroon leek orchid. Fencing of some sites to protect from recreational visitors. Targeted pest plant and animal control. Education of roadside machinery operators.	Known locations	Parks Victoria, DEECA, GLaWAC, TfN, GA, Latrobe Uni, Federation Uni	Implementing the Gippsland Bushfire Management Strategy 2020 and regional fire management plans and through the Conserving Threatened Plants and Communities of the Foothills and Mountains and Enhancing the Ecological Character of the Gippsland Lakes Projects.
 **Drought**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities. Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing. Undertake planned ecological burning. Undertake monitoring for the Maroon leek orchid. Fencing of some sites to protect from recreational visitors. Targeted pest plant and animal control. Education of roadside machinery operators.	Known locations	Parks Victoria, DEECA, GLaWAC, TfN, GA, Latrobe Uni, Federation Uni	Conserving Threatened Plants and Communities of the Foothills and Mountains and Enhancing the Ecological Character of the Gippsland Lakes Projects.

Plants

Asset: Snowy Colobanth (*Colobanthus curtisiae*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Continue to identify and protect high value peatlands with clear fire management priorities communicated to management and emergency staff. Coordinate with partner agencies to develop and implement appropriate fire regimes using planned burning plans and programs to protect the Threatened Ecological Community.	All locations	EGCMA, DEECA, PV, Alpine Resorts	Implementation of the NHT Alpine Peatlands Protection project, Regional Fire Management Plans and implementation of the VASPAP.
 **Drought**	Maintain hydrology and linkages across peatland clusters e.g. reduce vehicle access and barriers to water flow. Using the biosecurity approach, continue to monitor and control pest plants and animals impacting the area.	All locations	EGCMA, DEECA, PV, Alpine Resorts	Implementation of the NHT Alpine Peatlands Protection project.

Plants

Asset: Swamp Everlasting (*Xerochrysum palustre*)

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Ensure that species distribution data and ecological information is available and considered in fire management activities. Undertake biodiversity values check prior to fuel management in areas of the species' habitat, to confirm treatment suitability and timing. Development and implementation of better ecological burning practices. Reintroduction of this species through revegetation. Revegetation works will also help improve connectivity and buffering of remnants to improve resilience and ecosystem processes.	Gippsland Lakes and Red Gum Plains populations	PV, DEECA, TfN, GLaWAC, GA, EGCMN, Landcare Landholders	Implementation of the Gippsland Bushfire Management Strategy 2020 and regional fire management plans and through Enhancing the Biodiversity of the Red Gum Plains and NHT Enhancing the Ecological Character of the Gippsland Lakes projects.
 **Drought**	Changing land management practises including controlling stock access, reinstatement of wetland hydrology, and development of management plans and land management agreements. Targeted pest plant and animal control (including rabbits and deer). Reintroduction of this species through revegetation. Revegetation works will also help improve connectivity and buffering of remnants to improve resilience and ecosystem processes. Avoid activities that will further exacerbate changes to the hydrology of wetlands particularly drainage, clearing of wetlands or mining and/or forestry operations too close by.	Gippsland Lakes and Red Gum Plains populations	PV, DEECA, TfN, GLaWAC, GA, EGCMN, Landcare Landholders, EGSC, SRW, EGW	Implementing the Gippsland Lakes program, Including the NHT Enhancing the Biodiversity of the Red Gum Plains and Enhancing the Ecological Character of the Gippsland Lakes projects.

Threatened Ecological Communities

Asset: Alpine Sphagnum Bogs and Associated Fens

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Continue to identify and protect high value peatlands with clear fire management priorities communicated to management and emergency staff. Coordinate with partner agencies to develop and implement appropriate fire regimes using planned burning plans and programs to protect the Threatened Ecological Community.	All locations	DEECA, PV, Alpine Resorts	Implementation of the NHT Alpine Peatlands Cross Regional Protection project and Regional Fire Management Plans.
 **Drought**	Maintain hydrology and linkages across peatland clusters e.g. reduce vehicle access and barriers to water flow. Using the biosecurity approach, continue to monitor and control pest plants and animals impacting the Threatened Ecological Community.	All locations		Implementation of the NHT Alpine Peatlands Cross Regional Protection project.
 **Biosecurity**	Ensure hygiene measures are implemented to reduce risk of incursions. Identify the risk and susceptibility of the Threatened Ecological Community to pathogens, and continue to monitor the Threatened Ecological Community for pathogens and the movement and locality of pathogens.	Peatlands close to roads, tracks and easily accessible areas	PV, Alpine resorts	

Threatened Ecological Communities

Asset: Gippsland Red Gum Grassy Woodland and Associated Native Grassland

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Development and implementation of better ecological burning practices to reduce biomass to encourage regeneration of target species, or exclusion of fire to favour other species.	High value remnants predominantly on private land	EGCMA, PV, DEECA, TfN, GLaWAC, EGCMN, Landcare Landholders	NHT Gippsland Redgum Woodlands Ecological Restoration Project.
 **Drought**	Changing land management practices including controlling stock access, reinstatement of wetland hydrology to improve overall resilience and ecosystem processes to better withstand the impacts of drought.			
 **Biosecurity**	Improving condition by targeting transforming weeds and control of pest animals. A range of improved management practices, targeted revegetation and buffering of remnants to improve resilience and ecosystems to better withstand the impact of rural tree dieback. Ensure hygiene measures are implemented including vehicle cleanliness are maintained to prevent incursions of plant pathogens.			

Threatened Ecological Communities

Asset: Littoral Rainforest and Coastal Vine Thickets of Eastern Australia

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Development of a cross tenure implementation plan to inform on ground activities across priority sites, with a renewed focus on the those impacted by and recovering from the impacts of fire. Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Removing priority weeds, focussing on those with the potential to transform rainforest habitats as well as managing buffers around rainforest stands adjoining private land to prevent weed invasion. Protecting and improving littoral rainforest habitats particularly those that have been impacted by fire. This would include focussed restoration activities including weed control, soil erosion management and revegetation to enhance the recovery potential of key impacted stands.	The plan will address sites on public and private land from Howe Flat east of Mallacoota to the Gippsland Lakes	DEECA, PV, EGCMA, TfN EGCMN	Recovering Littoral Rainforest Communities project and implementing SNS South East Coastal Ranges project.
 **Storm Surge**  **Coastal Erosion**	Development of a cross tenure implementation plan to inform on ground activities across priority sites, with a renewed focus on the those impacted by and recovering from the impacts of fire. Removing priority weeds, focussing on those with the potential to transform rainforest habitats as well as managing buffers around rainforest stands adjoining private land to prevent weed invasion. Protecting and improving littoral rainforest habitats particularly those that have been impacted by fire. This would include focussed restoration activities including weed control, soil erosion management and revegetation to enhance the recovery potential of key impacted stands.	The plan will address sites on public and private land from Howe Flat east of Mallacoota to the Gippsland Lakes	DEECA, PV, EGCMA, TfN EGCMN	Recovering Littoral Rainforest Communities and SNS South East Coastal Ranges projects.
 **Biosecurity**	Ensure hygiene measures are implemented including vehicle cleanliness are maintained to prevent incursions of plant pathogens. Focussed restoration activities including weed control and revegetation to enhance the recovery potential of key impacted stands.		DEECA, PV, EGCMA, TfN EGCMN	Recovering Littoral Rainforest Communities and SNS South East Coastal Ranges project.

Threatened Ecological Communities

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

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Develop an action plan and prioritisation tool for the Ecological Community to inform priority works, enhancement of existing remnants through weed and pest animal control (including stock control) and revegetation, and identification of opportunities for permanent protection through conservation covenants on title.	Private and public land	EGCMA, PV, DEECA, TfN	Conserving Threatened Plants and Communities of the Foothills and Mountains project.
 **Drought**	Develop an action plan and prioritisation tool for the Ecological Community to inform priority works, enhancement of existing remnants through weed and pest animal control (including stock control) and revegetation, and identification of opportunities for permanent protection through conservation covenants on title.	Private and public land	EGCMA, PV, DEECA, TfN	Conserving Threatened Plants and Communities of the Foothills and Mountains project.

Threatened Ecological Communities

Asset: Silurian Limestone Pomaderris Shrubland of the South East Corner and Australian Alps Bioregions

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Ensure fire regimes protect and support rather than degrade habitat and provide a protective buffer from future fire events. Continue targeted pest plant and animal in particular deer control through exclusion fencing and shooting. Research genetic management & climate change adaptation / assessment of potential nearby sites.	Marble gully sites	PV, DEECA, LaTrobe Uni	Conserving Threatened Plants and Communities of the Foothills and Mountains project.

Threatened Ecological Communities — Asset: Natural Temperate Grasslands of the South Eastern Highlands

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Undertake planned burning for ecological and cultural outcomes. Regular monitoring and assessment. Maintain exclusion fencing. Control feral animals (pigs and horses) and high threat weeds.	Bendoc and Greenhills Nature Conservation reserves	PV	Conserving Threatened Plants and Communities of the Foothills and Mountains project.

Threatened Ecological Communities — Asset: Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Drought**	Targeted weed and pest animal control to build resilience. Seek to protect known locations form further damage and build resilience through stock exclusion and where appropriate reinstating drainage. Targeted restoration and revegetation Undertake more comprehensive mapping and surveys to identify and confirm locations of this community.	Known locations Across suitable habitat	TfN, PV, DEECA, GA, EGCMN, Landcare Landholders	NHT Enhancing the Biodiversity of the Red Gum Plains project.

