

West Gippsland: Biodiversity and Agricultural Ecosystem Assets Emergency Preparedness and Response Plan

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Acronyms

AIIMS	Australasian Inter-Service Incident Management System
BLA	BirdLife Australia
BLCAC	Bunurong Land Council Aboriginal Corporation
CFA	Country Fire Authority
CMA	Catchment Management Authority
DEECA	Department of Energy, Environment and Climate Action
EPBC	Act Environment Protection and Biodiversity Conservation Act 1999
EVC	Ecological Vegetation Class
FFG	Act Flora and Fauna Guarantee Act 1988
FFM	Vic Forest Fire Management Victoria
GEA	Gippsland Environmental Advocacy forum
GA	Greening Australia
GLaWAC	Gunaikurnai Land and Water Aboriginal Corporation
GKTOLMB	Gunaikurnai Traditional Owner Land Management Board
PV	Parks Victoria
SEMP	State Emergency Management Plan
TfN	Trust for Nature
VBA	Victorian Biodiversity Atlas
WGCA	West Gippsland Catchment Management Authority

1 Background

1.1 About West Gippsland

West Gippsland encompasses local government areas of La Trobe, South Gippsland and Wellington, and most of the municipalities of Baw Baw and Bass Coast. The region in Victoria's south-east encompasses over 1.7 million hectares¹. The region hosts a diverse array of important ecosystems including national parks, Ramsar listed wetlands, remnant vegetation and productive agricultural lands. Important biodiversity assets in the region include EPBC listed species: hooded plover, wollert (Leadbeater's possum) and pookila (New Holland Mouse), giant Gippsland earthworm, and the region hosts six threatened ecological communities (TEC):

- Alpine Sphagnum Bogs and Associated Fens
- Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland and Associated Native Grassland
- Natural Damp Grassland of the Victorian Coastal Plains
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
- Subtropical and Temperate Coastal Saltmarsh

West Gippsland's sizeable land area and an extensive coastline of around 500 kms creates both opportunities and challenges in terms of managing the region's natural assets.

The region's TECs are distributed across National Parks, public and private conservation holdings and on agricultural land. Some of the TECs are seasonally transient, hence hard to identify. All of the TECs face pressure from development, as the population West Gippsland grows, particularly the Bass Coast and Baw Baw Shires².

The two Ramsar-listed wetlands lay at the intersection of major river systems and the coast. Corner Inlet in the south-eastern corner of the region is part of the traditional lands and waters of the Gunaikurnai and Bunurong people and was Ramsar listed in 1982. The wetland encompasses 67,186ha of diverse habitats, including coastal woodland, mangrove communities, saltmarsh areas, intertidal zones and unique marine values such as Broadleaf Seagrass forests³.

The Gippsland Lakes are part of the traditional lands and waters of the Gunaikurnai people. The site was Ramsar listed in 1982 as a significant site for threatened wetland species, waterbird breeding, migratory bird habitat and fish spawning.

The coast and both wetlands are important tourism destinations, and support commercial and recreational fishing, boating, camping and general visitation. Corner Inlet and Gippsland Lakes are vulnerable to adverse impacts from pollutants, nutrient loading and sediment runoff from the multiple river systems that meet the sea at these two sites.

¹ BOM Regional Weather and Climate Guide 2019 <http://www.bom.gov.au/climate/climate-guides/guides/04-West-Gippsland-VIC-Climate-Guide.pdf>

² ABC News 2022: Census reveals Gippsland's fastest growing regions <https://www.abc.net.au/news/2022-07-02/census-shows-changing-face-of-gippsland/101200048>

³ Parks Victoria: Visitor Information (no date) <https://www.parks.vic.gov.au/-/media/project/pv/main/parks/documents/visitor-guides-and-publications/corner-inlet-and-nooramunga-marine-and-coastal-parks/corner-inlet-nooramunga-marine-and-coastal-parks-visitor-guide.pdf?rev=564f560bc23a48a8b3d023bf9434d794>

The West Gippsland economy is heavily reliant on agriculture, forestry and electricity production. Forty-one percent of the land area of West Gippsland is under agricultural production⁴. The region contributes⁵:

- 23% of Australia's milk production
- Most of Victoria's electricity and gas (offshore)
- About 60% of Melbourne's water

There has been a marked increase in irrigated horticulture in recent years, and plantation forestry remains an important component of the region's mix. The recent cessation of native forest logging in Victoria is significant for West Gippsland and its natural assets; a transition process is underway in the management of native forests, with this significant change in activity.

Agriculture and forestry in West Gippsland rely on a range of ecosystem services to maintain productivity. For example, clean air and water to maintain stock health, intact riparian zones to protect riverine water quality (used to irrigate horticulture), healthy bird populations to keep insects in check and reduce farmer reliance on pesticides, remnant vegetation for windbreak and stock shade, native insects for pollination services, and well-structured, microbiologically healthy soils as a base for all of the region's agricultural production systems. They are complex systems that offer many kinds of ecosystem services and the maintenance of these services is a high priority for the region's economy.

1.2 Caring for West Gippsland

Traditional owners continue to care for Country in West Gippsland. The Gunaikurnai, Bunurong, Boonwurrung and Wurundjeri Peoples are the traditional owners of much of Gippsland.

The Gunaikurnai Land and Water Aboriginal Corporation (GLaWAC) is the Registered Aboriginal Party (RAP) for the five major clans of the Gunaikurnai people. Bunurong and Wurundjeri people also have legislated authority to protect and manage their cultural heritage, with RAP status.

There are some parts of the region where there are multiple interested Traditional Owner groups, including areas where there has not been a determination. The current RAP boundaries in West Gippsland are: Gunaikurnai country extends from the coast near Wilsons Promontory, up to Mount Baw Baw and across a large part of East Gippsland. Clans of the Gunaikurnai include the Brataulung in South Gippsland, the Brabiralung and Braiakaulung in Central Gippsland, and the Tatungalung around the Gippsland Lakes.

Bunurong country extends to parts of the south and west of the region. Parts of the north-west of the region are Wurundjeri country⁶.

Along with the traditional owner groups, West Gippsland has a diverse and active network of individuals and groups committed to the preservation and management of its valuable and unique natural environment. A range of agencies and organisations cooperate to monitor,

⁴ BOM Regional Weather and Climate Guide 2019 <http://www.bom.gov.au/climate/climate-guides/guides/04-West-Gippsland-VIC-Climate-Guide.pdf>

⁵ West Gippsland Regional Catchment Strategy 2024 <https://westgippsland.rcs.vic.gov.au/themes/land/>

⁶ WGCMA NRM Plan (2022)

protect and remediate areas and species. For example, the region has ~60 active Landcare groups and ~55 active NRM groups. A range of organisations and agencies are in regular communication through the recent formation of the Gippsland Environmental Advocacy (GEA) forum. GEA members include:

- GLaWAC
- GKTOLMB
- DEECA
- Agriculture Victoria
- Trust for Nature
- Parks Victoria
- Southern Rural Water
- Gippsland Water
- East Gippsland Water
- South Gippsland Water

Across the region, the West Gippsland Catchment Management Authority (WGCMA) plays a co-ordinating role. The WGCMA was established in 1997, and has worked continuously to achieve the vision of ‘a healthy catchment, valued and cared for by the community, that underpins the environmental, social, cultural and economic wealth of the region’.

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

1.3 Natural disasters and emergency events

There is a growing need to enhance West Gippsland’s preparedness for natural disasters to mitigate their impact on the region’s biodiversity and our agricultural natural capital assets. Ensuring the survival of species and places helps to preserve ecosystem services such as clean air, water, and climate regulation, all of which profoundly affect human well-being. Disaster preparedness bolsters the resilience of ecosystems, enabling them to recover and recover following catastrophic events.

Better preparation, response and recovery planning also contribute to stronger regional economies through the continuity of tourism and agriculture activity. By investing in disaster preparedness, long-term costs for post-disaster recovery and restoration are also reduced.

This plan draws on lessons learned during the 2019-20 Black Summer bushfires⁷. Other environmental emergencies have also informed the Plan like the flooding event when seven rivers around Sale burst their banks (June 2007) and the flooding of Traralgon (June 2012), flooding along the Macalister River (October 2023)⁸, extreme heat events in 2009, 2014 and

⁷ 2009 Victorian Bushfires Royal Commission: Volume 1 (2010) <http://royalcommission.vic.gov.au/Commission-Reports/Final-Report/Volume-1/Intro-pages/Introduction.html>

⁸ <https://www.abc.net.au/news/2023-10-04/rain-relief-fires-east-gippsland-loch-sport-potential-flooding/102928564>

20199, and extreme storm activity in February 2024 which brought down trees and disrupted power supplies across a wide swath of West Gippsland.

The Plan builds on current regional plans (e.g. Regional Catchment Strategy, Regional NRM Action Plan; Gippsland Climate Change Plan) and draws on State and Federal plans, to ensure connectivity and coordination, and to reduce duplication of effort.

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

This Plan contributes, in part, to actions under Target 17 of the *Threatened Species Action Plan 2022-32*¹⁰ and Outcomes 1, 2 and 3 of the Natural Heritage Trust (NHT), by addressing vulnerability from extreme weather, climate or natural events relevant to biodiversity¹¹ and agricultural ecosystem assets¹². Target 17 and the NHT Outcomes support improved emergency response and planning within jurisdictions. This 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 as it relates to the ecosystem services that these natural assets provide.

⁹ Environment Victoria, *heatwaves and climate change* (no date) <https://environmentvictoria.org.au/our-campaigns/safe-climate/victoria-heatwaves-climate-change/>

¹⁰ <https://www.dcceew.gov.au/sites/default/files/documents/threatened-species-action-plan-2022-2032.pdf>

¹¹ 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.

¹² Agricultural natural capital assets relate to the on-farm natural resources that we rely on for food and fibre production, including soil, air, water, riparian areas, remnant native vegetation, agroforestry and environmental plantings and animals.

2 Objectives

The objectives of this plan are to improve preparedness for, and response to, emergency events where they occur through better integration of biodiversity and agricultural natural capital assets in emergency planning, response and recovery.

This Plan will enhance the resilience of biodiversity and agricultural assets by recognising the risks and threats posed by natural disasters and undertaking planning to improve outcomes through actions and management before, during (to the extent possible) and after emergency events.



3 Scope

This Biodiversity and Agricultural Natural Capital Assets Emergency Preparedness and Response Plan seeks to reduce the impact of future catastrophic events on biodiversity and agricultural natural capital assets in the West Gippsland region. The Plan considers the most likely emergency scenarios for West Gippsland and identifies mitigation measures in advance of emergency (preparedness), activities during emergency events (response) and activities to undertake after emergency events (recovery).

3.1 Defining emergencies

In this Plan, emergency scenarios with potential to impact biodiversity and agricultural ecosystems in WGCMA are considered including bushfire, flood, drought and storm (Figure 3-1). For the purposes of this Plan, the term ‘emergency’ is defined as:

‘an urgent, sudden, serious event that requires fast action to avoid harmful results’

As such, the emergency scenarios considered herein are discrete, time-bound events, as opposed to extant threats that develop (and continue) over a long period of time.

While introduced weeds, pests and diseases do pose a significant threat to agriculture and natural assets, the Plan does not include them as they tend to fall outside the ‘emergency’ definition underpinning this planning process.

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

Driven by the biosecurity strategy, Victoria has rigorous processes to prepare for, and respond to, biosecurity threats set out in the State Emergency Management Plan’s Animal, Plant, Marine and Environmental Biosecurity Sub Plan (2021)¹³ and led by Agriculture Victoria. This Sub Plan references the highest priority threats to agricultural assets in Victoria and is reviewed and updated periodically. Preparedness and Management Plans already exist for biosecurity threats using the Australasian Inter-Service Incident Management System (AIIMS) structure set out in the State Emergency Management Plan.

3.2 Assets considered

The assets included in this plan were previously prioritised and identified in the NRM Plan for the West Gippsland Region (2022) This was done collaboratively with regional stakeholders and funded by the Australian Government. The biodiversity assets include listed threatened species, threatened ecological communities (TEC) and Ramsar-listed wetlands.

Agricultural natural capital assets are those on-farm natural features that support the ongoing productivity of farmlands for food and fibre production, including soil, air, water,

¹³ Ref: www.emv.vic.gov.au/responsibilities/state-emergency-management-plan-sub-plans/sem-p-animal-plant-marine-and-environmental-biosecurity-sub-plan

riparian areas, remnant native vegetation and environmental plantings and animals. For this plan, the agricultural natural capital assets are summarised as:

- Soil - including carbon storage services, physical and chemical capacity (e.g. degree of erosion/erosion resistance, nutrient and trace element repository/mediator, soil microbiota for plant health, cation exchange capacity).
- Water (ground and surface) – availability and quality of surface and ground water has direct and significant impacts on agricultural land.
- Services from native vegetation - remnant native vegetation on farmland provides a range of services that support agriculture in the landscape (i.e. as insectaries, provision of shade/shelter, pollination and water filtration ecosystem services).

This Plan details preparedness, response and recovery actions for biodiversity assets and agricultural natural capital assets with 'high' to 'medium' susceptibility to specific emergencies. If an asset is considered to have 'low' susceptibility, detailed actions have not been identified.

To the extent possible, this Plan does not conflict with, or duplicate, other emergency management plans, or activity in the remit of existing agencies.

3.3 Actions

Implementation of actions and measures to prepare, respond or recover from emergencies is out of scope for this Plan. WGCMA, government agencies and partner organisations may deliver actions in future, if opportunities arise and funding is made available.

The Plan identifies activities required to enable robust, efficient and timely action in the case of emergency events. In reviewing what is needed, this Plan identifies actions that are 'business as usual', already funded, in-hand or underway. It also identifies gaps where priority actions are not being implemented.

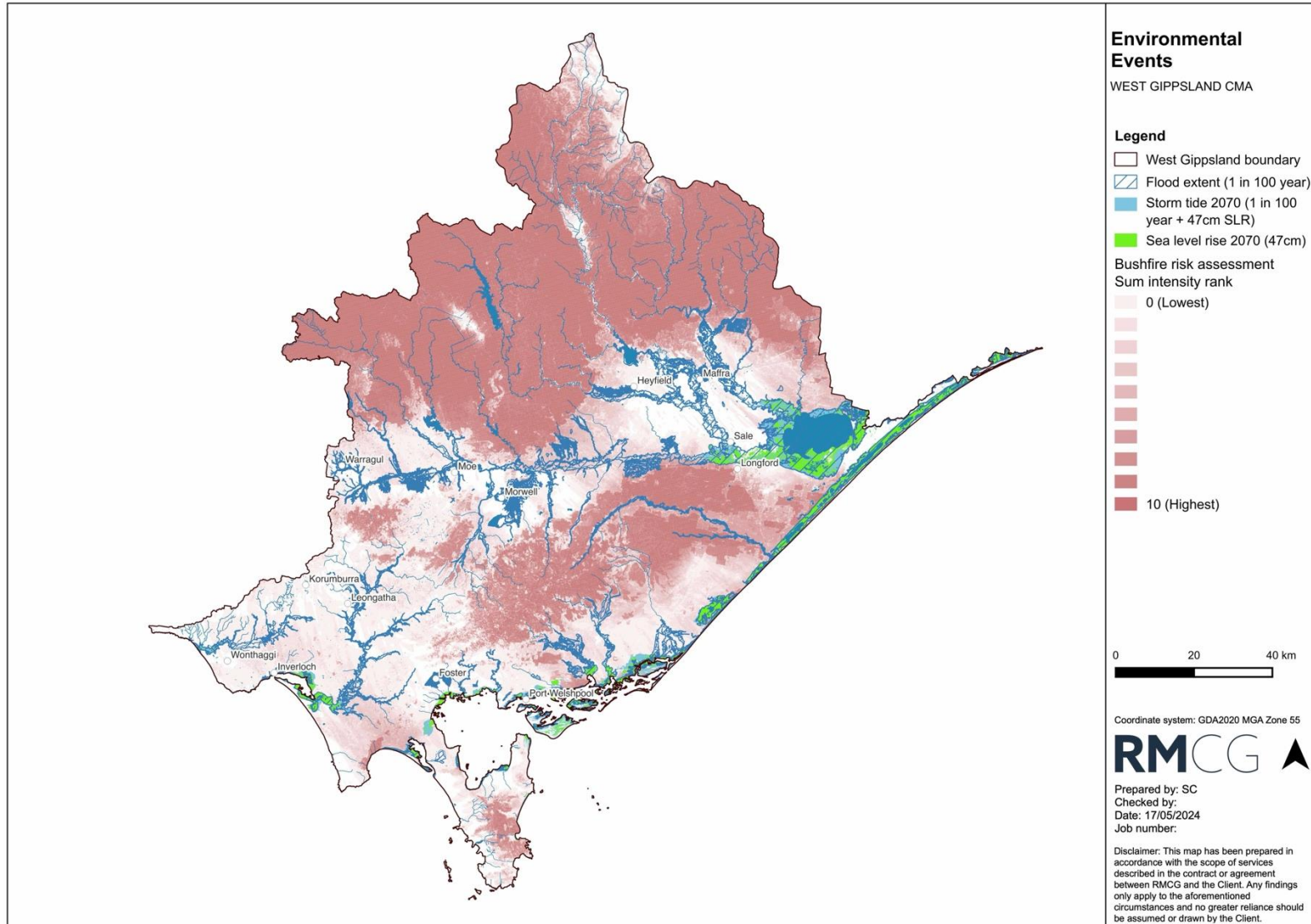


Figure 3-1 Map showing spatial data on emergencies considered in this plan

4 Stages of emergency management

For the purposes of this Plan, three key stages in emergency management have been defined – preparedness, response and recovery. This plan sets out actions under each of these categories which, in broad terms, include the following types of actions.

1. Preparedness:

- Monitoring – establishing base case, better identifying vulnerabilities and tracking changes in status, distribution, species abundance and change in physico-chemical parameters;
- Building resilience – on-ground activity to increase species or ecosystem capacity to weather and recover from disturbances.
- Insurance – active steps to spread or mitigate risk via, for example, seed banking or establishment of geographically dispersed ‘ark’ populations.
- Planning – developing action plans and informing frontline agencies of best/preferred course of action ahead of various emergency events.

2. Response:

- Asset protection – emergency management response prioritises protection of human life and property, however protecting the environment is also considered a priority¹⁴ Responses can include specific actions to protect priority natural assets.
- Relocation – under extreme conditions, co-ordinating the removal of a subset of a threatened population to another location (e.g. to create an ‘ark’ or seed bank).

3. Recovery:

- Monitoring – on-going assessment to quantify damage and track progress of recovery; to inform resourcing and activity.
- Defence – on-ground activity to limit or eliminate threats to ecosystem recovery (e.g. fencing out incursion by feral animals; weed management).
- Restoration and reconstruction – active, on-ground work to repair ecosystems (e.g. replanting, construction of hollows/nesting boxes, earthworks).

¹⁴ State Strategic Control Priorities, Fundamentals of Emergency Management, Emergency Management Victoria, 2015.

5 Assets and susceptibility

This section identifies the West Gippsland's biodiversity assets and defines their susceptibility to emergencies. The assets included in this plan were previously prioritised and identified in the NRM Plan for the West Gippsland Region (2022) which was prepared in collaboration with key regional stakeholders and the final version approved by the Australian Government. The biodiversity assets include listed threatened species, threatened ecological communities (TEC) and Ramsar-listed wetlands. The assets, are all Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There are no world heritage properties in West Gippsland.

Information provided for each biodiversity asset includes:

- A description of the asset and its location/s in West Gippsland.
- Identification of emergency scenarios such as bushfire, flood, drought, and storm surge that pose a threat and why.
- An assessment of each asset's current susceptibility to the emergency scenarios, assessed as high, moderate, or low.

A risk matrix was used to identify susceptibility for each asset. The matrix considered the likelihood of each emergency event, and the likely impact on each asset resulting from those events. A wide range of relevant plans and strategies were also reviewed to inform this Plan (listed in Appendix 1). Details of these assets and their susceptibility to emergencies are provided in the next sections.

5.1 Threatened species

Table 1 lists the four high priority threatened species identified for this Plan (as per the prioritisation process undertaken in the development of the NRM Plan for West Gippsland (2022). Appendix 2 features maps of each species included in this plan showing their habitat distribution across the region. Appendix 3 shows the interactions of those assets with the emergencies considered in this plan.

Appendix 4 highlights the jurisdictions responsible for management of each species included in this plan.

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Species	Common Name (TO name)	EPBC Act and Threatened Species Strategy (TSS) status	Location	Habitat and Life History
<i>Thinornis cucullatus</i>	Hooded plover	Vulnerable TSS Top 100	Resident along the Gippsland Coast, key areas for this species include Kilcunda, Cape Liptrap, along the Bunurong Coast, Wilsons Promontory and Corner Inlet.	Non-migratory, range tends to be ~20km with ~50km maximum so habitat fragmentation is problem; feed via forage amongst wrack, shoreline, wetlands and estuary for invertebrates; ~1km breeding territory per pair; nesting sites 4m zone in dunes above high tide mark; nesting August to April; 28 days to hatch; fledging September to May; some go to estuarine or wetland flocking sites in non-breeding season. High rate of nesting failure, up to 4 clutches per season.
<i>Gymnobelideus leadbeateri</i>	Leadbeater's possum (wollert)	Critically Endangered TSS Top 100	Populations in West Gippsland are on the Baw Baw and Toorong Plateaus. Range extends into central Victoria (outside WGCMA area).	Nest in old, hollow bearing trees (esp. mountain ash); population is fragmented via habitat fragmentation from bushfire and logging; competition for nesting hollows with owls, parrots, bats, gliders, reptiles; live in family groups (4-8 individuals) with ~5km ² territory; diet mainly arboreal insectivores, also wattle and eucalypt sap, eucalypt nectar and lerp honeydew.
<i>Pseudomys novaehollandiae</i>	New Holland mouse (pookila)	Vulnerable TSS Top 100	Small populations at Providence Ponds, Wilsons Promontory. Largest population between Dutson Downs and Loch Sport (DELWP, 2021b).	Ground dwelling and vulnerable to introduced predators; competition for food and nesting sites with non-native species (DSE, 2003; Zoos Victoria, 2022); habitat complexity and occupancy not well understood but preference for 'diggable/friable/sandy' soil for burrows. Likely genetic isolation of habitat-fragmented populations; extensive range but across farmland, disrupted habitats.
<i>Megascolides australis</i>	Giant Gippsland Earthworm	Vulnerable TSS Top 100	Fragmented distribution predominantly in permanent pasture used for dairying. Spread across ~40,000 ha in the western Strzelecki Ranges.	Long-lived and slow to reproduce. Limited home range and heavily reliant on consistent soil moisture for respiration, survival. Prefer creek banks, soaks and south-facing hillslopes. High moisture, clay soils. Currently fragmented habitat has led to genetic isolation of subpopulations.

