

# Biodiversity and Agricultural Natural Capital Emergency Preparedness, Response and Recovery Plan



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SOUTH



NRM South acknowledges the Tasmanian Aboriginal people’s strong connections to land, sea and sky Country (which includes the coast, land, and waterways of the southern region, as well as cultural values, sites, plants and animals), as well as traditional uses and significance in ceremonies, creation stories, art and identity. Stewardship of these sites and the cultural landscapes of southern Tasmania are not only integral to Aboriginal identity, health and wellbeing but also to the recognition of the rights of Aboriginal people.

Version number	Comments	Date
1	Draft structure and outline, submitted as a part of Milestone 1	8 January 2024
2	Draft NRM South Emergency Preparedness and Response Plan, submitted as a part of Milestone 2	8 May 2024
3	NRM South Emergency Preparedness and Response Plan, submitted as a part of Milestone 3	31 May 2024

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Background

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# 1. Background

## Context

Australia's variable climate, geography and environment place our communities, infrastructure, ecosystems and cultural and heritage values in the path of frequent and high-energy natural hazard events. Disasters and emergency events have become more frequent and severe, driven in part by the effects of climate change. In recent years, southern Tasmania has faced increasing challenges posed by disasters and emergencies, ranging from extreme weather events, to bushfires to flash floods, and emergency biosecurity incursions. These events not only threaten human lives, property, and food supply, but also have significant impacts on biodiversity and agricultural natural capital assets. It is crucial that we enhance our preparedness and response to mitigate these risks effectively.

Tasmania, with its unique ecosystems and temperate weather conditions, is particularly vulnerable to events such as bushfires, floods, and coastal hazards. The 2019-20 Black Summer bushfires and other recent environmental disasters (e.g. 2006 East Coast Tasmania bushfires, 2013 Dunalley and Tasmanian bushfires, 2018 Hobart flash flood, and 2018-2019 Tasmanian bushfires) have emphasised the urgent need for comprehensive emergency preparedness and response plans tailored to the region's natural assets and specific challenges.

The Bureau of Meteorology's declaration of an El Niño climate event in September 2023 and the subsequent forecast of drier and hotter conditions for Australia has heightened concerns about the risk of extreme weather events such as drought and emergencies such as bushfires. Changes in air and ocean temperatures, rainfall patterns, and other climatic variables associated with climate change further compound the challenges faced by the region. Additionally, the introduction and spread of invasive species and diseases poses a growing threat to Tasmania's ecosystems and productive industries.

Recognising the critical role of NRM organisations in supporting emergency preparedness and response, the Australian Government invited NRM South to develop a 'Biodiversity and Agricultural Natural Capital Emergency Preparedness and Response and Recovery Plan' (the Plan).

The Plan is informed by lessons learned from past disasters and guided by relevant strategic frameworks such as the *2030 NRM Strategy for Southern Tasmania 2030*, the *State Emergency Management Committee Strategic Directions Framework*; the *Tasmanian Disaster Resilience Strategy 2020 - 2025*; the *Tasmanian Emergency Management Arrangements (TEMA)*; and the *State Special Emergency Management Plan – Biosecurity Emergencies*. By identifying vulnerabilities, prioritising actions, and fostering coordination among stakeholders, the Plan seeks to minimise the impacts of natural hazard events that become disasters and emergencies on biodiversity and agricultural assets. This includes the role that NRM's play in contribute to environmental preparedness and response, by supporting communities and individuals to improve the health and resilience of their landscapes and coordinating habitat and landscape restoration works following extreme events.

The Plan contributes, in part, to actions under Target 17 of the Threatened Species Action Plan 2022-32<sup>1</sup> and Outcomes 1, 2 and 3 of the Natural Heritage Trust (NHT), by addressing vulnerability from extreme weather events relevant to biodiversity<sup>2</sup> and agricultural natural capital assets<sup>3</sup> identified in the management unit and improving emergency response and planning within jurisdictions. The Plan also contributes to Outcomes 1 and 3 of the Climate-Smart Agriculture Program by supporting the agriculture sector to build resilience to climate change and conserve natural capital and biodiversity on farms. In this instance, the Plan centres on terrestrial or land-based agriculture and farms. Nonetheless, it is important to note that the Climate-Smart Agriculture Program encompasses marine farming and fisheries. NRM South acknowledges the economic and social significance of these industries in southern Tasmania, as well as the aquatic systems and natural assets upon which they depend (i.e. these are

- 1 <https://www.dcceew.gov.au/sites/default/files/documents/threatened-species-action-plan-2022-2032.pdf>
- 2 Biodiversity assets refer to assets identified by jurisdictions, environment management agencies or environmental law as important to preserve during emergencies or disasters e.g., species, ecological communities, habitat features.
- 3 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.

identified as priorities in the 2030 NRM Strategy for Southern Tasmania). Consequently, future reviews of this Plan may consider NRM South's role and involvement in bolstering emergency preparedness of natural assets in aquatic ecosystems (natural assets that also support marine farming and fisheries).

The development of the Plan reflects a proactive approach to addressing the growing challenges posed by disasters for natural assets in southern Tasmania. By leveraging local knowledge, stakeholder engagement, and strategic partnerships, NRM South aims to enhance the region's resilience and safeguard its natural assets for future generations.

As the first of its kind, this Plan brings together information available from a variety of sources and as well as new information, modelled data and maps. The Plan identifies gaps and opportunities for the future across both natural asset themes and cross cutting themes (such as communications, coordination and collaboration). Across all areas, funding and resources will be required to progress work and address gaps and opportunities. Going forward the Plan presents a platform from which future work can be prioritised and funding secured with appropriate stakeholders.

## Biodiversity assets

Southern Tasmania is internationally recognised area of exceptional environmental significance. The region supports a wide range of biodiversity assets, including Ramsar-listed wetlands, UNESCO World Heritage Sites, several Important Bird Areas (IBAs – BirdLife International) and marine biodiversity hotspots (productive temperate reef systems, within what is collectively referred to as Australia's Great Southern Reef).

The region is characterised by pristine to near-pristine river systems in the south-west, diverse flora and fauna – including many endemic species – and complex, geo-diverse landscapes. Notably, it encompasses the world heritage areas of the Tasmanian Wilderness World Heritage Area (TWWHA) and Macquarie Island, along with seven national parks and terrestrial, estuarine, and marine ecosystems with high levels of biodiversity.

With more than 47% of the region managed primarily for conservation, including significant areas within the National Reserve System, southern Tasmania demonstrates a commitment to preserving its natural heritage. Despite these conservation efforts, some biodiversity values remain under-reserved, highlighting the need for continued conservation actions.

Threatened and important ecological communities play a vital role in southern Tasmania's biodiversity landscape. With numerous vegetation communities identified, including some listed as threatened under the *Nature Conservation Act 2002* and the *Environment Protection and Biodiversity Conservation Act 1999*, concerted efforts are required to manage and protect these ecosystems. NRM South aims to support informed management of these communities, focusing on areas requiring immediate attention, including extent, condition, and connectivity of critical habitats.

Furthermore, southern Tasmania's rivers, floodplains, estuaries, wetlands, coastal, and marine areas harbor diverse ecosystems and provide essential ecosystem services. These waterways support aquatic ecosystem health, primary production, recreation, and tourism. NRM South's actions aim to improve or maintain the condition of these water bodies, accounting for projected climate change impacts and focusing on critical habitats and ecological character.

Priority biodiversity assets in the southern Tasmanian NRM region include a World Heritage Area, four Ramsar sites, Threatened Ecological Communities, and threatened species:

- The far south-west, southern, and eastern sections of the Tasmanian Wilderness World Heritage Area (and Macquarie Island, however this is not covered in this plan).
- Ramsar sites:
  - Interlaken
  - Moulting Lagoon
  - Apsley Marshes
  - Pitt Water-Orielton Lagoon
- Biodiversity hotspots and priority places:
  - Bruny Island
  - Midlands (southern Midlands)
  - Giant Kelp Marine Forests of Southeast Australia
- Statewide, there are seven Commonwealth-listed and 39 state-listed Threatened Ecological Communities\*, which are diverse, ranging from alpine to rainforest, buttongrass plains, wetlands and grasslands.
- Statewide, there are approximately 689 threatened species\* listed under the Tasmanian *Threatened Species Protection Act 1995* and/or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

*\*Not all of these could be included in the Plan, so endangered (or higher) species and those particularly vulnerable to impacts of an emergency event were prioritised.*

### Agricultural natural capital assets

The agricultural natural capital assets in southern Tasmania form the foundations of the region's economy, agricultural productivity, and biodiversity. Encompassing a diverse array of resources, including soil, air, water, riparian areas, remnant native vegetation, agroforestry, and environmental plantings, these assets underpin the success of agricultural enterprises across the landscape. Covering approximately 6,450 km<sup>2</sup> of the south-east region's land area, the agricultural landscapes of southern Tasmania are predominantly used for dryland grazing and irrigated cropping, concentrated in lower altitudes across floodplains and valleys. However, this spatial concentration renders these areas particularly susceptible to flooding, thereby posing significant risks to agricultural operations.

Across Tasmania, sheep farming, beef cattle farming, dairy farming, and vegetable farming constitute the primary agricultural land uses, collectively occupying 56% of the agricultural land area. Additionally, the presence of 18 irrigation schemes underscores the importance of water management in sustaining agricultural productivity. Conservation areas on farms cover 111,000 ha, contributing to biodiversity conservation and ecosystem resilience. The state also boasts vast expanses of production forests on both public and private lands, totalling 812,000 ha on public land, 434,000 ha on private timber reserves, and plantation forests spanning 283,000 ha across various tenures contribute to timber production and ecosystem services.

Southern Tasmania's production landscapes are largely concentrated on the eastern side of the region, encompassing approximately 6,450 km<sup>2</sup> (27%) of the south-east region's land area. Dryland grazing (13% of the region's land area) is the most common land use, followed by irrigated cropping (0.3% of the region's land area). Agricultural development has generally occurred at lower altitudes (below 400 m) resulting in a concentration of activity across the floodplains and valleys, disproportionately exposing these areas to flooding.

Despite their economic and ecological significance, agricultural natural assets in southern Tasmania face many challenges, including vulnerability to drought, bushfires, and biosecurity incursions. These can create lasting and difficult to reverse impacts on soil, water, biodiversity assets and production landscapes with ongoing implications for natural assets and food security.

## Cultural values and practices

Cultural practices of the Palawa people of Lutruwita, Tasmania, are rooted in a profound respect for Country, recognising that the health of the land directly impacts the wellbeing of its people. Land and Sea Country holds cultural values that provide strong and continuing significance to the Tasmanian Aboriginal people. The legacy, practices, and place-based wisdom of the Palawa people is a living tradition that offers insight into sustainable management practices for nature and Country.

Cultural landscape management practices, such as cultural burning, represents a holistic approach to landscape resilience and are deeply embedded in tradition. The significance of these practices extends beyond ecological considerations to encompass spiritual and cultural dimensions.


NRM South recognises the significant, abundant, and diverse cultural values across southern Tasmanian and that natural disasters and emergencies have the potential to impact cultural values and sites. Whilst this Plan does not assess the impacts of these events on cultural sites and values it does include recommendations for cultural practices and knowledge to be used in planning and recovery actions.

In recognising the heritage and cultural values of the Palawa people, it is essential to acknowledge the risks posed by coastal inundation, flood, and fire to these values and to culturally significant species. Species such as the muttonbird, which face threats from fire, flood, and coastal inundation; the Mienna cider gum, vulnerable to fire, drought, and longer-term climate change; and native shellfish, at risk from coastal inundation and floods, are of particular interest and concern.

Cultural burning is an example of a landscape resilience tool characterised by deliberate, low-intensity fires, strategically applied to landscapes, and guided by knowledge systems that respect the balance of ecosystems. Cultural burning practice fosters a sense of belonging and reinforces cultural identity, while promoting biodiversity and landscape resilience. It respects the intricate balance of ecosystems and contributes to soil and landscape health by enhancing soil moisture levels, reducing soil density, increasing organic matter content, and improving nutrient availability for native plants.

Cultural knowledge and management practices form an integral part of natural resource management and emergency resilience, response and recovery for natural events, disasters and emergencies. NRM South aims to navigate the complexities of emergency management while honouring the rich cultural heritage of the Palawa people. By recognising the leadership and stewardship role of the Palawa people in fostering the resilience and health of Country, we aim to empower community, facilitate access to funding and resources, foster collaboration, and support increased formal involvement and recognition of Palawa people in managing Country.





# 2

## Objectives of this plan

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## 2. Objectives of this plan

### Purpose

The Plan serves as a strategic blueprint to enhance preparedness, response, and recovery measures pertaining to emergency events impacting biodiversity and agricultural natural capital assets. The plan aims to provide information to assist integration of these crucial assets into emergency frameworks, and to mitigate risks, minimise damage, and expedite recovery processes for natural assets in the face of disasters.

The Plan identifies the role of NRM South and how we can collaborate with agencies responsible for emergency preparedness and response in southern Tasmania. This includes efforts to enhance the resilience of biodiversity and agricultural assets by recognising the risks and threats posed by disasters and undertaking planning to improve outcomes through actions and management before, during (to the extent possible) and after to support recovery.

### Objectives

This Plan marks a pivotal moment in NRM South's approach to emergency preparedness, response, and recovery concerning biodiversity and natural capital assets in southern Tasmania. It lays the foundation for future initiatives, highlighting the need for collaborative approaches, funding, and resources to bridge existing gaps and implement actions. Through future funding and strategic implementation of the recommendations of this Plan, we envision a future where our objectives are achieved, bolstering our resilience, and safeguarding our natural values. As such, our key goals are to:

#### 1 Enhance preparedness:

- a) Outline proactive actions that identify, assess, and reduce risks posed by potential emergency events to biodiversity and agricultural natural capital assets.
- b) Foster collaboration and information sharing to ensure a comprehensive understanding of vulnerabilities and effective preparedness measures.

#### 2 Strengthen capabilities:

- a) Support clear communication that facilitates swift and coordinated responses to emergency events affecting biodiversity and agricultural natural capital assets.
- b) Identify training and resources required to equip NRM South and our stakeholders with the necessary skills and knowledge to effectively address crises.
- c) Plan, develop and implement strategic actions tailored to the unique needs of biodiversity and agricultural natural capital assets, with a focus on restoring ecosystems and enhancing resilience.
- d) Bring together and coordinate on-ground efforts with state and federal governments and local stakeholders to expedite the recovery process for natural assets, leveraging available resources and expertise to maximise outcomes.
- e) Facilitate the inclusion of biodiversity and agricultural natural capital assets in existing emergency planning frameworks, fostering a holistic approach to risk management and mitigation, and promoting long-term resilience and sustainability.