Threatened Ecological Communities — Asset: Subtropical and Temperate Coastal Saltmarsh

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	*Enhancing wetland habitats* freshwater and variably saline wetlands, and saltmarsh communities through control of pest plants and animals, the exclusion of grazing stock, and the protection of wetlands on private land.	Gippsland Lakes	EGCMA, DEECA, PV, GLaWAC, EGSC, TfN, GA, GP, Landcare	Implementing the Gippsland Lakes program, including the NHT Enhancing the Ecological Character of the Gippsland Lakes project.
 **Storm Surge**  **Coastal Erosion**	*Enhancing wetland habitats* freshwater and variably saline wetlands, and saltmarsh communities through control of pest plants and animals, the exclusion of grazing stock, and the protection of wetlands on private land.	Gippsland Lakes	EGCMA, DEECA, PV GLaWAC, EGSC, TfN, GA, GP, Landcare	
 **Biosecurity**  **Blue-green Algae Bloom**	*Reduce the inputs of nutrients and sediment to the lakes* (guided by prioritisation tools) to improve water quality of coastal lagoons.	Gippsland Lakes	EGCMA, DEECA, PV GLaWAC, EGSC, TfN, GA, GP, Landcare	

Ramsar Sites

Asset: Gippsland Lakes Ramsar Site

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	*Enhancing wetland habitats* freshwater and variably saline wetlands, and saltmarsh communities through control of pest plants and animals, the exclusion of grazing stock, and the protection of wetlands on private land.	Gippsland Lakes	EGCMA, DEECA, PV, GLaWAC, EGSC, TfN, GA, GP, Landcare	Implementing the Gippsland Lakes program, including the NHT Enhancing the Ecological Character of the Gippsland Lakes project.
 **Storm Surge**  **Coastal Erosion**	*Enhancing wetland habitats* freshwater and variably saline wetlands, and saltmarsh communities through control of pest plants and animals, the exclusion of grazing stock, and the protection of wetlands on private land.	Gippsland Lakes	EGCMA, DEECA, PV GLaWAC, EGSC, TfN, GA, GP, Landcare	
 **Biosecurity**  **Blue-green Algae Bloom**	*Reduce the inputs of nutrients and sediment to the lakes* (guided by prioritisation tools) to improve water quality of coastal lagoons.	Gippsland Lakes	EGCMA, DEECA, PV GLaWAC, EGSC, TfN, GA, GP, Landcare	

6.2 Preparedness actions for protecting Agricultural natural capital assets

Soil

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Appropriate fire management planning and implementation across the public land estate. Where applicable cross tenure fire management planning and implementation. Develop and implement property fire plans.	Across region	DEECA, PV, CFA, GLaWAC Landholders	CFA Plan and Prepare.
 **Drought**	Support land managers to prepare for future challenges and opportunities: • climate change adaptation • prepare for natural disasters Support land managers to adopt best management practices: • maintain or improve soil carbon • address soil acidity • improve soil fertility • protect and improve the condition of native vegetation and biodiversity Implement relevant aspects of the Gippsland Drought Resilience Plan.	Across agricultural regions of the catchment	EGCMA, EGLN, FEVL, High Country Landcare Network, SRILC, Ag Vic, GAgG, SFS, Private LandholdersSAF	Implementing priorities in the GRDP, including Improving land management practices in agriculture (Topsoils) project.
 **Flood**	Support land managers to adopt best management practices: • maintain or improve soil carbon • address soil acidity • improve soil fertility • protect and improve the condition of native vegetation and biodiversity Support land managers to prepare for future challenges and opportunities: • climate change adaptation • prepare for natural disasters	Across agricultural regions of the catchment	EGCMA, EGLN FEVL, High Country Landcare Network, SRILC, Ag Vic, GAgG, SFS, LandholdersSAF	Improving land management practices in agriculture project (Topsoils). Supporting land managers to prepare for change project.
 **Windstorms**	Support land managers to adopt best management practices: • maintain or improve soil carbon • address soil acidity • improve soil fertility • protect and improve the condition of native vegetation and biodiversity	Across agricultural regions of the catchment	EGCMA, EGLN, FEVL, High Country Landcare Network, SRILC, Ag Vic, GAgG, SFS, Private LandholdersSAF	Supporting land managers to prepare for change project.

Riparian areas, native vegetation, and environmental plantings on farms

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Appropriate fire management planning and implementation across the public land estate. Where applicable cross tenure fire management planning and implementation. Develop and implement property fire plans. On property fire breaks.	Across region	DEECA, PV, CFA, GLaWAC, Private landholders	Gippsland Bushfire Management Strategy 2020 and regional fire management plans and CFA Plan and prepare.
	Continue to implement a strategic and integrated program to control willows and other invasive tree weeds along waterways, focussing on high value stream and areas recovering from fire impact.		EGCMA	EGCMA Waterway Health Program.
 **Drought**	Support land managers to adopt best management practices: • maintain or improve soil carbon • address soil acidity • improve soil fertility • protect and improve the condition of native vegetation and biodiversity Implement relevant aspects of the Gippsland Drought Resilience Plan.	Targeted areas	EGCMA, EGLN, FEVL, High Country Landcare Network, SRILC, Ag Vic, GAgG, SFS, Private LandholdersSAF	Implementing priorities in the GDRP and supporting land managers to prepare for change project.
 **Flood**	Continue to implement a strategic and integrated program to control willows and other invasive tree weeds along waterways, focussing on high value stream and areas recovering from fire impact. Support land managers to adopt best management practices: • maintain or improve soil carbon • address soil acidity • improve soil fertility • protect and improve the condition of native vegetation and biodiversity	Targeted areas	EGCMA, EGLN, FEVL, High Country Landcare Network, SRILC, Ag Vic, GAgG, SFS, Private LandholdersSAF	SES Local flood guides; EGCMA Waterway Health program and supporting land managers to prepare for change project.

Water

Emergency Scenario	Actions	Where	Who	Is action currently underway?
 **Bushfire**	Appropriate fire management planning and implementation across the public land estate. Where applicable cross tenure fire management planning and implementation. Develop and implement property fire plans. On property fire breaks.	Across region	DEECA, PV, CFA, GLaWAC, Private landholders, EGSC	EGCMA Waterway Health program; and through the Supporting land managers to prepare for change project.
 **Drought**	Support land managers to adopt best management practices • maintain or improve soil carbon • address soil acidity • improve soil fertility • protect and improve the condition of native vegetation and biodiversity	Across region	DEECA, Ag Vic	Implementing priorities in the GDRP.
 **Blue-green Algae Bloom**	Support land managers to adopt best management practices • maintain or improve soil carbon • address soil acidity • improve soil fertility • protect and improve the condition of native vegetation and biodiversity	Focus on agricultural areas with high input use and adjacent to waterways, in particular intensive agriculture	DEECA, Ag Vic	BGA response plan and stock dam health programs.

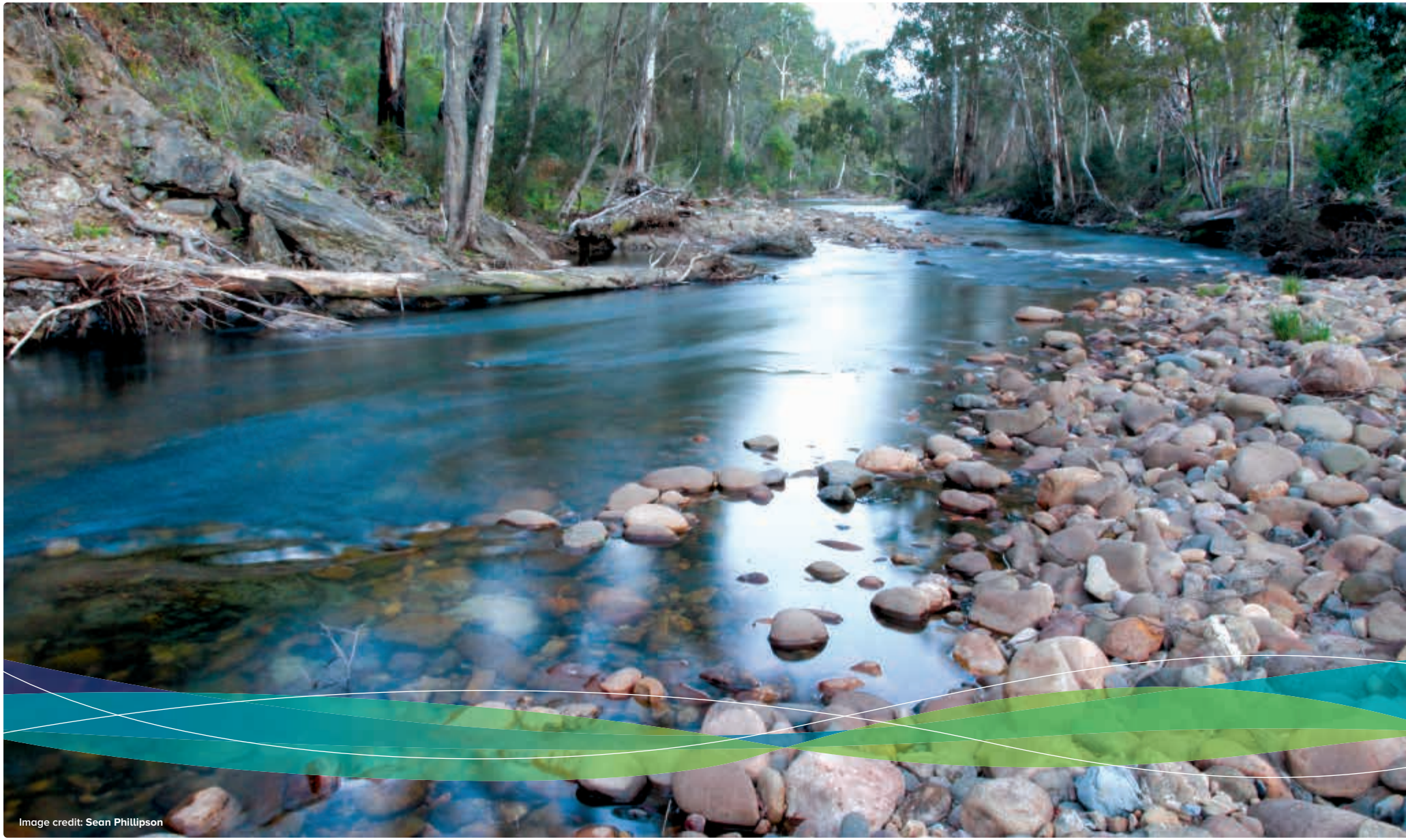


Image credit: **Sean Phillipson**

7 Asset Response

Image credit: **Sean Phillipson**

7.1 Response actions for protecting Biodiversity assets

Birds | **Asset:** Australasian Bittern (*Botaurus poiciloptilus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	All locations	DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Maintain hydrology and linkages across population areas e.g. reduce vehicle access and barriers to water flow.	All locations	DEECA, PV, GLaWAC, EGCMA
 **Biosecurity**	Ensure critical habitat is not impacted through vehicle movement, or pathogen inadvertently spread during control measures. If disease outbreak ensure guidelines from WHA are followed, including seeking guidance for handling of sick or dead birds.	All locations	DEECA, PV, GLaWAC, EGCMA, BA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing pest control especially feral animals such as pigs, deer and horses. Seek to restore impacted wetlands.	Where required	DEECA, PV, GLaWAC, EGCMA
 **Drought**	Ongoing monitoring of impact. Implement targeted pest plant and animal control measures.	Where required	DEECA, PV, GLaWAC, EGCMA
 **Biosecurity**	Ongoing monitoring / surveillance of impacted population. Ensure continued implementation of hygiene guidelines.	Where required	DEECA, Ag Vic, PV, GLaWAC, EGCMA, BA