Table 1: West Gippsland high priority threatened species

Tables 2 to 5 identify the susceptibility of each high priority species to the emergency scenarios considered in this Plan.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Hooded plover	Storm tide	Single event unlikely to impact whole range of population/habitat. Longer-term - increased incidence and impact with climate change (high tide+storm surge combined with sea level rise SLR) and potentially exacerbated by extreme storm events (high wind, extreme precipitation).	High	Nesting habits mean direct impacts through egg, chick mortality and abandonment during event; longer-term coastal erosion and dune retreat/reformation; fragmentation of coastal breeding/habitat areas.
	Drought/flooding	Potential for some impact of drought or flooding on feeding, flocking and nesting habitat on shores of estuaries, wetlands and lakes, but unlikely to impact full range.	Medium	Distributed population but events impacting specific sites could fragment already low population. Higher density of nests in estuaries vs. shoreline; healthy estuarine habitat reduces chick/egg vulnerability to fox predation, people, dogs.

Table 2: Susceptibility of hooded plover to emergencies in West Gippsland

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Leadbeater's possum (wollert)	Bushfire	Direct mortality during event; loss of old mountain ash tree nesting hollows. Longer term population fragmentation from habitat loss. (ref: decline in habitat quality and population fragmentation -DEPI, 2014).	High	Almost all (99.4%) of the species population falls within area of high intensity bushfire risk making it susceptible to a mass extinction event.
	Drought	Reduced access to arboreal food sources and hydration (insects, nectar, sap, free water) with potential impact on reproductive success. Population fragmentation from habitat loss.	Medium	Projections for more severe and long-lasting drought with climate change. Potential for reduced reproductive success across remaining population.

Table 3: Susceptibility of Leadbeater's possum to emergencies in West Gippsland

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
New Holland mouse (pookila)	Bushfire	Direct mortality during event. Adults might seek refuge in burrows but less effective with high intensity burn. Over-frequent burning impacting food resources. (ref – NRM Plan habitat fragmentation, genetic isolation of fragmented populations, inappropriate fire regimes).	High	Dispersed population so unlikely to have mass extinction but vulnerable to population fragmentation. Competition for scarce food resources post-event.
	Flood	Direct mortality during event. Adults might seek higher ground during event but subsurface burrows and young drowned (water/sediment). Toxicants.	Medium	Dispersed population so unlikely to have mass extinction but vulnerable to population fragmentation.
	Drought	Loss of food resources.	Medium	Omnivorous but reduced fitness detrimental given current numbers and dispersed population.

Table 4: Susceptibility of New Holland mouse to emergencies in West Gippsland

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Giant Gippsland earthworm	Drought	Drought length and frequency is predicted to increase, increasing competition for water during times of prolonged drought particularly on dairy farms. Drought can also be induced in some of the preferred habitat as water may be diverted to enable other uses of these areas (drainage, farm/soil improvement).	High	Direct mortality during event due to burrows drying out. Impact on success post event. Dispersed population so extinction unlikely unless drought covers full high country range. Vulnerable to population fragmentation and genetic isolation.
	Flood	Direct mortality during event from drowning in burrows. Might emerge during event, increasing vulnerability to predation. Soil impacts post event (compaction, toxicants) hinder burrow formation.	Medium	High country habitat with limited flood map overlap. Dispersed population so unlikely to have mass extinction but vulnerable to population fragmentation.
	Bushfire	Soil erosion, soil moisture loss, ash, topsoil, toxicants and other detritus washed into burrows post event.	Low	Subsurface habitat and mostly pasture, which is a low intensity bushfire threat.

Table 5: Susceptibility of Giant Gippsland earthworm to emergencies in West Gippsland

5.2 Threatened Ecological Communities (TEC)

Table 6 lists the six high priority threatened ecological communities (TEC) for the West Gippsland region. Figure 5-1 provides an overview map of showing where these TECs occur in the region. Appendix 2 includes detailed maps of each TEC. Appendix 3 shows the interactions of those assets with the emergencies considered in this plan.

Appendix 4 highlights the jurisdictions responsible for management of each TEC included in this plan.

These TECs were identified in the NRM Plan for West Gippsland (2022) on the basis of their EPBC status. Notable species listed in Table 6 are EPBC-listed species that co-occur in the identified TECs, and are hence collaterally managed as part of the wider protection plan for that TEC.

TEC	EPBC status	Location/s	Notable species
Alpine Sphagnum Bogs and Associated Fens	Endangered	Found in small pockets across alpine, subalpine and some montane areas. In Victoria this ecological community is only found in five geographic areas, two which are located in West Gippsland (Baw Baw and Moroka-Wonnangatta).	<i>Lobelia gelida</i> <i>Philoria frosti</i>
Gippsland Red Gum Grassy Woodland and Associated Native Grass land	Critically Endangered	Limited to the central Gippsland Plain between Morwell and Swan Reach. This ecological community mostly occurs as small, fragmented patches, with good quality remnants found on public land and, to a lesser extent, in informal and formal conservation reserves.	<i>Dianella amoena</i> , <i>Xerochrysum palustre</i> , <i>Commersonia prostrata</i> , <i>Thelymitra matthewsii</i> <i>Prasophyllum frenchii</i> <i>Litoria raniformis</i>
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Distribution is reported across the lowland plains of south-eastern Australia, however the location or likelihood of a wetland being a Seasonal Herbaceous Wetland is known in only a small part of this area (Papas, et al., 2016). This ecological community is known to occur around the Gippsland Lakes and 'Red Gum Plains', but further survey work is required to confirm locations in West Gippsland. Seasonality means these TEC's may be transitory, and hence can be difficult to definitively locate. They occur on relatively fertile soils (often poor draining clays), are <500m elevation, in areas with average annual rainfall 400-800mm, often on land that is valued for agriculture ¹⁵ .	<i>Dianella amoena</i> , <i>Xerochrysum palustre</i> , <i>Commersonia prostrata</i> , <i>Thelymitra matthewsii</i> <i>Prasophyllum frenchii</i> , <i>Litoria raniformis</i>
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Located in disjunct occurrences between Seaspray and Welshpool, including the Darriman Bushland Reserve and Alberton cemetery, and also around Westernport (Clyde and Tooradin). Its distribution in the area between these occurrences is not well known, mapped or understood.	<i>Dianella amoena</i> , <i>Prasophyllum frenchii</i> <i>Litoria raniformis</i>
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Located along the West Gippsland coastline in coastal sectors including Kilcunda-Powlett, Anderson Inlet, Shallow Inlet, Wilsons Promontory, Corner Inlet, Nooramunga coast and islands, Jack Smith Lake and the Gippsland Lakes (Lake Reeve, Lake Wellington).	
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Four dynamic salt-wedge estuary systems are listed in West Gippsland, including the Powlett River, Darby River, Tidal River and Growler Creek. The latter three are all located within the Wilsons Promontory National Park.	

Table 6. Threatened ecological communities considered in this Plan

¹⁵ Seasonal Herbaceous Wetlands Bayes and Cook (2017) for GBCMA https://www.ghcma.vic.gov.au/wp-content/uploads/2017/06/Seasonal_Herbaceous_Wetlands_Handbook.pdf

Tables 7-12 below examine the susceptibility level of each listed TEC to the emergencies that are being considered under this plan. The threat posed by each emergency and the consequent TEC susceptibility are analysed and key reasoning laid out for each TEC in each table.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Alpine Sphagnum Bogs and Associated Fens	Bushfire	Increasing bushfire frequency/periodicity. Increasing bushfire intensity/hot burn. 'Megafires' impacting on firefighting capacity. Greater likelihood due to climate change - change in rainfall, duration and intensity of droughts	High	Rarely burnt and maladapted to high fire frequency. Intersection with heat, drying/drought changing ecological character of TEC.
	Drought	Drought will be exacerbated by climate change. Direct impacts on plant species and ecosystem services/function; longer term change in ecosystem composition/potential extinctions	High	Highly adapted assemblages for current hydrological conditions; no capacity for 'retreat' given altitude and many sessile, slow growing community members. Increased vulnerability to bushfire if dry out

Table 7: Susceptibility of Alpine Sphagnum Bogs and Associated Fens to emergencies in West Gippsland

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Flooding	Hydrological change including flooding caused by extreme weather projected to increase (has increased) with climate change. Physical intensity, duration of events, regularity of events.	Medium	Flooding can reduce oxygen, create wetland with less biodiversity, permanently wet sites favour amphibious species and reduces species richness. System is adapted to seasonal flooding but may be vulnerable if periodicity and intensity/duration changes. Physical damage from sedimentation, toxicants, perturbation, debris. Weeds invading scoured grounds.
	Drought	Areas where these wetlands occur are subject to drought. Drought length and frequency is predicted to increase increasing competition for water during times of prolonged drought with impact on parts of the wetland recharged by groundwater. Drought can also be induced in these areas since water may be diverted to enable other uses of these areas. About 42% (TBC) of the area of these wetland types have been drained to some extent.	High	Prolonged drought can impact on egg and seed banks. These wetlands are seasonal but the longer a system is dry the greater the likelihood of transformation. Repeat droughts will further reduce the species richness and resilience of wetlands, largely through impacts on the seed and egg banks.

Table 8: Susceptibility of Seasonal Herbaceous Wetlands to emergencies in West Gippsland

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Gippsland Red Gum Grassy Woodland and Associated Native Grassland	Bushfire	Greater incidence of bushfire (intensity, frequency) but open structure and dispersed remnants means unlikely to lose all assets in one event.	Medium	Fragmented TEC means loss of one or more high quality remnants (seed stock, genetic diversity) could be very detrimental.
	Drought	Projected increase in intensity of drought means likely direct impacts on survival of remnants, potential loss of biodiversity/species in the assemblage. Unlikely to impact across entire range.	Medium	Fragmented TEC means loss of one or more high quality remnants (seed stock, genetic diversity) could be very detrimental. Similar for loss of biodiversity if less drought tolerant species lost. Drought likely to exacerbate tree dieback.

Table 9: Susceptibility of Red Gum Grassy Woodland to emergencies in West Gippsland

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Natural Damp Grassland of the Victorian Coastal Plains	Bushfire	Greater incidence of bushfire (intensity, frequency) but grassy so may burn cool, and dispersed remnants mean unlikely to lose all assets in one event.	High	Fragmented TEC means loss of one or more high quality remnants (seed stock, genetic diversity) could be very detrimental. Overhot burns or increased fire periodicity may selectively weed out key/priority species.
	Drought	Drought will be exacerbated by climate change. Direct impacts on plant species and ecosystem due to longer term change in ecosystem composition/potential extinctions of key species.	High	Fragmented TEC means loss of one or more high quality remnants (seed stock, genetic diversity) could be very detrimental. Occurrence on farmlands may be colonised by weeds during recovery from drought, overgrazed by stock.

Table 10: Susceptibility of Damps Grasslands to emergencies in West Gippsland

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Subtropical and Temperate Coastal Saltmarsh	Drought	Drought conditions may exacerbate impacts of existing pressures on TEC, including land clearing, culverts/drains diverting recharge, but this TEC is dispersed along the coast, although assemblages vary by latitude and local conditions.	High	While dispersed, development/land use pressures mean the TEC is under water stress/hydrological change. Vulnerable to weed invasion
	Storm tide	Coastal exposure to storm surge and SLR.	High	From conservation advice 'current and projected rises in temperature and sea level and increased storm events from climate change are considered severe threats to Coastal Saltmarsh that could result in landward retreat, transgression by mangroves, fragmentation and loss of habitat or function.'

Table 11: Susceptibility of Temperate Coastal Saltmarsh to emergencies in West Gippsland

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Asset	Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Assemblages of species with open-coast salt-wedge estuaries of western and central Victoria ecological community	Drought	Decline in incoming water (volume and water quality). Restricted range (Wilson's Prom x3) means localised drought event could be highly detrimental.	High	"Restricted range (Wilson's Prom x3) means localised drought event could have significant impact. For example 'Eutrophication and algal blooms causing altered levels of dissolved oxygen, shading of seagrasses, toxicity and subsequent mortality of aquatic organisms. It is estimated that 88 percent of estuaries within the ecological community are threatened by increasing rates of eutrophication and algal blooms.
	Stormtide	Coastal exposure to storm surge and SLR.	High	Effects of human-induced climate change, including reduced rainfall, rising temperature, sea level rise, increased storm activity and ocean acidification, are anticipated to significantly threaten the ecological community. Over time, these changing environmental factors are predicted to substantially alter the spatial extent, hydrology, water quality, ecological processes and aquatic biota of salt-wedge estuaries.

Table 12: Susceptibility of Salt-wedge Estuaries to emergencies in West Gippsland

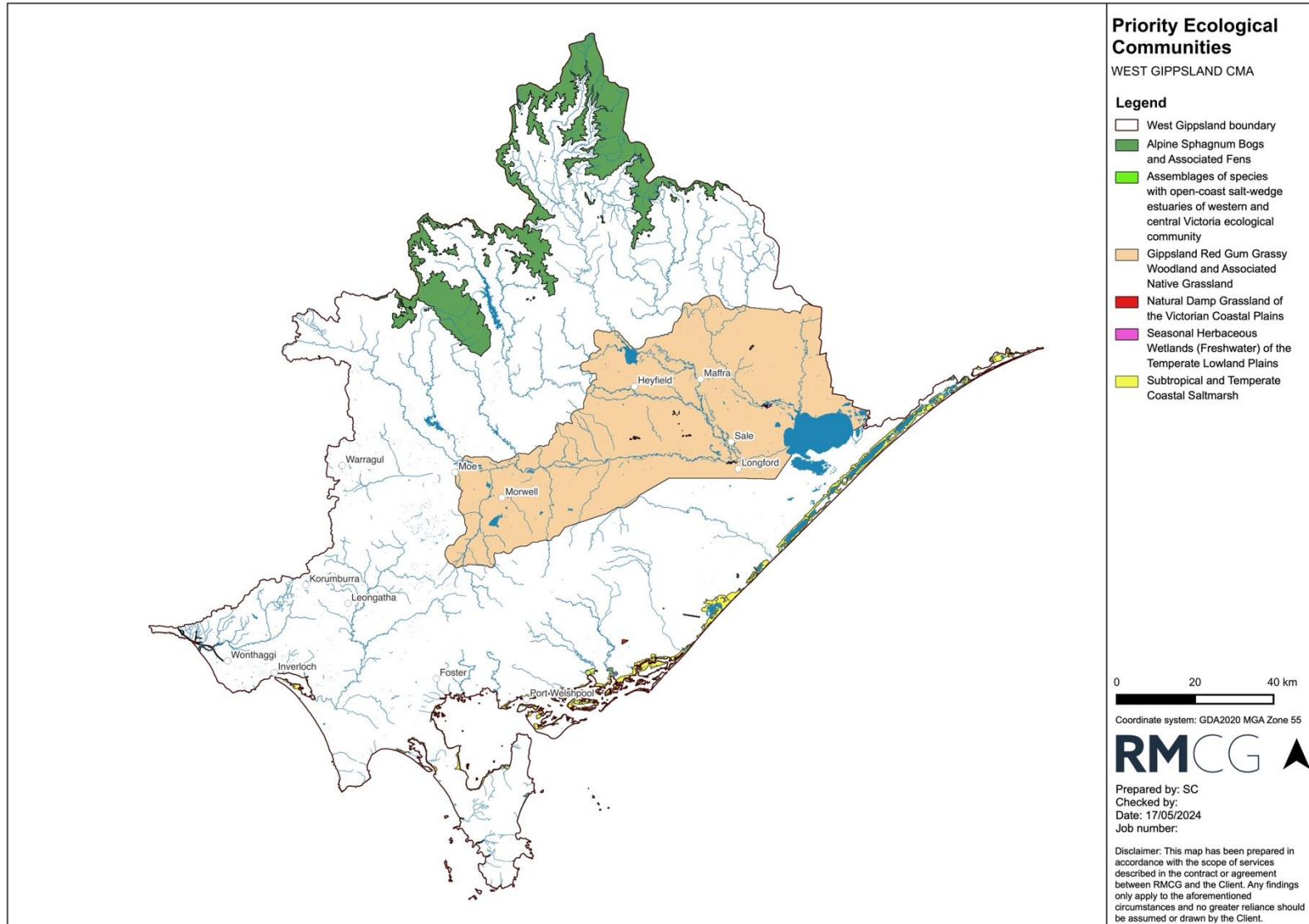


Figure 5-1 Overview of the threatened ecological communities in West Gippsland. (Detailed maps of each TEC in Appendix 2)

5.3 Ramsar-listed wetlands

Corner Inlet and the Gippsland Lakes are wetlands of international importance under the Ramsar convention and are critical habitats for many vulnerable and threatened species, including migratory bird species listed under the Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) and Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Corner Inlet

The Corner Inlet Ramsar Site is a marine embayment located approximately 200 kilometres southeast of Melbourne. The site is bounded by Wilsons Promontory in the southwest and extends to a portion of the Ninety Mile beach in the east covering approximately 67,000 hectares (Figure 5-2). The boundary essentially follows that of three marine parks (Corner Inlet Marine and Coastal Park, Corner Inlet Marine National Park and Nooramunga Marine and Coastal Park) with a small, unreserved area of coastal waters between.

The site comprises extensive intertidal mudflats, tidal channels, and sandy barrier islands and includes the marine and estuarine areas of inflowing creeks and small areas of freshwater wetland on islands within the boundary. Corner Inlet has large areas of seagrass, saltmarsh and mangrove vegetation communities, supports significant migratory bird populations, provides important habitat for beach-nesting birds and supports outstanding fish habitat values (WGCMA, 2020).

There are eight components, two processes and two services that are critical to the ecological character of the Ramsar site as identified in the Ecological Character Description (BMT WBM 2011). There are also a range of other values associated with Corner Inlet that are drivers for the broader management of the marine embayment and its catchment. Under Victorian site management arrangements, the WGCMA is the Ramsar Site Coordinator and responsible for the development and implementation of the *Ramsar Site Management Plan*.

Critical component processes and services of Corner Inlet:

- **Seagrass** Three species of seagrass cover much of the intertidal and subtidal areas of Corner Inlet: *Posidonia australis*, *Zostera nigricaulis* and *Z. muelleri*, providing significant habitat for fish.
- **Intertidal and shallow subtidal sand or mudflats** Intertidal habitats cover a large portion of the Ramsar site (approximately 60 percent) and form extensive feeding grounds for shorebirds.
Mangroves Cover around 2000 hectares and provide important habitat for fish (when inundated) and feeding and roosting shorebirds.
- **Saltmarsh Cover** an area of approximately 3700 ha and are important habitats for invertebrates, shorebirds and fish. The Subtropical and Temperate Coastal Saltmarsh Ecological Community is listed under the EPBC Act as vulnerable.
- **Permanent shallow marine water** The shallow marine waters support microphytobenthos dominated flats with important functions in productivity and nutrient cycling.
- **Abundance and diversity of waterbirds** The site is known to support over 95 species of waterbird, including 26 international migratory species listed under international agreements (JAMB, CAMBA, ROKAMBA).
- **Waterbird breeding** Corner Inlet provides critical breeding habitat for a number of beach nesting birds including Pied Oyster Catcher, Caspian Tern, Crested Tern as well as the threatened Fairy Tern and Hooded Plover.

Threatened species

Corner Inlet supports nine threatened species including:

- Australian fairy tern – the Ramsar site provides significant breeding and feeding habitat for this species and regularly supports greater than one percent of the population.
- Bar-tailed godwit, curlew sandpiper, eastern curlew, great knot, greater sand plover, lesser sand plover and red knot – are international migratory species that spend the non-breeding season in the southern hemisphere. They arrive in late spring, spend the summer feeding on invertebrates in intertidal mudflats and depart for the northern hemisphere in February to March.
- Hooded plover – site supports foraging and breeding of this threatened species.
- Australian grayling – although not recorded in the site, it is present in the streams of the catchment and the species has an obligatory marine life stage and so must pass through the site to complete its lifecycle.

Corner Inlet also provides important habitats, feeding areas, recruitment areas, dispersal and migratory pathways, and spawning sites for numerous fish species of direct and indirect fisheries significance. The site supports a diversity of fish that cover a number of life history strategies: estuarine dependent, marine estuarine opportunists, marine stragglers.

Table 13 describes the susceptibility of the Corner Inlet Ramsar site to the four emergencies considered in this plan. Appendix 3 shows the interactions of the Ramsar sites with the emergencies considered in this plan. Appendix 4 highlights the jurisdictions responsible for management of the Ramsar sites included in this plan.

Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Flooding (catchment)	Extreme rainfall events projected to increase. Physical damage to ecosystem and changes in hydrodynamics.	High	Physical damage to ecosystem, debris, sedimentation damage to seagrass and intertidal and wetland/shore vegetation and invertebrates, toxicants. Change in salinity. Topsoil, nitrogen and phosphorus from Albert River and the Jack River catchments, and Western Tributaries. Franklin, Agnes and Tarra Rivers also contribute (WGCMA CIWQ Improvement 2013). However, ecosystem is adapted to periodic flooding.
Storm tide	Storm surges at high tide combined with sea level rise (SLR) and potentially exacerbated by climate change/extreme storm events with high wind, rainfall/runoff.	High	Greatest risk of extreme sea levels occurs along the northern coastline of the inlet, low laying barrier islands at mouth of inlet vulnerable to inundation. Will cause a change in the ecological character of wetlands from physical perturbation and changes in salinity. Barrier islands likely to absorb/mitigate some impact.
Drought	Altered rainfall and runoff patterns with climate change. Catchment is partly agricultural with competition for water resources.	Medium	Change in water availability to, salinity of intertidal mudflats with recharge from ocean. Freshwater systems most impacted. Shorebirds vulnerable to predation (foxes - BirdLife Australia 2016a MW REF). Change in fringing vegetation and weed pressure/invasion.
Bushfire	Increased sediment and nutrient inflows to waterways and wetlands post-fire	Medium	Change in water quality, impacts on seagrass with flow on impact on nursery/fisheries

Table 13: Susceptibility of Corner Inlet to emergencies in West Gippsland

Gippsland Lakes

The Gippsland Lakes is a large wetland complex located approximately 300 kilometres east Melbourne covering an area of approximately 60 000 hectares (Figure 5-2). The site is highly valued for its ecological, social, economic, and cultural values. A large portion of the Gippsland Lakes extending from Sale Common in the west to Lake Tyers, is listed as a wetland of international importance under the Ramsar Convention on wetlands, especially as waterfowl habitat (GLCC, 2021). East Gippsland CMA is the nominated Ramsar Site Coordinator and administers the GLCC and the Ramsar Coordinating Committee, WGCMA is a member of both these groups.