#### 3 Collaborate with relevant agencies:

- a) Identify and engage with key agencies responsible for emergency preparedness and response, fostering collaboration and coordination to achieve shared objectives.
- b) Identify partnerships and cooperative agreements to leverage resources and expertise for more effective management of priority natural assets during and following emergencies.



» Photo: Eric Woehler



# 3

## Scope and definitions

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### 3. Scope and definitions

Definitions of key terms is relevant to understanding the scope of this Plan. The following outlines key definitions from the *Tasmanian Emergency Management Arrangements*:

- Hazard—a place, structure, source or situation, that may potentially endanger, destroy or threaten to endanger or destroy human life, property or the environment (section 3 of the Act).
- Disaster — a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic or environmental losses and impacts.
- Emergency - ‘an event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response’.
- Emergency management—the planning, organisation, coordination and implementation of measures that are necessary or desirable to prevent, mitigate, respond to, resist, adapt to, overcome and recover from an emergency. Can include civil defence, emergency-related research or training, or the development of emergency policy and procedures relating to any of the above measures or actions.

The natural hazards included within the scope of this plan result from either earth systems (such as extreme weather events) or biological system (disease, pest, pathogen).

According to Australian Climate Services (a partnership between the Bureau of Meteorology, Geoscience Australia, CSIRO and Australian Bureau of Statistics), natural weather hazards include bushfires, floods and heatwaves and severe thunderstorms, and are linked to drought and flood cycles. Natural hazards vary in type, frequency, intensity and severity and only become a disaster when the hazard/s intersect with people and things of value, and when the impacts of the natural hazard/s exceed people ability to avoid, cope or recover from them. Disasters are influenced by the natural hazard, exposure of people, property and

assets, and their vulnerability (physical, social, economic and environmental factors or processes) and many be determined as a ‘natural emergency’ or ‘emergency event’. It is worth noting that a natural hazard may have a serious environmental impact but not be declared a disaster or emergency.

Natural emergencies and disasters are acute in nature, involving sudden or extreme events that endanger or have the potential to endanger life, property, or the environment. Emergency and disaster events may also be human-induced, such as industrial accidents or hazardous material spills and cause significant impacts to natural values, however these are out of scope of the Plan.

Additionally, one type of emergency or disaster event can trigger others. For example, a flood may create a biosecurity risk (e.g. invasive fish being swept into pristine streams) or the aftermath of a bushfire creates impacts away from the site (e.g. soil loss, erosion, or landslip) such as downstream water quality decline or expansion of weeds.

It is important to note that while natural emergencies and disasters are acute events, they may also be exacerbated by chronic and periodic environmental stressors such as climate change, biodiversity loss and soil degradation. Whilst it is understood that climate change is causing an increase in frequency, intensity and duration of weather-related hazards leading to natural disasters and emergencies, chronic climate change impacts are as ‘out of scope’ for this Plan. Further information on projected climate change in Tasmania can be found through [Climate Futures Tasmania](#) projections and technical reports produced.

[Table 1](#) identifies natural disasters and emergencies that have been determined to be either ‘in’ or ‘out’ of scope for this Plan.

This Plan covers acute ‘in-scope’ events and includes identification of preparedness, response and recovery actions but not their implementation unless already funded or underway elsewhere.

Future reviews and updates of this Plan may consider some of the out of scope or new issues noted in [Table 1](#).



» Bushfire smoke in Fingal. Photo: iStock

**TABLE 1: Scope of the Biodiversity and Agricultural Natural Capital Emergency Preparedness and Response plan (2024)**

Natural disaster/emergency	In scope	Out of scope
<b>Bushfires</b>	Bushfires of significant scale, intensity, frequency, or at vulnerable sites that pose a substantial threat or has impacted biodiversity or agricultural natural assets.	Activities such as cool burns, cultural burns, fire hazard reduction burns, forestry burns, and ecological burns. These practices are managed separately for ecosystem maintenance and fire risk reduction.
<b>Flooding and coastal inundation</b>	Flooding and coastal inundation events that pose a substantial threat or causes substantial impact to biodiversity or agricultural natural assets, particularly in areas or assets intolerant to flooding.	Events that are small-scale or short-term with minimal impact on valued assets are considered out of scope for this Plan.
<b>Drought</b>		Acute drought conditions with the potential to significantly impact biodiversity or agricultural natural assets, including a risk to agricultural productivity. Urgent response required, especially when landholders/managers are unprepared or when the environment is particularly vulnerable.  Chronic impacts such as longer-term drying and persistent drought-like conditions, which require longer-term strategies, are considered out of scope for this category.
<b>Biosecurity</b>	New or existing weeds, pest or diseases that pose a substantial threat to biodiversity or agricultural natural assets.	Existing pests, weeds, and diseases within the state are generally considered out of scope unless there is a significant change in their distribution or impact. Agricultural pests, weeds, and diseases primarily affecting livestock or crops fall outside the scope of this category.

Natural disaster/emergency	In scope	Out of scope
<b>Marine or terrestrial heatwaves</b>		<p>Sudden and prolonged periods of unusually warm temperatures impacting ecosystems and production are beyond the scope of this category. Additionally, since management actions for marine heatwaves are still being researched, they are not currently described, but ongoing research is expected to enhance understanding in the future.</p>
<b>Other</b>		<p>Earthquakes, severe storms and tsunamis are considered out of scope due to their reduced frequency and intensity in Tasmania. Chronic impacts such as those related to climate change are considered out of scope. These broader, long-term trends require comprehensive strategies beyond the scope of individual event response.</p> <p>The impacts of 'in-scope' natural disasters and emergencies on aquatic and marine environments and assets are out of scope for this Plan.</p> <p>The impacts of 'in-scope' natural disasters, emergencies on cultural assets and values is out of scope for this Plan.</p> <p>Other human-induced crises, such as industrial accidents or hazardous material spills are also out of scope the Plan.</p>

## Impacts of natural disaster and emergencies

### Bushfire

Landscape and environmental conditions significantly influence the nature of bushfires. Tasmania's topography and vegetation composition contribute to a distinct bushfire pattern. The Southern Region predominantly experiences bushfires characterised by rapid spread and intense heat, often exacerbated by dry and windy conditions. These fires pose significant challenges for firefighting efforts and can result in extensive damage to both natural ecosystems and human infrastructure.

Aside from the direct impacts of bushfires including vegetation and habitat loss, fauna deaths and biodiversity decline, there are several indirect consequences that must be considered:

- Increased risk of soil erosion and land degradation due to vegetation loss.
- Disruption of water catchment areas, potentially leading to reduced water quality and availability.
- Pollution from ash and salinisation when saline water is used.
- Loss of habitat for native flora and fauna, including endangered species.
- Threats to human health and safety, including respiratory issues from smoke inhalation and potential evacuation requirements.
- Economic impacts, including damage to agricultural lands, forestry assets, and tourism infrastructure.

Given the characteristics of bushfires in the Region, proactive measures such as fuel reduction programs, community awareness campaigns, and effective emergency response strategies are essential to mitigate risks and ensure effective management of bushfire events.

### Flooding and coastal inundation

As Tasmania is mountainous the experience with floods is very different from that on mainland Australia. Tasmania mainly experiences flash flooding rather than long period floods with several weeks of inundation. Therefore, impacts are usually localised.

Flooding and coastal inundation can cause:

- Flooding into groundwater reservoirs causing destabilization.
- Debris flows and deposition can modify/disrupt waterflows and destabilize banks.
- Karst systems need to be considered, such as inflow of nutrients, slumpage and sinkholes
- Erosion
- Mobilisation of pollutants
- Injury and death of fauna
- Damage to riparian and other vegetation and habitats.
- Excess nutrients and sediments in waterways
- Impact on estuarine flows, river mouths etc.
- Agricultural impacts of logjams and rock deposits
- Salinisation of near coastal soils from coastal inundation.
- Changes to river mouths.

### Biosecurity incursion

The threat of biosecurity incursions presents significant risks to both natural ecosystems and agricultural industries of the Region. Biosecurity incursions refer to the introduction or spread of harmful pests, diseases, or invasive species that can have devastating effects on local biodiversity and economic activities.

Due to Tasmania's unique environmental conditions and geographic isolation, the introduction of invasive species or diseases can have profound and far-reaching consequences. The NRM South Region is particularly vulnerable to biosecurity threats given its diverse range of ecosystems, including forests, farmlands, and coastal areas.

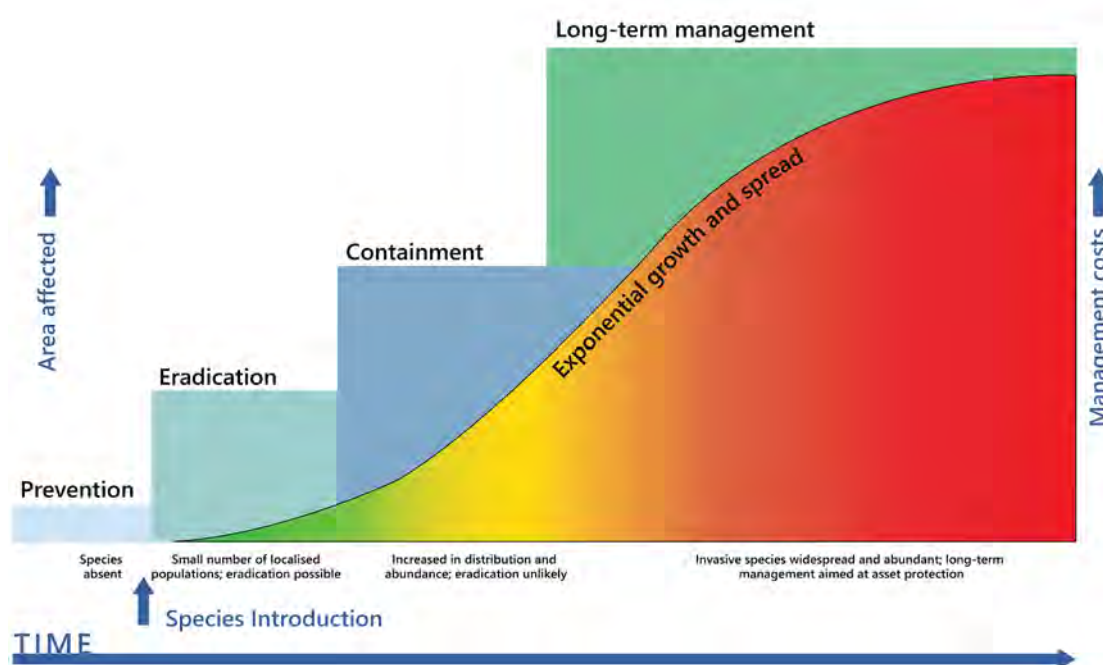
Biosecurity incursions can be in the form of:

- Invasive pests – which can impact biodiversity assets through predation, competition, browsing, trampling, spreading disease (e.g. feral cats, deer, sugar gliders)
- Weeds – are introduced plant species that have a significant negative effect on biodiversity and/or agricultural values by out competing native or agricultural plants, are a threat to native or agricultural animals, or impact habitat of fauna (e.g. *Nasella* grasses).
- Diseases –comprise diseases, fungi and parasites that affect the health of native flora and fauna, reducing their ability to reproduce or survive. Wildlife Health Australia lists 41 infectious diseases in Australian animals that carry biosecurity concerns, including 13 viruses, 12 bacteria, 6 fungi, 6 protozoa, 2 internal parasites and 2 external parasites (Invasive species, problematic native species, and diseases | Australia

state of the environment 2021 (dcceew.gov.au)). Of particular concern currently is the spread of Highly Pathogenic Avian Influenza, which is impacting wildlife and domestic animals. At the time of writing strains have been found in Antarctica and in poultry in Victoria.

Given the severity of potential impacts, early detection and rapid response are crucial in addressing biosecurity incursions effectively (see the Invasion Curve, Figure 1). This involves coordinated efforts between government agencies, industry stakeholders, and the broader community to prevent, detect, and manage biosecurity threats in the Region. Proactive measures such as surveillance programs, quarantine protocols, and public awareness campaigns play a vital role in safeguarding the region's environmental and economic interests against biosecurity risks.

FIGURE 1: **Invasion curve** (source: [invasives.org.au](https://invasives.org.au))



It is not possible to map an acute biosecurity incursion, as there could be a variety of scenarios that occur. Instead, a biosecurity incursion needs to be managed on a case-by-case basis, recognising the areas with priority assets.



A person wearing a blue long-sleeved shirt is shown from the chest up, slightly out of focus. A thin red branch with small buds is in the foreground, partially obscuring the person. The background is a warm, blurred mix of orange and brown tones.

# 4

## Organisational roles

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# 4. Organisational roles

## Key roles and responsibilities

Within the framework of the *Emergency Management Act 2006*, and the *Tasmanian Emergency Management Arrangements* (TEMA), clear roles and responsibilities are provided to govern emergency management in Tasmania. These encompass prevention and mitigation, preparation, response, relief, and recovery efforts, ensuring a structured and coordinated approach to managing emergencies across the state.

For a comprehensive understanding of these arrangements and the specific responsibilities of agencies involved, stakeholders can refer to the TEMA. This document provides a high-level overview of the organisational structures and protocols underpinning Tasmania’s emergency management framework.

In alignment with these overarching structures, [Table 2](#) summarises the key roles integral to emergency preparedness, response, and recovery efforts for natural assets. Contact names and details are omitted from the Plan due to their susceptibility to frequent change within dynamic operational environments.