Birds

Asset: Australian Fairy Tern (*Sternula nereis nereis*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Storm Surge**	No action applicable	All locations	DEECA, PV
 **Coastal Erosion**	No action applicable	All locations	DEECA, PV, EGCMA
 **Biosecurity**	Implement monitoring program to assess impact on species. Implement targeted pest plant and animal control measures.	All locations	DEECA, PV, GLaWAC
 **Biosecurity (HPAI H5N1)**	If disease outbreak ensure guidelines from WHA are followed, including seeking guidance for handling of sick or dead birds.	All locations	DEECA, PV, Ag Vic, BA

AFTER EVENT HAS Ooccurred

Emergency Scenario	Actions	Where	Who
 **Storm Surge**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	All locations	DEECA, PV
 **Coastal Erosion**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	All locations	PV, DEECA, EGCMA, GLaWAC
 **Biosecurity**	Implement targeted pest plant and animal control measures.	All locations	PV, DEECA, GLaWAC, EGCMA
 **Biosecurity (HPAI H5N1)**	Ongoing monitoring / surveillance of impacted population. Ensure continued implementation of hygiene guidelines.	All locations	PV, DEECA, Ag Vic, BA

Birds

Asset: Eastern bristlebird (*Dasyornis brachypterus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants. Consider rescue and relocation options.	Known locations	DEECA, PV, CFA
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat. Consider rescue and relocation options.	Known locations	DEECA, PV
 **Biosecurity**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Known locations	DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population. Implement targeted pest plant and animal control measures.	Where required	DEECA, PV
 **Drought**	Ongoing monitoring / surveillance of impacted population.		
 **Biosecurity**	Ongoing monitoring / surveillance of impacted population.		

Birds

Asset: Eastern Curlew (*Numenius madagascariensis*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Storm Surge**  **Coastal Erosion**	No action applicable.	Impacted sites	N/A
 **Drought**	Implement monitoring program to assess impact on species. Implement targeted pest plant and animal control measures.		DEECA, PV, BA
 **Biosecurity (HPAI H5N1)**	If disease outbreak ensure guidelines from WHA are followed, including seeking guidance for handling of sick or dead birds.		DEECA, PV, Ag Vic, BA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Storm Surge**  **Coastal Erosion**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Impacted locations	DEECA, PV, BA, GLaWAC
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.		DEECA, PV, BA, GLaWAC
 **Biosecurity (HPAI H5N1)**	Ongoing monitoring / surveillance of impacted population. Ensure continued implementation of hygiene guidelines.		PV, DEECA, AgVic, BA

Birds

Asset: Eastern Hooded Plover (*Thinornis cucullatus cucullatus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Storm Surge**  **Coastal Erosion**	Due to safety reasons there are no actions that occur whilst event is occurring.		
 **Biosecurity (HPAI H5N1)**	If disease outbreak ensure guidelines from WHA are followed, including seeking guidance for handling of sick or dead birds.		DEECA, PV, AgVic, BA

AFTER EVENT HAS occurred

Emergency Scenario	Actions	Where	Who
 **Storm Surge**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Where required	DEECA, PV, EGCMA, GLaWAC, GP
 **Biosecurity**	Ongoing monitoring / surveillance of impacted population. Ensure continued implementation of hygiene guidelines.	Where required	DEECA, Ag Vic, PV, GLaWAC, EGCMA, BA

Mammals

Asset: Broad-toothed Rat (*Mastacomys fuscus mordicus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, Alpine Resorts
 **Drought**	Maintain hydrology and linkages across peatland clusters e.g. reduce vehicle access and barriers to water flow. Targeted pest plant and animal control to protect population and habitat.	All locations	PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Impacted locations	IMT, DEECA, PV, Alpine Resorts
 **Drought**	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required.	Impacted locations	DEECA, PV, Alpine Resorts, GLaWAC

Mammals

Asset: Brush-tailed rock-wallaby (*Petrogale penicillate*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Little River Gorge	PV, DEECA, CFA
 **Drought**	Ongoing monitoring / surveillance of impacted population. Targeted pest plant and animal control to protect population and habitat.	Little River Gorge	PV, DEECA
 **Biosecurity**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Little River Gorge	PV, DEECA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.	Little River Gorge	PV, DEECA
 **Drought**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.	Little River Gorge	PV, DEECA
 **Biosecurity**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population. Implement targeted pest plant and animal control measures. Ensure continued implementation of hygiene guidelines.	Little River Gorge	PV, DEECA

Mammals

Asset: Grey-headed Flying-fox (*Pteropus poliocephalus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Impacted locations	IMT, DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species.		DEECA, PV, EGSC
 **Biosecurity**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.		DEECA, PV, EGSC

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required.	Impacted locations	IMT, DEECA, PV DEECA, PV, ARI, EGSC
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.		DEECA, PV, ARI, EGSC
 **Biosecurity**	Ensure continued implementation of hygiene guidelines. Post-disaster habitat condition, population monitoring to determine whether further interventions required.		DEECA, PV, EGSC

Mammals

Asset: Southern Brown Bandicoot (*Isoodon obesulus obesulus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted areas with known population	DEECA, PV
 **Biosecurity (Toxoplasmosis)**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Impacted areas	DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Impacted areas	IMT, DEECA, PV
 **Drought**	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required. Targeted pest plant and animal control to protect population and habitat.	Impacted areas	DEECA, PV, GLaWAC
 **Biosecurity (Toxoplasmosis)**	Post-disease habitat condition, population monitoring to determine whether further interventions required. Ensure continued implementation of hygiene guidelines.	Impacted areas	DEECA, PV

Mammals

Asset: Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA, GLaWAC

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Impacted areas	IMT, DEECA, PV

Mammals

Asset: Long-footed Potoroo (*Potorous longipes*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted areas with known population	DEECA, PV
 **Biosecurity (Toxoplasmosis)**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Impacted areas	DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Impacted areas	IMT, DEECA, PV
 **Drought**	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required. Targeted pest plant and animal control to protect population and habitat.	Impacted areas	DEECA, PV, GLaWAC
 **Biosecurity (Toxoplasmosis)**	Post-disease habitat condition, population monitoring to determine whether further interventions required. Ensure continued implementation of hygiene guidelines.	Impacted areas	DEECA, PV

Mammals

Asset: Southern Long-nosed Potoroo (*Potorous tridactylus trisulcatus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted areas with known population	DEECA, PV
 **Biosecurity (Toxoplasmosis)**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Impacted areas	DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Impacted areas	IMT, DEECA, PV
 **Drought**	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required. Targeted pest plant and animal control to protect population and habitat.	Impacted areas	DEECA, PV, GLaWAC
 **Biosecurity (Toxoplasmosis or Phytophthora cinnamomi)**	Post-disease habitat condition, population monitoring to determine whether further interventions required. Ensure continued implementation of hygiene guidelines.	Impacted areas	DEECA, PV

Fish

Asset: Eastern Dwarf Galaxias (*Galaxiella pusilla*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values Officer and relevant technical specialist to Incident Management Team.	Threatened populations	ICT, DEECA, PV
 **Drought**	Implement monitoring program to assess impact on species.		DEECA, ARI
 **Flood**	Implement monitoring program to assess impact on species.		DEECA, ARI

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Emergency control organisation to deploy RRATs (Rapid Risk Assessment Teams) to assess risk and prioritise potential risk mitigation activities. Emergency extractions, translocation, captive breeding programs and returning fish once conditions have improved. Immediate priority activities include targeted pest animal control particularly feral pigs and deer that damage waterways and other habit.	Threatened populations	ICT, DEECA, PV, ARI
 **Drought**	Ongoing monitoring / surveillance of impacted population. Emergency extractions, translocation, captive breeding programs and returning fish once conditions have improved. Targeted pest animal control particularly feral pigs and deer that damage waterways and other habit.		ICT, DEECA, PV, ARI
 **Flood**	Ongoing monitoring / surveillance of impacted population. Consider impact of changes to riparian vegetation, substrate and hydrology, implement emergency extractions, translocation, captive breeding programs and returning fish once conditions have improved.		ICT, DEECA, PV, ARI, EGCMA

Fish

Asset: Threatened Mountain Galaxia Species:

Dargo Galaxias *Galaxias mungadhan*
East Gippsland Galaxias *Galaxias aequipinnis*
Yalmy Galaxias *Galaxias sp. nov. 'Yalmy'*
McDowell's Galaxias *Galaxias mcdowalli*

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values Officer and relevant technical specialist to Incident Management Team.	Threatened populations	ICT, DEECA, PV
 **Drought**	Implement monitoring program to assess impact on species.		ARI, PV
 **Flood**	Implement monitoring program to assess impact on species.		EGCMA, ARI, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Emergency control organisation to deploy RRATs (Rapid Risk Assessment Teams) to assess risk and prioritise potential risk mitigation activities. Emergency extractions, translocation, captive breeding programs and returning fish once conditions have improved. Immediate priority activities include targeted pest animal control particularly feral pigs and deer that damage waterways and other habit.	Threatened populations	ICT, DEECA, PV, ARI
 **Drought**	Ongoing monitoring / surveillance of impacted population. Emergency extractions, translocation, captive breeding programs and returning fish once conditions have improved. Targeted pest animal control particularly feral pigs and deer that damage waterways and other habit.		
 **Flood**	Ongoing monitoring / surveillance of impacted population. Consider impact of changes to instream barriers and substrate and implement emergency extractions, translocation, captive breeding programs and returning fish once conditions have improved.		