The *Gippsland Lakes Ramsar Site Management Plan* (EGCMA, 2015) provides a detailed description of the site. The site comprises a series of coastal lagoons formed behind a barrier dune system; however, the ocean beaches and dunes of the Gippsland Coast are outside the site boundary. The Gippsland Lakes have been connected to the Southern Ocean (Bass Strait) by an artificially maintained channel at Lakes Entrance since 1889 and receive freshwater inflows from seven major river systems. The major waterbodies comprising the Gippsland Lakes are Lake Wellington, Lake Victoria and Lake King, which are all large and shallow and occur along a salinity gradient. Lake Reeve is a narrow, shallow water body lying along the coastal dune barrier and has an area of 50 square kilometres. It is usually dry, except for times of high rainfall (Webster et al. 2001) and salinity is generally classified as hypersaline (Tilleard et al. 2009). A number of wetlands that fringe the main lakes are within the site boundary and these range from fresh (Sale Common and Macleod Morass), through brackish to hypersaline. The broad categories of wetlands within the Gippsland Lakes Ramsar site are:

Main Lakes

- Deep Lakes – permanent deep waterbodies, Lakes King and Victoria
- Shallow Lakes – shallow permanent waterbodies, Jones Bay and Lake Wellington

Fringing wetlands

- Freshwater wetlands – two fringing wetlands that have freshwater, Sale Common and Macleod Morass;
- Variably saline wetlands – intermittent wetlands that fluctuate between fresh or brackish and saline, such as Heart Morass, Clydebank Morass and Dowd Morass; and
- Hypersaline wetlands – wetlands with salinity generally greater than seawater, such as Lake Reeve and

Victoria Lagoon.

There are eight components, two processes and two services that are critical to the ecological character of the Ramsar site as identified in the Ecological Character Description. There are also a range of other values associated with the Gippsland lakes that are drivers for the broader management of the Lakes system. Critical component processes and services of Gippsland Lakes are:

- Marine subtidal aquatic beds (seagrass) Seagrass covers an area of approximately 4000-5000 hectares within the Gippsland Lakes Ramsar Site, although there is a high degree of variability over time.
- Coastal brackish or saline lagoons Algal food webs are an important part of the Gippsland Lakes and the large lagoons that are dominated by phytoplankton drive the energy dynamics of the system.

- Freshwater wetlands Limited to Sale Common (West Gippsland) and MacLeod Morass (East Gippsland) at the time of listing (approx. 400ha)
- Brackish wetlands Fringing the open water areas of Lake Wellington including Dowd, Heart, Clydebank Morasses, Lake Coleman and Tucker Swamp (West Gippsland)
- Saltmarsh The dominant vegetation community associated with Lake Reeve and some other fringing wetlands. The Subtropical and Temperate Coastal Saltmarsh Ecological Community is listed under the EPBC Act as vulnerable and is important habitat for fish and shorebirds.
- Abundance and diversity of waterbirds - The site is known to support over 86 species of waterbird with periodic counts exceeding 20,000 individuals.
- The margins and fringing wetlands provide the majority of the significant habitat.
- Saltmarsh and saltflats such as those found at Lake Reeve are important feeding grounds for waders, including migratory species.
- Lake Tyers and islands of the Gippsland Lakes supports breeding of significant numbers of little tern and fairy tern, which then move to other areas in the site such as Jones Bay and Victoria lagoon to feed (all East Gippsland except Victoria Lagoon).
- The freshwater and brackish habitats support significant numbers of waterfowl including black swan (*Cygnus atratus*), chestnut teal (*Anas castanea*) and musk duck (*Biziura lobata*) and larger resident wading bird species.
- The large expanses of open water in Lakes Wellington (West Gippsland), King and Victoria are considered less important as bird habitat, although may be important foraging areas.

Threatened species

Gippsland Lakes supports a number of threatened species including:

- Green and golden bell frog and growling grass frog recorded in Sale Common, Dutson Downs, Dowd Morass, Heart Morass, Clydebank Morass, Macleod Morass.
- Australian grayling –lives in the rivers of the Gippsland Lakes catchment and migrates to the ocean for part of its lifecycle.
- Fairy tern and little tern nest at a number of locations in the Ramsar site, including Lake Tyers (East Gippsland).
- Australasian bittern – inhabits dense reed beds of the fringing wetlands.
- Three species of wetland plant: dwarf kerrawang, swamp everlasting and metallic sun-orchid located on the fringes of Lake Victoria in Blond Bay Wildlife Reserve (East Gippsland).

Waterbird breeding

The Gippsland Lakes Ramsar Site supports breeding of a number of waterbird species across a variety of habitats. This includes:

- Australian pelican at Lake Coleman, Tucker Swamp and Crescent Island.
- Little tern and fairy tern at mud islands and Lake Tyers; and
- Black swan, Australian white ibis, straw-necked ibis and little black cormorant at Macleod Morass, Sale Common and Dowd Morass. In addition, Royal Spoonbills have been recorded nesting at Dowd Morass

Fisheries resource value

The Gippsland Lakes Ramsar Site is an important commercial and recreational fishery as well as providing nursery habitat for a range of fish that form part of the Bass Strait commercial fishery. Over 170 species of fish have been recorded within the site.

Through the development of the Gippsland Lakes Ramsar Site Management plan a rigorous risk assessment process was undertaken to identify key threats to the ecological character of the Ramsar site. The table below outlines the priority threats identified for the various mega-habitats within the Gippsland Lakes Ramsar site.

Table 14 describes the susceptibility of the Gippsland Lakes Ramsar site to the four emergencies considered in this plan. Appendix 3 shows the interactions of the Ramsar sites with the emergencies considered in this plan. Appendix 4 highlights the jurisdictions responsible for management of the Ramsar sites included in this plan.

Emergency scenario	Why it poses a threat	Susceptibility	Susceptibility mediators
Storm tide	Storm surges at high tide combined with sea level rise (SLR) will cause a change in the ecological character of wetlands, seawater ingress, degradation/erosion of shores.	Medium	Lake Reeve and the low-lying swamp lands along the inner edge of the coastal barrier are likely to be the first places to experience more extensive inundation (McInnes et al 2006). Lake Wellington 'salinisation and wave actions have eroded shorelines - liberation of sediments and nutrients, and loss of submerged vegetation'.
Flooding (catchment)	Extreme rainfall events projected to increase. Physical damage to ecosystem and changes in hydrodynamics. Range of freshwater to hypersaline lakes impacted. TBC% of the habitat will be affected by flood by 2070 (TBC)	Medium	Ecosystem adapted to some hydrodynamic/salinity variation. But strong or long duration change in salinity, inundation regime could alter ecosystem make-up. Detritus, sediment, nutrients and toxicants into lakes from agricultural activity along LaTrobe, Avon, Mitchell, Nicholson and Tambo River catchments.
Drought	Altered rainfall and runoff patterns with climate change. Catchment is partly agricultural with competition for water resources.	High	Change in hydrology, saturation and salinity impacting ecological character of each type of lake, wetland, morass. Species loss. Increased weed pressure/invasion.
Bushfire	Increased incidence with climate change/drought could change character of fringing vegetation and influx of nutrients, ash impacting water quality.	Medium	Change in water quality, impacts on aquatic flora and fauna from catchment inflows (sediment, nutrient)

Table 14: Susceptibility of Gippsland Lakes to emergencies in West Gippsland

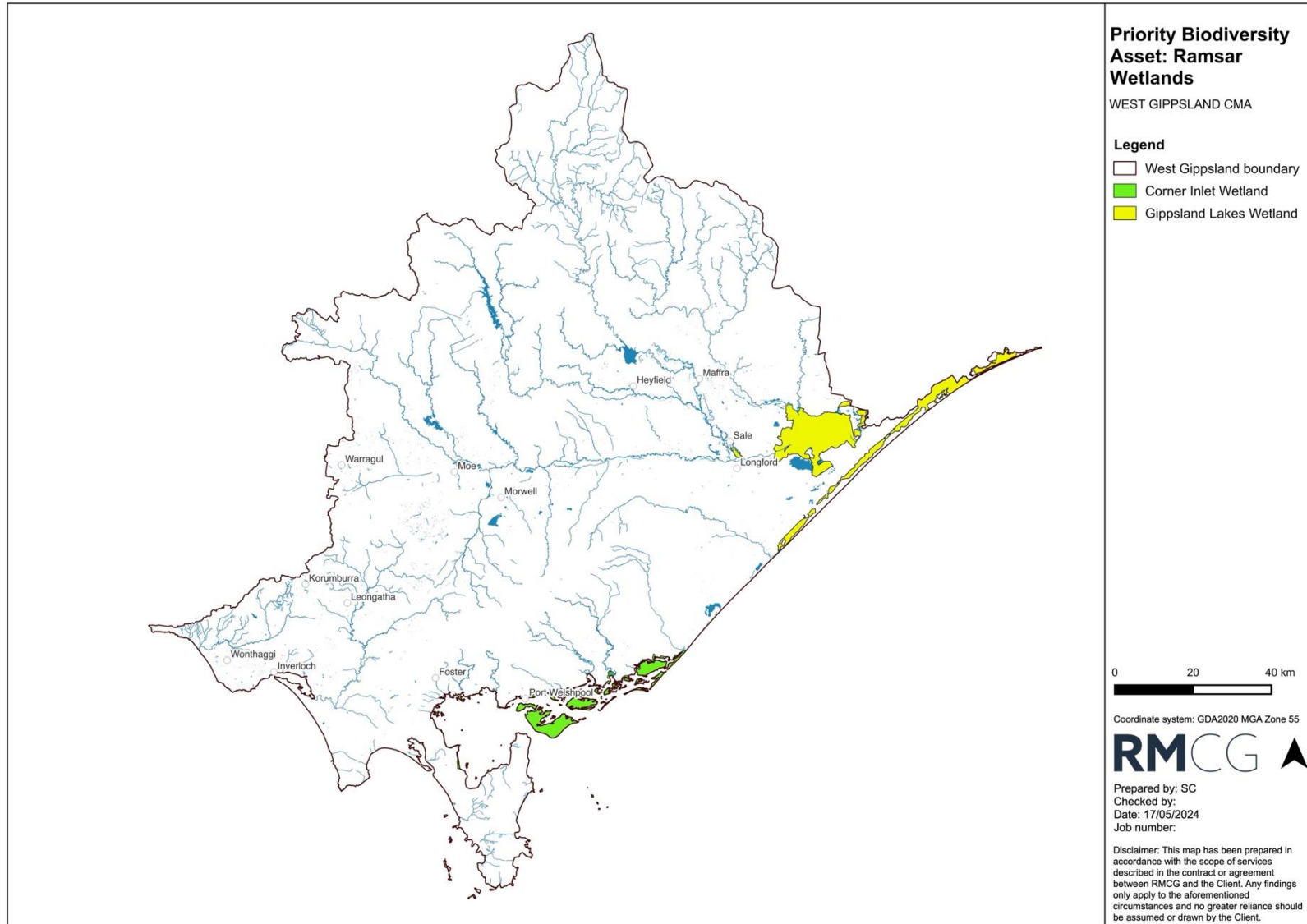


Figure 5-2 Map showing the Ramsar wetland in West Gippsland

5.4 Agricultural natural capital assets

The diverse landscape, rainfall, and soil types across West Gippsland result in a complex mix of different agricultural industries, all with unique challenges and opportunities. Although agriculture in West Gippsland is continually evolving, it remains dominated by pasture-based dairy, meat and livestock enterprises, both irrigated and dryland. Some cropping occurs within grazing enterprises, and there is an emerging horticulture industry.

Agricultural natural capital assets are the natural resources on farms that support food and fibre production. This includes soil, air, water, riparian areas, remnant native vegetation including patches and large hollow-bearing trees, agroforestry and environmental plantings. As noted earlier, for this plan, the agricultural natural capital assets are summarised as:

- Soils
- Water (ground and surface)
- Services from native vegetation

Table 15 describes the susceptibility of West Gippsland's Agricultural Natural Assets to the four emergencies considered in this plan.



Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
Soils	Bushfire	Bushfires can cause loss of native and non-native vegetation on agricultural land, reducing groundcover. This exposes soils making them more susceptible to erosion through wind and water. The steeper areas in the region are particularly prone to soil erosion.	Medium	There are some areas of the region that are at high risk of bushfire, are steep and have erosion prone soils. Loss of groundcover will expose them to significant erosion risk however this represents a relatively small proportion of the total area of agricultural land in the region.
	Drought	Drought can lead to soil degradation due to groundcover loss and consequent erosion risk. This can reduce productivity and can delay recovery post-drought.	High	The scale of droughts in the region mean that all parts of the region are affected therefore soils across the region can be affected.
	Flooding	Flooding can degrade soils due to erosion. Soil can also be degraded (at least over the short-term) due to extended periods of waterlogging. This can reduce productivity in subsequent years but is generally a short-term impact.	Medium	The scale of floods in the region means that this threat tends to be isolated and occurs on a relatively small proportion of the region's agricultural land.
Water (ground and surface)	Bushfire	Bushfire can lead to water quality issues, particularly for surface water. Sediment and run-off from agricultural land has the potential to impact water quality following a bushfire event affecting both agriculture and biodiversity.	Medium	The extent of fires and their position in catchments has a major influence on their potential impacts on water. If a key water supply catchment is burned the impacts can be significant for stock and irrigation water quality. The scale of fires is the key determinant of susceptibility.
	Drought	Reduced ground and surface water availability can have a major impact on irrigation dependent agricultural operations as well as water supply for stock.	High	The scale of droughts in the region mean that all parts of the region are affected therefore water quality and quantity across the region can be affected.
	Flooding	Flooding can lead to water quality issues (e.g. fences can be washed away in floods allowing stock direct access to waterways)	Low	The scale of floods in the region means that this threat tends to be isolated and occurs on a relatively small proportion of the region's agricultural land.
Services from native vegetation	Bushfire	The agricultural land in this region features significant areas of native vegetation which provides services to agriculture such as insectaries to support biological control of pests, pollination and water filtration services. Bushfire can lead to the loss of this native vegetation on farmland and the consequent loss of these services.	Low	The areas of the region that are at high risk of high intensity bushfire, are most at risk of losing the native vegetation. However, bushfire on farmland is likely to be lower intensity (due to limited fuels) and remnant native vegetation is generally fire adapted, which means that the overall susceptibility is reduced.
	Drought	Drought can lead to the loss of remnant native vegetation on farmland and the consequent loss of the services that the farm operation receives from those areas. Drought also increases stress on native vegetation and it's capacity to function in an agricultural landscape (i.e. as insectaries, provision of shade/shelter, pollination and water filtration ecosystem services).	High	The scale (and duration) of droughts in the region mean that all parts of the region are affected therefore native vegetation across the region could be affected. Given the areas of vegetation on agricultural land are generally small and fragmented, they are more vulnerable to drought stress.
	Flooding	Flooding can lead to the degradation of remnant native vegetation on farmland and the consequent loss of the services that the farm operation receives from those areas. Loss of vegetation is possible but only in extreme events.	Low	The scale of floods in the region means that this threat tends to be isolated and occurs on a relatively small proportion of the region's agricultural land.

Table 15: Susceptibility of agricultural assets to emergencies in West Gippsland

6 General preparedness

This section outlines broad actions offering system-level preparedness (fire and investment) and more specific preparedness actions that could be undertaken for each biodiversity asset to reduce the threat of relevant emergency scenarios such as bushfires, drought, flooding, and storm tide.

Tables for each biodiversity asset are provided in Section 10, where specific action is required:

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

6.1 Fire preparedness

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

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

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

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

DEECA's Bushfire Risk, Engagement and Predictive Services team have maps of relative bushfire risk in West Gippsland which are relevant for this Plan (Figure 3-1). These maps show the relative intensity and likelihood of bushfire in the West Gippsland landscape, based on a worst-case scenario of maximum fuel loads and worst-case bushfire weather.

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

Victorian Flora and Fauna Guarantee Act 1988 (FFG) and the Victorian Planning and Environment Act 1987.

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

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

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

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

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

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

6.2 Preparedness requiring investment

The development of this Plan highlighted several priority areas requiring further investment to effectively protect biodiversity assets from the impacts of natural disasters and emergency events. Examples of landscape-scale actions include:

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

Common actions for biodiversity assets that require investment include surveys in suitable habitat to:

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

7 General Response

This section outlines response actions that could be undertaken for each biodiversity asset in response to relevant emergency scenarios during an event, like a bushfire, drought, flooding or storm tide including:

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

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

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

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

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

8 General recovery

This section considers emergency recovery considerations impacting all biodiversity assets. DEECA is the Recovery Coordinating Agency for the following areas related to this Plan (among other areas):

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

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

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

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

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

9 Emergency Management Actions

The actions detailed in the following tables relate to specific assets and are in addition to the generic actions described in the sections above. Appendix 2 includes maps showing the interactions between biodiversity assets and emergencies.

9.1 Biodiversity assets: threatened species

Asset name	Emergency event	Susceptibility rating	Key actions	Who
Hooded plover	Stormtide	High	Preparedness: Monitoring location and status of nests in breeding season (current national project led by BirdLife Australia); evaluate/consider retreat zones for habitat in face of coastal erosion. Response: no known actions to take during stormtide event. Recovery: Monitor population and breeding success; continue to protect nests and territories where possible (as per NRM Plan 2022); coastal retreat of shoreline as SLR eats into coastline.	Parks Victoria, BirdLife Australia, GLaWAC, BLCAC
	Drought/flooding	Medium	Preparedness: Monitoring location and status of nests (esp. estuarine/wetland nests) and seasonal habitat used by juveniles and non-breeding birds; identify mitigation strategies and works in preparation for flood; assess opportunities for use of environmental flows for wetland and estuarine maintenance (drought) Response: co-ordination with EM/incident control team to inform response; irrigation of key habitat/wetlands during drought; relocation of eggs if necessary/possible during flooding event Recovery: Monitor population and breeding success; increase protection from foxes, people, dogs during recovery; monitor wetland hydrodynamics and impact on reproduction, nesting.	
	Heatwave	Unknown	Preparedness: monitor and investigate potential impact of heatwaves on reproductive success; Response: insufficient information on impacts to recommend a response; Recovery: continued recovery strategies as described in NRM Plan 2022	
Leadbeater's Possum (wollert)	Bushfire	High	Preparedness: Fuel management around key populations and habitat. Spatial information identifying key habitat and populations is developed and provided to fire management agencies. Response: Fire management agencies use spatial data on habitat and populations to reduce direct fire impacts (e.g. exclude fire when possible). Recovery: Population support measures and habitat restoration post fire	DEECA, Parks Victoria, GLaWAC, Trust for Nature, CFA
	Heatwave	Unknown	Susceptibility unknown so no actions identified.	
	Drought	Unknown	Susceptibility unknown so no actions identified.	
New Holland Mouse (pookila)	Drought	Medium	Preparedness: Farmland use around key populations and habitat. Spatial information identifying key habitat and populations is developed and provided to emergency management agencies. Response: Emergency management agencies use spatial data on habitat and populations to reduce direct drought impacts if possible. Recovery: Population support measures and habitat restoration post drought and associated actions as per pages 23-46 of DRAFT National Recovery Plan 2024.	DEECA, Zoos Victoria, Parks Victoria, GLaWAC, Trust for Nature, private landholders, Agriculture Victoria, CFA, Gippsland Water
	Bushfire	Medium/low	Susceptibility medium to low so no actions identified.	
	Flooding	Low	Susceptibility low so no actions identified.	
	Heatwave	Unknown	Susceptibility unknown so no actions identified.	
Giant Gippsland earthworm	Drought	High	Preparedness: Monitoring and management of habitat saturation, water availability and water quality. Mitigation activity with farmers (recharge of soil). Response: Potential irrigation of key habitat or population where known. Recovery: monitor recovery; manage key habitat (negotiate with private landholders to exclude stock, provide soil recharge/water).	DEECA, Parks Victoria, BLCAC, GLaWAC, Trust for Nature, private landholders, Agriculture Victoria
	Flooding	Medium	Preparedness: Work with private landholders to manage impacts from flood preparation/mitigation works (drainage/earthworks), sediment trapping works/planting for flood events; on-farm soil and nutrient management. Response: No appropriate response during event. Recovery: Monitoring of recovery; removal of debris/rubbish; exclusion/ removal of stock to limit compaction of favoured habitat; restoration works (e.g. earthworks, planting) in co-operation with Parks Victoria.	
	Bushfire	Low	Susceptibility low so no actions identified.	