**TABLE 2: Key lead and supporting organisations involved in emergency preparedness, response and recovery in the NRM South region.**

Lead organisations with statutory responsibilities under the act	
Organisation	Role
Department of Health (DoH)	<p>State agency responsible for emergency public health care services in Tasmania, including developing and maintaining the <i>Tasmanian Mass Casualty Management Plan</i> and the <i>Tasmanian Public Health Emergencies Management Plan</i>.</p> <p>Ambulance Tasmania, a division of DoH, is responsible for providing emergency medical services, including medical response during disasters and emergencies. They work alongside other agencies to ensure the health and safety of the community.</p>
Department of Natural Resources and Environment (NRE), includes Parks and Wildlife Service (PWS) and Biosecurity Tasmania (BT)	<p>State agency responsible for supporting primary industry development, the protection of Tasmania’s natural environment, effective land and water management and the protection of Tasmania’s relative disease and pest free status.</p> <p>The PWS is responsible for managing 49% Tasmania’s land area including the Tasmanian Wilderness World Heritage Area. PWS develops and maintains bushfire management plans for some PWS managed land.</p> <p>BT is responsible for the protection of Tasmania’s industries and environment from the negative impacts of pests, weeds and diseases. Responsible for developing and maintaining the <i>Tasmanian Biosecurity Emergencies Plan</i> and the <i>Dam Safety Emergencies Plan</i>.</p>

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**Lead organisations with statutory responsibilities under the act**


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Organisation	Role
<b>Department of Premier and Cabinet (DPAC)</b>	<p>The central agency of the Tasmanian State Government, DPAC is responsible for a broad range of services to Cabinet, other members of Parliament, Government agencies and the community.</p> <p>The Office of Security and Emergency Management (OSEM) sits within DPAC and works in partnership with emergency services and other agencies to lead the collaborative development of whole-of-government policy, advice and initiatives to improve Tasmania's capability to prevent, prepare for, respond to, and recover from emergencies.</p> <p>DPAC is responsible for whole of government recovery planning, preparedness and coordination and responsible for developing and maintaining several State Special Emergency Management Plans including but not limited to, the <i>State Recovery Plan</i>, <i>Tasmanian Disaster Resilience Strategy 2020-2025</i> and the <i>Impact and Damage Assessment Plan</i>. DPAC leads whole of government coordinated resilience and recovery work.</p> <p>DPAC also manages the Tasmanian Emergency Information Service.</p>
<b>Department of State Growth</b>	<p>State agency responsible for transport, infrastructure, skills, training and workforce growth, international relations and trade, science and technology, resources, energy and emissions reductions, and region and sector development. State Growth provides support to and retains a close working relationship with the statutory authorities Forest Practices Authority and Private Forests Tasmania.</p> <p>Notably State Growth includes Renewables, Climate and Future Industries Tasmania (ReCFIT) who are responsible for advising the government on the state's strategic direction on climate change, renewable energy growth and emissions reduction to help shape Tasmania's future while maintaining a secure, sustainable, and affordable energy system.</p>

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**Lead organisations with statutory responsibilities under the act**


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Organisation	Role
<b>Department of Police Fire and Emergency Management, includes Tasmanian Fire Service (TFS), Tasmanian Police, Tasmanian State Emergency Service (SES)</b>	<p>The TFS is responsible for mitigating the impact of, preparing for and responding to fire emergencies including providing community education on bushfire preparedness and fire safety. TFS manage the state and regional firefighting operations for bushfire, structural fire, and hazardous material incidents. This includes intelligence, air operations, warnings and public information. They undertake vegetation fire management activities and bushfire mitigation programs, are the fire protection industry regulator and maintain building safety standards. Responsible for developing and maintaining the <i>State Fire Protection Plan</i>.</p> <p>Tasmanian Police are responsible for delivering support services during emergencies, including providing information to the community in relation to security and safety. They work in partnership with TFS and SES.</p> <p>The Tasmanian SES is responsible for providing emergency response services for severe storms and floods, road crash rescue, and a range of other general rescue and community support roles through the coordination of volunteers. Includes the Emergency Management Unit (EMU) who provides whole of government advice and executive support to the State Emergency Management Committee and Regional Emergency Management Planning committees. It also takes the lead with much of the State's emergency management planning and emergency risk management work. The EMU is responsible for maintaining the <i>Tasmanian Emergency Management Arrangements</i> on behalf of the State Emergency Management Committee.</p>
<b>Local governments including: Brighton, Central Highlands, Clarence, Derwent Valley, Glamorgan Spring Bay, Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands, Tasman.</b>	<p>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 <i>Municipal Emergency Management Plans</i> (MEMP) and coordinating MEM Committee meetings involving local emergency-management agencies.</p>
<b>Aboriginal groups, including: Tasmanian Aboriginal Corporation (TAC), Tasmanian Regional Aboriginal Communities Alliance (TRACA) (incl. South East Tasmania Aboriginal Corporation, and weetapoonna Aboriginal Corporation), Firesticks Alliance.</b>	<p>Represent and advocate for the rights and roles of Tasmanian Aboriginal people and groups, including engaging and advising Government at all levels regarding affairs affecting Aboriginal Tasmanians. Lead on-ground natural resource management actions to support healthy sea, land and air country, including cultural burning as a management action.</p>
<b>Agricultural extension and industry groups including: TasFarmers, Tasmanian Agricultural Productivity Group (TAPG), Seafood Industry Tasmania (SIT)</b>	<p>Agricultural industry associations representing and advocating for the interests of primary producers in Tasmania and engaging and educating farmers and graziers in emergency preparedness, response, and recovery.</p>

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**Lead organisations with statutory responsibilities under the act**


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Organisation	Role
<b>Emergency relief and support organisations, including the Australian Red Cross</b>	Providing immediate relief, long-term recovery support, emergency preparedness initiatives, information dissemination, health and welfare services, and coordination efforts with other organizations during all stages of disasters.
<b>GBEs and core utilities, including: Sustainable Timber Tasmania, Tasmanian Irrigation, TasWater, Hydro Tasmania, TasNetworks</b>	State owned business enterprises responsible for managing and maintaining natural resource and infrastructure assets including production and non-production forests, irrigation systems, fresh water and sewerage services and energy generation.
<b>Landcare groups, represented by Landcare Tasmania.</b>	Landcare groups are community-based volunteer powered groups that provide on-ground natural resource management services relevant to emergency preparedness and recovery. Landcare Tasmania supports landcare groups and landholders in their local areas through leadership, planning and resources.
<b>Local conservation and land management organisations, including: Tasmanian Land Conservancy (TLC)</b>	Not-for-profit, apolitical, science and community-based organisations that raise funds to deliver conservation actions and protect irreplaceable sites, rare ecosystems, and threatened species and communities in Tasmania.
<b>Local farming groups, including: Coal River Products Association, East Coast Primary Producers Association, Sprout Tasmania</b>	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 NRM South 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.
<b>Private forestry</b>	Undertaking prevention and mitigation efforts, early detection and reporting of forest fires, mobilising resources for emergency response, collaborating with authorities, and engaging with communities to support preparedness and recovery efforts.
<b>Research institutes, including CSIRO and University of Tasmania</b>	Assess environmental damage, monitor ecosystem recovery, and develop strategies for mitigating future environmental risks associated with emergencies.
<b>Wildcare Tasmania, including 'Friends of' groups, Threatened Plants Tasmania and other community led volunteer groups</b>	Community organisation representing environmental volunteer groups whose foci include capacity building and undertaking on-ground natural resource management works such as invasive plant control, revegetation, and threatened plant and waterway monitoring at a local scale.
<b>Wildlife rescue and rehabilitation groups, including coordination by Bonorong Wildlife Sanctuary</b>	Medical care, rehabilitation, and release services for injured or displaced native animals.

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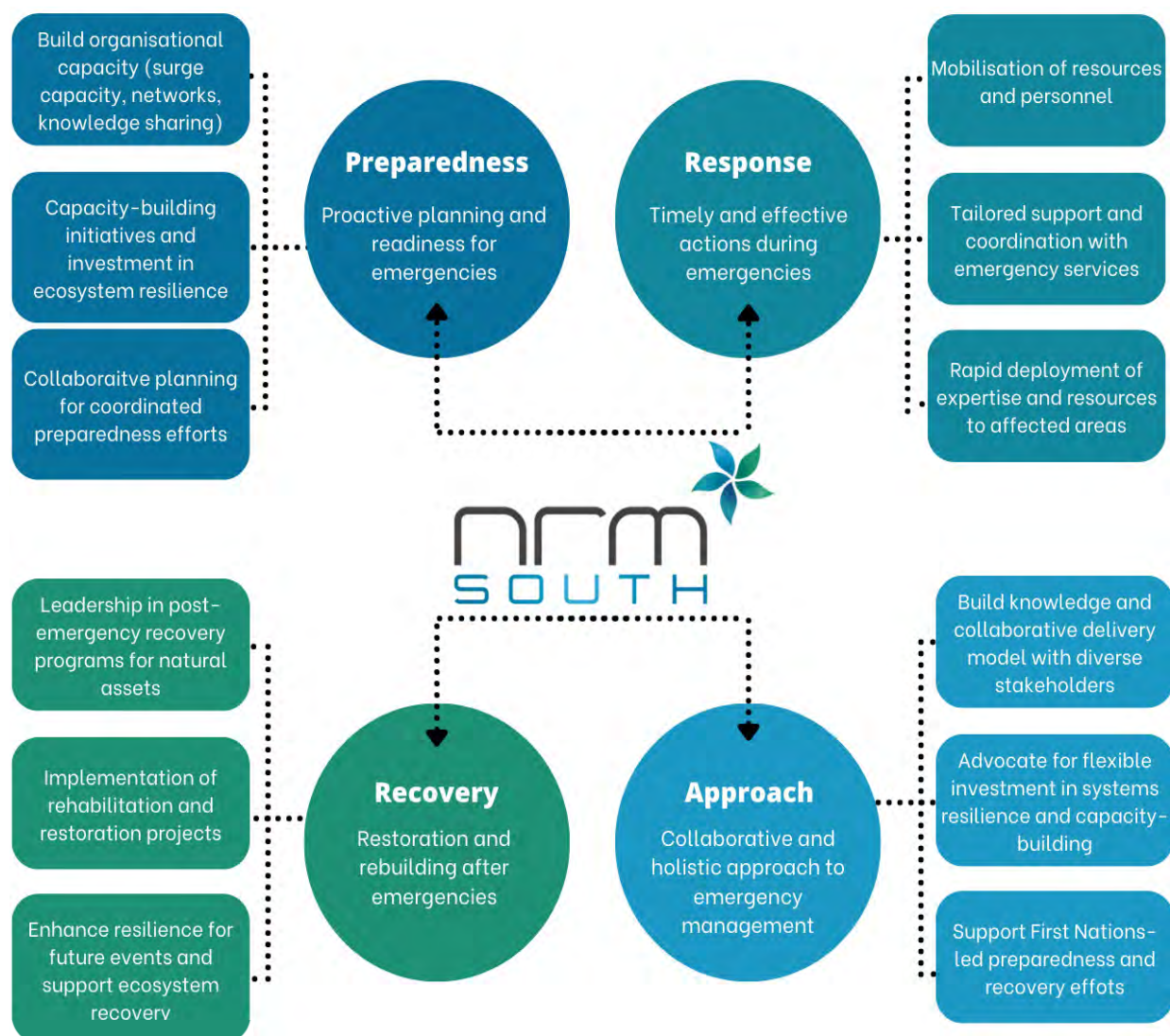
Several other organisations play significant roles in regional emergency management; however, their involvement in biodiversity and agricultural natural-capital preparedness, response, and recovery efforts is comparatively limited. This includes utility agencies (e.g. telecommunications), health services and hospitals, transportation authorities, charitable organisations and educational institutions.

### Overview of NRM South's role in emergency preparedness and response

In the southern NRM region of Tasmania, the preservation and management of natural resources are critically important, particularly in the face of increasing natural disasters and emergencies. NRM South, as the statutory body responsible for strategic planning and management of natural resources in the region, plays a key role in strengthening emergency preparedness, resilience, response, and recovery efforts. Our role encompasses planning, coordinating, and delivering programs to support healthy and productive landscapes, communities, and industries. We establish regional networks to address identified needs across diverse ecosystems and tenures, ensuring a holistic and integrated approach to landscape management. We maintain a regional focus on long-term recovery and preparedness beyond immediate crisis responses.

NRM South's approach to emergency management is underpinned by our experience, strategic planning, and collaborative approach ([Figure 2](#)).

FIGURE 2: NRM South's approach to emergency management.



### NRM South experience

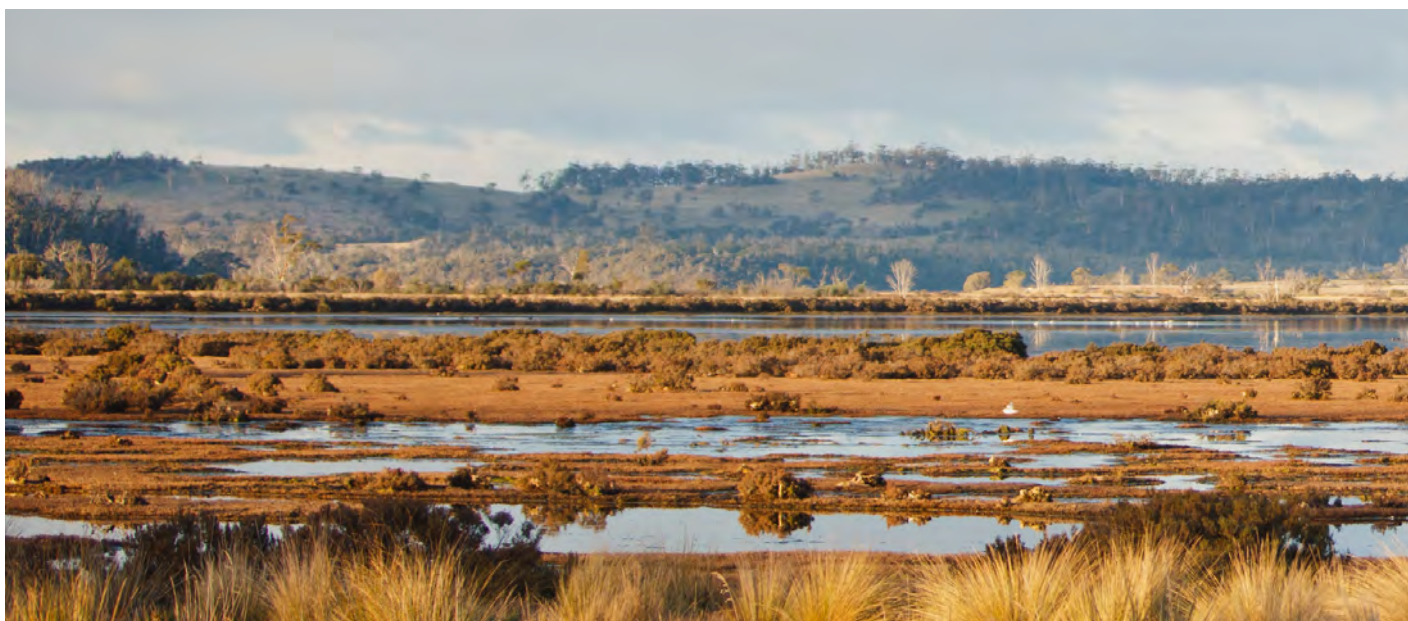
In relation to emergency preparedness, response, and recovery, NRM South provides standing capability and support as an ally to emergency services and government defined roles. Drawing upon two decades of specialised expertise in natural resource management (NRM), our focus has developed through our strategic planning role and delivery of a diverse portfolio of projects valued at over \$60 million. From targeted conservation actions to primary industries, sustainability, and biosecurity measures, our efforts reflect our dedication to strengthening environmental sustainability and community resilience.

Through this experience, we have developed robust internal processes to design, plan, budget, manage, and deliver projects. Our team has a demonstrated track record in delivering efficient and effective project services to the required quality and specifications of the Australian Government.