Frogs

Asset: Giant Burrowing Frog (*Heleioporus australiacus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA
 **Biosecurity**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Where required	DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Targeted pest control especially feral animals such as pigs, deer and horses and invasive weed species. Post-disaster management response - habitat restoration works, including revegetation and weed control.	Fire impacted areas	IMT, DEECA, PV
 **Biosecurity**	Ensure continued implementation of hygiene guidelines.	Where required	DEECA, PV

Frogs

Asset: Green and Golden Bell Frog (*Litoria aurea*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Drought (Leading to changed hydrological regime)**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted locations	DEECA, PV, EGCMA, GA, GLaWAC
 **Biosecurity**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Where required	DEECA, PV
 **Flood**	Implement monitoring program to assess impact on species.	Impacted locations	DEECA, PV, EGCMA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Drought (Leading to changed hydrological regime)**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Impacted locations	DEECA, PV, EGCMA
 **Biosecurity**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.		DEECA, PV
 **Flood**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.		DEECA, PV, EGCMA

Frogs

Asset: Southern Heath Frog, Watson's Tree Frog (*Litoria watsoni*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted locations	DEECA, PV, ARI
 **Biosecurity**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Where required	DEECA PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Targeted pest control especially feral animals such as pigs, deer and horses and invasive weed species. Post-disaster management response - habitat restoration works, including revegetation and weed control.	Fire impacted areas	IMT, DEECA, PV
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Impacted locations	DEECA, PV, ARI
 **Biosecurity**	Ensure continued implementation of hygiene guidelines.	Where required	DEECA, PV

Reptiles

Asset: Alpine She-oak Skink (*Cyclodomorphus praealtus*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, Alpine Resorts, CFA
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Known locations	PV DEECA Alpine Resorts

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Impacted locations	IMT, DEECA, PV, Alpine Resorts
 **Drought**	Implement targeted pest plant and animal control measures. Post-disaster habitat condition, population monitoring to determine whether further interventions required.		PV, DEECA

Plants

Asset: Austral Toadflax (*Thesium austral*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Known locations – Green Hills NCR	IMT, DEECA, PV
 **Drought**	Ongoing monitoring / surveillance of impacted population.	Known locations – Green Hills NCR	PV, DEECA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Known locations – Green Hills NCR	IMT, DEECA, PV
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Known locations – Green Hills NCR	PV, DEECA

Plants

Asset: Betka Bottlebrush (*Callistemon kenmorrisonii*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Betka River populations	DEECA, PV, CFA
 **Drought**	Monitoring of population to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.		DEECA
 **Flood**	Monitoring of event including water levels and duration.		EGCMA, BOM, DEECA
 **Biosecurity**	Ensure critical habitat is not impacted, or pathogen inadvertently spread during control measures.		DEECA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.	Betka River populations	DEECA
 **Drought**	Monitoring of population to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.		DEECA
 **Flood**	Ongoing monitoring of impact. Implement restoration process if required.		EGCMA DEECA
 **Biosecurity**	Ongoing monitoring / surveillance of impacted population. Ensure continued implementation of hygiene guidelines. Targeted pest control especially feral animals such as pigs and deer and invasive weed species.		DEECA

Plants

Asset: Bog Willow Herb (*Epilobium brunnescens subsp. beaugleholei*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Drought**	Maintain hydrology and linkages across population areas e.g. reduce vehicle access and barriers to water flow. Implement monitoring program to assess impact on species.	Known location	PV
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.		IMT, DEECA, PV, Alpine resorts

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Known locations	PV
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.		DEECA, PV

Plants

Asset: Colquhoun Grevillea (*Grevillea celata*)

WHILE EVENT IS OCCURRING			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Colquhoun SF	IMT, DEECA
 **Drought**	Implement monitoring program to assess impact on species.	Colquhoun SF	DEECA

AFTER EVENT HAS OCCURRED			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Colquhoun SF	IMT, DEECA
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Colquhoun SF	DEECA

Plants

Asset: Dwarf Kerrawang (*Commersonia prostrata*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Impacted sites	IMT, DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted sites	EGCMA, DEECA, PV, TfN, GA, EGCMN, GLaWAC

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population. Targeted pest control especially feral animals such as pigs,deer and invasive weed species.	Impacted sites	IMT, DEECA, PV, TfN, GA, EGCMN
 **Drought**	Post-disaster management response - habitat restoration works, including revegetation and weed and feral animal control.	Impacted sites	EGCMA, TfN, GA, PV, DEECA, EGCMN

Plants

Asset: Forrester's Bottlebrush (*Callistemon forresterae*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Genoa River population	PV, DEECA, CFA
 **Drought**	Monitoring of population to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.		PV, DEECA
 **Flood**	Monitoring of event including water levels and duration.		EGCMA, BOM, PV
 **Biosecurity**	Ensure critical habitat is not impacted, or pathogen inadvertently spread during control measures.		PV, DEECA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.	Genoa River population	PV, DEECA
 **Drought**	Monitoring of population to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures. Continue aerial control of deer and feral pigs.		PV
 **Flood**	Ongoing monitoring of impact. Implement restoration process if required.		PV, EGCMA
 **Biosecurity**	Ongoing monitoring / surveillance of impacted population. Ensure continued implementation of hygiene guidelines. Targeted pest control especially feral animals such as pigs and deer and invasive weed species.		PV, DEECA

Plants

Asset: Genoa River Correa (*Correa lawrenceana var. genoensis*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Genoa River catchment populations	DEECA, PV, CFA
 **Drought**	Monitoring of population to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.		DEECA
 **Flood**	Monitoring of event including water levels and duration.		EGCMA, BOM, DEECA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.	Genoa River catchment populations	DEECA
 **Drought**	Monitoring of population to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.		DEECA
 **Flood**	Ongoing monitoring of impact. Implement restoration process if required.		EGCMA, DEECA

Plants

Asset: Leafy Nematolepis (*Nematolepis frondosa*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Mt Elizabeth NCR sites	IMT, DEECA, PV
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.		PV, DEECA
 **Biosecurity (Phytophthora cinnamomi)**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented. Ensure critical habitat is not impacted through vehicle movement, or pathogen inadvertently spread during control measures.		PV, DEECA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Mt Elizabeth NCR sites	IMT, DEECA, PV
 **Drought**	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required Ongoing monitoring / surveillance of impacted population.		PV, DEECA
 **Biosecurity (Phytophthora cinnamomi)**	Ensure continued implementation of hygiene measures including vehicle cleanliness are maintained to prevent incursions of plant pathogens.		PV, DEECA

Plants

Asset: Limestone Blue Wattle (*Acacia caerulescens*)

WHILE EVENT IS OCCURRING			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Impacted sites	IMT, DEECA, PV, CFA, GLaWAC

AFTER EVENT HAS OCCURRED			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Impacted sites	IMT, DEECA, PV

Plants

Asset: Marble Daisy-Bush (*Olearia astroloba*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Marble Gully sites	IMT, DEECA, PV, CFA
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Marble Gully sites	DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Marble Gully sites	IMT, DEECA, PV
 **Drought**	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required.	Marble Gully sites	PV, DEECA

Plants

Asset: Matted Flax Lily (*Dianella amoena*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities.	Impacted locations	DEECA, PV, TfN, GA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat. Install fencing to prevent predation by stock and native herbivorous species.	Impacted locations	DEECA, PV, TfN, GA, GLaWAC

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted locations	DEECA, PV, TfN, GA, GLaWAC
 **Drought**	Targeted pest plant and animal control to protect population and habitat.	Impacted locations	DEECA, PV, TfN, GA, GLaWAC

Plants

Asset: Threatened Orchidaceae Species

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Impacted sites	IMT, DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat.	Impacted sites	DEECA, PV, TfN, GA, GLaWAC

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Impacted sites	IMT, DEECA, PV
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Impacted sites	DEECA, PV

Plants

Asset: Snowy Colobanth (*Colobanthus curtisiae*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Drought**	Maintain hydrology and linkages across population areas e.g. reduce vehicle access and barriers to water flow. Implement monitoring program to assess impact on species.	Known locations	PV
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Known locations	IMT, DEECA, PV, Alpine resorts

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Drought**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.	Known locations	PV
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Known locations	DEECA, PV

Plants

Asset: Swamp Everlasting (*Xerochrysum palustre*)

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants. Ensure additional protective measures are taken around known wetlands with peat substrates.	Impacted sites	IMT, DEECA PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species. Targeted pest plant and animal control to protect population and habitat. Avoid activities that will further exacerbate changes to the hydrology of wetlands.	Impacted sites	DEECA, PV, SRW, EGW, GP

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.	Impacted sites	IMT, DEECA, PV
 **Drought**	Post-disaster management response - habitat restoration works, including revegetation and weed control.	Impacted sites	PV, DEECA, TfN, GA, EGCMA, Landcare, Private landholders

Threatened Ecological Communities

Asset: Alpine Sphagnum Bogs and Associated Fens

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT).	Fire impacted areas	PV, DEECA, Alpine Resorts
 **Drought**	Maintain hydrology and linkages across peatland clusters e.g. reduce vehicle access and barriers to water flow.	All locations	PV
 **Biosecurity**	Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.	Peatlands close to tracks, roads, accessible areas and where emergency vehicles and personnel are opertating.	PV, Alpine Resorts

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Targeted pest control especially feral animals such as pigs, deer and horses.	All locations	PV, DEECA, Alpine Resorts
 **Drought**	Targeted pest control especially feral animals such as pigs, deer and horses.	All locations	PV
 **Biosecurity**	Continue to monitor the Threatened Ecological Community for presence and movement of pathogens.	Peatlands close to tracks, roads, accessible areas	PV, Alpine Resorts

Threatened Ecological Communities

Asset: Gippsland Red Gum Grassy Woodland and Associated Native Grassland

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Priority high value remnants on public and private land	DEECA, PV, CFA, GLaWAC, Local landholders
 **Drought**	Targeted pest plant and animal control to protect population and habitat. Reduction or removal of grazing pressure.		DEECA, PV, Local landholders
 **Biosecurity**	Ensure critical habitat is not impacted through vehicle movement, or pathogen inadvertently spread during control measures.		DEECA, PV, TfN, GLaWAC, GA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted population.		DEECA, PV, TfN, GLaWAC, GA
 **Drought**	Monitoring of population to assess risk and prioritise risk mitigation activities. Implement targeted pest plant and animal control measures.		DEECA, PV, TfN, GLaWAC, GA
 **Biosecurity**	Ensure continued implementation of hygiene guidelines.		DEECA, PV, TfN, GLaWAC, GA

Threatened Ecological Communities

Asset: Littoral Rainforest and Coastal Vine Thickets of Eastern Australia

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Impacted location(s)	IMT, DEECA, PV
 **Storm Surge**  **Coastal Erosion**  **Windstorms**	Due to safety reasons there are no actions that occur whilst event is occurring.		N/A
 **Biosecurity**	Ensure critical habitat is not impacted through vehicle movement, or pathogen inadvertently spread during control measures. Ensure hygiene measures are implemented during response phase to ensure further incursions are prevented.		DEECA, AgVic, PV, TfN, EGCMN