Table 16: Actions for susceptible assets for emergencies in West Gippsland

9.2 Biodiversity assets: TECs

Asset name	Emergency event	Susceptibility rating	Key actions	Who
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Flooding	Medium	Preparedness: Protection of wetlands and creation of buffer zones. Flood mitigation works (e.g. drainage or diversions) where possible. Response: none identified Recovery: Wetland restoration - removal of debris, manage pest animals and monitor weeds.	Parks Victoria, BLCAC, GLaWAC, Trust for Nature, private landholders, Agriculture Victoria, Greening Australia, Melbourne Water, CMAs
	Drought	High	Preparedness: Prevention of drainage of wetlands. Community engagement. Response: Planned irrigation, use of levees/environmental flow allocations to hydrate wetlands. Recovery: Manage pest animals, grazing and weeds during recovery period	
Alpine Sphagnum Bogs and Associated Fens	Bushfire	High	Preparedness: Ensure that peatland mapping is updated in statewide databases used by Fire Incident Management Teams. Protect alpine peatlands from fuel reduction activities, firebreaks, back-burning, and vehicle and machinery movements (Applicable for sub-clusters on public land) AND Encourage landowners to protect alpine peatlands on private property when managing fire on their land. (Applicable for sub-clusters on private land). Establish insurance populations of key species/seed bank. Response: no action during event. Recovery: monitoring and maintenance/exclusion of weeds, pests.	Parks Victoria, GLaWAC, Trust for Nature, Greening Australia, CMAs
	Drought	High	Maximise the structural and functional integrity and resilience of alpine peatlands to the effects of climate change by undertaking recommended actions to address other threats (Applicable for sub-clusters on public land.)	
Gippsland Red Gum Grassy Woodland and Associated Native Grassland	Bushfire	Medium	Preparedness: identify, map and monitor high quality remnant stands; develop and implement appropriate management regimes to maintain the distinctive biodiversity elements of the ecological community (for example, strategic grazing regimes, roadside verge management practices or appropriate fire regimes). Response: prepared strategy with incident management team. Recovery: as per conservation advice and NRM Plan 2022, monitor recovery and exclude weeds, pests, negotiate for protection from grazing with private landholders.	DEECA, Parks Victoria, GLaWAC, Trust for Nature, CFA
	Drought	Medium	Preparedness: identify, map and monitor high quality remnant stands; develop and implement appropriate management regimes to maintain the distinctive biodiversity elements of the ecological community (for example, strategic grazing regimes, roadside verge management practices or appropriate fire regimes). Response: prepared strategy with incident management team. Recovery: as per conservation advice and NRM Plan 2022, monitor recovery and exclude weeds, pests, negotiate for protection from grazing with private landholders.	
Natural Damp Grassland of the Victorian Coastal Plains	Bushfire	High	Preparedness: identify, map and monitor high quality remnant; mapping is updated in statewide databases used by Fire Incident Management Teams. Protect from fuel reduction activities, firebreaks, back-burning, and vehicle and machinery movements (Applicable for sub-clusters on public land) AND Encourage landowners to protect TEC on private property when managing fire on their land. (Applicable for sub-clusters on private land). Establish insurance populations of key species/seed bank. Response: prepared strategy with incident management team. Recovery: as per conservation advice and NRM Plan 2022, monitor recovery and exclude weeds, pests, negotiate for protection from grazing with private landholders.	private landholders. Ag Vic, Parks Victoria, DEECA
	Drought	High	Preparedness: identify, map and monitor high quality remnants; develop and implement appropriate management regimes to maintain the distinctive biodiversity elements of the ecological community (for example, strategic grazing regimes or appropriate fire regimes). Response: prepared strategy with incident management team. Recovery: as per conservation advice and NRM Plan 2022, monitor recovery and exclude weeds, pests, negotiate for protection from grazing with private landholders.	
Subtropical and Temperate Coastal Saltmarsh	Drought	High	Preparedness: identify, map and monitor high quality remnants; develop and implement appropriate management regimes to maintain the distinctive biodiversity elements of the ecological community. Response: prepared strategy with incident management team. Recovery: as per conservation advice and NRM Plan 2022, monitor recovery and exclude weeds, pests, negotiate for protection from drainage or earthworks with private landholders.	Parks Victoria, BirdLife Australia, GLaWAC, Trust for Nature, private landholders, CoastCare
	Stormtide	High	Preparedness: Prevent and manage any changes to hydrology that impact the marshlands. Ensure that development activities minimise direct impacts to the ecological community and indirect effects on its ecological function. Investigate options for permanent protection of good quality remnants. Ensure that networks of TEC that serve as refugia or linkages for wildlife and their habitat are maintained across the landscape. Response: no response during event. Recovery: Monitor the progress of recovery, post major events.	
Assemblages of species with open-coast salt-wedge estuaries of western and central Victoria ecological community	Drought	High	Preparedness: identify, map and monitor high quality remnants; develop and implement appropriate management regimes to maintain the distinctive biodiversity elements of the ecological community. Response: prepared strategy with incident management team. Recovery: as per conservation advice and NRM Plan 2022, monitor recovery and exclude weeds, pests, negotiate for protection from drainage or earthworks with private landholders.	Parks Victoria, BirdLife Australia, GLaWAC, Trust for Nature, private landholders, CoastCare, CMAs
	Stormtide	High	Preparedness: Prevent and manage any changes to hydrology that impact the wedgelands. Ensure that development activities minimise direct impacts to the ecological community and indirect effects on its ecological function. Investigate options for permanent protection of good quality remnants. Ensure that networks of wetlands that serve as refugia or linkages for wildlife and their habitat are maintained across the landscape. Response: Develop and implement appropriate grazing regimes for the TEC where adjacent to or on private land. Recovery: Monitor the progress of recovery, post major events.	

Table 17: Actions for susceptible assets for emergencies in West Gippsland

9.3 Biodiversity assets: Ramsar wetlands

Asset name	Emergency event	Susceptibility rating	Key actions	Who
Corner Inlet	Flooding (catchment)	High	Preparedness: flood mitigation and sediment trapping works/planting for flood events; on-farm soil and nutrient management. Continue onground works and monitoring identified in NRM Plan 2022 (Pg 57). Response: If warranted, removal/relocation of key species (insurance population). Recovery: Monitoring of recovery; removal of debris/rubbish; exclusion/ removal of pests and weeds; restoration works (e.g. earthworks, planting) in co-operation with Parks Victoria.	Parks Victoria, BirdLife Australia, GLaWAC, Trust for Nature, private landholders, Ag Vic, WGCMA
	Stormtide	High	Preparedness: resilient wetland ecosystem; base level monitoring of physicochemical state; trialling of buffers to surge and establishment of 'retreat zones' for non-sessile species during events Response: If warranted, removal/relocation of key species (insurance population). Recovery: Wetland restoration, managed retreat.	
	Drought	Medium	Preparedness: Monitoring of water levels in order to identify when drought impacts are/will occur. Response: If warranted, irrigation of selected shoreline assets (e.g. NRM Plan 2022 'construction of watering infrastructure' Lower Latrobe Wetlands). Relocation of key estuarine (intermediate saline tolerance) plant species/insurance population. Recovery: Monitoring of recovery; exclusion of threats (e.g. weeds, ferals, predators, people); irrigation, planting for wetland restoration.	
	Bushfire	Medium	Preparedness: As per CSIRO 2022, gather water quality information for assets within Ramsar site. Response: incident controller access to maps and information on key assets - waterways in the CI catchment. Recovery: reduce nutrient and other contaminants that can mobilise post-bushfires; maintain health of aquatic and shoreline vegetation to slow nutrient cycling (CSIRO 2022).	
Gippsland Lakes	Stormtide	Medium	Preparedness: onground works and monitoring (as per NRM Plan 2022) to increase resilience of wetland ecosystem; base level monitoring of physicochemical state; investigate infiltration vs. direct ingress of seawater to system; establishment of buffers to surge and establishment of 'retreat zones' for non-sessile species during events; plan for managed retreat Response: If warranted, removal/relocation of key species (insurance population). Recovery: Wetland restoration.	Parks Victoria, GLaWAC, Trust for Nature, private landholders, Agriculture Victoria, Greening Australia, CMAs
	Flooding (catchment)	Medium	Preparedness: Review potential drainage/earthworks, sediment trapping works/planting for flood events; on-farm soil and nutrient management. Response: If warranted, removal/relocation of key species (insurance population). Recovery: Monitoring of recovery; removal of debris/rubbish; exclusion/ removal of pests and weeds; restoration works (e.g. earthworks, planting)	
	Drought	High	Preparedness: Monitoring and management of water levels and water quality. Upstream activity with farmers (topsoil, runoff). Response: If warranted, irrigation of selected shoreline assets (e.g. NRM Plan 2022 construction of watering infrastructure for Lower Latrobe wetlands). Relocation of key plant species/insurance population. Recovery: Monitoring of recovery; manage threats (e.g. weeds, ferals, predators); recovery plantings for wetland restoration.	
	Bushfire	Medium	Preparedness: As per CSIRO 2022, gather water quality information for assets within Ramsar site; mapping identifying parts of the system at highest risk post-fire Response: incident controller access to maps and information on key assets. Recovery: reduce nutrient and other contaminants that come from bushfires, and maintain health of aquatic and shoreline vegetation to slow nutrient cycling (CSIRO 2022).	

Table 18: Actions for susceptible assets for emergencies in West Gippsland

9.4 Agricultural assets

Asset name	Emergency event	Susceptibility rating	Key actions	Who
Soils	Bushfire	Medium	<p>Preparedness: Support landholders to take actions on-farm such as:</p> <ul style="list-style-type: none"> Managing fire fuel loads (on-going) Preparing a whole farm plan that includes identification of natural capital assets (soil, water, native vegetation). (status unknown). <p>Recovery: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Revegetation Whole farm planning post fire. (Status unknown). 	Agriculture Victoria Private land managers
	Drought	High	<p>Preparedness: Drought resilience planning and advice to landholders on actions to take in preparation for drought (on-going) including:</p> <ul style="list-style-type: none"> Creating stock exclusion areas Grazing management plans to preserve pasture and groundcover Plant alternative fodder crops that are more drought tolerant than conventional pasture species Plant crop varieties that are more drought tolerant than conventional crops Develop farm business resilience plans that build in drought risk. <p>Response: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Reduce stocking rates and use stock containment Emergency access to water for stock (animal welfare) Manage drought conditions in accordance with farm business resilience plans. <p>Recovery: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Pasture recovery and grazing management during drought recovery Implement farm business resilience plan post drought. 	Agriculture Victoria Private land managers
	Flooding	Medium	<p>Preparedness: Support landholders to take actions on-farm such as:</p> <ul style="list-style-type: none"> Preparing a whole farm plan that includes identification of natural capital assets (soil, water, native vegetation). (status unknown). <p>Recovery: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Pasture recovery to restore groundcover 	WGCMA, Agriculture Victoria Private land managers
Water (ground and surface)	Bushfire	Medium	<p>Preparedness: Support landholders to take actions on-farm such as:</p> <ul style="list-style-type: none"> Managing fire fuel loads on-farm (on-going) Preparing a whole farm plan that includes identification of natural capital assets (soil, water, native vegetation). (status unknown). <p>Recovery: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Soil and pasture recovery to restore groundcover and prevent sediment and nutrient movement into waterways Revegetation Whole farm planning post fire. (Status unknown). 	Agriculture Victoria Private land managers, CMAs
	Drought	High	<p>Preparedness: Drought resilience planning and advice to landholders on actions to take in preparation for drought (on-going) including:</p> <ul style="list-style-type: none"> Creating stock exclusion areas Grazing management plans to preserve pasture and groundcover Develop farm business resilience plans that build in drought risk. <p>Response: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Emergency access to water for stock (animal welfare) Manage drought conditions in accordance with farm business resilience plans. <p>Recovery: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Pasture recovery and grazing management during drought recovery Implement farm business resilience plan post drought. 	Agriculture Victoria, Private land managers
Services from native vegetation	Drought	High	<p>Preparedness: Drought resilience planning and advice to landholders on actions to take in preparation for drought (on-going) including:</p> <ul style="list-style-type: none"> Grazing management plans to preserve native vegetation Develop farm business resilience plans that build in drought risk. <p>Response: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Reduce stocking rates and use stock containment Manage drought conditions in accordance with farm business resilience plans. <p>Recovery: Support landholders to take actions on-farm (on-going) such as:</p> <ul style="list-style-type: none"> Excluding stock from native vegetation Implement farm business resilience plan post drought. 	Agriculture Victoria, Private land managers

Table 19: Actions for agricultural natural capital assets for emergencies in West Gippsland

10 Emergency management in Victoria

This section describes Victoria's emergency-management planning framework and, together with Section 12 of this Plan, describes the roles and responsibilities of organisations involved in emergency management in Victoria including the role of WGCMA. Figure 10-1 depicts Victoria's emergency management planning framework.

10.1 Victorian Emergency Management Act

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

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

10.2 Victorian State Emergency Management Plan

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

10.3 Gippsland Regional Emergency Management Plan

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

West Gippsland is part of the Gippsland emergency management region. The Gippsland emergency management region extends along the east coast of Victoria to the NSW border, and is bounded at the west by Hume, Metro and Southern Metro emergency management regions. The Gippsland emergency management region comprises two subregions – East Gippsland and West Gippsland – which between them co-ordinate with 7 Local Government Areas.

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

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

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

10.4 Municipal Emergency Management Plans

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

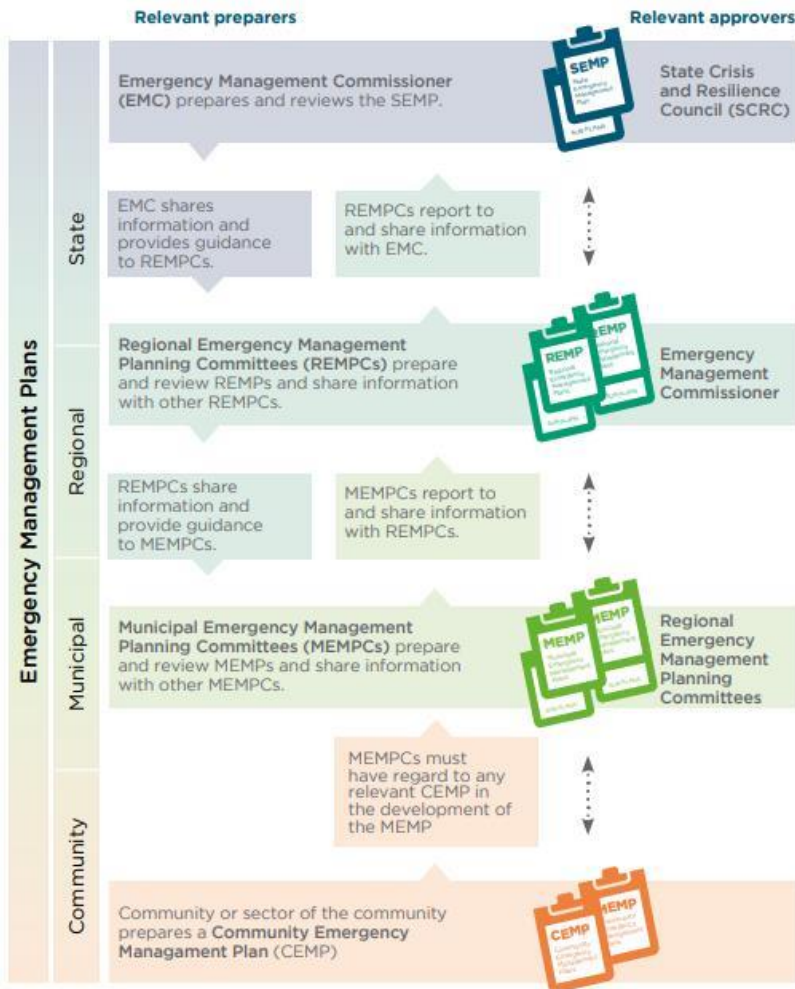


Figure 10-1. Framework for emergency management planning in Victoria (EMV, 2023)

11 Organisational Roles and Responsibilities

11.1 Key organisations and contacts

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

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

This Plan lists organisations involved in emergency preparedness, response and recovery and what their role is in relation to this Plan (Table 20). The Plan does not list contact names and details because they are subject to frequent change.



Organisation	Role
Agricultural extension and industry groups including: (Landcare; Southern Farming Systems; Food and Fibre Gippsland; GippsDairy)	Farmer-led organisations supporting peer learning and practical information on best-management techniques for soil conservation and productivity benefits in local conditions. These organisations partner with WGCMA on sustainable- agriculture projects and activities, including supporting farmers to retain ground cover to protect productive soils from wind and water erosion, including during and after bushfire, flood, and drought.
Bunurong Land Council Aboriginal Corporation (BLCAC)	Trustee for the Native Title rights and interests of the Bunurong peoples of the South East Kulin Nation as recognised in the Consent Determination in 2005. Registered Aboriginal Party under the <i>Victorian Aboriginal Heritage Act 2006</i> .
BirdLife Australia	A bird conservation charity with members and volunteers undertaking bird monitoring, community education and habitat restoration projects in the West Gippsland region.
Country Fire Authority (CFA) / Fire Rescue Victoria.	The CFA is a large volunteer-based emergency-service organisation. The CFA works with Victoria’s emergency services to fulfil its mission to protect lives and property through operational response and the promotion of community safety and education. The CFA plays a role in implementing this plan to protect biodiversity and agricultural natural-capital assets when performing its operations. The CFA works with Victorian fire-fighting agency Fire Services Victoria.
East Gippsland Catchment Management Authority (EGCMA)	Integrated management of land, biodiversity, and water resources in the East Gippsland region, including as lead agency for the Ramsar listed Gippsland Lakes.
Gippsland Water Corporation	Responsible for managing groundwater and surface-water resources, including water and wastewater services and associated infrastructure.
Greening Australia	Engages the community in vegetation management to protect and restore the health, diversity, and productivity of Australian landscapes.
Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	Represents Traditional Owners from the Brataualung, Brayakaulung, Brabralung, Krauatungalung and Tatungalung family clans, who were recognised under the Traditional Owner Settlement Act 2010. GLaWAC is the Prescribed Body Corporate (PBC) for the Gunaikurnai people and claim area, and the Registered Aboriginal Party for the Gunaikurnai claim area.
Gunaikurnai Traditional Owner Land Management Board (GKTOLMB)	Coordinate development of a joint management plan by working closely with the Gunaikurnai people, joint management partners and consulting with all groups and individuals
Landcare Networks	The Bass Coast, Latrobe Catchment, Maffra and Districts, South Gippsland and Yarram Yarram Landcare Networks are community-based organisations that provide support to Landcare Groups and landholders in their local areas through leadership, planning and resources.
Local farming, conservation, and waterway protection groups: Landcare groups, ‘Friends of’ groups, river- improvement committees.	Gippsland environmental volunteering groups whose focus includes capacity building and undertaking on-ground natural resource management works such as invasive plant and animal control, revegetation, waterway monitoring and improving farming practices at a local scale.
Local government areas of: Baw Baw; Bass Coast; South Gippsland; Latrobe and Wellington Shire Councils.	Responsible for localised services including emergency management such as response and recovery. Have a legislated role to assist with local planning and preparation for emergency events. This involves leading the preparation of Municipal Emergency Management Plans (MEMP) and coordinating MEMP Committee meetings involving local emergency-management agencies.
Parks Victoria.	A statutory authority established to protect, conserve and enhance Parks Victoria- managed land, including its natural and cultural values, for the benefit of the environment and current and future generations consistent with the Parks Victoria Act 2018. Parks Victoria plays a significant role in fire and emergency management as a support agency and partner in the whole-of-government planning and response program. Parks Victoria supports DEECA to prepare for, respond to and recover from bushfires on public land. Parks Victoria also has a key support role in other emergency events. Parks Victoria works in partnership with DEECA responding to bushfires and conducting planned burns and other fuel-management activities under the brand ‘Forest Fire Management Victoria’ (FFMVic). Parks Victoria also engages in a comprehensive monitoring and research program informing bushfire- management planning. This includes pre-fuel and post-fuel hazard monitoring, projects relating to ecosystem reliance, evidence-based management and application of ecological fire and post-fire regeneration in fire-sensitive bioregions (Parks Victoria, 2024).
South Gippsland Water Corporation	Responsible for managing groundwater and surface-water resources, including water and wastewater services and associated infrastructure.
Trust for Nature.	Responsible for helping people protect biodiversity on private land. This includes conservation covenants, land-management stewardship, Revolving Fund program, land ownership and management and assistance in arranging native-vegetation offsets. Trust for Nature can support and facilitate fire on private land for asset management and threatened species purposes.
Victorian Government Department of Energy, Environment and Climate Action (DEECA).	DEECA brings together Victoria’s energy, environment, water, agriculture, forestry, resources, climate action and emergency-management functions into a single department to maximise connections between the environment, community, industry and economy. DEECA aims to improve Victoria’s liveability with a population that is expected to almost double by 2050, while responsibly taking climate action and protecting the natural environment, infrastructure and heritage for future generations.
Agriculture Victoria.	Agriculture Victoria works with the agriculture industry on research, development, and extension to improve production, connect the sector with international markets, support development and maintain effective biosecurity controls. Agriculture Victoria works with Victorian farmers and industry to prepare for, respond to and recover from natural disasters, including floods and storms. This includes delivering technical information and supporting events to support farm- business recovery. Agriculture Victoria also works with industry, community, and other government agencies to respond to biosecurity outbreaks. Agriculture Victoria is a lead regulator for Biosecurity, including: <ul style="list-style-type: none"> • The lead agency for managing biosecurity legislative outcomes and biosecurity threats within Victoria. • Working with the Commonwealth and other state and territory governments to enhance Australian and Victorian biosecurity through national committees, working groups, production of standards and shared emergency management exercises. • Collaborating with other Victorian government departments to ensure the effective delivery of biosecurity outcomes and compliance and to ensure enforcement is delivered within this system. • Working with local government and community groups to promote shared responsibility within our biosecurity system.
DEECA - Forest Fire Management Victoria (FFMVic)	FFMVic’s core purpose is to protect people, property and the environment by managing bushfires and bushfire risk in Victoria’s parks, forests and other public land, and by minimising the impact of fire on communities and the environment. This management includes: risk-based bushfire management and planning; fire prevention and preparedness; fuel-management programs (including planned burning); and emergency response and recovery.
Victorian Government Department of Transport and Planning (DTP)	DTP’s key responsibility for emergency management is to minimise the impact of emergencies across its portfolio areas through effective preparation, coordination, response, and recovery. DTP’s role in this Plan is in relation to biodiversity assets on roadsides managed by DTP.
Victoria Police (VicPol)	VicPol’s role is to serve the Victorian community and uphold the law to promote a safe, secure and orderly society through preserving the peace, protecting life and property, preventing the commission of offences, detecting and apprehending offenders and helping those in need of assistance. VicPol has emergency- management control and coordination functions, as outlined in the <i>Emergency Management Act 2013</i> and the SEMP.
Victoria State Emergency Service (VicSES).	VicSES is a volunteer-based organisation that provides emergency assistance to minimise the impact of emergencies and strengthen the community’s capacity to plan, respond and recover, when emergencies occur. VicSES is the control agency for storm, flood, earthquake, tsunami and landslide throughout Victoria.
West Gippsland Catchment Management Authority	West Gippsland CMA’s primary role in relation to emergencies is to provide support and advice and to assist with recovery in areas where it can provide expertise. An organisational role statement in the SEMP describes the support and advisory role of CMAs in mitigation, response, and recovery in relation to floods, the natural environment, and land (https://www.emv.vic.gov.au/responsibilities/state-emergency-management-plan-semp/roles-and-responsibilities).

Table 20: Key lead and supporting organisations involved in emergency preparedness, response and recovery in the Gippsland that will help deliver on this plan.

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

This includes Ambulance Victoria, Australian Red Cross, Department of Families, Fairness and Housing, Department of Health, South and Central Gippsland Health, Emergency Recovery Victoria, and VCC Emergencies Ministry.

11.2 WGCMA's experience, knowledge and expertise

As part of its statutory obligations under the Catchment and Land Protection Act, the WGCMA provides NRM leadership and coordination throughout the West Gippsland region. The WGCMA supports more than 95 volunteer groups like Landcare and Coastcare, and have led the establishment of the GEA which is the peak environmental agencies group in Gippsland. WGCMA have also developed strong relationships with both GLaWAC and BLCAC the 2 Registered Aboriginal Parties (RAPs) that cover over 90% of the West Gippsland region. The relationships with these RAPs have been recognised in a formal MoU between the organisations build WGCMA's cultural competency and aims to support self-determination and build WGCMA's cultural competency.' WGCMA has been the preferred service deliverer of environmental, natural-resource management and sustainable- agriculture projects in West Gippsland for the Australian and Victorian Governments since 1997. This includes Natural Heritage Trust (NHT)-funded programs. It is recognised for delivering integrated, innovative, strategic, value-for-money projects, making significant contributions to the environment, sustainable agriculture and community, while aligning with investors' priorities.