Our team possess extensive technical expertise and experience in delivering Australian Government projects. The team prioritises formal project management training and develops and implements comprehensive project plans. We participate in various boards, advisory groups, and technical committees, including NRM Regions Australia's Community of Practice groups, to ensure we remain at the forefront of best practice and innovation.

In the face of emergent challenges, agility and adaptability are our guiding principles. We embrace adaptive management, mobilising surge capacity measures to address evolving priorities and recalibrate strategies as circumstances dictate. NRM South is committed to achieving efficiency, value-for-money, and delivering tangible outcomes. Leveraging existing projects, networks, and partnerships, we optimise resource allocation and amplify the impact of our interventions. Through stringent procurement processes and local knowledge, we maximise the impact of investment to support outcomes.

Our approach is effective because our practices are informed by best practices and cutting-edge research. Through networking, engagement with specialised groups, and ongoing capacity-building, we ensure the latest methodologies are integrated into our strategic actions. We have a partnership-driven approach, which sees us working strategically and collaboratively with diverse stakeholders, including research institutions, Aboriginal people and groups, and government bodies. This allows us to amplify our collective impact and facilitate a more resilient future.



### Strategic planning

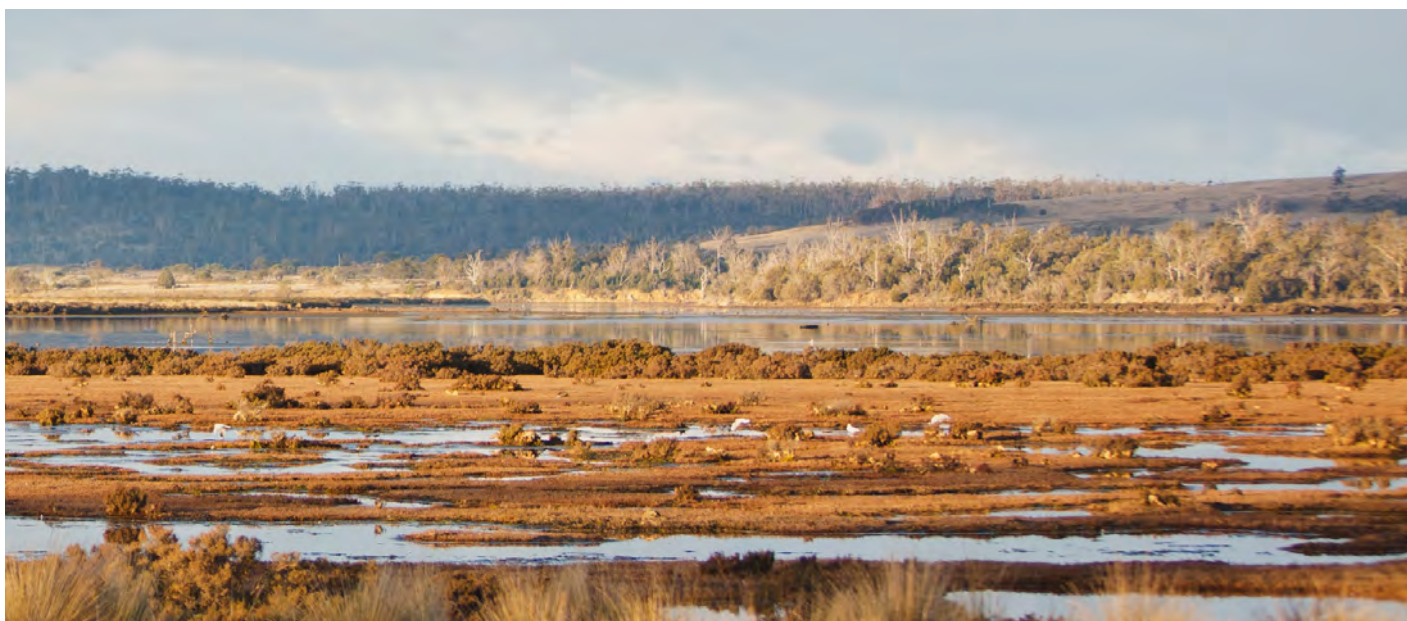
Our *2030 NRM Strategy for Southern Tasmania* (Strategy) provides a framework that supports effectiveness – it provides clarity and delineates clear priorities, threats, and actionable strategies that aim to improve the management of natural resources in southern Tasmania. This Plan addresses a gap in the Strategy, which is to identify relevant actions relating to emergency preparedness, response and recovery.

As a part of our statutory role under the *Natural Resource Management Act 2002 (Tas)*, and other contractual arrangements, NRM South has a mandate through our strategic planning processes to coordinate regional efforts aimed at safeguarding natural assets. By leading the development and implementation of comprehensive regional NRM strategies, we prioritise and facilitate action to address emerging threats and leverage opportunities. Our strategic approach creates synergies across sectors and tenure to foster a coordinated approach to landscape management.

### Collaborative approach

Central to our approach is our support for collaborative leadership and multistakeholder planning to identify and address shared priorities. Our commitment to stakeholder engagement is key to foster inclusive and informed decision-making processes. By working with an extensive network of partners and collaborators, we have strengthened our capacity to translate plans into tangible outcomes.

We bring together diverse sectors to address issues such as firewood harvesting, water quality management, erosion, weed control, coastal health, climate change planning and biosecurity issues. Through a 'best-placed' approach to service delivery, we leverage the skills and knowledge of both internal and external partners, optimising outcomes across a diverse portfolio of projects. Our partnership delivery model enables us to deliver action with industry partners, community groups, Aboriginal people and groups, other Non-Government-Organisations, Government-Business-Enterprises and government departments, land managers and farmers. We can share resources and expertise to achieve shared objectives.







5

**Biodiversity  
assets**

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## 5. Biodiversity assets

### Identification of priority biodiversity assets

There are over 600 threatened species in the NRM South region (threatened under the Tasmanian *Threatened Species Protection Act 1995* and/or the *EPBC Act 1999*), and it has therefore been necessary to prioritise a subsection of these in this planning for emergency preparedness. While we have identified current priorities, we recommend a triage approach in future planning and implementation (i.e. evaluating and selecting species or assets which have the best chance of recovery), and it is therefore critical that the identified priorities, the mapping of these and the risks analyses be regularly reviewed, and are adaptively managed to accommodate evolving issues, changes in priorities, new information and to incorporate learnings.

Priority biodiversity assets selected were identified using the following criteria:

- Relevant Matters of National Environmental Significance (MNES), including:
  - Listed threatened species and Threatened Ecological Communities (concentrating on the Priority species in the 2022-2032 Threatened Species Action Plan present in our region), and priority sites (Bruny Island, Midlands, Giant Kelp)
  - Ramsar Wetlands of International Importance
  - World Heritage properties (the parts of the Tasmanian Wilderness World Heritage in our region)
- Other biodiversity priorities in our region as identified in the 2030 NRM South Strategy
- Other regional priorities relevant to the in-scope emergencies. These have been included because the MNES and strategic priorities are limited in their extent and at times do not capture other important species or communities. Therefore, we have included some others, informed by stakeholder feedback or recognition that they are likely to be particularly susceptible to these types of emergency events or are iconic Tasmanian species (those that are emblematic of the unique features of Tasmania that attracts visitors and economic value), significant alpine and other species that are particularly at risk of drought and fire. These additions are also not completely comprehensive and should be reviewed and updated as required.

The following iconic and threatened plants – particularly alpine and orchid species have been included in the mapping analysis (see Appendix B Figure 49). Noting that these species were not included in the modelled risk assessments (Appendix A).

- *Athrotaxis cupressoides*: pencil pine
- *Athrotaxis selaginoides*: King Billy pine
- *Caladenia saggicola*
- *Callitris oblonga subsp. oblonga*: South Esk Pine
- *Diselma archeri*: Dwarf pine
- *Lagarostrobos franklinii*: Huon pine
- *Limonium austral var. baudinii*
- *Microcachrys tetragona*: Creeping pine
- *Nothofagus gunnii*: Deciduous beech
- *Pherosphaera hookeriana*: Mt Mawson or Drooping pine
- *Podocarpus lawrencei*: Mountain plum-pine
- *Prasophyllum milfordense*
- *Pterostylis wapstrarum*

While none of these species are listed on EPBC Act and (other than *Pherosphaera hookeriana*) are not listed under *Threatened Species Protection Act 1995*, where the *Athrotaxis* species dominate they are within threatened vegetation communities in Schedule 3A of the *Tasmanian Nature Conservation Act 2002*.

The sources of data are provided in Chapter 10 and the detailed methods used for the spatial analysis are provided in Appendix A.

As indicated in Section 10, the maps are indicative rather than definitive, because they represent a point in time and there are known gaps in information in the Tasmanian Natural Values Atlas and other data sources. Obviously, these data gaps require future attention (e.g. through additional monitoring). For modelling purposes, discrepancies in the records required certain assets to be modelled in a precise manner to prevent overestimation or underestimation of their distribution. [Table 3](#) summarises how some of the key assets were mapped.

TABLE 3: Specific ways data were managed for priority threatened species

Asset	Issue	How the issue was managed
<b>Swift parrots</b>	Plotting known breeding range boundaries resulted in a poor representation of priority areas	The SPIBAs were used and overlayed with a key breeding habitat layer (STT) to identify priority areas.
<b>Orange-bellied parrots</b>	Observation records were not helpful	Nesting habitat was identified from the TASVEG 4.0 communities in 20km buffer around Melaleuca and 5km around Birch's Inlet
<b>Eastern quolls</b>	The known range boundaries resulted in a poor representation of priority areas	A 400m buffer on existing observations (Sightings, Present, on or after 01/01/2014)
<b>Tasmanian devils</b>	The known range boundaries resulted in a poor representation of priority areas	Focussed on disease-free parts of the state, Tasman Peninsula and Maria Island, as priority areas.
<b>Masked owls</b>	The known range boundaries resulted in a poor representation of priority areas	Base priority (fire) rating assigned from mature habitat class within the known range boundary.
<b>Wedge-tailed eagles</b>	There are many nest records in the NVA, with highly many old nests or nests that are unlikely to still exist.	500m buffer on Known Present nest records since 01/01/2014.
<b>Blue-winged parrots</b>	The known range boundaries resulted in a poor representation of priority areas	Not included
<b>Eastern-barred bandicoots</b>	The known range boundaries resulted in a poor representation of priority areas	A 500m buffer on observation records since 01/01/2014 with less than 1km position accuracy.
<b>Azure kingfisher</b>	The known range boundaries resulted in a poor representation of priority areas	Not included

Priority biodiversity asset maps are provided in Appendix B and their details are listed in Table C1 (Appendix C). This table examines how the various emergency scenarios pose a threat to the priority biodiversity assets. Note that priorities with similar actions during each phase, preparedness, during and after an emergency in Tables C2 and C3 of Appendix C.

### Risk assessment

Through a standardised approach, the spatial analysis involved the development of a risk assessment model for each identified threat outlined in the plan, including fire (Figure 3), flood (Figure 4), coastal erosion and coastal inundation (Figure 5). Coastal erosion and coastal inundation are used as indicators of episodic events from storm surge. The mapping has been specifically tailored to assess their impact on biodiversity assets when applicable.

The three major components of each risk assessment model were:

- 1 Threat Rating (input): describes the extent and likelihood/severity of the threat.
- 2 Natural Capital Asset Priority Rating (input): describes the extent of the natural capital assets, which are then rated against all other assets in terms of priority for conservation value and/or the asset's vulnerability to the threat.
- 3 Risk Assessment Rating (output): describes the combination of the two above rating models which can be used to identify areas at highest risk to the threat.

FIGURE 3: Biodiversity natural capital asset fire risk assessment – NRM South region

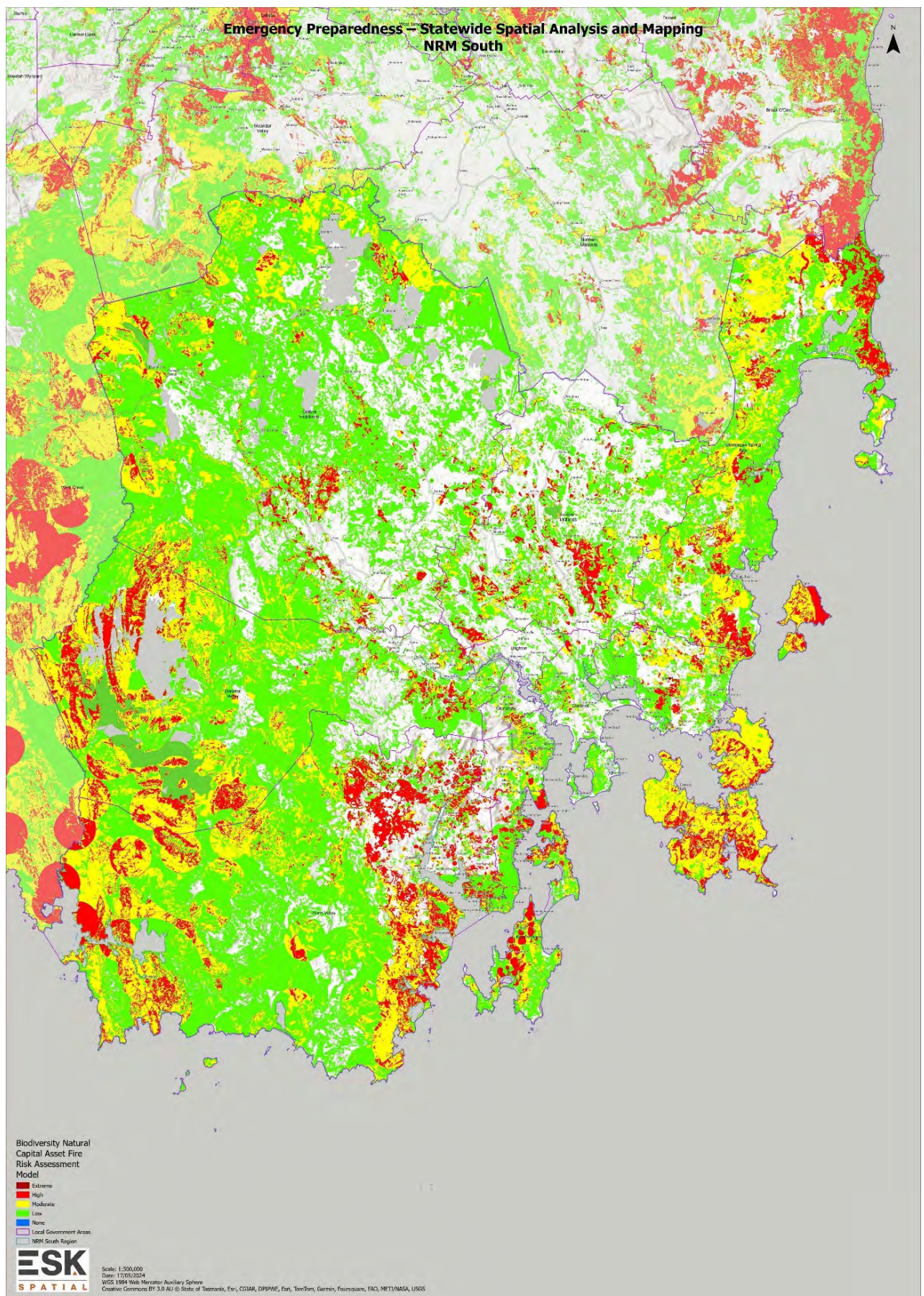


FIGURE 4: Biodiversity natural capital asset flood risk assessment – NRM South region