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Targeted pest control especially feral animals such as pigs, deer and horses and invasive weed species. Post-disaster management response - habitat restoration works, including revegetation and weed control.	Impacted location(s)	IMT, DEECA, PV, TfN, EGCMN
 **Storm Surge**  **Coastal Erosion**  **Windstorms**	Post-disaster habitat condition, population monitoring to determine whether further interventions required.		DEECA, PV, TfN, EGCMN
 **Biosecurity**	Ensure continued implementation of hygiene measures including vehicle cleanliness are maintained to prevent incursions of plant pathogens. Habitat condition, population monitoring to determine impacts and gauge whether further actions are required.		DEECA, PV, TfN, EGCMN

Threatened Ecological Communities

Asset: Natural Temperate Grasslands of the South Eastern Highlands

WHILE EVENT IS OCCURRING			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA, GLaWAC

AFTER EVENT HAS OCCURRED			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Fire impacted areas	IMT, DEECA, PV

Threatened Ecological Communities

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

WHILE EVENT IS OCCURRING			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA, GLaWAC
 **Drought**	Implement monitoring program to assess impact on species.	Impacted area	TfN, DEECA

AFTER EVENT HAS OCCURRED			
Emergency Scenario	**Actions**	**Where**	**Who**
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Fire impacted areas	IMT, DEECA, PV
 **Drought**	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required.	Impacted area	TfN, DEECA

Threatened Ecological Communities

Asset: Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 Drought	Implement monitoring program to assess impact on species.	Impacted area	TfN, DEECA, PV, GA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 Drought	Ongoing habitat condition, population monitoring to determine impacts and gauge whether further actions are required.	Impacted area	TfN, DEECA, PV, GA

Threatened Ecological Communities

Asset: Silurian Limestone Pomaderris Shrubland of the South East Corner and Australian Alps Bioregions

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 Bushfire	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure that species distribution data and ecological information is available and considered in fire management activities. Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Fire impacted areas	IMT, DEECA, PV, CFA, GLaWAC

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 Bushfire	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities.	Fire impacted areas	IMT, DEECA, PV

Threatened Ecological Communities

Asset: Subtropical and Temperate Coastal Saltmarsh

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Impacted areas	IMT, DEECA, PV, GLaWAC, CFA
 **Storm Surge**  **Coastal Erosion**			
 **Blue-green Algae Bloom**	Ensure critical habitat is not impacted through vehicle movement, or pathogen inadvertently spread during control measures.		DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted Threatened Ecological Community. Implement targeted pest plant and animal control measures.	Impacted areas	IMT, DEECA, PV
 **Storm Surge**  **Coastal Erosion**	Post-disaster management response - habitat restoration works, including revegetation and weed control.		EGCMA, DEECA, PV
 **Blue-green Algae Bloom**	Post-disaster management response - habitat restoration works, including revegetation and weed control.		DEECA, PV, EGCMA

Ramsar Sites

Asset: Gippsland Lakes Ramsar Site

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Natural Values officer and relevant technical specialist to the Incident Management Team (IMT). Ensure critical habitat is not impacted through vehicle movement, backburning or the use of chemical retardants.	Impacted areas	IMT, DEECA, PV, GLaWAC, CFA
 **Storm Surge**  **Coastal Erosion**			
 **Blue-green Algae Bloom**	Ensure critical habitat is not impacted through vehicle movement, or pathogen inadvertently spread during control measures.		DEECA, PV

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Deploy Rapid Risk Assessment Teams (RRAT) to assess risk and prioritise risk mitigation activities. Ongoing monitoring / surveillance of impacted Threatened Ecological Community. Implement targeted pest plant and animal control measures.	Impacted areas	IMT, DEECA, PV
 **Storm Surge**  **Coastal Erosion**	Post-disaster management response - habitat restoration works, including revegetation and weed control.		EGCMA, DEECA, PV
 **Blue-green Algae Bloom**	Post-disaster management response - habitat restoration works, including revegetation and weed control.		DEECA, PV, EGCMA

7.2 Response actions for protecting Agricultural natural capital assets

Soil

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Undertake fire suppression to minimise spread and impact of fire.	Impacted area	DEECA, PV, CFA, Land managers
 **Drought**	Monitor / assess impacts. Minimise activities that impact and contribute to loss of ground cover. Fence off remnants and control stock movements, retain shelter belts or where possible retain crops, pasture and direct drill.	Impacted areas	Land Managers, AgVic, EGCMA Land managers
 **Flood**	Allocate resources to respond to flood event and implement asset and community protection during the flood event. Monitor and map flood progression.	Flood areas	SES, EGCMA, Water Authorities

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Rapid assessment of impact. Plan for restoration – Re-establish ground cover as quickly as possible.	At known impact sites	Ag Vic, Private landholders
 **Drought**	Assess impact. Develop and implement a recovery plan with an emphasis on: - reestablish ground cover - control pest plants	Impacted areas	Ag Vic, Land managers
 **Flood**	Assess impact. Develop and implement a recovery plan focussing on: - erosion control - repair to damaged structures - repair or reinstate riparian fencing - reestablish ground cover - control pest plants		EGCMA, Land Managers

Riparian areas, native vegetation, and environmental plantings on farms

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Undertake fire suppression to minimise spread and impact of fire.	Impacted area	DEECA, PV, CFA, Land managers
 **Drought**	Fence off remnants to minimise activities that contribute to vegetation loss. Control stock movements into remnants or do so under crash grazing principles. If soil loss occurs design and construct erosion control approaches.	Impacted area	Land managers Land managers, Ag Vic
 **Flood**	Monitor and map flood progression.		EGCMA

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Assess impact. Plan for restoration – Re-establish plants as quickly as possible. Reinstate fencing if required.	Impacted area	Land managers
 **Drought**	Asses Impact. Develop and implement a recovery plan with an emphasis on: - reestablish ground cover - control pest plants and animals		Ag Vic Land managers
 **Flood**	Assess impact. Develop and implement a recovery plan focussing on: - erosion control - repair to damaged structures - repair or reinstate riparian fencing - reestablish ground cover - control pest plants	Impacted areas	EGCMA Land managers

Water

WHILE EVENT IS OCCURRING

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Undertake fire suppression to minimise spread and impact of fire.	Impacted areas	DEECA, PV, CFA, Land managers
 **Drought**	Monitor impact. Fence waterways. Maintain ground cover by minimising activities that impact and contribute to loss of ground cover.	Impacted areas	Land managers, Ag Vic
 **Blue-green Algae Bloom**	Monitor impact. Fence waterways. Maintain ground cover by minimising activities that impact and contribute to loss of ground cover.	Impacted areas	Land managers, DEECA, Ag Vic

AFTER EVENT HAS OCCURRED

Emergency Scenario	Actions	Where	Who
 **Bushfire**	Rapid assessment of impact. Plan for restoration – Re-establish ground cover as quickly as possible.	At known impact sites	Ag Vic, Private landholders
 **Drought**	Assess impact. Develop and implement a recovery plan with an emphasis on: - reestablish ground cover - control pest plants	Impacted areas	Ag Vic, Land managers
 **Blue-green Algae Bloom**	Assess impact. Maintain or re-establish ground cover.	Impacted areas	Land managers

Image credit: **Sean Phillipson**

8 Community/ Stakeholder Engagement

Image credit: **Sean Phillipson**

The East Gippsland CMA has a proud close connection with Traditional Owners, partner agencies and community.

The East Gippsland CMA Communications and Engagement Strategy (2023–28) outlines CMA communications guidelines and process, including the key stakeholders. The strategy also outlines "*the East Gippsland CMA recognises that a community impacted by natural disasters has different needs for communications and engagement than a community not impacted by these pressures. The East Gippsland CMA has a role in community resilience and preparedness pre-event alongside other agencies and post-event alongside other agencies to support the community to recover, this can often extend several years post-event. In this case the Implementation plan will be revised to accommodate for community and stakeholder needs.*" This strategy has guided the approach to developing this regional plan.

8.1 Engagement, collaboration and coordination activities

East Gippsland CMA consulted with stakeholders with specialist expertise whilst developing the mapping of biodiversity and agricultural natural capital assets.

This included:

- Consulting on the initial list of biodiversity and agricultural natural capital assets for inclusion in the plan.
- Validating mapping and information sources for locations of assets.
- Validating mapping and information sources for locations prone to natural disasters.

East Gippsland CMA sent the draft plan to stakeholders for comment and discussion.

Key biodiversity and agriculture stakeholders were provided with the template emergency preparedness and response plan, inviting feedback on content.

Given the short timeframes for the development of this plan, East Gippsland CMA staff sent sections of the draft plan to stakeholders with specific expertise for comment and feedback as they were developed and refined.

East Gippsland CMA met with individuals and groups of stakeholders to discuss the project, seek input and refine sections of the draft as required. East Gippsland CMA has considered and included relevant stakeholder feedback on the draft mapping and plan to develop final versions.

8.2 Raising Public Awareness

The East Gippsland CMA has several communication channels providing engagement and feedback opportunities. With a predominant demographic of East Gippsland residents favouring the local newspaper, news sheets and social media, a broad cross-section of the target audience can be met easily.

This plan may be included in general East Gippsland CMA communications, where appropriate, as it aligns with the following Communications and Engagement Strategy outcomes:

- 1.1 East Gippsland Chief Executive Officers and Management Directors Forum (EGCEOs) forum have an agreed net zero emissions target that they are working towards achieving.
- 2.1 Community collaborate and deliver programs that build resilience in the Lakes.
- 3.1 Farmers are prepared for changes in the climate and have practices in place that will make them and their business more resilient.
- 4.1 Communities are safer, and the rivers and catchments are healthier.
- 4.2 A model is developed for communities interacting with fire management.
- 4.6 Partnerships deliver regional priorities more effectively with agencies working to outcomes not silos.
- 6.1 A stronger GLaWAC and First Nations communities and healthier Country.
- 7.2 Community initiatives to improve the health of rivers and catchments are supported and grow.

8.3 Education and Training

East Gippsland CMA and regional stakeholders will have an opportunity to provide educational outcomes for the wider community using this plan as a tool for communication before, during and after events.

8.4 Key gaps

A key gap in community and stakeholder engagement is resourcing and timeframes to trial the proposed plan and work with stakeholders and community to attempt these actions on-ground. With this, adjustments may be needed for the plan to ensure this is actionable in an emergency event and not being trialled at that critical point in time. This is critical as an unactionable plan during a stressful situation can lead to fracture lines amongst stakeholders and community and impact on perceptions of the East Gippsland CMA and future use of the plan. Resourcing gaps are also found between agencies. Data is not always shared amongst agencies which does not align with connectivity where adjacent land managers have different information. Small scale response to events is self-managed by each department/land manager. Different processes impact on continuity and collaborative efforts for a unified outcome.