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

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

WGCMA has proven expertise in developing and implementing regional strategies and plans in collaboration with stakeholders and the regional community. It has strong working relationships with the region's Traditional Owner groups.

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

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

12 Community and stakeholder engagement

This section outlines WGCMA’s approach to developing and communicating this Plan to stakeholders, including how we will support (and integrate this plan into) Commonwealth, state and territory government efforts to identify and incorporate biodiversity and agricultural natural-capital assets into emergency response management and planning systems. Table 21 is the register of consultations to-date, and this will be the start of further stakeholder consultation WGCMA will undertake in the future refinements to the Plan by the WGCMA.

Who was consulted	How	When	Notes
Gippsland Environmental Agencies Delivery Managers (Parks Vic, Emergency Management Victoria, Agriculture Victoria)	Stakeholder meeting	April 2024	Briefed agencies on the project, requested information from partners to contribute to the plan. Partners requested individual phone interviews to test the ratings and discuss outcomes due to the short timeframes for delivery.
Parks Victoria	Phone interview	May 2024	Susceptibility ratings discussed, no concerns raised
BirdLife Australia	Phone interview	May 2024	Susceptibility ratings discussed, no concerns raised
DEECA	Phone interview	May 2024	Susceptibility ratings discussed, no concerns with ratings. Wider concern about need for CMA Plans to be integrated to be of any value during emergency event.
Agriculture Victoria	Phone interview	May 2024	Susceptibility ratings discussed, no concerns raised.
Emergency Recovery Victoria	Meeting	April	As part of Gippsland Regional Delivery Managers meeting, Plan overview and invitation to participate.
BLCAC	Meeting	April 2024	Overview of the Plan and its purpose. How and when they would like to be involved. Interest however priority low, support WGCMA input to finalise and explore opportunities for future collaboration at a later date.
GLaWAC	Meeting	April 2024	Overview of the Plan and its purpose. How and when they would like to be involved. Interest however priority low, support WGCMA input to finalise and explore opportunities for future collaboration at a later date.

Table 21: Register of stakeholder consultation activities as at 30th May 2024

12.1 Engagement, collaboration and co-ordination activities

WGCMA has excellent relationships with emergency services, biodiversity, and sustainable agriculture stakeholders and Traditional Owners across the Gippsland region. Working in collaboration with stakeholders and the regional community is a strength of its approach to delivering plans, strategies, and projects. The engagement approach for this plan builds on these existing relationships.

Due to the short timelines of this project, the Plan has utilised existing data and information developed through detail previous regional planning processes e.g., Regional Catchment Strategy (2021-2027), NRM Plan for West Gippsland (2022), Drought Resilience Plan for Gippsland (2023) etc... The development of these plans involved significant stakeholder involvement and collaboration with a wide number of key partners and regional groups. Consolidating that information into a draft Plan was then used to undertake targeted engagement with key regional stakeholders as outlined below. The approach used to develop and communicate this Plan to stakeholders and collaborate included:

- Providing stakeholders with early information at the commencement of Plan development from April 2024 and inviting feedback on their preferences regarding their involvement.
- Providing information via existing forums that emergency services, biodiversity and agricultural stakeholders are already involved with and meet regularly. This included Gippsland Regional Delivery Managers (Feb and May 2024) of meetings that discussed the Plan.
- Multiple meetings, phone discussions and emails with key stakeholders including DEECA Forest Fire Management Victoria and Natural Environment Programs, Emergency Recovery Victoria, Bird Life Australia, Parks Victoria, Agriculture Victoria, Victorian CMAs, and Traditional Owners* (GLaWAC and BLCAC).
- Providing multiple and flexible opportunities for input, including targeted contributions provided to stakeholders early and at key points during the development process. This included WGCMA inviting stakeholders to provide feedback on and contribute to:
 - Threat and susceptibility assessment for each biodiversity and agricultural ecosystem assets proposed for inclusion in the Plan during May 2024 via distribution of draft Plan and follow-up phone calls (see Table 21).
 - Initial draft information describing preparedness, response and recovery actions proposed for each biodiversity asset and agricultural ecosystem assets during consultation workshop.
 - A full draft of the Plan and associated mapping provided post workshop for comment and feedback.

*direct engagement with GLaWAC and BLCAC has occurred with the development of this Plan. Both GLaWAC and BLCAC have indicated that the timelines for appropriate engagement are not suitable for them to participate in a meaningful way. However, both have asked the WGCMA to prepare a statement to include in the Final Plan that outlines high risks to cultural heritage and opportunities for future engagement. This is currently being prepared and will be included in a future refinement of the Plan.

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

WGCMA view the development of this Plan as the first step in the process. Next steps will include further discussions with key stakeholders to implement priority actions. WGCMA will also promote it to the public via WGCMA's website and social media platforms. Beyond the life of this project, additional funding will be required to raise public awareness.

12.2 Education and training

WGCMA will encourage emergency-management authorities to make the Plan part of their training and education programs.

13 Key gaps

Where possible, gaps in preparedness, response and recovery actions for assets have been identified in the tables included in Section 9 of this Plan. For example, actions such as research or monitoring tasks have been included that are designed to fill identified gaps.

General gaps identified by WGCMA and stakeholders affecting many species include:

- There is a gap in up-to-date information regarding the locations of many species and/or the persistence of species where observation records are quite old. Further survey and monitoring work to identify the locations of threatened species and communities is required to feed into emergency preparedness, response, and recovery actions.
- There are some species where the impact of emergencies is unknown and further work is required to ensure appropriate management is implemented and unintended impacts are avoided.
- Climate change is likely to exacerbate some impacts and may result in multiple emergencies occurring at the same time (e.g. drought and heatwave; storm tide, extreme rainfall and sea level rise); there is need for better understanding of the impact of co-occurring emergencies and development of appropriate mitigation strategies.
- Funding to support ongoing implementation of this Plan is also a key gap.

14 Legal framework

14.1 Emergency management

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

EM Act: <https://www.legislation.vic.gov.au/in-force/acts/emergency-management-act-2013/021> SEMP: <https://www.emv.vic.gov.au/responsibilities/state-emergency-management-plan-semp>

14.2 Workplace Health and Safety

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

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

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

The Program is designed to ensure that: All hazards and risks to health, safety and wellbeing are identified, assessed and where they cannot be eliminated are effectively controlled.

Measures to control hazards and risks to health, safety and wellbeing are regularly monitored and evaluated with a philosophy of continual improvement:

- All employees, contractors, volunteers, customers and visitors are consulted and encouraged to contribute to the decision-making process on occupational health and safety matters affecting their health, safety and wellbeing at work.
- All managers, supervisors and employees receive the appropriate information, instruction, training and supervision to safely carry out their responsibilities.
- All employees are aware of issues that impact on health, wellbeing and safety and the importance of general health and wellbeing and its impact on safety and wellbeing in the workplace.

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

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

15 Risk management including mitigation Strategies

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

Table 22 outlines the key overarching risks associated with implementation of preparedness, response and recovery actions for biodiversity and agricultural natural-capital assets, and risk mitigation actions.

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

Table 22: Key overarching risks associated with implementation of asset preparedness and response actions.

16 Monitoring and data

This section describes the data used in the development of this Plan, especially the sources of the data, and how it is shared and can be accessed by the Australian Government. The sections below describe how the data can be viewed online, accessed and downloaded. Appendix 2 features maps for each of the assets and susceptibility to emergencies (bushfire and flood).

16.1 Biodiversity Assets: Threatened species

This Plan includes maps showing modelled habitat for threatened species. This data is sourced from DEECA's Naturekit Victoria mapping tool available on-line at: www.environment.vic.gov.au/biodiversity/naturekit.

Additional data can be downloaded from: <https://www.data.vic.gov.au/>.

16.2 Habitat Distribution Models - data source, accessibility and availability

Habitat distribution models predict and map where species are most likely to occur using the best scientific information available. The Arthur Rylah Institute and Victorian Government Department of Energy, Environment and Climate Action have developed habitat distribution models for almost all of Victoria's terrestrial flora and fauna species, with published versions currently available for all listed rare and threatened species. Arthur Rylah Institute's website (<https://www.ari.vic.gov.au/research/modelling/habitat-distribution-models-hdms>) provides the following information:

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

The habitat mapping used in this plan, SMP Habitat Distribution Models at 225m resolution, were sourced from DEECA's Naturekit Victoria mapping tool. This mapping indicates areas where threatened species were classified to have >50% likelihood of occurrence.

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

16.3 Biodiversity Assets: Threatened ecological communities

The locations of threatened ecological communities is key information informing where preparedness, response and recovery actions should occur.

West Gippsland CMA has prepared maps showing where threatened ecological communities were considered 'likely to occur'. The maps include the following data:

- The Australian Government's mapping of Ecological Communities of National Environmental Significance Distributions 2020 mapping (DAWE, 2021). This data can be downloaded from the Australian Government Department of Climate Change, Energy, the Environment and Water's 'Find Environmental Data' geoportal: <https://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7B184A3793-2526-48F4-A268-5406A2BE85BC%7D>.
- Mapping of Victorian Ecological Vegetation Classes (EVCs) considered to be likely equivalents to the EPBC-listed threatened ecological communities. This is consistent with EVCs identified in the Conservation Advice and National Recovery Plan for the ecological community (DSE, 2005). This data can be downloaded from Victoria's DataVic open data platform:

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

Note that it is unknown whether all mapped EVC locations currently meet the criteria for the threatened ecological community (TEC). This depends on the species composition and condition and has not been assessed for most locations. These sites would require an on-ground assessment to determine if they meet the criteria for the threatened ecological community. The maps in Appendix 2 provide a guide for potential existing locations of the threatened community and sites that could be managed and improved to meet the TEC criteria over time.

16.4 Biodiversity Assets: Ramsar sites

Appendix 2 maps the location of the two Ramsar sites in West Gippsland CMA region. The map uses the following data:

- The Australian Government's mapping of Ramsar Wetlands of Australia which shows the location and boundary of the Ramsar site. This data can be downloaded from the Australian Government Department of Climate Change, Energy, the Environment and Water's 'Find Environmental Data' geoportal:
<https://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7BF49BFC55-4306-4185-85A9-A5F8CD2380CF%7D>.

16.5 Agricultural Natural Capital Assets

Appendix 3 includes a map of land use across the region. The agricultural natural capital assets in the region occur on all of the areas identified as agricultural land on this map.

16.6 Maps of Susceptibility to Natural Disasters and Emergency Events

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

16.7 Bushfire risk

WGCMA worked with DEECA staff to deliver a bushfire risk assessment and maps for this Plan. DEECA's Bushfire Risk, Engagement and Predictive Services team provided the information to inform bushfire risk mapping and assessments for this Plan.

16.8 Areas subject to flooding

The 1:100 year flood map shows the flood prone land in the region. The map combines data on maximum flood extent from flood investigations completed in the region.

Flood investigations involve a detailed technical analysis of historic information to determine future flooding possibilities and their impacts. Community participation and ground-truthing are essential parts of investigations.

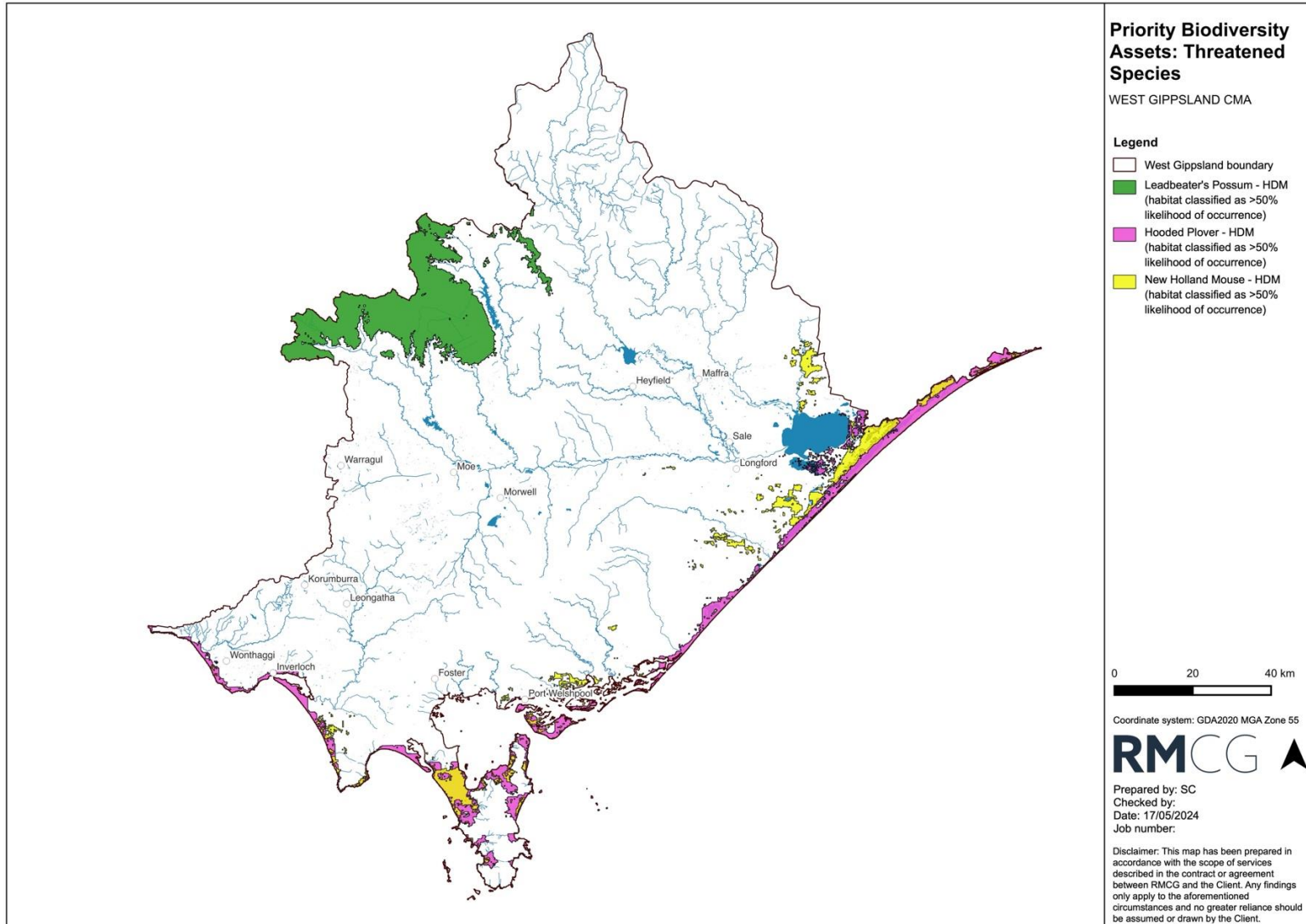
The flood map does not show stormwater or overland flooding that can occur because of rainfall events, because susceptibility or risk is not mapped for this parameter. All low-lying areas in the region are susceptible to localised flooding from rainfall events.

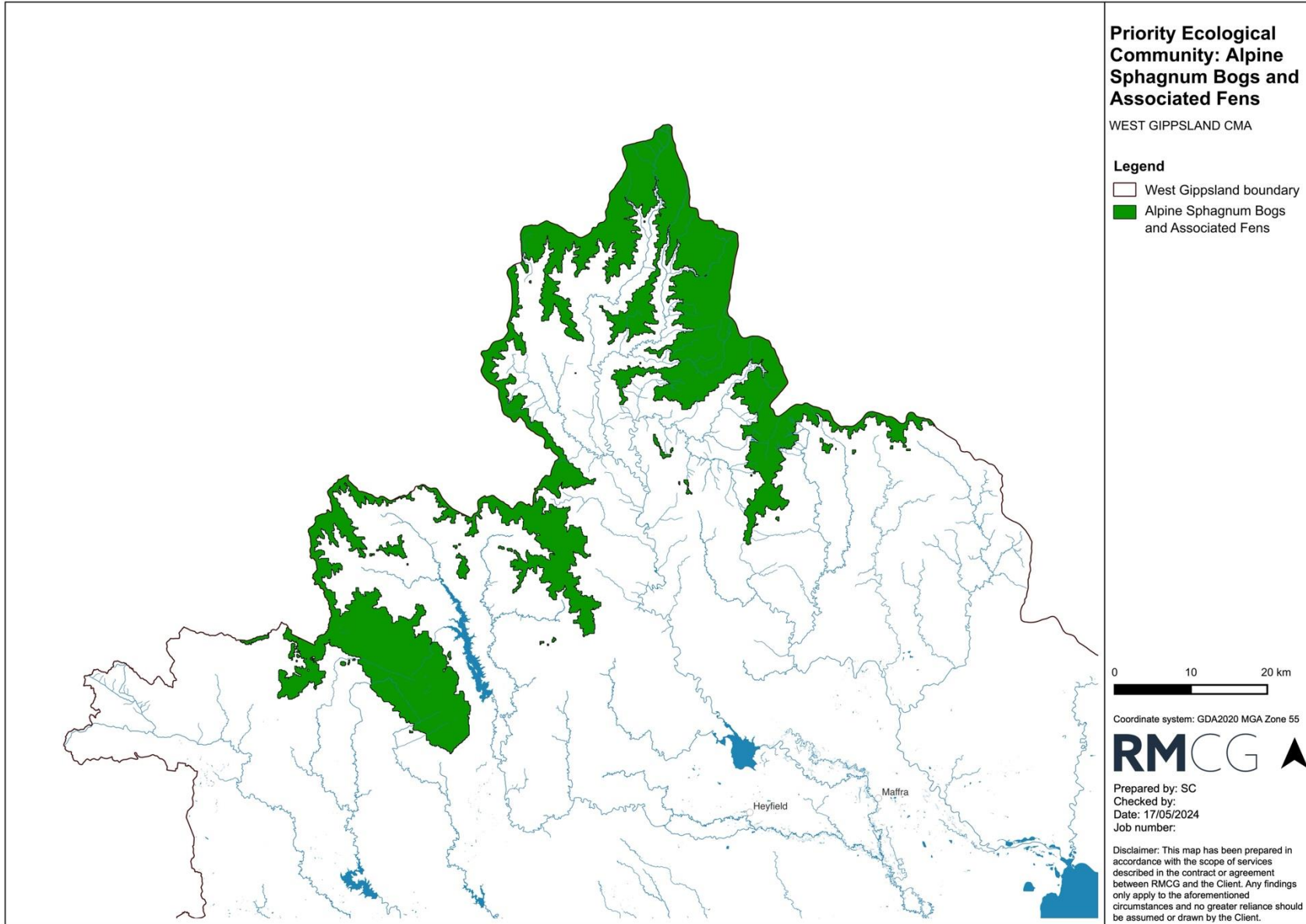
Appendix 1: Resources used in developing this plan

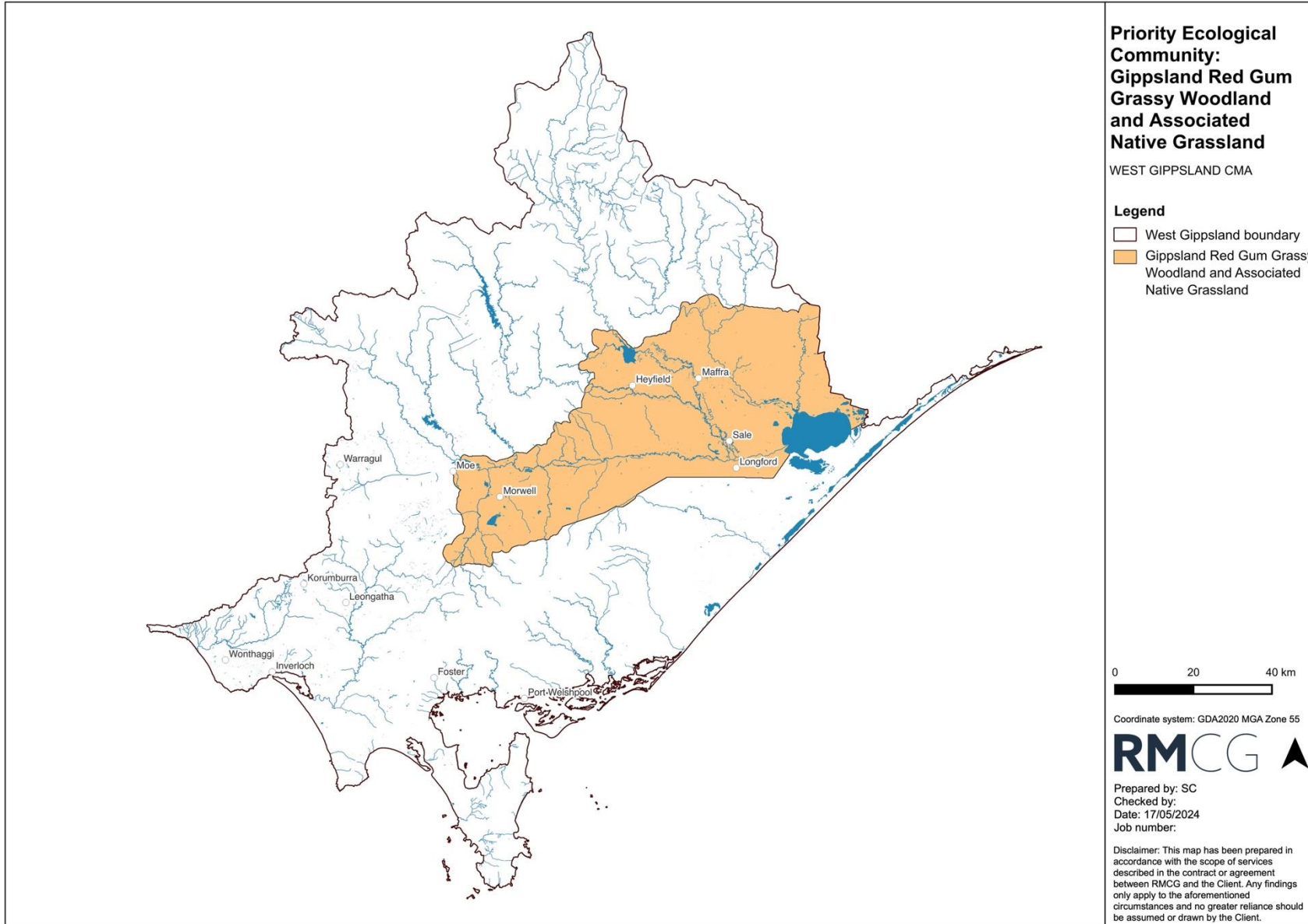
Document	Lead agency/owner
Gippsland Drought Resilience Plan (2022)	Victorian and Commonwealth Government under the Future Drought Fund
West Gippsland Regional Strategy 2021-27	WGCMA
Gippsland Regional Climate Adaptation Strategy (2021)	DEECA
Gunaikurnai Whole of Country Plan (2015)	GLaWAC
Marine and Coastal Strategy 2022	DEECA
Regional Landcare Support Plan 2020-2025	WGCMA & Victorian Landcare Program
Corner Inlet Ramsar Site Management Plan 2020	WGCMA
Gippsland Lakes Ramsar Site Strategic Management Plan (2015)	EGCMA
Gippsland Lakes Priorities Plan (2021)	Gippsland Lakes Coordinating Committee
West Gippsland NRM Climate Change Strategy Summary (2016)	WGCMA
West Gippsland Regional Waterway Strategy (2016)	WGCMA
Lake Wellington Land and Water Management Plan (2021)	WGCMA