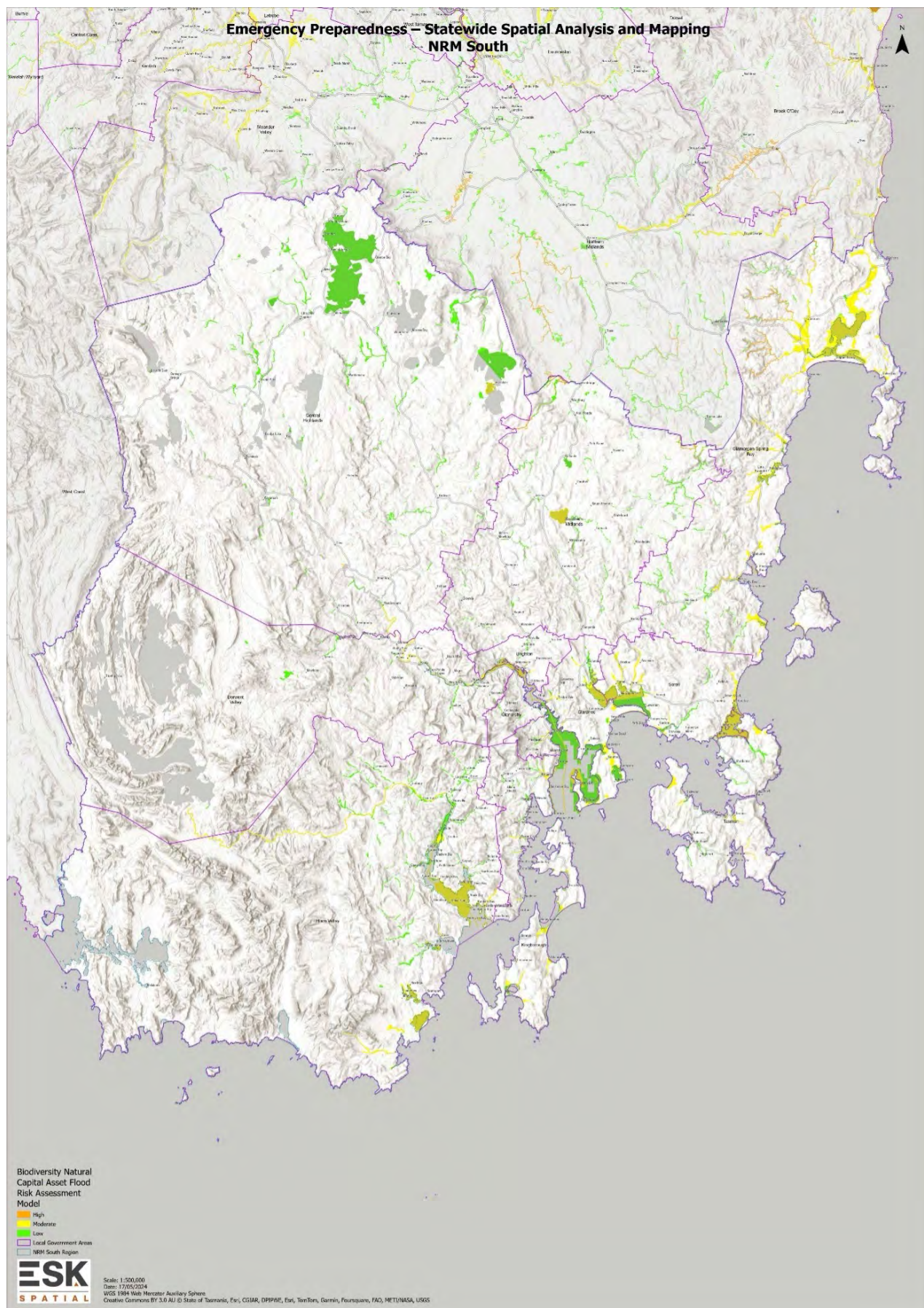
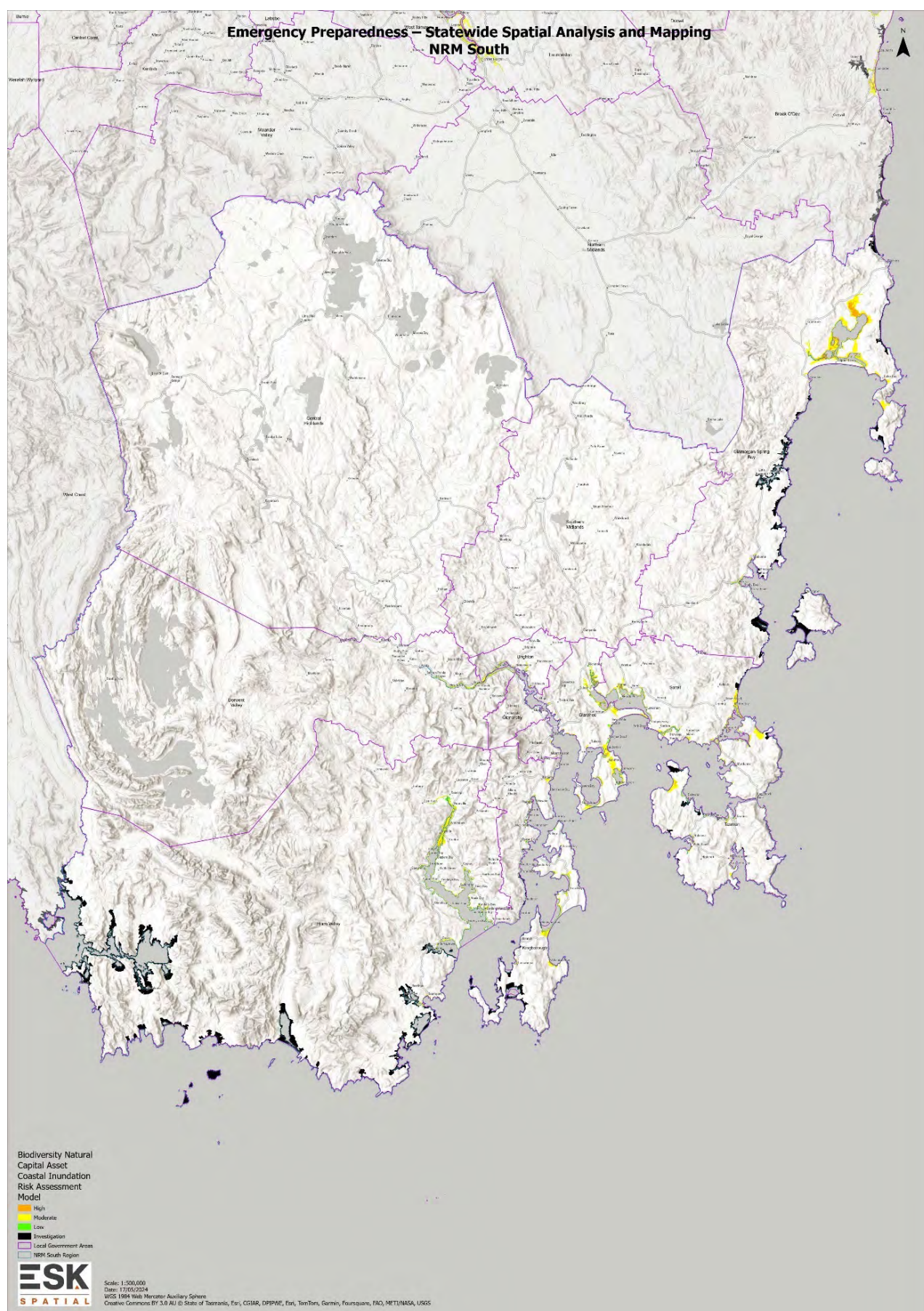


FIGURE 5: Biodiversity natural capital asset coastal erosion risk assessment – NRM South region



## Preparedness actions for protecting biodiversity assets

During the preparedness phase, NRM South's goals are to:

- a) Enhance resilience in the assets in an attempt to reduce potential impacts from threatening processes arising from emergencies
- b) Identify key gaps in information and knowledge and address these, and
- c) Conduct comprehensive planning and preparation for future events, including identifying roles and responsibilities.

While some emergency events, such as fire response, have undergone meticulous planning, others have received less attention, particularly regarding the protection of natural capital values. Therefore, our focus is to bridge these gaps where resources allow.

We acknowledge that safeguarding biodiversity assets is most effectively achieved through a landscape and catchment-scale approach to building ecological resilience. To this end, Natural Capital Asset Action Plans are a useful tool, as they incorporate pathways to action:

- Building resilience: Strategies must be developed to strengthen natural asset resilience, including reducing the impact of other threatening processes and implementing protective measures. This is reliant on comprehensive species and ecological management information, hence priority gaps in data, information and knowledge to support resilience and preparedness should be addressed.
- Identifying effective responses: targeted and tailored actions are required for different assets and land tenures, informed by scientific evidence, management learnings and engagement with First Nations organisations. For biosecurity incursions, strategies ranging from eradication to containment will be formulated (see the Species Invasion Curve).

- Continuous improvement: action plans, processes and on-ground management must undergo regular reviews and post-event evaluations to ensure their effectiveness. Evaluating negative impacts from previous event responses and undertaking risk analysis provides opportunity to assess current and new planning and management actions with the aim of improving effectiveness and prevention of unintended consequences. Examples include minimising soil disturbance during earthworks, avoiding damaging fire frequency or intensity, and addressing habitat loss resulting from planned bushfire prevention vegetation clearing.

To prepare for emergencies, including bushfires, floods, and biosecurity incursions, NRM South will consider potential responses – these may include:

- Raising awareness in the community. This could include education about effective management actions to reduce the risk of fire, actions during an emergency that do not significantly impact natural values, biosecurity risks and how to address them; or providing guidance on developing property level biosecurity plans.
- Implementing actions to enhance resilience, such as captive breeding, improving seed back collections, removal of species to safe locations, pest, weed and disease control, habitat restoration, and limiting unintended consequences like pollution.
- Bushfire suppression, managing fuel loads through various methods like controlled burning and slashing, cultural burns, creating fire breaks, and planting less fire-prone species. All need to be designed in recognition of the sensitivities
- Construct appropriate (temporary) structures to contain floodwaters and limit damage, and engage in revegetation efforts to prevent erosion and stabilise the soil.

## Response and recovery actions for protecting biodiversity assets

During an event, NRM South aims to protect biodiversity assets – potential responses may include:

- Bushfire suppression efforts, working with authorities to establish containment lines, protecting vulnerable plants/communities with sprinklers, facilitating or conducting surveys to identify injured wildlife, and assessing water quality while stabilising waterways.
- Engaging in flood control measures, facilitating or conducting surveys to rescue trapped or injured wildlife and protect at-risk flora species, and assessing water quality alongside stabilising waterways.
- Conducting monitoring activities, including asset condition monitoring or assessing the effectiveness of implemented actions.
- Conducting targeted biosecurity surveys to determine the extent of occurrence, initiate control measures, and/or application of hygiene protocols to prevent further spread.

Note that some recovery actions are likely to be costly, and that the timeframe for funding is often only 12 months but remediation often takes far longer. For example, previous experience has indicated that weed control following a fire was required for four years before native vegetation recovered sufficiently. It is assumed the recovery actions commence within 12 months of an event.

After an event, NRM South aims to restore biodiversity assets – potential responses may include:

- Cleaning up, such as removing debris, stabilising soil, controlling weeds, restoring ground cover, addressing direct and indirect impacts
- Monitoring activities to assess the effectiveness of implemented actions, conducting follow-up surveys to identify impacted wildlife, stabilising waterways, developing local area and species recovery plans, prioritising areas for management, and addressing critical threats such as erosion, weeds, and pest/predator control.
- After bushfire, implementing strategies such as captive breeding, translocations, establishing exclosures and refugia, enhancing connectivity between key habitats, providing artificial habitat like nest boxes or shelters, and conducting plant propagation and revegetation efforts.
- Conducting follow-up biosecurity surveys to monitor the extent of occurrence, continue control efforts (eradication or containment), apply hygiene measures, and educate the community and relevant stakeholders on prevention methods.



A photograph of a grassy field with several sheep in the foreground and a dense forest of trees in the background. The sheep are white and fluffy, standing on the grass. The trees are green and brown, creating a natural setting.

# 6

## Agricultural natural capital assets

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## 6. Agricultural natural capital assets

### Identification of priority agricultural natural capital assets

In alignment with the approach delineated in the biodiversity assets chapter (Chapter 5), this chapter of the Plan aims to comprehensively identify and summarise these vital assets in relation to agricultural landscapes, while also considering additional agricultural natural capital assets and evaluating their susceptibility to various emergency scenarios.

The natural capital assets under consideration encompass a diverse range of elements integral to the region's agricultural landscape. These assets, as defined in the Tasmanian Land Use (2021) dataset, primarily include areas dedicated to production within relatively natural environments, and areas of dryland and irrigated agriculture. Areas identified as plantation or native production forests are not considered agricultural for the purposes of this analysis so are excluded.

In understanding the vulnerability of these assets to emergency scenarios, it is important to acknowledge the complex nature of potential threats. Direct impacts may include the destruction or decline of vegetation and habitats, wildlife mortality, loss of habitat, impacts to breeding success, or recruitment and degradation of local water, soil, or air quality. Additionally, indirect consequences may arise from reduced food or nesting resources, diminished breeding success, or the loss of critical food sources.

To systematically evaluate the susceptibility of agricultural natural capital assets, various factors are considered, with a primary focus on soil vulnerability. The assessment of vulnerability to identified threats, including flood, coastal erosion, and coastal inundation, was conducted through an analysis of water erosion hazards, in line with the [vulnerable soils approach](#) (NRE 2018). This evaluation accounts for factors such as soil properties, slope, and land cover, providing insights into areas where erosion hazards might be prevalent, particularly in the absence of sufficient ground cover.

The presence of natural vegetation, such as forest, woodland, or native vegetation, is recognised as a critical mitigating factor against erosion and other threats. Incorporating data from the National Forest and Sparse Woody Vegetation Database (Version 7.0 – 2022 Release, DCCEEW) and TASVEG 4.0 (NRE), areas with significant vegetation cover were accorded lower priority ratings for threats like flood, coastal erosion, and coastal inundation, reflecting their inherent resilience.