Further research into species specific and ecological community recovery post fire or anticipated response after fire is also missing in the region. Integration into land management direction or practice would assist with a focus on natural capital assets rather than the land tenure, if efficiently resourced.

9 Legal Framework

The State Emergency Management Plan (SEMP) is authorised through the *Emergency Management Act 2013* 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.

It is important to note the organisations listed in this document are those with either broad or state-wide presence, Government organisations, those with a statutory emergency management involvement and some private corporations with specific roles.

The SEMP is a hybrid document consisting of three components. Combined, these provide details of arrangements for an integrated, coordinated, and comprehensive approach to emergency management at a state level. Emergency Management Victoria outline the role CMAs have in emergency preparedness, response, and recovery. Actions the CMAs have been identified to undertake are:

Mitigation

- Advise and assist local government in the incorporation of flood related planning controls in planning schemes
- Prepare flood response action plans for internal use focused on the collection of flood related data, flood level, flood photography, and hydrographic
- In partnership with local government, prepare and implement local floodplain management plans in accordance with the regional floodplain management strategy and community expectations
- Assist with specific strategic and regional (non-urban) works and measures in accordance with responsibilities under the regional floodplain management strategy or catchment management strategy in consultation with expert advice
- Prioritise regional flooding issues in cooperation with local government, VICSES and the community
- Participating agency for the following flood mitigation activities:
  - Legislative policy framework including floodplain management strategy, reform (lessons learnt)
  - Land use planning (Strategic and statutory)
  - Vegetation/waterway management
  - Flood emergency planning including readiness

Response

- Advise government on regional priorities for floodplain management activities through the implementation of regional floodplain management strategies
- In partnership with support and control agencies, collect, maintain, and enhance flood information
- Monitor significant flood events and collect flood data in conjunction with local government
- Provide flood advice to local government and the community in general
- Advise local government and other authorities on planning permit referrals, building issues and infrastructure management within floodplains
- Assist local government, the BoM and DEECA support the development, maintenance and upgrading of regional flood warning systems
- Support response agencies at the regional level through the provision of flood advice, including flood extent and severity during major flood events
- Support response agencies through the provision of advice on emergency stabilisation and other activities to arrest river breakaways, and the removal of debris accumulation threatening structural stability of public assets in consultation with expert advice
- Support community education and involvement on flooding issues
- Assess all river waterway damage that poses a threat to the stability of river systems

Recovery

- Recovery Lead Agency (RecLA) responsible to provide advice and information services to Councils and delegate public land managers and community groups (with DEECA and supported by DTP and EPA)
- Recovery Support Agency (RecSA) to:
  - relevant land managers to undertake erosion control on public land to help manage risk to public safety, natural and cultural assets and values, and infrastructure
  - DEECA to in its role to survey and protect threatened bird, marsupial, aquatic and plant species and develop and implement protection activities to support ecosystem recovery and regeneration
  - support DEECA, EPA and PV in fish death clean-ups where the fish death event is due to natural causes, and where the CMA has the resources. The CMA will lead a local fish death clean-up and larger scale clean-ups depending on resource availability
  - restore, clear and rehabilitate waterways managed by CMAs, and support DEECA and PV in their lead role of rehabilitating, restoring and reinstating public land and tourism and visitor assets. DEECA or PV are directly responsible for managing to mitigate risks, as well as public land and assets CMAs are responsible for.
- Lead agency responsible to develop and prioritise bushfire and flood recovery programs for CMA assets/ waterways
- Support DEECA to deliver its recovery activities to:
  - restore impacts of river erosion where there is an immediate danger of the formation of river breakaways and/or immediate danger to CMA assets
  - implement balanced bushfire and flood recovery programs consistent with funding allocated
- Implement bushfire and flood damage restoration programs for bushfire and flood affected waterways

Assurance and Learning

- Monitor and report on performance of regional floodplain management strategies

10

Risk Management Including Mitigation Strategies

Image credit: **Sean Phillipson**

RISKS	Safety	Human health (e.g. exposure to pollutants)	Further ecosystem destruction (brought on by the response actions)	Resource availability	Public communication	Maintaining channels of communication with emergency services	Corporate knowledge	Technological reliance
ACTIONS	**MITIGATIONS**							
Ensuring connectivity - to reduce the impact of isolation due to intense environmental events.	Safety is a key consideration for connectivity activities and best practice standards are followed	Ensuring pollutants are considered when responding to and recovering from intense environmental events	Facilitate positive contribution to connectivity and minimise fracturing connection	Use GIS software to plan for connectivity activities across all threatened ecological communities	Regular updates with connectivity enhancements and vegetation quality	Regular updates with connectivity enhancements and vegetation quality	Planning for all potential scenarios with a climate lens to account for event intensity	Ensuring connectivity through a diversity of technological options and not holding reliance on one application
Protecting key ecosystem features - to build resilience and strength prior to large impact events.	Organisational workplace safety is a fundamental component of protection activities	Planning for potential pollutants to be present or migrate when an event occurs	Education across multiple organisations for a comprehensive understanding of ecosystem structures and intricacies	Prioritise features on vulnerability and influence of each event to distribute resources adequately	Engagement in communities to enhance understanding of prioritising and resourcing capabilities	Provide detailed information regarding ecosystem features and priorities	Embed communication systems to exchange changing knowledge to prevent static information	Use GIS software to regularly update changing ecosystem features
Reducing non-climate stressors – including controlling pest plants and animals which hinder the ability of ecosystems to withstand or adjust to changing climate.	Ensure practical organisational safety is understood across multiple organisations and contractors	Minimise risk when controlling plant pest and animals and encourage awareness of neighbouring potential events or seasonal chance of events	Re-evaluate control programs across a landscape scale to minimise further damage where damage has recently occurred in similar ecosystem types	Prioritise ecosystems most vulnerable to climate stressors to build a higher tolerance to events within a changing climate	Communicate purpose of regular works to enhance understanding of project longevity	Communicate purpose of regular works to enhance understanding of project longevity	Research best-practice climate resilience and create multi-organisational approach to control methods for most productivity	Explore potential technologies to enhance reducing non-climate stressors
Ensuring connectivity – such as ensuring connectivity of coastal vegetation by supporting landward retreat of coast marsh	Safety is a key consideration for connectivity activities and best practice standards are followed in a coastal environment	Planning for potential pollutants to be present or migrate when an event occurs	Facilitate positive contribution to connectivity and minimise fracturing connection in coastal environments	Integrate multiple organisations to collaborate on coastal connectivity activities	Education involving fragility of coastal environments and impacts of disconnection during events	Regular updates with connectivity enhancements and vegetation quality	Planning for all potential scenarios with a climate lens to account for coastal marsh ecosystem management	Use GIS software to plan for connectivity activities across coastal threatened ecological communities

Continued...

RISKS	Safety	Human health (e.g. exposure to pollutants)	Further ecosystem destruction (brought on by the response actions)	Resource availability	Public communication	Maintaining channels of communication with emergency services	Corporate knowledge	Technological reliance
ACTIONS	**MITIGATIONS**							
Ensure connectivity - build on understanding and connection to sites and artifacts to increase intrinsic value.	Safety is a key consideration for connectivity activities and best practice standards are followed	Planning for potential pollutants to be present or migrate when an event occurs and monitor impacts on mental health when managing intrinsic items	Use experts and specialised equipment with constant consultation to eliminate any further damage	Consider demands on cultural officer availability when working on potentially significant sites	Obtain an understanding of information that will enhance public connection rather than encourage undesirable interaction with artefacts and sites	Educate emergency services on best practice protection of sites and artefacts	Planning for all potential scenarios with a climate lens to best protect sites and artefacts	Consider alternative information sources to create connectivity with sites and artefacts
Protecting key features - through priority building and pre-emptive protection for sites and artifacts.	Organisational workplace safety is a fundamental component of protection activities	Planning for potential pollutants to be present or migrate when an event occurs and monitor impacts on mental health when managing intrinsic items	Use experts and specialised equipment with constant consultation to eliminate any further damage	Consider demands on cultural officer availability when working on potentially significant sites	Obtain an understanding of information that will enhance pre-emptive protection rather than encourage undesirable interaction with artefacts and sites	Educate emergency services on best practice protection of sites and artefacts	Planning for all potential scenarios with a climate lens to best protect sites and artefacts	Use a range of information sources to communicate protection for sites and artifacts
Reducing non-climate stressors - such as controlling human and natural impacts.	Ensure practical organisational safety is understood across multiple organisations and contractors	Directing impactful activities to less vulnerable spaces	Planning for all potential scenarios and how to create the least impact on ecosystems	Factoring human and natural impacts into extending current resources or investing in furthering resources	Developing succinct communication so that messaging on ecosystem value prior to events are clearly understood	Develop procedure for working in threatened ecological communities or with habitat of threatened species	Research best-practice approaches to reducing human and natural impacts	Explore potential technologies to enhance reducing non-climate stressors
Protecting key ecosystem features – for example, protecting mangroves and seagrass beds which provide important fish nurseries and spawning areas.	Ensure practical organisational safety is understood across multiple organisations and contractors	Monitor human exposure while working with key ecosystem features	Develop management solutions to reduce human impact during event response that integrate key ecosystem features	Prioritise features on vulnerability and influence of each event to distribute resources adequately	Regular updates with protection activities and their importance	Provide detailed information regarding ecosystem features and priorities	Embed communication systems to exchange changing knowledge to prevent static information	Use GIS software to regularly update changing ecosystem features and update seasonality


Image credit: Sean Phillipson

11 Monitoring and Data

Image credit: **Sean Phillipson**

GIS data

GIS-based information is collected, used, and updated through the East Gippsland CMA system. Distribution map showing the locations of assets will be shared with the Australian Government through the plan, where appropriate. Supplementary data may also be stored or accessed through partner and supporting organisations to strengthen and further inform the plan during implementation.

Communications

The East Gippsland CMA maintains an engagement database called Accessing Community Engagement (ACE). This database stores all individual stakeholder discussions, media coverage, social media, events and engagement activities hosted by the East Gippsland CMA.

Stakeholder information

As this plan will be made publicly available, information contained within this plan will also be made publicly available. Therefore, personal data will not be shared on the plan and professional information included only. Stakeholder information is stored in ACE. Partner and supporting organisations are listed in this plan, with key contacts stored in ACE to maintain currency. This also enables the list to grow and adjust through time.