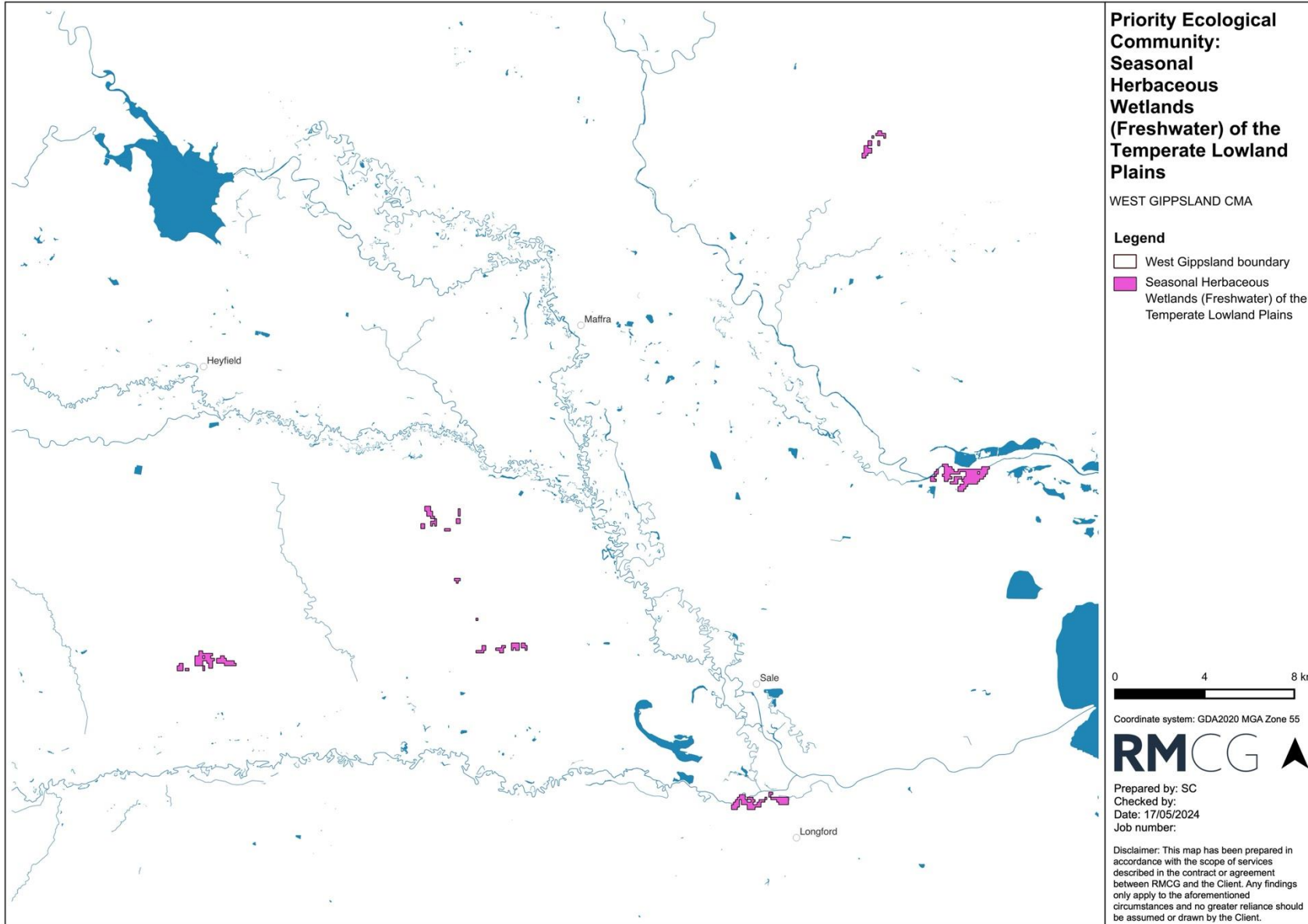
Table A1: Documentary resources reviewed to identify assets and assess susceptibility