Chapter 10 outlines data collected, used, and made accessible as part of this Plan, including how to access the mapping and modelling outcomes.

Appendix A outlines the mapping methodology, data sources and assumptions.

Table C1 identifies the priority agricultural natural capital assets and outlines their susceptibility to the key emergency scenarios.

By adopting a comprehensive approach that considers both direct and indirect threats, alongside the inherent characteristics of agricultural natural capital assets, this assessment lays the groundwork for informed decision-making and targeted intervention strategies to mitigate potential emergencies effectively.

Appendix C outlines the susceptibility of natural capital assets in agricultural landscapes. Threatened ecological communities, biodiversity hotspots, and threatened species have similar vulnerabilities to other environments with similar consequences and management strategies. These assets can have a higher level of exposure due to the existing clearing and degradation of the land resulting from agricultural production.

Agricultural natural capital assets all have a high susceptibility to bushfire, flood and drought with compounding consequences for food security. Land used for agricultural production is already degraded and more susceptible to longer-term damage and recovery difficulties. For example, disasters can reduce agricultural land's capacity to resist erosion, erosion can become a permanent landscape challenge.

It is imperative that natural assets on agricultural land have recovery strategies so that they can perform the production and protection role that improve food production outcomes while minimising environmental damage.

### Preparedness actions for protecting agricultural natural capital assets

In southern Tasmania, agricultural land hosts natural capital assets that are essential for sustaining food and fibre production. These assets, ranging from soil to native vegetation, play a pivotal role in supporting agricultural production while fostering biodiversity and ecological resilience. This chapter of the Plan describes the key assets, their susceptibility to emergencies, and the preparedness actions required to safeguard them.

Agricultural natural-capital assets encompass a spectrum of resources managed by producers to support their businesses, families, and future generations. These assets include soil, air, water, riparian areas, remnant native vegetation, agroforestry, and environmental plantings. Soil forms a crucial natural capital asset, underpinning the region's agricultural productivity. Native vegetation in various forms – remnant patches, riparian zones, and agroforestry – contributes significantly to biodiversity conservation and ecosystem health. Healthy water resources, obtained from irrigation schemes, dams, and off-stream watering systems, are essential for supporting agricultural operations.

These natural-capital assets are susceptible to various emergencies, including bushfires, floods, and contamination events. Bushfires pose a significant threat to native vegetation, soil integrity, and water quality, exacerbating erosion and runoff issues. Flood events can inundate agricultural land, causing soil erosion, infrastructure damage, and loss of vegetation.

Appendix C Tables C2, C3 and C4 outline the preparedness actions that could be undertaken for each and/or across the key agricultural natural asset(s) prior to an emergency scenario, including the location, roles best placed for each scenario, and current actions underway.

### Response and recovery actions for protecting agricultural natural capital assets

In the face of emergencies, swift and strategic response actions are critical to safeguarding agricultural natural capital assets, which are crucial for sustaining food and fibre production in southern Tasmania. Building upon the groundwork laid in the “Asset Preparedness” chapter, this chapter identifies response strategies tailored to tackle a variety of potential emergencies. From the immediate threat of bushfires to the devastating impacts of flooding, and biosecurity incursions, each scenario requires clear achievable response actions. Coordination, resources, and interventions are necessary to reduce risk of adverse effects of emergencies on agricultural land, biodiversity, and ecological resilience. Appendix C Tables C5, C6, C7 and C8 outline the response actions that could be undertaken for key agricultural assets in response to emergency scenarios, including bushfires, flooding, and biosecurity incursions.

Figure 6 and Figure 7 identify significant areas of agricultural land where soils and remnant vegetation have a high conservation value but are also vulnerable to threat from flood.

FIGURE 6: Agricultural Soils Flood Priority Rating Model – NRM South region

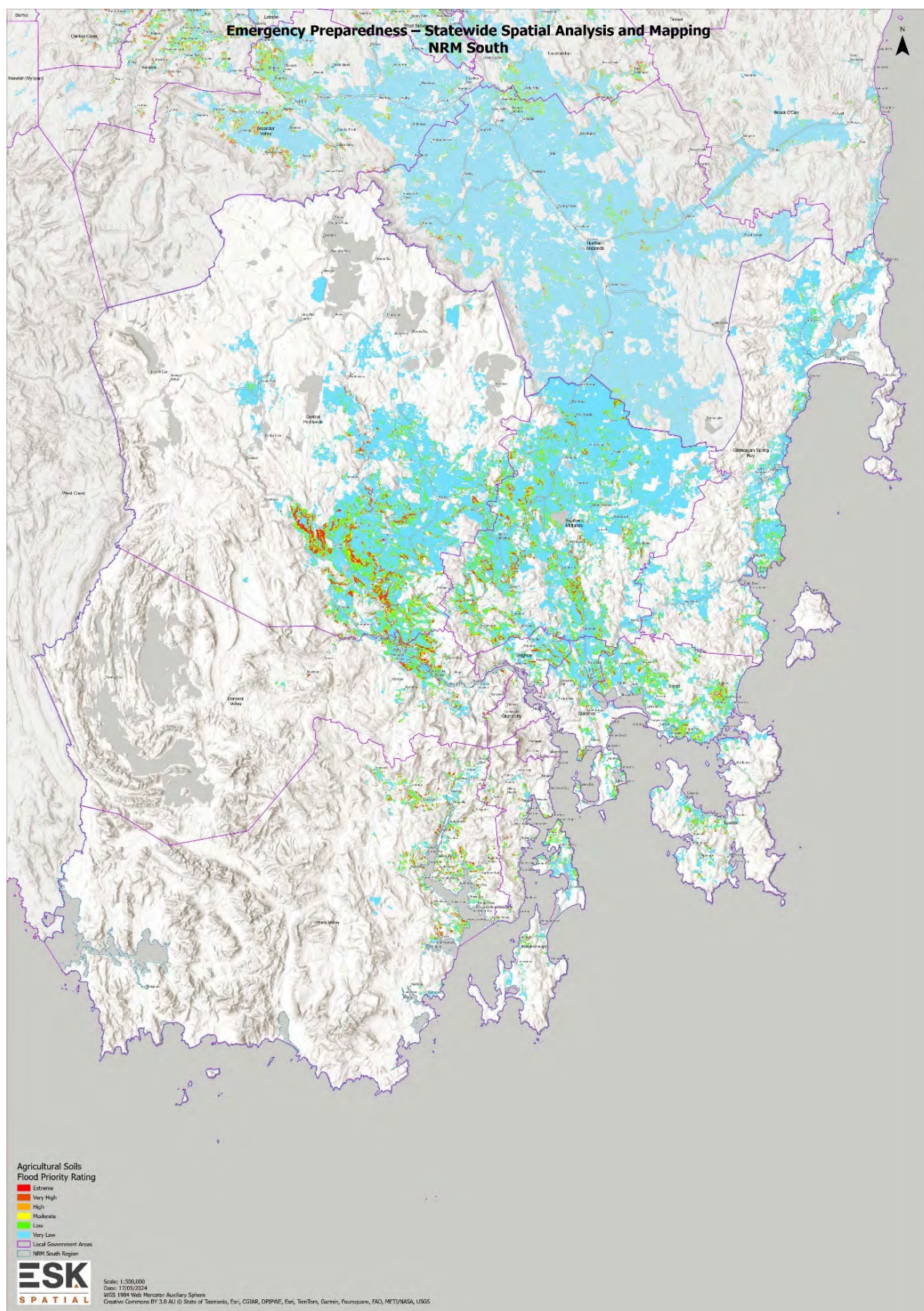
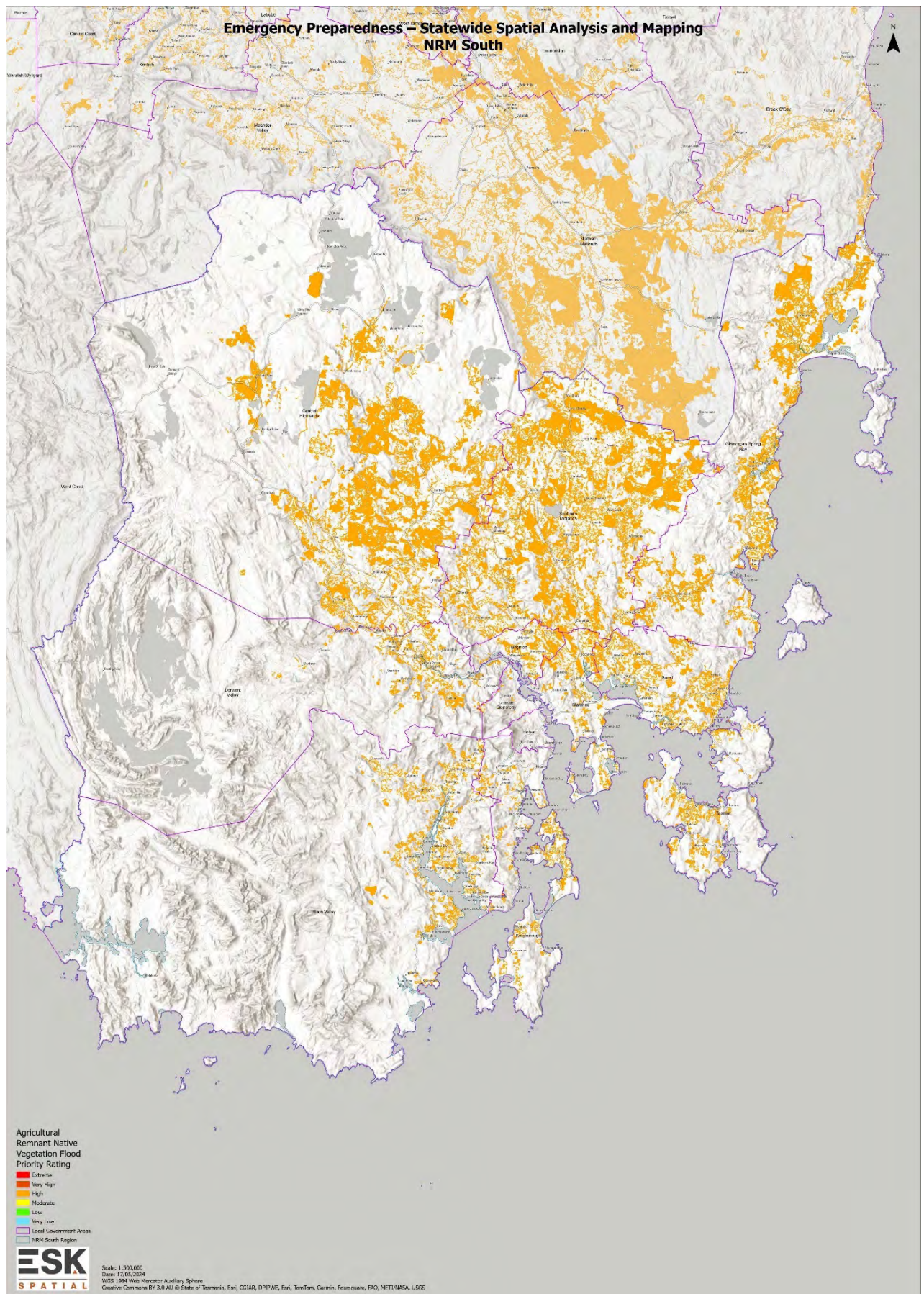


FIGURE 7: Agricultural Remnant Native Vegetation Flood Priority Rating Model – NRM South region





A close-up photograph of a person's foot wearing a bright green sneaker, stepping onto dark, rich soil. Dry, brown grass and some small green plants are visible around the shoe. The scene is lit with natural light, creating a sense of being outdoors.

7

Community /  
stakeholder  
engagement

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## 7. Community / stakeholder engagement

This chapter outlines NRM South's approach to developing and communicating this Plan with stakeholders and summarises gaps and opportunities across four community and stakeholder engagement areas.

### Engagement, collaboration and coordination

Working in collaboration with stakeholders and the regional community is a strength of NRM South's approach to delivering strategies, plans, and projects. NRM South has purposeful, productive and respectful relationship with biodiversity and sustainable agriculture stakeholders and First Nations people across southern Tasmania. Through the development of, and consultation on this Plan, NRM South has also been developing relationships with emergency management stakeholders particularly across State and Local Government, community, research and industry sectors and Aboriginal groups.

### Plan Consultation

Initial introduction to the '*Emergency Plan*' project was via email communication and a discussion paper sent to key stakeholders. This information outlined the project context, scope and timing, as well as the planned approach for engagement and consultation. Targeted communications with key organisational senior executive staff also provided introduction to the project and information about planned consultation activities.

Stakeholder engagement and consultation was undertaken over three key phases:

- PHASE 1 – targeted high-level input to priority natural capital assets, threats, and data and information gathering.
- PHASE 2 – input regarding likely natural asset impacts, recommended actions before, during and after disasters and emergencies, existing roles and responsibilities as well as gaps and opportunities for NRM South and other stakeholders to work more closely together.
- PHASE 3 – focussed on review and feedback on a draft Plan.

The engagement approach was structured to include statewide consultation in collaboration with NRM North and Cradle Coast Authority, and regional communications and consultation with stakeholders in southern Tasmania.

Targeted interviews to assist data gathering and technical input were held in Phase 1 and 2 with representatives from Natural Resources and Environment Tasmania (NRE Tas), Department of Premier and Cabinet, Department of State Growth (Mineral Resources Tasmania), and Forest Practices Authority. A follow up targeted workshop was then held in mid-March 2024 with NRE Tas representatives across the Natural Values Conservation Branch, Parks and Wildlife Service, Environment and Heritage Division, Emergency Services and Spatial sections to elicit technical and authoritative input.

Representatives from local and state government, community groups and NGO's, industry (agricultural, forestry and fishery sectors), and government business enterprises were invited to phase 1 and 2 engagement activities. Engagement formats in these consultation phases included workshops, written feedback on the discussion paper and targeted one on one communications or interviews. Stage 1 and 2 stakeholder workshops (see [Table 4](#)) were undertaken in early 2024 and were followed up with phone discussions and emails, where need.

Stakeholders provided valuable input which was used to identify priority asset and threat information, management actions, and roles and responsibilities in the Plan.