Monitoring

This plan will be monitored regularly. As new information is provided, this plan will be dynamic and updated as needed. This will ensure that information is current and appropriate.

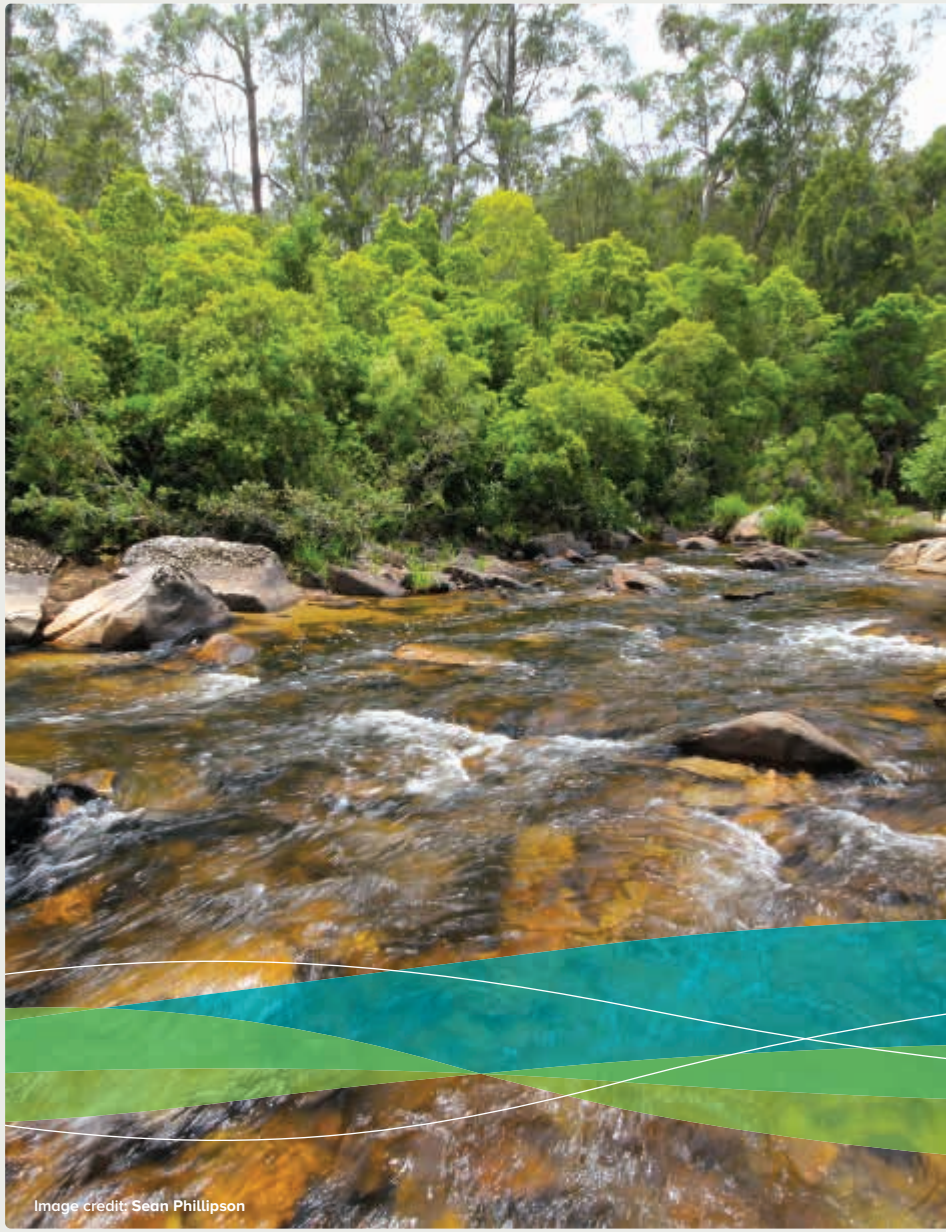


Image credit: Sean Phillipson

12
Key Contacts

Stakeholder Category	Organisation	Role	Contact Details
Australian Government agency	Department of Climate Change, Energy, the Environment and Water (DCCEEW) And Department of Agriculture, Fisheries and Forestry (DAFF)	Allocates funding for Climate Preparedness, Action, and Response at a national level.	Website: https://www.dcceew.gov.au/about/contact T: 1800 920 528
Victorian Government agency	Department of Energy, Environment and Climate Action (DEECA)	Allocates funding and coordinates programs for Climate Preparedness, Action, and Response at a state level.	Website: https://www.deeca.vic.gov.au/ T: 136 186
State Government agency	Emergency Management Victoria (EMV)	Emergency Management Victoria (EMV), established in July 2014, leads emergency management in Victoria	Website: https://www.emv.vic.gov.au/ T: 03 9650 9292
	DEECA, Natural Environment Programs	Multifaceted role includes implementing nature-positive programs, biodiversity initiatives, and ensuring environmental protection, as well as managing natural and built assets on public land.	Website: https://www.deeca.vic.gov.au/ T: 136 186
	DEECA, Public land		
	DEECA, Forest Fire Management Victoria	Forest Fire Management Victoria (FFMVic), a collaborative effort involving staff from DEECA, Parks Victoria, Melbourne Water, and VicForests, and plays a pivotal role in safeguarding Victoria's parks, forests, and public land. Their role encompasses risk-based bushfire management, planned burning, emergency response, and environmental recovery efforts. They also enhance forest health, accessibility, and community resilience while minimising the impact of major bushfires.	Website: https://www.ffm.vic.gov.au/
	Agriculture Victoria (Ag Vic)	Agriculture Victoria plays a crucial role in supporting the growth and protection of profitable, sustainable farms across thriving regional and rural communities in Victoria.	Website: Home | Agriculture Victoria T: 03 5626 1691
	Parks Victoria (PV)	Parks Victoria serves to protect our state's natural and cultural heritage on behalf of all Victorians. Together with Traditional Owners and the community, Parks Victoria cares for Country and value environmental conservation combined with an accessible and sustainable visitor experience that encourages current and future generations to get into nature.	Website: https://www.parks.vic.gov.au/ T: 131 963
	Victorian Fisheries Authority (VFA)	The Victorian Fisheries Authority (VFA) is established to promote sustainable and responsible fishing and fishing-related activities in Victoria.	Website: https://vfa.vic.gov.au/

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Stakeholder Category	Organisation	Role	Contact Details
State Government Agency	Gippsland Ports (GP)	Gippsland Ports, a Committee of Management appointed by the State of Victoria, manages five local ports and two waterways in Gippsland. These waterways, spanning approximately 1,430 square kilometres, play a crucial role in supporting local communities and industries within Victoria's economy.	Website: https://gippslandports.vic.gov.au/ T: 03 5155 6900
	Trust for Nature (TfN)	A conservation organisation in Victoria, securing habitat on private land to protect wildlife and native plants.	Website: https://trustfornature.org.au/ T: 03 8631 5888
Emergency Services Organisations	Victoria State Emergency Service (VicSES)	The Victoria State Emergency Service (VICSES) serves as the control agency for storm, flood, earthquake, tsunami, and landslide emergencies throughout Victoria.	Website: https://www.ses.vic.gov.au/ T: 03 9256 9400 Email: ust.gippsland@ses.vic.gov.au
	Country Fire Authority (CFA)	The Country Fire Authority (CFA), one of the world's largest volunteer-based emergency services organisations, collaborates with Victoria's emergency services to protect lives and property through operational response and the promotion of community safety and education.	Website: https://www.cfa.vic.gov.au/ T: 03 9767 1800
Local Government	East Gippsland Shire Council (EGSC)	East Gippsland Shire Council provides a wide range of different services to the community, ranging from customer service and emergency response to infrastructure management, health services, environmental conservation, and cultural programs. They play a vital role in enhancing the well-being and development of the Gippsland region in Victoria.	Website: https://www.eastgippsland.vic.gov.au/ T: 03 5153 9500
	Wellington Shire Council (WSC)	Wellington Shire Council provides a wide range of different services to the community, ranging from customer service and emergency response to infrastructure management, health services, environmental conservation, and cultural programs. They play a vital role in enhancing the well-being and development of the Gippsland region in Victoria.	Website: https://www.wellington.vic.gov.au/ T: 1300 366 244
Water Authority	East Gippsland Water (EGW)	East Gippsland Water plays a vital role in ensuring a healthy water cycle for present and future communities in East Gippsland. They manage water services, including harvesting, storage, and urban supply, benefiting around 45,000 people in the region.	Website: https://www.egwater.vic.gov.au/ T: 1800 671 841
	Southern Rural Water (SRW)	Southern Rural Water (SRW) is responsible for water licensing and regulation in southern Victoria, working closely with farmers, businesses, individuals, and the community to manage water resources, ensure fair access, and uphold sustainability.	Website: https://www.srw.com.au/ T: 03 5139 3100

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Stakeholder Category	Organisation	Role	Contact Details
Landcare	East Gippsland Landcare Network (EGLN)	Landcare plays a crucial role in East Gippsland, fostering community engagement and environmental stewardship. The EGCMA Landcare Support Plan 2020 details the interactions of these roles in East Gippsland.	Landcare Australia Website: https://landcareaustralia.org.au/ Landcare Victoria T: 03 9034 1940 East Gippsland Landcare Network M: 0437 524 437 Email: eglncommittee@egln.org.au Regional Landcare Coordinator T: 03 5152 1184 Website: https://egcma.com.au/ Far East Victoria Landcare M: 0419 317 509 Website: https://www.fevl.org.au/ Snowy River Interstate Landcare Coordinator - T: 02 6458 4003 Email: srilc@bigpond.com Sustainable Agriculture Facilitator M: 0400 467 921
	Far East Victoria Landcare (FEVL)		
	Snowy River Interstate Landcare Committee (SRILC)		
	Landcare Coordinators / Facilitators		
	Individual Landcare groups		
	East Gippsland Regional Landcare Coordinator (RLC)		
	East Gippsland Sustainable Agriculture Facilitator (SAF)		
Traditional Owners	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	Serves as the Registered Aboriginal Party representing the Gunaikurnai people, the Traditional Owners of their Country in Victoria. Their role includes implementing native title settlement agreements, environmental projects, and providing policy advice.	Wesbite: https://gunaikurnai.org/ T: 03 5152 5100
First Nations Groups	Nindi Ngujarn Ngarigo Monero Aboriginal Corporation (Ngarigo Monero)	Focuses on safeguarding the interests of the Ngarigo Monero people, preserving their cultural knowledge, maintaining connections to significant places, and passing down this heritage to future generations. Additionally, they actively engage in conservation efforts and healing programs related to their Country and cultural heritage.	Website: https://nnnmac.org/
	Bidwell First Nations Clans (Bidwell)	Focuses on safeguarding the interests of the Bidwell/Bidawal people, preserving their cultural knowledge, maintaining connections to significant places, and passing down this heritage to future generations.	N/A – made up of several entities