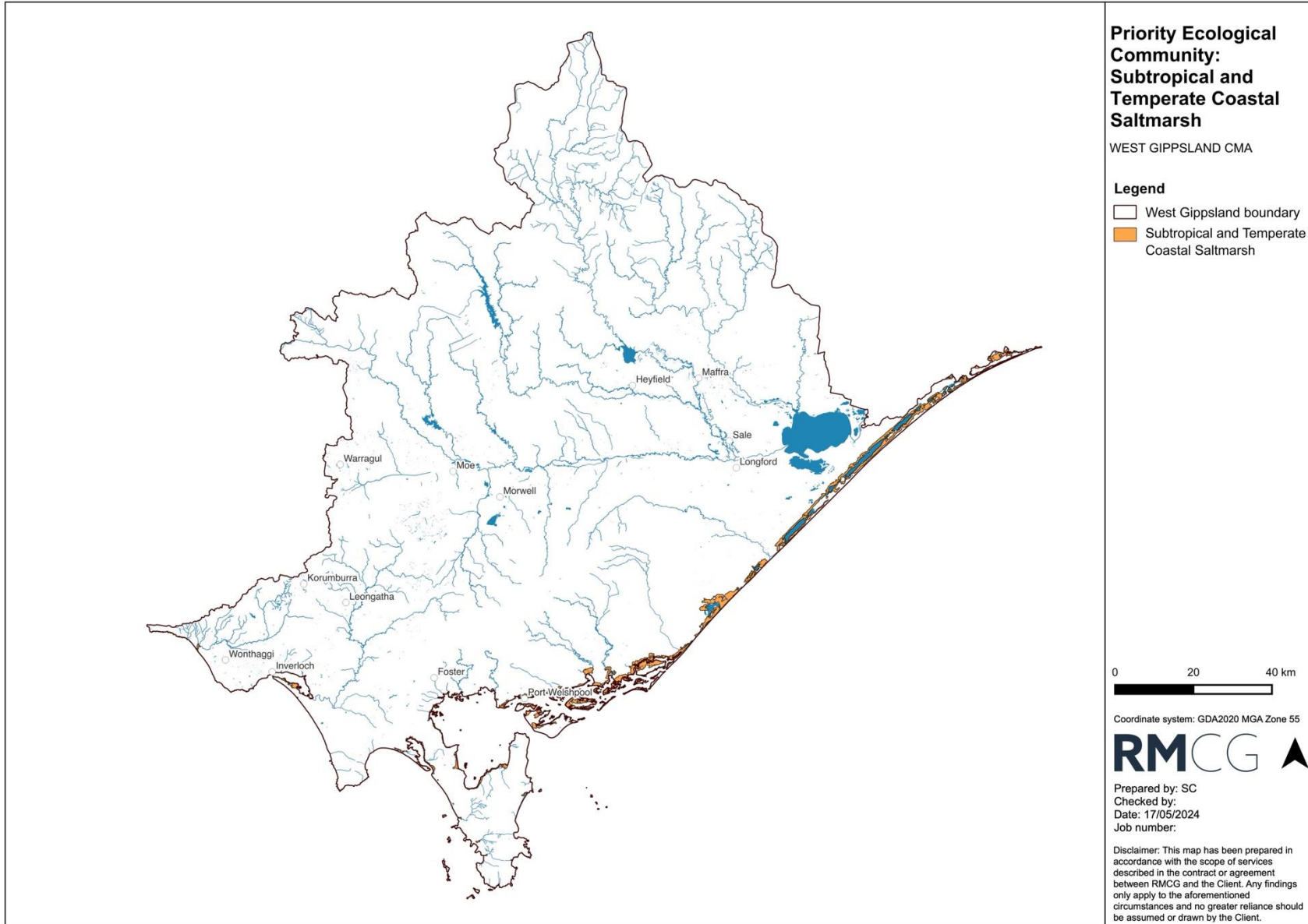
Appendix 2: Maps of biodiversity assets

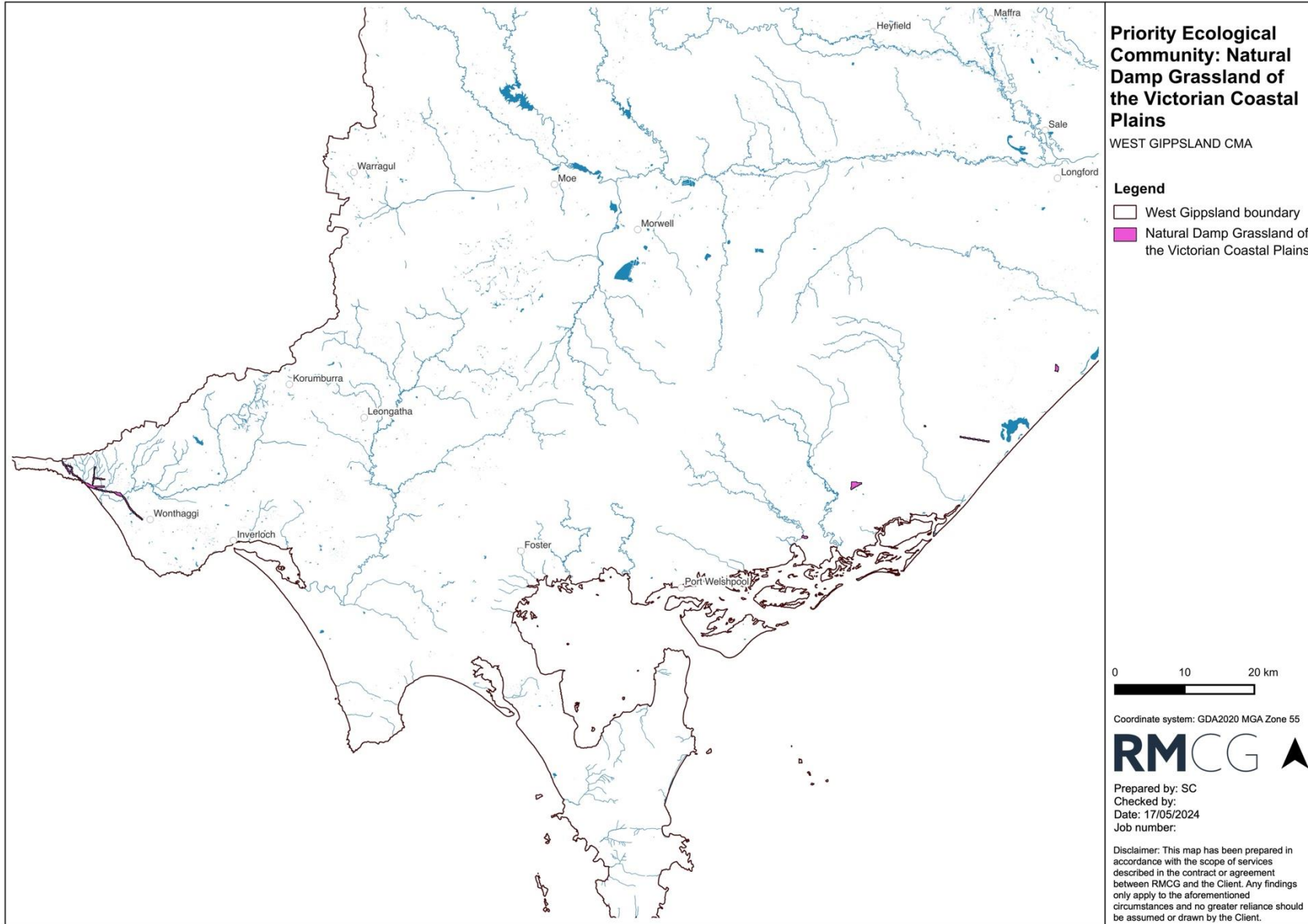


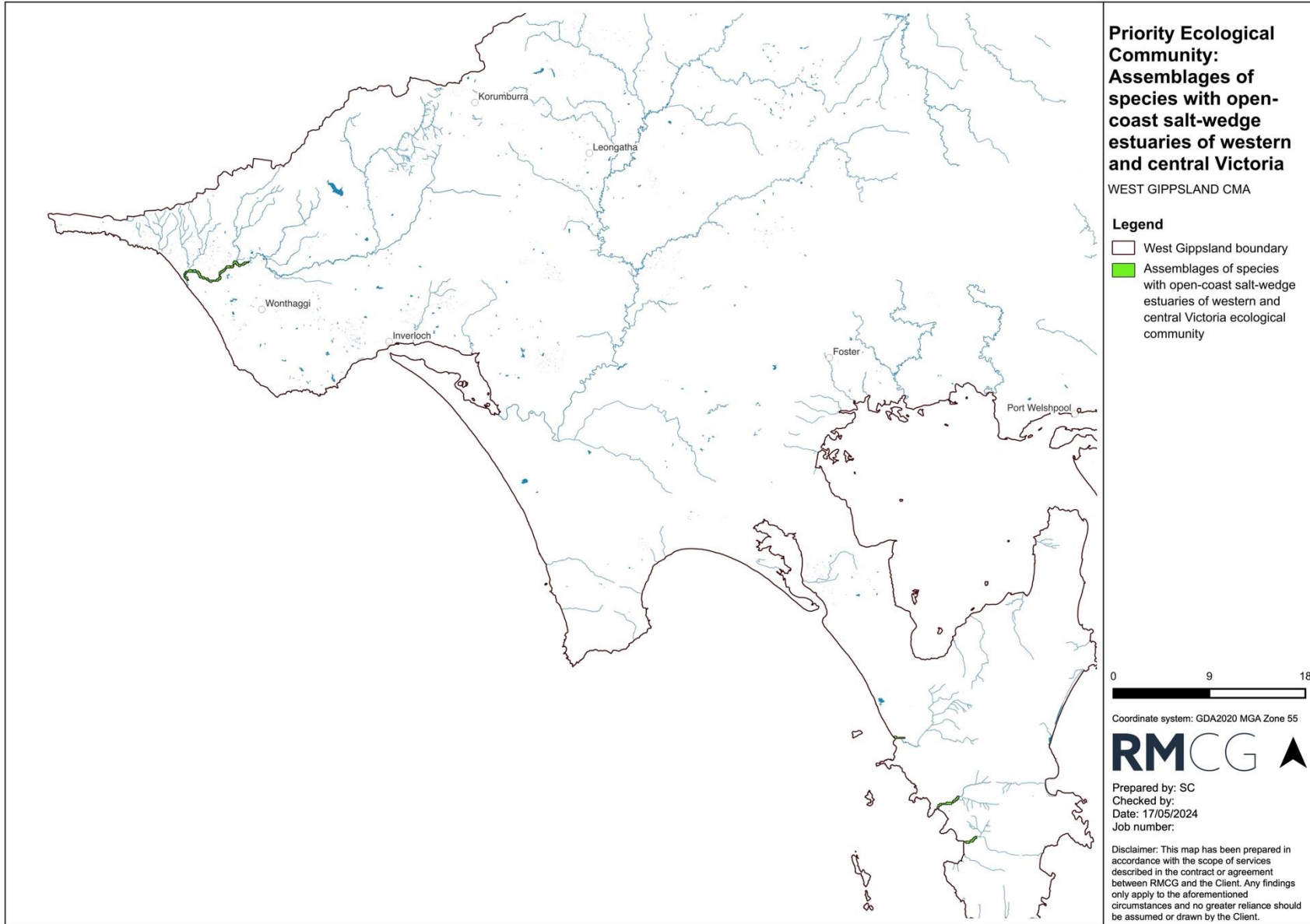




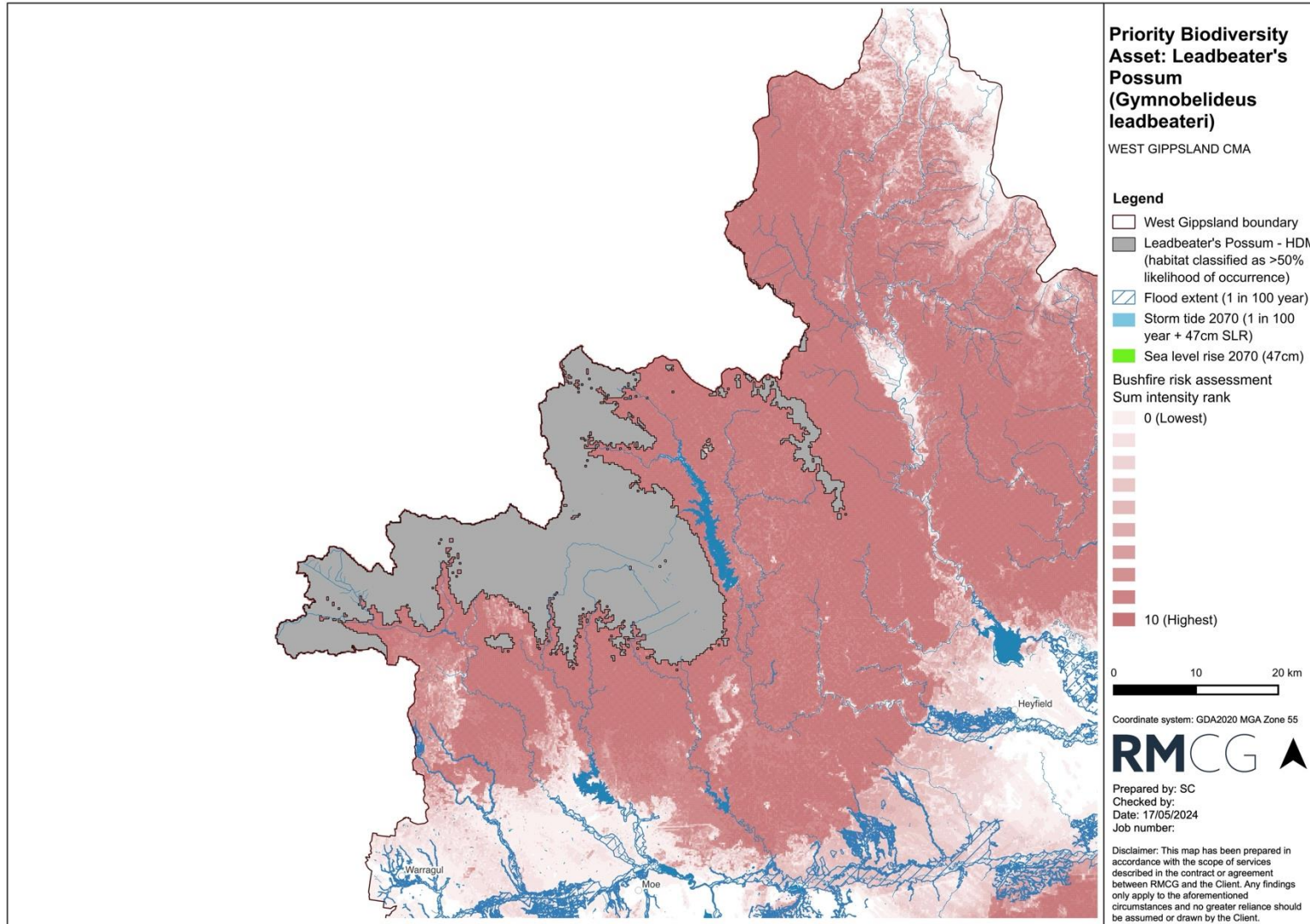


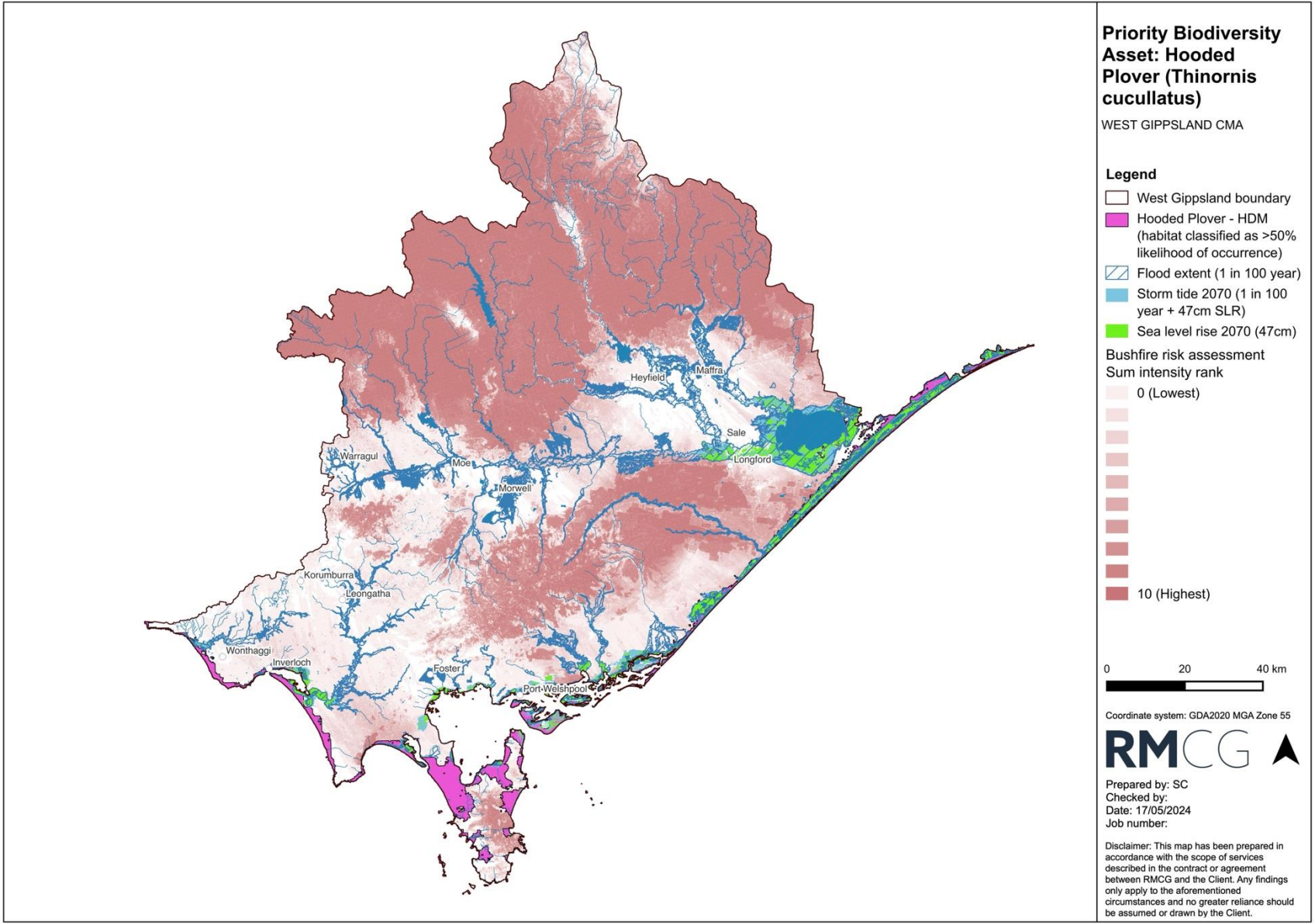


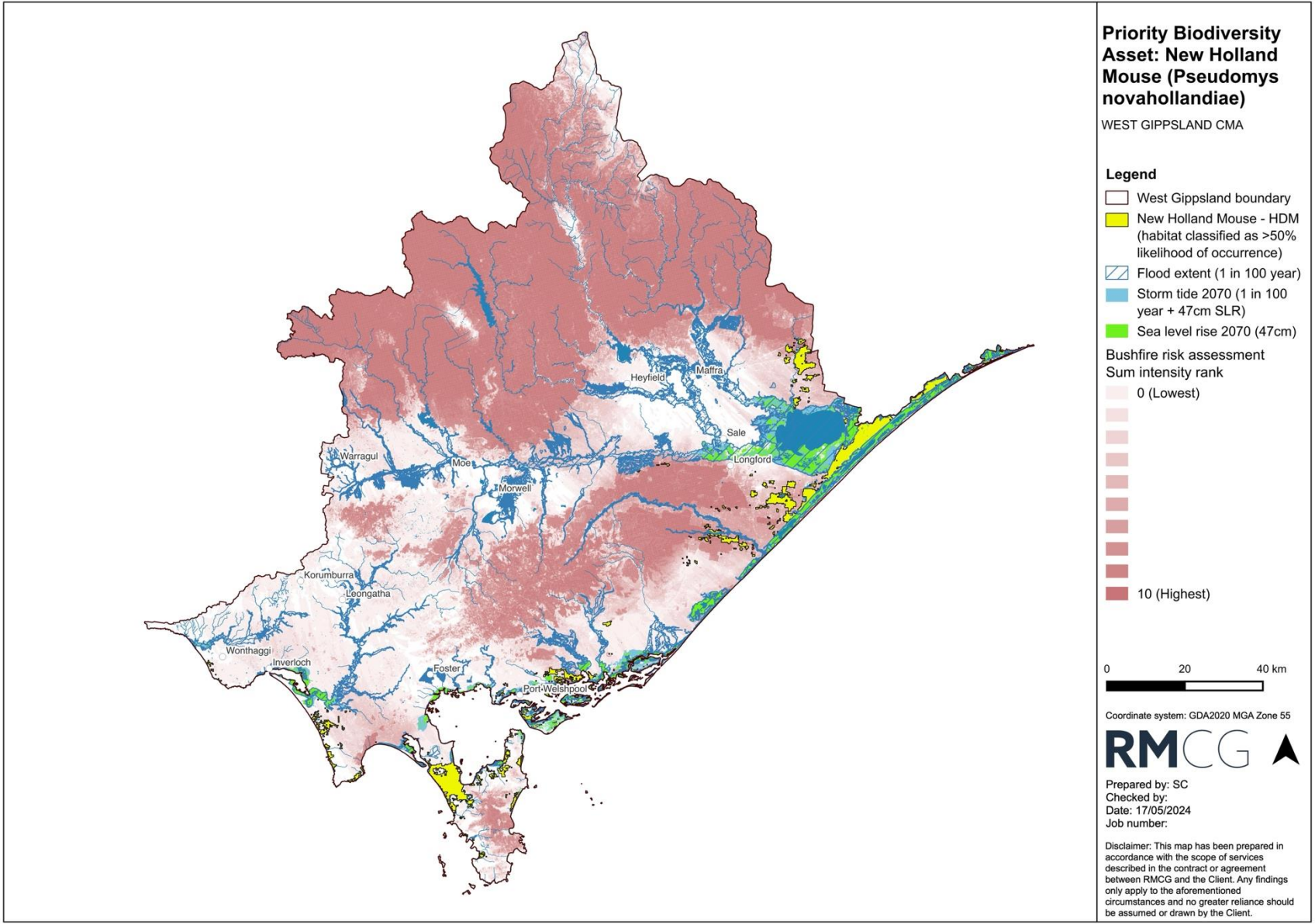


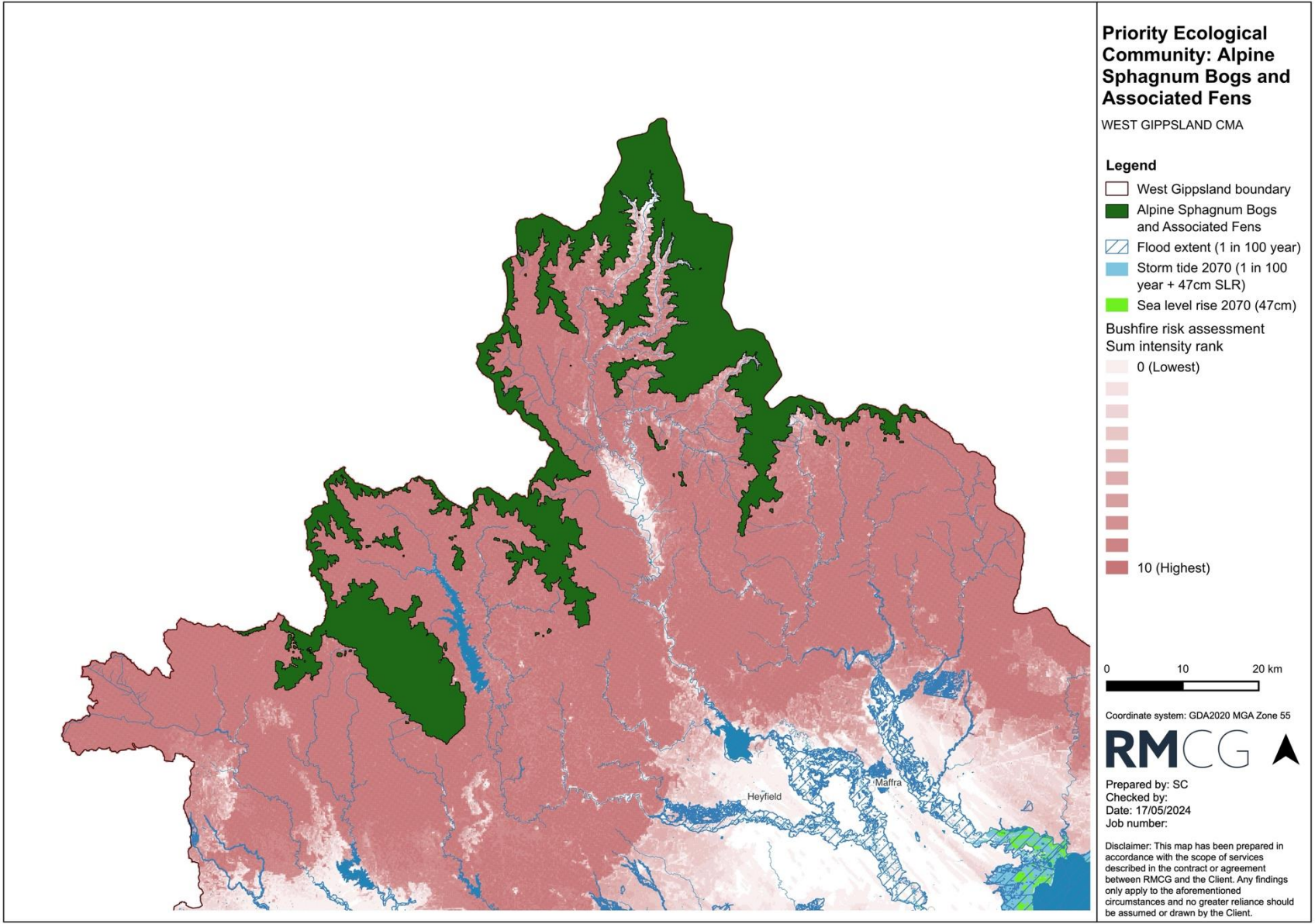


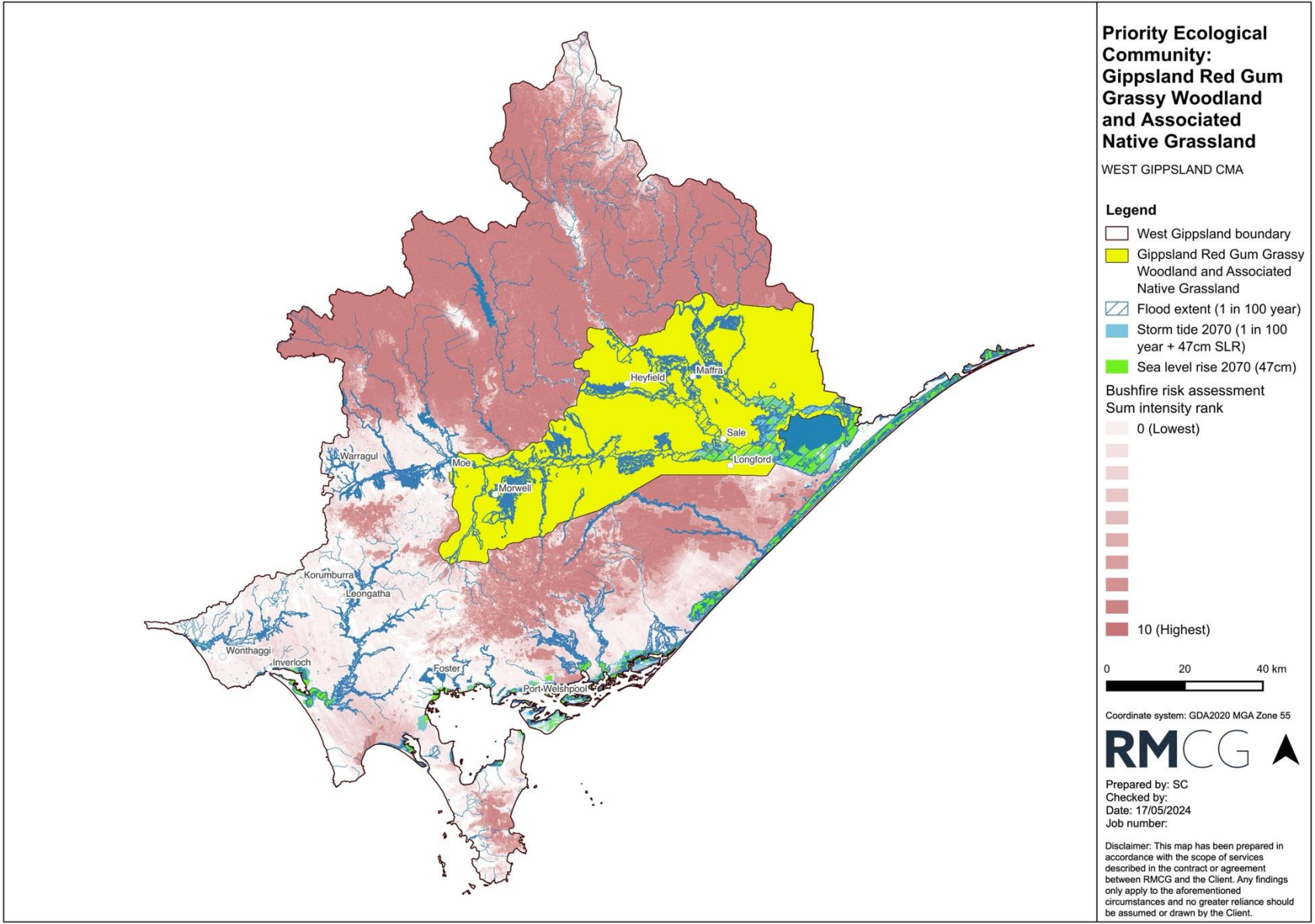
Appendix 3 Emergencies with assets

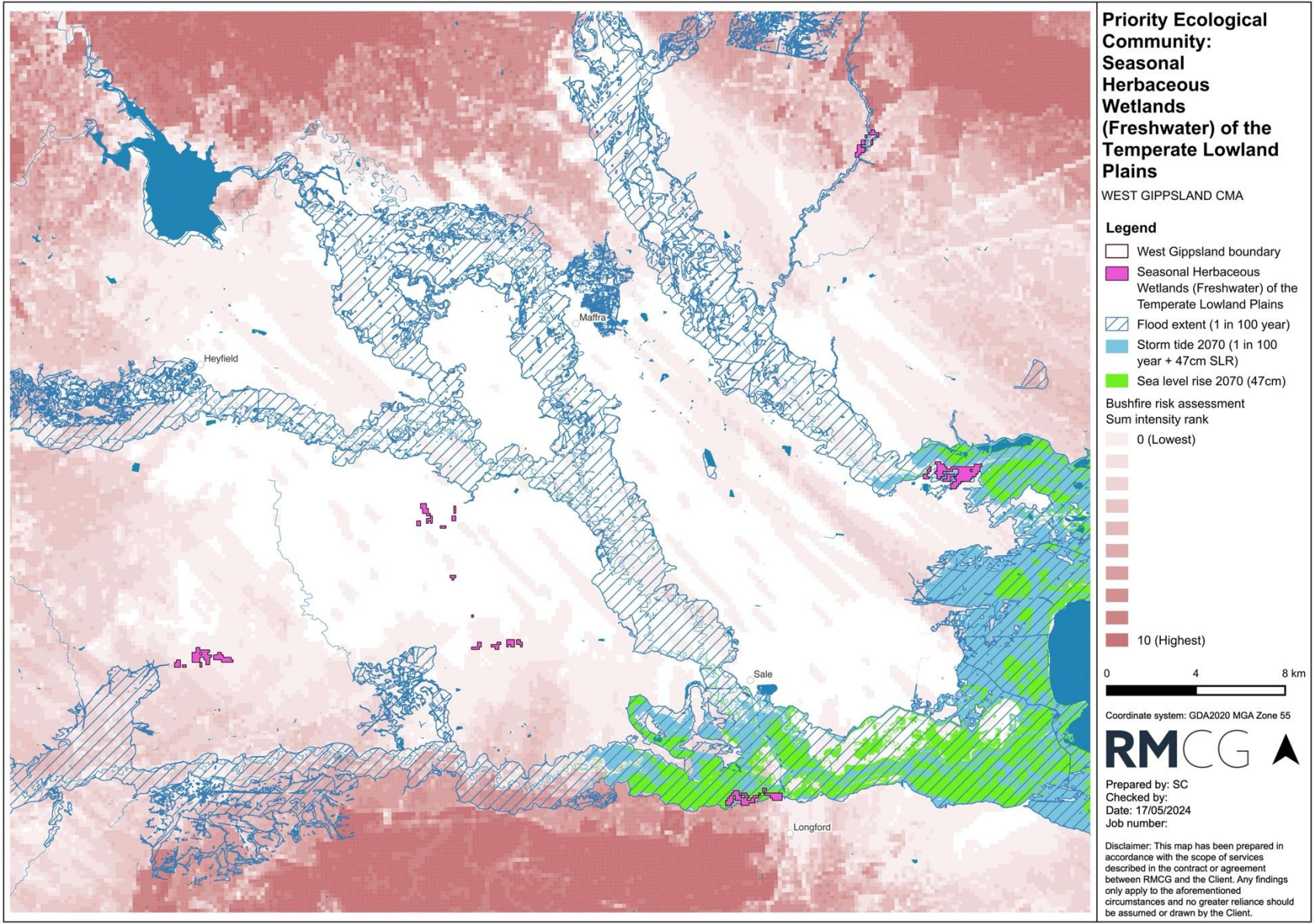


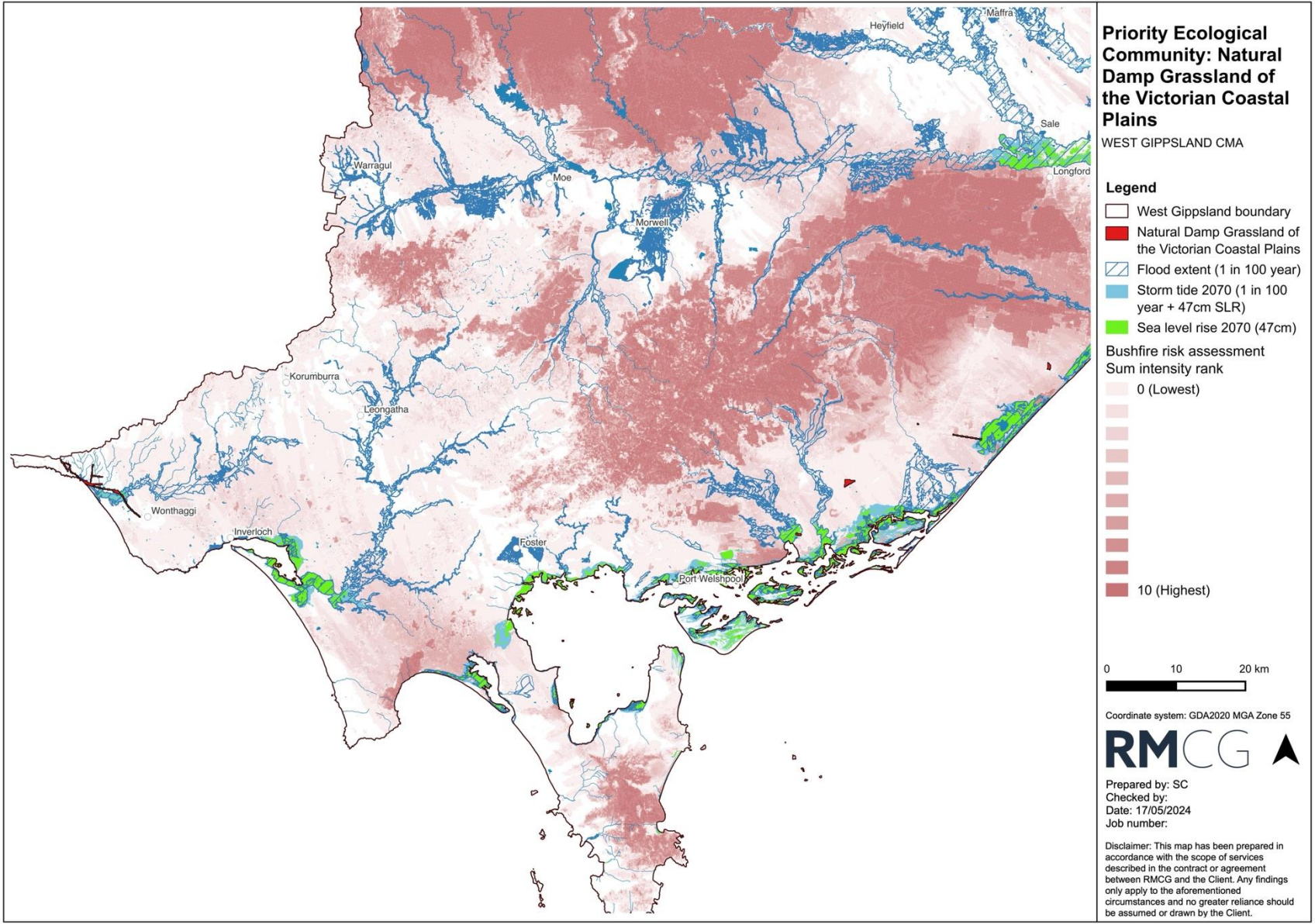


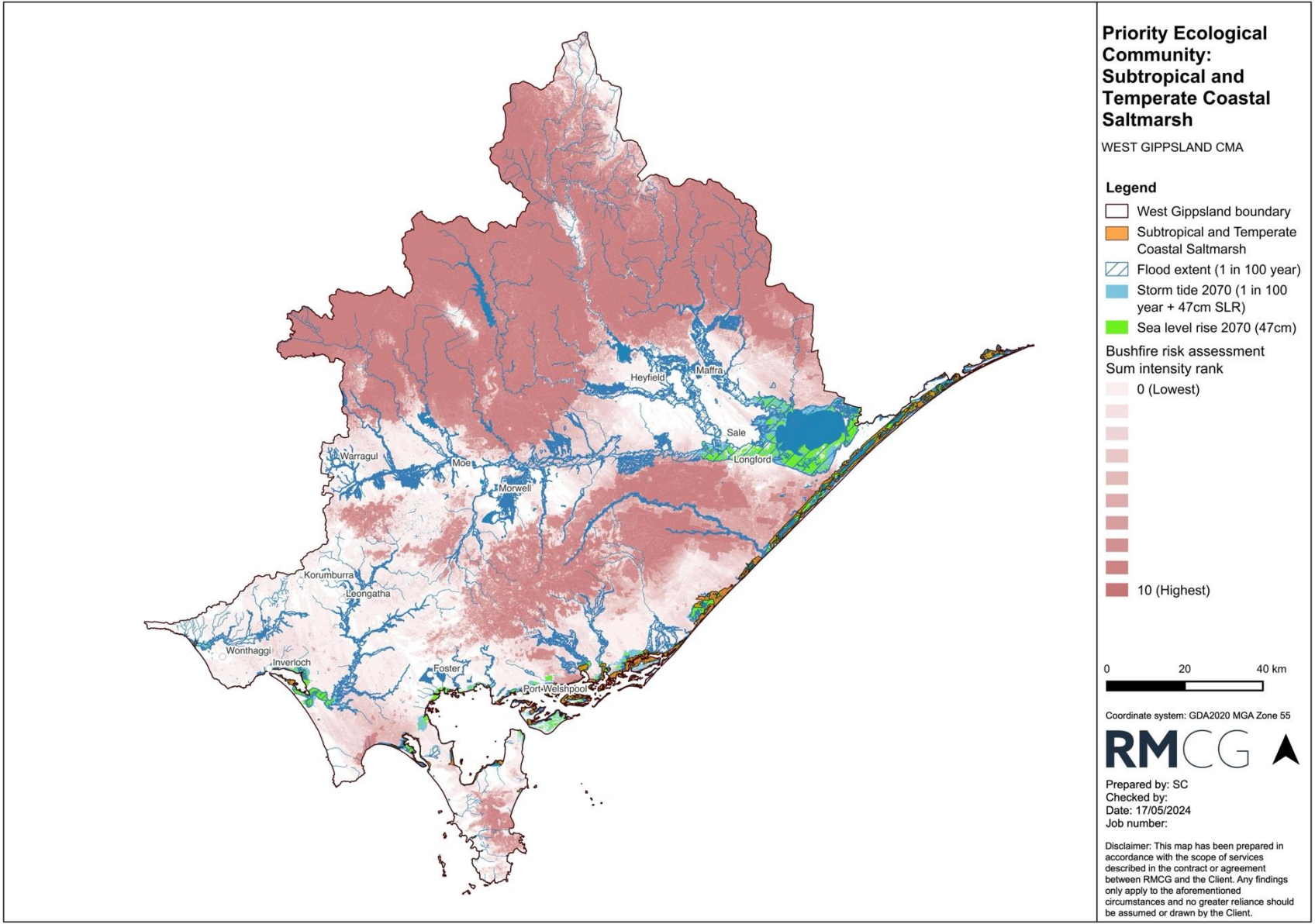


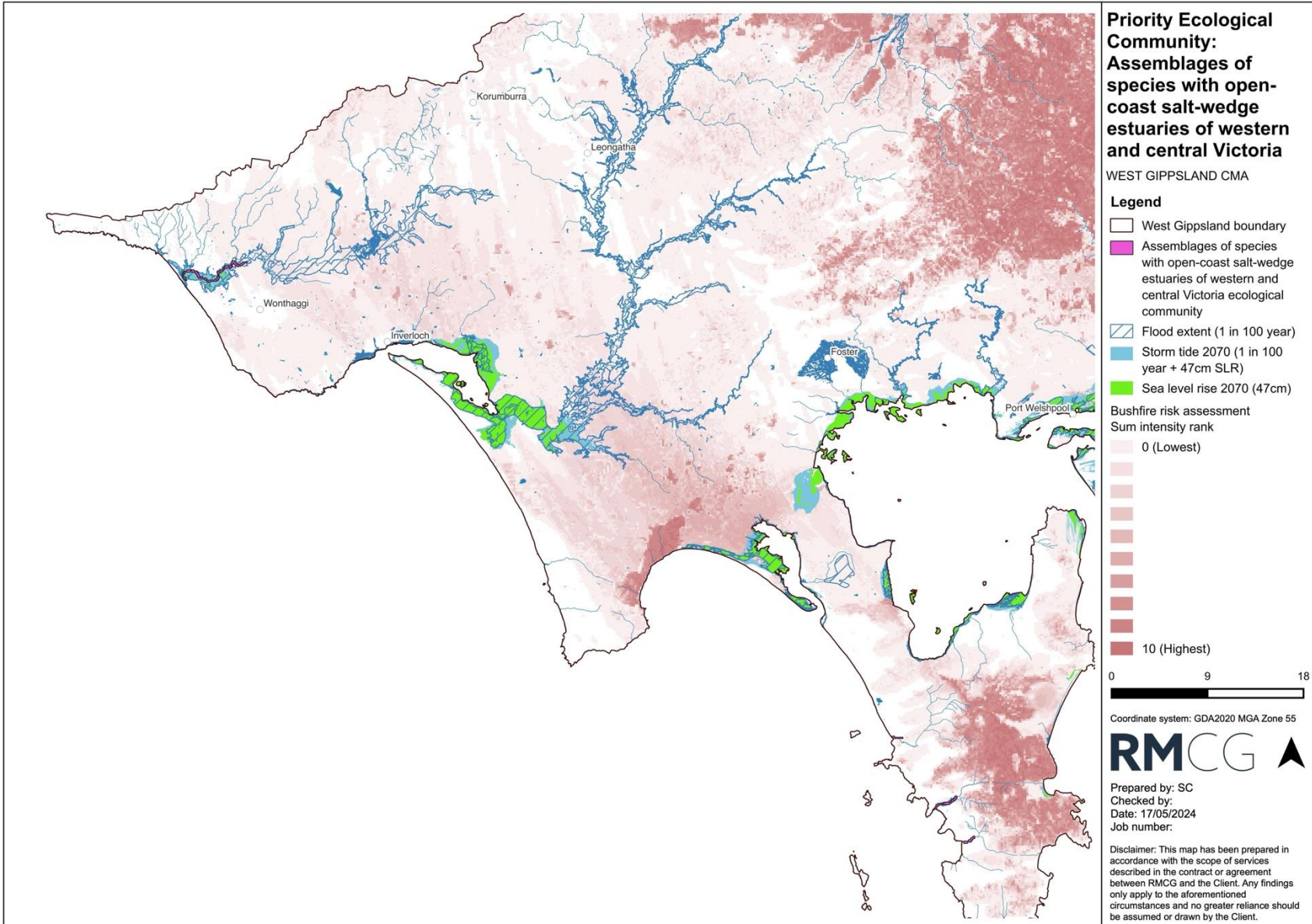


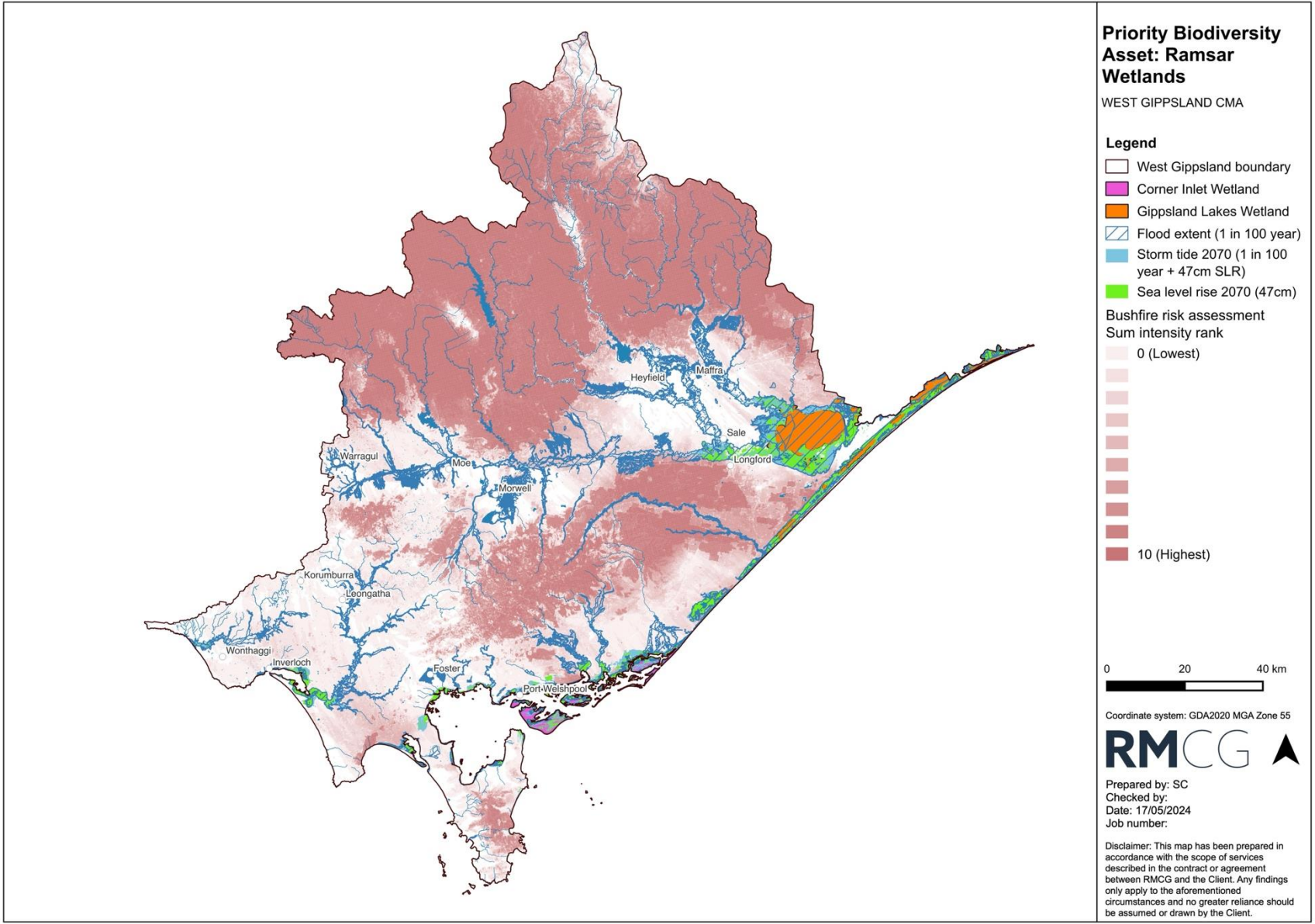


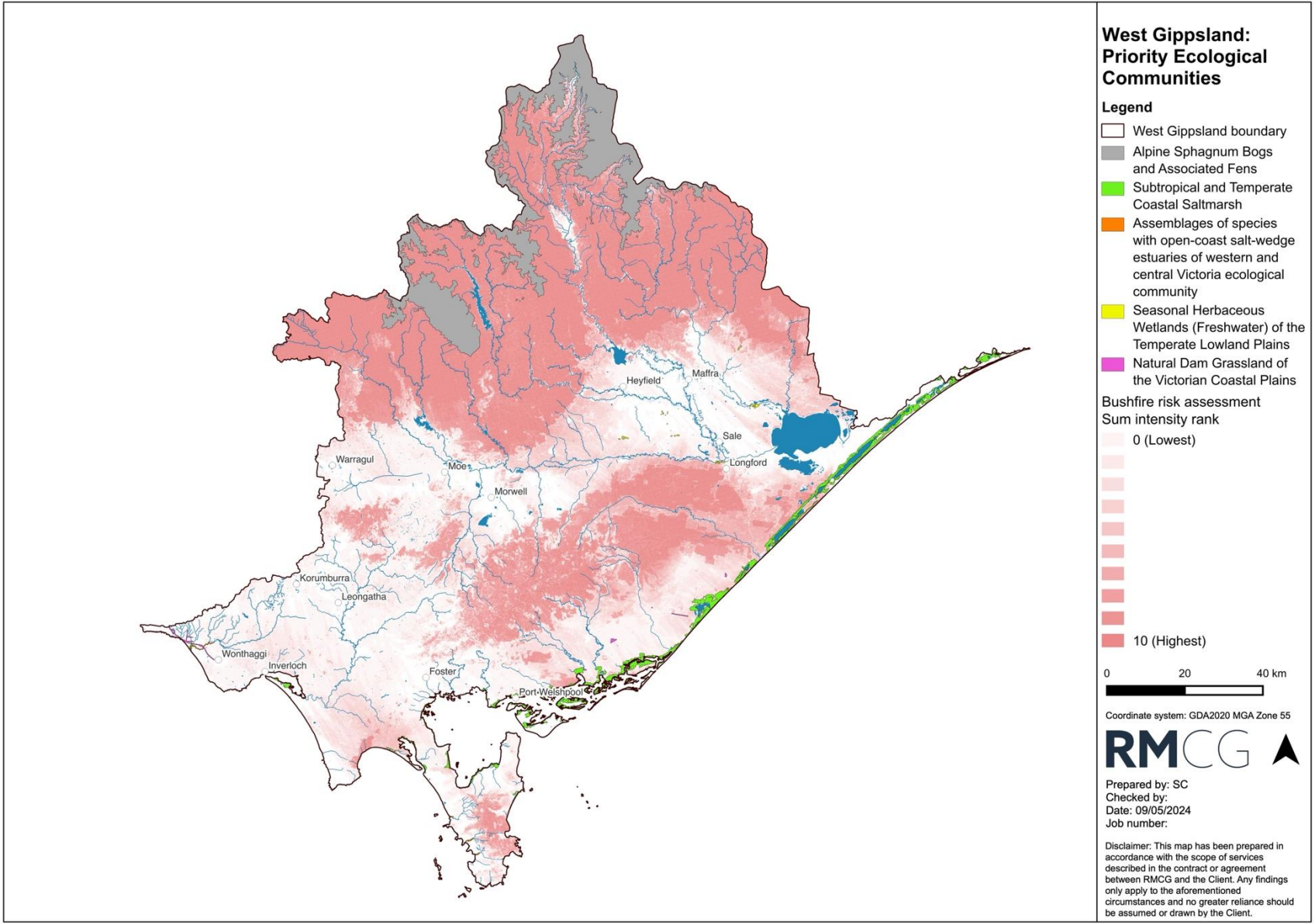


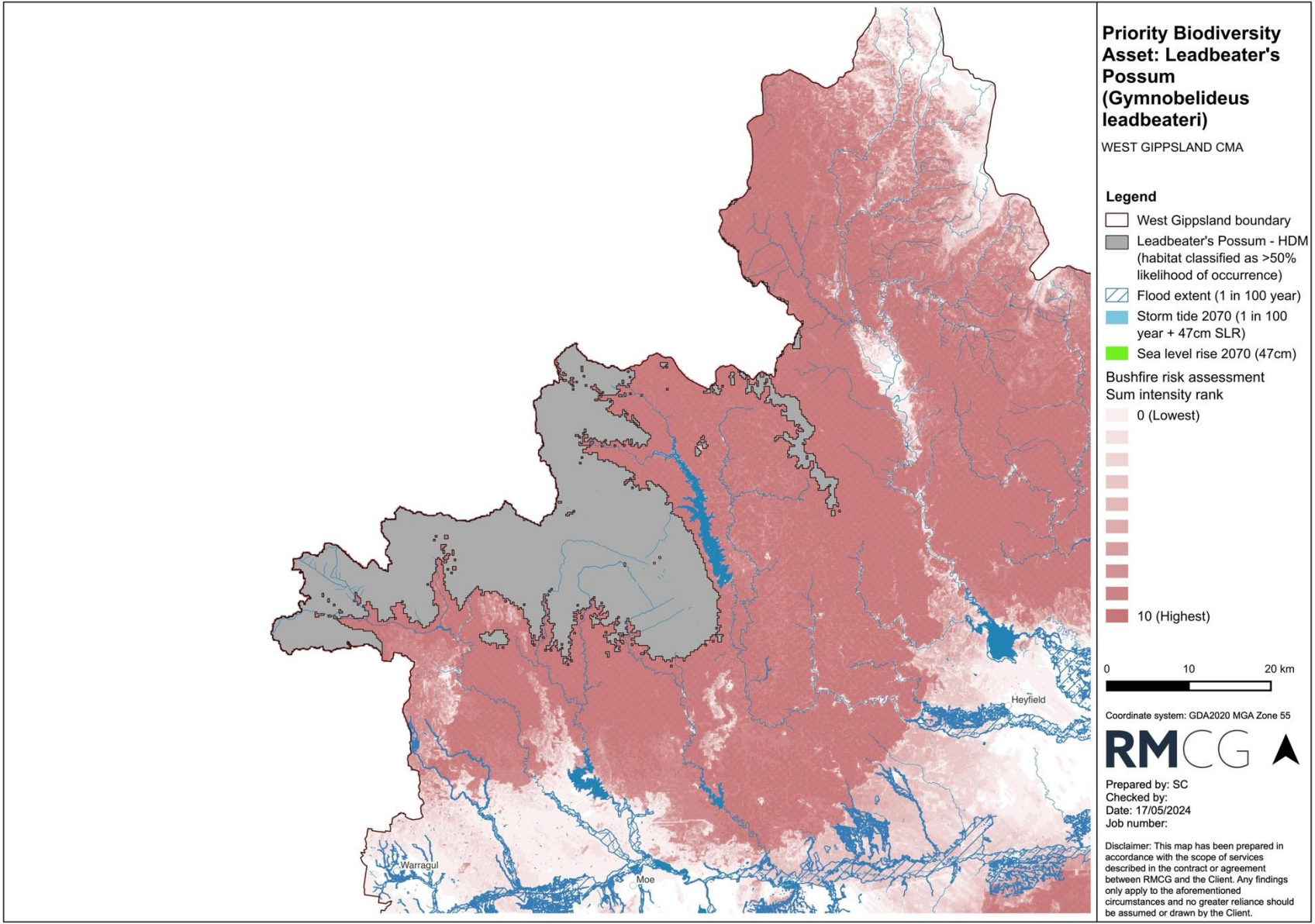


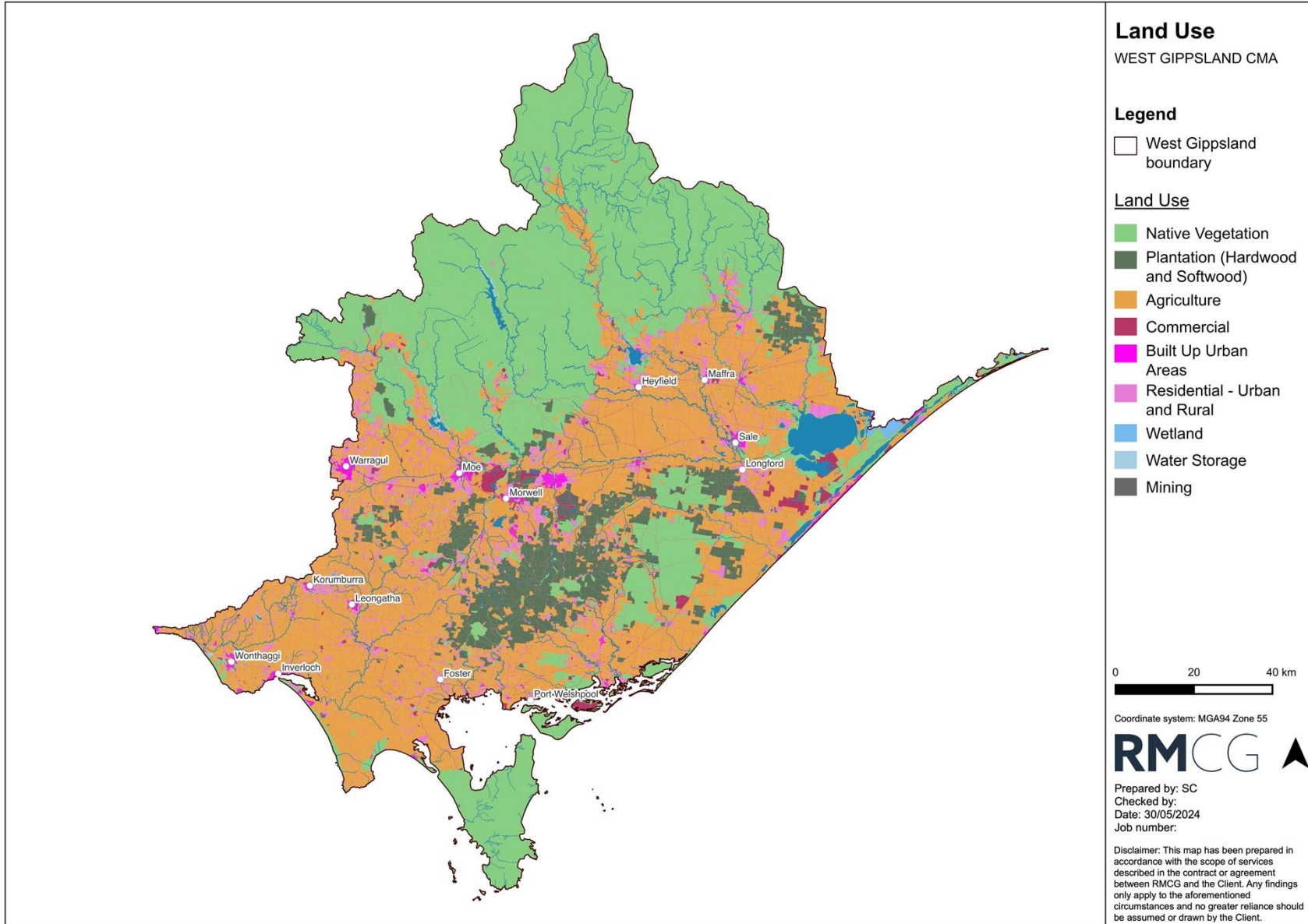













Appendix 4 Impact rating

The purpose of Table A2 is to identify the impact of an emergency event on a biodiversity asset. The likelihood and distribution of the event across a particular asset’s environment/habitat is identified to provide this rating.

Table A2: Impact on the population habitat

		Spatial extent of event on population distribution				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood of event	Scale					
	Impact description	Event occurs across a limited extent of regional population habitat 				Event occurs across entire regional population habitat
	Remote	Low	Low	Low	Medium	Medium
	Unlikely	Low	Medium	Medium	Medium	High
	Possible	Low	Medium	High	High	High
	Likely	Medium	Medium	High	High	Extreme
	Almost Certain	Medium	High	High	Extreme	Extreme

Appendix 5 Multi-jurisdictional Inventory of Assets

Purpose

This document provides a multi-jurisdictional inventory of biodiversity and agricultural natural capital assets present in WGCMA to include in emergency response management and planning systems.

Threatened species

Table A3 provides a multi-jurisdictional inventory of nationally threatened species included in the WGCMA Emergency Preparedness, Response and Recovery Plan. The table documents the jurisdictions where the species are located, legislation the species are protected under and their conservation status.