**TABLE 4: Organisations that participated in phase 1, 2 & 3 consultation**

State Government	<ul style="list-style-type: none"> <li>· Natural Resources and Environment Tasmania (incl. Parks and Wildlife Service &amp; Emergency Management)</li> <li>· Department of Defence</li> <li>· Department of Police, Fire &amp; Emergency Management (incl. State Emergency Service, Tasmanian Fire Service, Tasmanian Fire Council Vegetation Working Group)</li> <li>· Department of State Growth – Renewables, Climate and Future Industries Tasmania</li> <li>· Department of Premier and Cabinet</li> </ul>
Local Government	<ul style="list-style-type: none"> <li>· Huon Valley Council</li> <li>· Kingborough Council</li> <li>· Glamorgan Spring Bay Council</li> <li>· Hobart City Council</li> <li>· Tasman Council</li> <li>· Sorell Council</li> <li>· Clarence City Council</li> <li>· Glenorchy City Council</li> </ul>
Independent Statutory Authorities	<ul style="list-style-type: none"> <li>· Forestry Practices Authority (Tas)</li> </ul>
Government Business Enterprises	<ul style="list-style-type: none"> <li>· Tasmanian Irrigation</li> <li>· Sustainable Timber Tasmania</li> <li>· TasWater</li> <li>· Hydro Tasmania</li> <li>· TasNetworks</li> </ul>
Industry / Industry Bodies	<ul style="list-style-type: none"> <li>· Forico</li> <li>· Seafood Industry / Bodies</li> <li>· Agricultural Industry/ Bodies Groups</li> <li>· Tasmanian Farmers and Graziers Association</li> </ul>
Non Government Organisations	<ul style="list-style-type: none"> <li>· Tasmanian Aboriginal Groups</li> <li>· Greening Australia</li> <li>· Wildcare</li> <li>· Landcare</li> <li>· Bonorong</li> <li>· Greening Australia</li> <li>· Threatened Plants Tasmania</li> <li>· University of Tasmania (Tas Farm Innovation Hub, Tasmanian Institute of Agriculture)</li> <li>· Centre for Invasive Species Solutions</li> </ul>

Phase 3 consultation was undertaken in May 2024 and invited stakeholders involved in the initial consultation phases, as well as broader stakeholders, to provide feedback on the draft Plan. Additional stakeholders invited to participate in this consultation phase included councils, Landcare networks, conservation organisations, farmer-led sustainable agriculture groups, and other representative farming and environmental bodies. Consultation formats included a discussion paper, online workshops, face to face meetings and an online survey.

A broad range of stakeholders engaged through the phase 3 review processes particularly through the online and face to face workshops and meetings.

Feedback on the draft Plan was positive, largely acknowledging gaps in emergency planning and management for biodiversity and agricultural natural capital assets and showing support for future actions to address these gaps. Information and feedback from Phase 3 consultation was used to refine the draft Plan for submission to the Australian Government.

## Communication, collaboration and engagement opportunities and actions

Strengthening the capacity of stakeholders to prepare, respond and recover in ways that considers and manages high risk biodiversity and agricultural natural capital assets is a key objective of this Plan. Further phases of engagement will be more ongoing in nature and will include communications and collaboration (as opportunities arise) to embed key information and actions within existing emergency management processes/structures, and NRM South's strategic framework.

The consultation processes during Plan development established or reinvigorated engagement with stakeholder groups across all phases of emergency management and now provides a basis for future engagement, collaboration and coordination.

The Plan will be subject to future review with stakeholders and updated in alignment with organisational review processes for all strategic documents. Additionally, it will be used to inform updates to the *2030 NRM Strategy for Southern Tasmania*, as well as other organisational project, communication and engagement plans.

In the future the Plan can be used to direct resources to the most at-risk assets and prioritise actions in the NRM South region in a manner that is appropriate, relevant and endorsed by key stakeholders.

Table 5 outlines key opportunities for NRM South and stakeholders to work together to enhance communication, coordination and collaboration towards enhanced protection and management of biodiversity and agricultural natural capital assets.

**TABLE 5: Opportunities for coordination, communication and collaboration actions to enhance natural capital asset protection and management in emergency management processes.**

Action	Prepare	Respond	Recover	Approach
Initiate or expand engagement with key agencies responsible for emergency preparedness, response and recovery in southern Tasmania to foster relationships, collaboration and coordination to achieve shared objectives.				x
Facilitate the inclusion of biodiversity and agricultural natural capital assets in existing emergency planning frameworks	x			
Establish clear protocols and communication channels to facilitate swift and coordinated responses to emergency events affecting biodiversity and agricultural natural capital assets.	x			
Investigate opportunities for NRM South involvement/represent on relevant regional or local emergency management committees or groups.				x
Identify information sharing needs and opportunities across stakeholders regarding natural assets and emergency management.				x
Identify partnerships, cooperative agreements and / or delivery models to leverage funding, resources and expertise for more effective management of priority natural assets during and following emergencies.				x
Facilitate coordinate on-ground efforts with local, state and federal stakeholders to expedite the recovery process for natural assets, leveraging resources and expertise to enhance outcomes.			x	
Support landholders with key biodiversity or agricultural natural capital assets to identify, plan for and manage natural assets on their property before, during or after emergency events.	x			
Support deployment of expertise to affected areas in response and recovery phases to support natural asset protection and interventions in alignment with existing or revised plans and frameworks.		x	x	
Support First Nations led preparedness and recovery actions.				x

### Raising public awareness

As acknowledged in regional, state and national strategies and frameworks, the community plays an essential role in all phases of resilience building, response efforts and recovery work. This Plan provides a platform to further understand, integrate and deliver coordinated and collaborative resilience, response and recovery work with the public to improve natural and agricultural resources outcomes.

NRM South has strong links and relationships with community groups, organisations and land holders. As such, there is an opportunity for NRM South to work in partnership with key stakeholders and utilise NRM South's existing communication channels to leverage awareness about:

- the potential impacts of emergencies on natural assets and agricultural values,
- information, resources and data available to aid understanding of natural values, disaster impacts and risks,
- resilience, response and recovery actions to help land holders and landcare groups mitigate and manage impacts, and restore natural and agricultural values post event, and
- avenues funding to protect and restore natural assets before and after emergencies and events.

Potential future communications and awareness raising activities with the public, private landholders or care groups should stem from further establishment of relationships with lead and support emergency management organisations and integration with existing communications frameworks and key messages. Beyond the life of this project, funding opportunities would need to be progressed to pursue this work.

### Education and training

A gap in emergency preparedness, response and recovery identified through stakeholder engagement for this Plan included specific and general knowledge and information gaps regarding understanding and management of natural assets in emergency management processes. As outlined in other chapters, identified data and information gaps that would need to be filled to build the information and knowledge base to support capacity building needs and opportunities (Key actions to support education and training needs for natural asset protection and management in emergency management processes.).

NRM South is well placed to work with key stakeholders to develop or integrate 'prepare, respond and recover' information or plans for natural assets and support the delivery of education and training to a range of stakeholders. Funding to support this work would need to be secured.

**Key actions to support education and training needs for natural asset protection and management in emergency management processes.**

Action	Prepare	Response	Recover	Approach
Gap analysis to identify education and capacity building needs across the emergency sector regarding biodiversity and agricultural natural capital assets, and who is best to lead and support this work.				x
Analysis of NRM South's internal capacity building needs to strengthen skills and knowledge to better support emergency management stages for natural assets.				x
Establish knowledge sharing networks and opportunities between key stakeholders to improve cross tenures and jurisdiction sharing.				x
NRM South attend relevant emergency management workshops, forums, events.				x
Support First Nations capacity building for involvement in planning, responding and recovery of natural assets.				x





# 8

## Legal framework

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## 8. Legal framework

In Tasmania the *Emergency Management Act 2006* (*The Act*) is the principle legislative mechanism guiding emergency prevention and mitigation, preparedness, response and recovery. *The Act* provides for the establishment of Tasmania's overarching emergency management arrangements, including establishment and regular review of the following key documents:

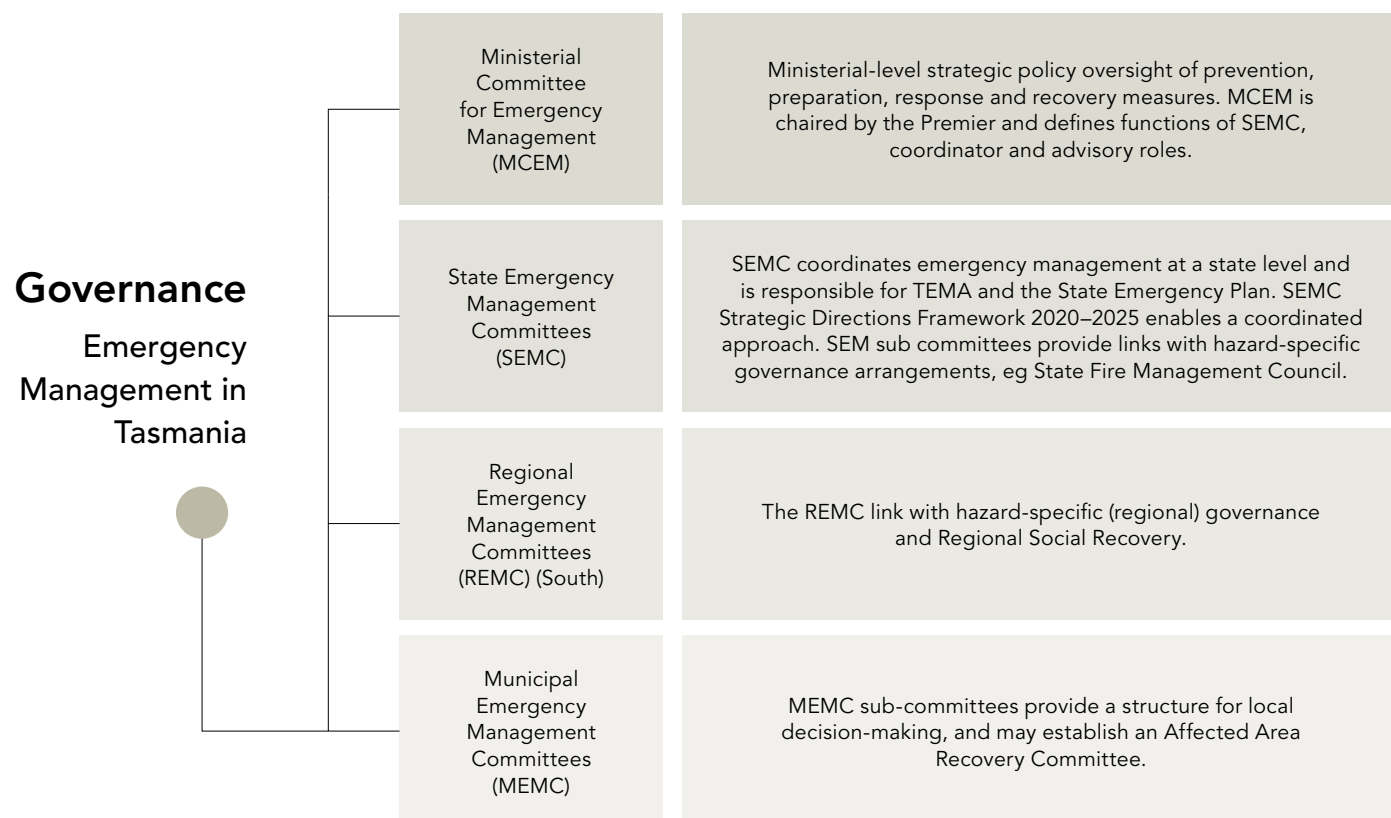
- Tasmanian Emergency Management Arrangements (TEMA) – outlines the 'who', 'what' and 'when' of emergency management arrangements and describes roles, responsibilities and agreed arrangements for the four phases of emergency management.
- State Special Emergency Management Plans – includes statewide plans for specific types of emergencies.
- Regional Emergency Management Plans – north west, northern and southern.
- Municipal Emergency Management Plans – maintained by municipal councils on behalf of the Municipal EM Committees.
- Tasmanian Relief and Recovery Arrangements: Natural Disaster Relief to Local Government Policy – provides State Government assistance through councils for relief and recovery from disasters.

The Tasmanian government has primary responsibility for emergency management legislation, policies, and frameworks within the state. However, emergency management within Tasmania occurs at multiple levels– State, Regional and Municipal – with statutory emergency management committees operating at each of these levels. The Emergency Management Unit provides whole of government advice and executive support to the State Emergency Management Committee and Regional Emergency Management Planning committees. It also takes the lead with much of the State's emergency management planning and emergency risk management work.

Tasmania's governance structures for emergency management aims to enable effective coordination across key players and levels (Figure 8). Partnerships across all levels of government and sectors underpin these arrangements. This system is designed to provide for scalable and flexible emergency management (especially response and recovery operations), and a safer Tasmania.

Tasmania's emergency management framework is guided by a set of nationally agreed principles that improve and provide consistency in policy and decision-making and support a disaster-resilient Tasmania. It emphasises a coordinated and collaborative approach to emergency management, with clear roles and responsibilities assigned to various stakeholders at each phase of the emergency management cycle.

FIGURE 8: Tasmania's governance structures for emergency management.



## Emergency Management Act 2006

The Act provides the legal framework for emergency management in Tasmania, setting out state, regional, and municipal responsibilities, which is essential for NRM South when coordinating biodiversity and agricultural response activities.

The Act outlines:

- Specific roles, such as the State and Regional Controller and Municipal Coordinators, whose directives NRM South must follow during emergency responses.
- The coordination of resources and efforts across various agencies and levels of government, which is crucial for NRM South in leveraging State and regional resources for emergency responses.

- The emergency powers that can be enacted during significant incidents, which NRM South might need to operate under during biodiversity or agricultural emergencies.

The provisions of the Act prevail where there are any inconsistencies with provisions of any other Tasmanian Acts that relate to emergency management. The Act and the *Local Government Act 1993* also establish other provisions and powers to complement hazard specific legislation.

## Tasmanian Emergency Management Arrangements (TEMA)

The *Tasmanian Emergency Management Arrangements* (TEMA) provides essential information for people who have direct involvement in emergency management, either full time, as an occasional part of their regular duties, or as an emergency service volunteer.

The TEMA:

- Outlines the roles, authorities, and responsibilities for emergency management, including governance, administrative and legal frameworks; and
- Defines the planning and management arrangements that bring all the different elements together.

TEMA establishes a structured and integrated approach to emergency management, promoting a collaborative environment where NRM South can participate. Regional Emergency Management Committees (REMC) are established throughout Tasmania. The respective Regional Police Commander chairs them. NRM South can be an active stakeholder, ensuring that their response efforts are aligned with broader state strategies during disasters.

The TEMA may also:

- Provide details on preparedness, response, and recovery actions, guiding NRM South in developing and implementing practical and compliant response plans (Preparedness and Response Guidelines).
- Outline risk management and mitigation strategies that align with NRM South's objectives to minimise risks associated with disasters affecting biodiversity and agricultural natural capital.
- Stress the importance of community engagement and maintaining public information systems, which are vital for NRM South to manage public expectations and communications during emergencies effectively.