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Stakeholder Category	Organisation	Role	Contact Details
Not-for-profit NRM organisations	Greening Australia (GA)	Greening Australia is an environmental enterprise that tackles the challenges facing Australia's unique landscapes by conserving and restoring them at scale, benefiting communities, economies, and the environment.	Website: https://www.greeningaustralia.org.au/ T: 1300 886 589
	Conservation Volunteers Australia (CVA)	Conservation Volunteers Australia (CVA) empowers people to restore biodiversity, build climate resilience, feel connected to community, and improve personal wellbeing through conservation efforts since 198212.	Website: https://conservationvolunteers.com.au/ T: 1800 032 501
	Birdlife Australia (BA)	BirdLife Australia is Australia's largest bird conservation charity, leading efforts to prevent human-driven extinction of threatened birds, improve their conservation status, and ensure a long-term future for all native bird species.	Website: https://birdlife.org.au/ Email: support@birdlife.org.au T: 03 9347 0757
	Southern Farming Systems (SFS)	Southern Farming Systems is a farmer-driven, non-profit organisation that assists farmers with practical research and information, leading to real-world results.	Website: https://sfs.org.au/ T: 03 5265 1666
	Wildlife Unlimited (WU)	Wildlife Unlimited provides on-ground environmental services to government agencies, local councils, catchment management authorities, Landcare, environmental agencies, schools, and community groups.	Website: https://wildlifeunlimited.org.au/ T: 03 5152 6367
	EcoLands Collective (EC)	**BIODIVERSITY LEGACY LTD** offers landholders, communities, and investors a framework through which they can purchase or donate properties to the Legacy, where they can be restored, protected and stewarded by the community for future generations.	Website: https://ecolandscollective.org.au/
Agricultural groups	Gippsland Agricultural Group (GagG)	The Gippsland Agricultural Group is a volunteer-driven, non-profit organisation based in Gippsland. They conduct relevant research trials and agricultural demonstrations to benefit farmers in the Gippsland region, aiming to improve productivity, profitability, and sustainability through collaboration, innovation, research, and education1.	Website: https://gippslandag.com.au/ Email: administration@gippslandag.com.au

Image credit: **Sean Phillipson**

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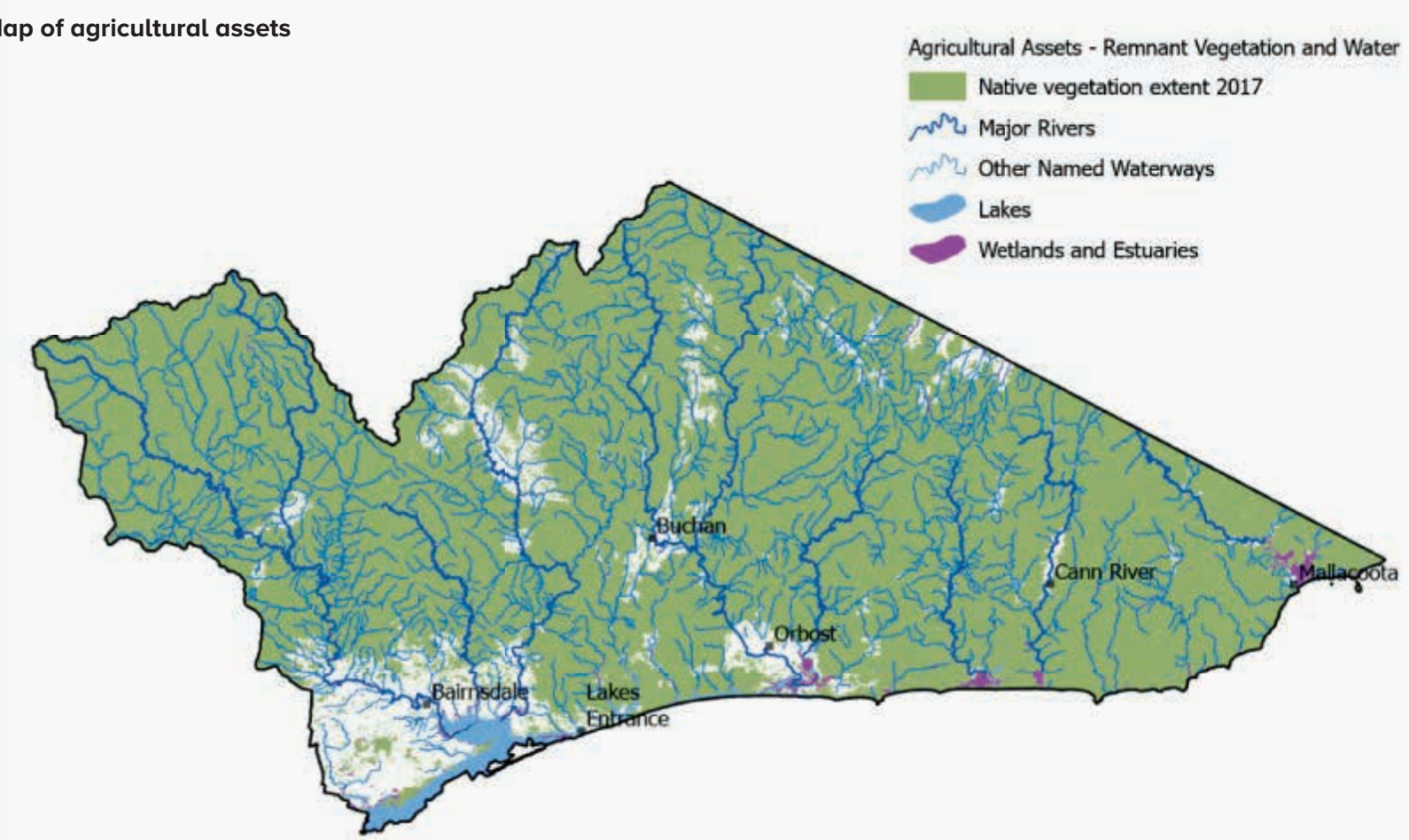
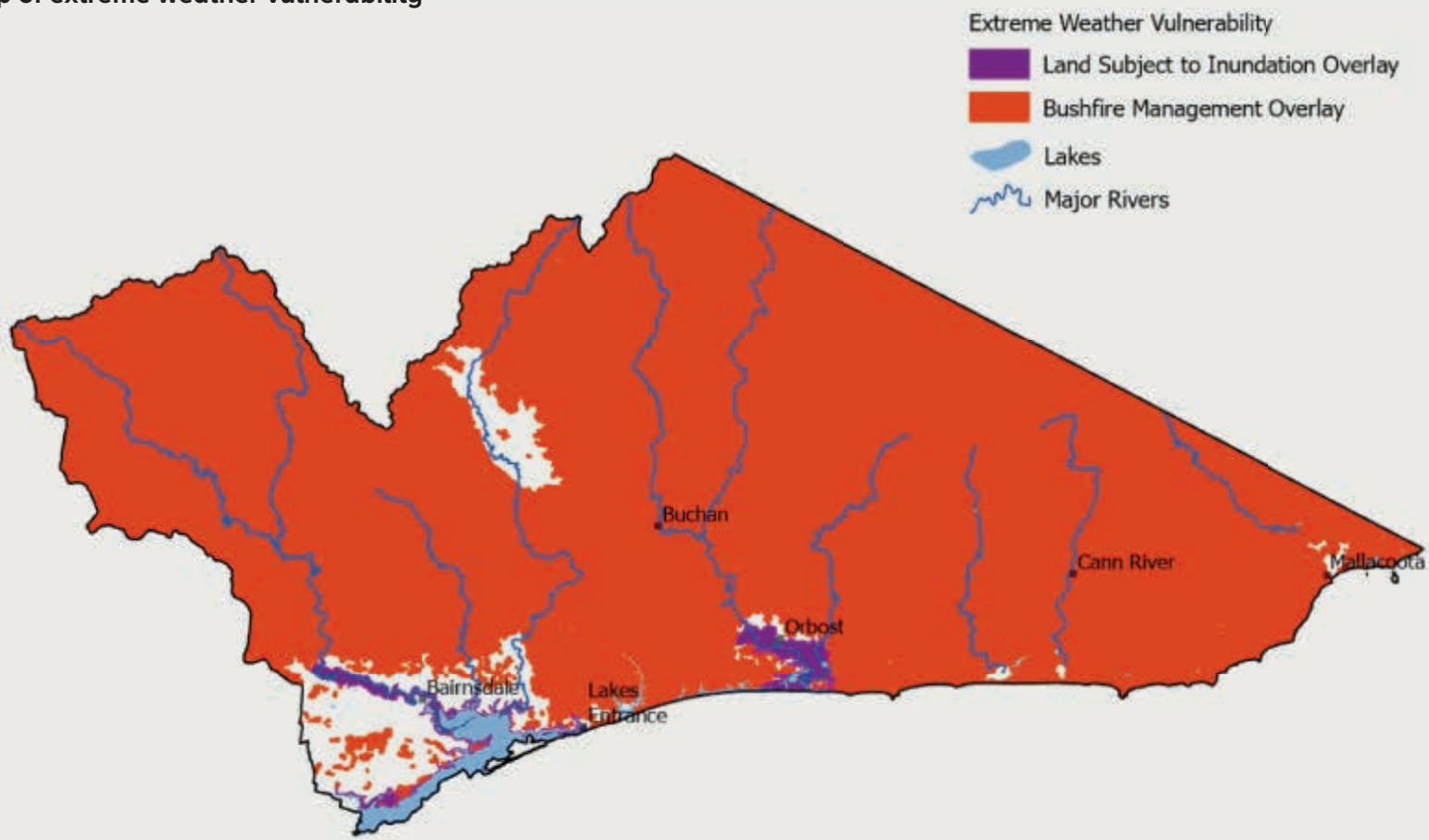
14 Appendices

Appendix A – Map of agricultural assets



Appendix B – Map of extreme weather vulnerability



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