Table A3. Multi-jurisdictional inventory - Threatened species

Species, TEC or Ramsar site	Jurisdiction	Legislation the asset is protected under	Conservation status	Description of extent
Corner Inlet	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Ramsar listed	Confined - WGCMA
Gippsland Lakes	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Ramsar listed	Confined - WGCMA and EGCMA
Hooded plover	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Threatened	Extended - NSW, Victoria, Tasmania (coastal, estuarine)
Leadbeater's possum	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Critically endangered	Confined - WGCMA, Port Phillip and Westernport CMA
New Holland mouse	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Endangered	Extended – Qld, NSW, Victoria, Tasmania
Giant Gippsland earthworm	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Threatened	Confined – WGCMA
Alpine Sphagnum Bogs and Associated Fens	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Endangered	Extended – WGCMA, EGCMA, North East CMA, Port Phillip and Westernport CMA
Gippsland Red Gum (Eucalyptus tereticornis subsp. mediana) Grassy Woodland and Associated Native Grassland	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Critically Endangered	Confined – WGCMA, EGCMA
Natural Damp Grassland of the Victorian Coastal Plains	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Critically Endangered	Confined – WGCMA, EGCMA
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Critically Endangered	Extended – WGCMA, EGCMA, Corangamite CMA, Glenelg Hopkins CMA North East CMA, Port Phillip and Westernport CMA
Subtropical and Temperate Coastal Saltmarsh	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Vulnerable	Extended – NSW, Victoria, South Australia, Tasmania
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Australian Government Victorian Government	Environment Protection and Biodiversity Conservation Act 1999 Flora and Fauna Guarantee Act 1988	Endangered	Extended – NSW, Victoria, South Australia, Tasmania