Tasmania has integrated human-derived ('man-made') hazards into the emergency management arrangements, which apply to emergency events in this State regardless of cause. TEMA now recognises that response and recovery agencies work with individuals and communities to ensure Tasmanians' safety during and after emergencies.

The TEMA also provides a comprehensive list of responsible agencies/bodies for each type of emergency, broken down into the three stages of the emergency management cycle (pp.33-36). The agencies/bodies responsible for recovery actions (pp. 37-39) and other functions (pp. 40-48) are detailed also.

## Emergency management plans

State-wide, regional and municipal emergency management plans, established under *The Act*, detail the multi-agency coordination arrangements, including managing risks and consequences of an emergency (such as bushfire or flood); and managing additional functions necessitated by emergencies (such as recovery). A summary of these can be viewed [here](#).

## State Special Emergency Management Plans

State-wide emergency management plans exist for:

- Bushfire – the State Fire Protection Plan for which Tasmanian Fire Service (TFS) and the State Fire Commission are the responsible agency.
- Flood and storms – Tasmanian Flood Plan for which the State Emergency Service (SES) is the responsible agency.
- Animal and plant biosecurity – Tasmanian Biosecurity Emergencies Plan for which the Department of Natural Resources and Environment Tasmania (NRE) is the responsible agency.
- Tsunami – State Tsunami Emergency response plan for which SES is the responsible agency.
- State Recovery Plan which applies to recovery from all natural hazards (outlined in TEMA) for which DPAC is the responsible agency.

There is no statewide emergency management plan for coastal inundation outside tsunamis. This is likely to reflect the smaller scale of impact of other forms of coastal inundation and storm surge.

## Tasmanian Relief and Recovery Arrangements

The *Tasmanian Relief and Recovery Arrangements* provides the overarching framework for recovery management in Tasmania. It outlines the roles and responsibilities of various agencies and organisations, including NRM South, in the event of an emergency. It sets the strategic direction and provides guidelines for recovery efforts, ensuring all parties work towards the same goals and objectives. Recovery efforts are focused on building resilience. Management of recovery efforts depends on the scale of the emergency:

- Level 1 – Emergency of Local significance. Locally-coordinate recovery managed and coordinated through the Municipal Committee or as per arrangements set out in the Municipal Emergency Management Plans. Applies to emergencies which involve: response coordination occurs at the municipal level, possibly with some regional support; a discrete affected area (one LGA or industry sector); and minimal ongoing recovery assistance required from Tasmanian Government agencies.
- Level 2 – Emergency of Regional significance. State-supported recovery with response coordinated at a regional level. Applies to emergencies which involve: response coordination at regional level; multiple or dispersed affected areas; impacts across multiple domains requiring assistance from multiple government agencies; and activation of financial assistance measures.
- Level 3 – Emergency of State significance. State coordinated recovery. This applies to emergencies which: require response coordination at regional or state levels, multiple local government or regions; involve a small to moderate number of casualties; have significant and complex impacts across multiple recovery domains; and require activation of financial assistance measures.
- Level 4 – Emergency of national significance. This applies to; catastrophic disasters that exceed the State's capability, capacity and systems; or may require a nationally supported or coordinated approach.

There are five domains of recovery in Tasmania:

- Social recovery
- Economic recovery
- Infrastructure recovery
- Environmental recovery
- Cross-domain recovery

For environmental recovery, the Department of Natural Resources and Environment Tasmania (NRE) is the Coordinating Agency. Recovery functions in this domain are:

- Environmental health and pollution
- Crown land, National Park and landscape rehabilitation
- Aboriginal, natural and cultural heritage
- Animal welfare, feed and fodder
- Assistance measures for primary producers
- Waste management and carcass removal
- Biosecurity and invasive species

## Workplace Health and Safety

NRM South is committed to continuously improving the management and standards of Workplace Health and Safety (WHS). The *Work Health and Safety Act 2012 (Tas) (WHS Act)* requires that NRM South ensure as far as reasonably practicable, that all persons, while at work, are safe from injury and risks to health, safety and welfare, by providing them with a safe working environment and safe systems of work.

In line with Section 17 of the *WHS Act* (Management of Risks), NRM South has a duty to eliminate risks to health and safety as far as is reasonably practicable or, if not possible, to minimise those risks. This includes conducting operations in a way that safeguards health and includes risk assessments, emergency response training, and handling hazardous materials.

In line with Section 19 of the *WHS Act* (Primary Duty of Care), NRM South has a duty to ensure, as far as reasonably practicable, the health and safety of workers engaged by the person and that other persons are not put at risk from work carried out as part of the business or undertaking. It covers the provision and maintenance of a safe work environment, systems of work, handling and storage of substances, and emergency response procedures.

At NRM South, we will achieve this by developing and implementing emergency response procedures that comply with WHS requirements, particularly for handling natural disasters or emergencies affecting biodiversity and agricultural resources. We will:

- 1 Comply with all WHS legislative obligations and upholding our primary duty of care to ensure our people are safe and supported at work and in our workplaces.
- 2 Equip our people with information, training, resources, and tools to enable them to perform their work safely and proactively contribute to a culture of safety and wellbeing.
- 3 Ensure everyone understands their WHS responsibilities and accountabilities.
- 4 Report all incidents, injuries and hazards and acting promptly to provide support, prevent recurrences, and share learnings.
- 5 Eliminate or minimise risks by routinely identifying hazards, assessing potential impacts, developing mitigation measures, and implementing appropriate controls.
- 6 Focus on individual and team wellbeing and recognising and managing work-related stress and other psychosocial risks.
- 7 Enable an environment where our people and others feel supported and empowered to speak up and stop unsafe work and contribute to developing solutions.
- 8 Support the mental and physical wellbeing and recovery of staff by providing access to appropriate counselling, rehabilitation services, flexible work arrangements and staff wellbeing initiatives.
- 9 Integrate health, safety, and wellbeing into NRM South's planning and decision making.

### Key legislation

*Emergency Management Act 2006 (Tas)*

## Other potentially relevant legislation

The following Acts may need to be considered when implementing this Plan:

Legislation	Requirement
<b>Commonwealth</b>	
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Legal framework to protect and manage unique plants, animals, habitats and places. This includes heritage sites, marine areas, some wetlands and other protected matters.
<b>Tasmanian</b>	
<i>Crown Lands Act 1976</i>	Provides for the management of public reserves and licences to take material from Crown land.
<i>Fire Service Act 1979</i>	Lays out fire services in the State and the law relating to preventing and extinguishing fires and the protection of life and property from fire.
<i>Forest Practices Act 1985</i>	Ensures that all forest practices are conducted in accordance with the Forest Practices Code.
<i>Land Use Planning and Approvals Act 1993</i>	Pertains to bushfire hazard management plans.
<i>Local Government Act 1993</i>	Relating to Council functions and operations
<i>Environmental Management and Pollution Control Act 1994</i>	Pertains to environmental protection and pollution, focussing on prevention, reduction and remediation of environmental hard associated with development activities.
<i>Threatened Species Protection Act 1995</i>	Provides for the protection and management of Tasmania's threatened native flora and fauna and to enable and promote the conservation of native flora and fauna.
<i>Living Marine Resources Management Act 1995</i>	Pertains to diseases of managed and wild marine fish; invasive marine pests, plants and animals.
<i>Inland Fisheries Act 1995</i>	As it pertains to pests and diseases of managed and wild freshwater fish; pests and diseases of managed and wild freshwater plants.
<i>Agricultural and Veterinary Chemicals (Tasmania) Act 1994</i>	response in relation to misuse and subsequent impacts in relation to agricultural and veterinary chemicals
<i>Animal Health Act 1995</i>	Pertains to the prevention and detection and control of animal diseases.
<i>Water Management Act 1999</i>	Management of water resources by non-government bodies.

Legislation	Requirement
<i>Natural Resource Management Act 2002</i>	Relevant to natural resource management and development of regional strategies for natural resource management.
<i>Nature Conservation Act 2002</i>	Pertaining to invasive terrestrial animals.
<i>National Parks and Reserves Management Act 2002</i>	Management of parks and reserves based on management objectives of each class of reserve, declaration and management of Marine Protected Areas.
<i>Cat Management Act 2009</i>	Control of cats.
<i>Primary Produce Safety Act 2011</i>	breaches in primary production food standards and product integrity
<i>Workplace Health and Safety Act 2012</i>	Requires that as far as reasonably practicable, that all persons, while at work, are safe from injury and risks to health, safety and welfare, by providing them with a safe working environment and safe systems of work.
<i>Biosecurity Act 2019</i>	Pertaining to pests and diseases

### How NRM South's Plan fits with the statewide emergency management framework

NRM South operates within the broader emergency management framework for southern Tasmania, playing a crucial role in supporting effective response and recovery efforts by focusing on natural assets (prioritisation, response, and resilience), and facilitating natural resource management coordination and communication.

The TEMA is an integral part of the broader emergency management framework in Tasmania. The *Emergency Preparedness and Response Plan for Biodiversity and Agricultural Natural Capital* (this Plan) is designed to work with the TEMA to ensure a comprehensive and coordinated approach to emergency management, particularly in relation to disasters and environmental emergencies. It is important to note that the relationship between the two plans is not one of direct governance but of coordination, collaboration, and mutual support.

Tasmania's emergency management framework does not govern NRM South in a traditional sense but instead provides a policy and strategic context within which NRM South operates. NRM South contributes

to implementing the emergency and recovery management plans and legal framework by addressing specific risks and vulnerabilities related to natural resources. This collaborative approach ensures a comprehensive, coordinated, and practical approach to emergency management in Tasmania.

NRM South must ensure alignment with these legal and procedural guidelines to effectively manage and respond to emergencies while complying with Tasmania's legislative requirements. This includes adapting to the structured emergency management roles, responsibilities, and actions detailed in the Act, the TEMA, and the WHS Act.

This Plan complements the statewide emergency management framework through:

- **Shared objectives:**  
Both frameworks share the common goal of reducing the impact of emergencies and enhancing the resilience of communities and the environment. They aim to achieve this through a combination of prevention, preparedness, response, and recovery strategies.
- **Complementary roles:**  
The TEMA provides the overarching framework for

emergency management in Tasmania. It outlines the roles and responsibilities of various agencies and organisations, including NRM South. On the other hand, NRM South's Plan provides more specific strategies and actions for managing natural assets in the southern region of Tasmania.

- **Collaboration and coordination:**  
The frameworks advocate for strong inter-agency and governmental collaboration, which is essential for NRM South to successfully integrate and execute this Plan. Both frameworks emphasise the importance of cooperation and coordination among various stakeholders. The TEMA outlines the mechanisms for coordination among different agencies and organisations. At the same time, NRM South's Plan describes how it interacts with other stakeholders within the broader emergency management framework.
- **Consistent approach:**  
Both frameworks adopt a consistent approach to emergency management based on risk management principles and continuous improvement. They recognise the need to adapt to changing circumstances and to learn from past experiences.

- **Integration of strategies:**  
NRM South's Plan contributes to implementing the TEMA by addressing specific risks and vulnerabilities related to natural resources. For example, it includes strategies for managing the impact of emergencies on biodiversity and agricultural natural capital assets. Both frameworks encourage risk-based planning, guiding NRM South to focus on high-risk areas concerning biodiversity and agriculture.
- **Mutual support:**  
The two plans support each other in achieving their respective objectives. The TEMA provides the policy and strategic context for NRM South's Plan. In contrast, the NRM South's Plan provides practical actions and initiatives that support the broader objectives of the TEMA.

NRM South works with the relevant organisations responsible for fire, flood and biosecurity, in particularly their systems and approaches, focussing on natural and cultural asset protection within their models. In line with Tasmania's Emergency Management Framework, NRM South's role encompasses four key phases: prevention and mitigation (Tasmania's Emergency Management Framework: Phase 1 – Mitigation), preparedness (Table 8), response (Table 9), and recovery (Table 10).

**TABLE 6: Tasmania's Emergency Management Framework: Phase 1 – Mitigation**

Mitigation phase	Role description
<b>State Government and Emergency Management Agencies</b>	Identify and assess hazards, develop emergency risk and mitigation strategies, and implement measures to reduce risks. Coordinate with relevant stakeholders to implement mitigation measures, including infrastructure upgrades, environmental management, and public awareness campaigns.
<b>Local Government</b>	Implement local-level mitigation initiatives, such as land-use planning, building codes, and community education programs.
<b>NRM organisations</b>	Identify environmental hazards and vulnerabilities. Conduct risk assessments for natural asset priorities. Develop and implement strategies to mitigate environmental risks, such as land degradation, biodiversity loss, and water pollution. Communication and conduit between government bodies, broader networks and the community.

TABLE 7: Tasmania's Emergency Management Framework: Phase 2 – Preparedness

Preparedness phase	Role description
<b>State Government and Emergency Management Agencies</b>	Lead preparedness efforts, including training and exercises, community engagement, and development of emergency plans and procedures. Coordinate action to ensure readiness for potential emergencies (e.g. response plans, risk assessments, training and drills).
<b>Community/ Non-Government Organisations (NGOs)</b>	Education and awareness, develop neighbourhood emergency plans, and participate in training and awareness programs.
<b>NRM organisations</b>	<p>Collaborate with stakeholders to plan and integrate natural resource management considerations into emergency planning and preparedness activities, provide expertise on ecosystem resilience and adaptation strategies, engage in public education and awareness campaigns on environmental hazards and conservation practices.</p> <p>Build organisational capacity to ensure readiness to respond promptly to emergencies by preparing systems and capacities, surge capability, and network-building, laying the groundwork for swift and informed action.</p> <p>Support First Nations-led initiatives, fostering inclusivity and cultural sensitivity in emergency management strategies.</p> <p>Advocate for strengthened funding systems that support planning, collaboration, and coordination activities post-fire, ensuring resources are allocated efficiently to address priority actions and build networked capacity.</p>

TABLE 8: Tasmania's Emergency Management Framework: Phase 3 – Response

Response Phase	Role description
<b>State Government and Emergency Management Agencies</b>	Designated agencies lead the response to specific types of emergencies, such as the Tasmania Fire Service for bushfires and the SES for storms and floods. Provide specialized support during response operations, including medical services, logistical support, and public information dissemination. Establish Emergency Coordination Centres at both state and regional levels to coordinate response efforts, allocate resources, and communicate with stakeholders.
<b>Community/ Non-Government Organisations (NGOs)</b>	Assist emergency services in various capacities, including search and rescue, emergency communications, and community support.
<b>NRM organisations</b>	<p>Provide technical expertise and support to emergency response agencies during environmental emergencies, such as bushfire suppression, flood management, and ecosystem restoration, mobilise resources and personnel for habitat restoration and natural resource recovery efforts, collaborate with stakeholders to assess environmental impacts and develop mitigation measures during response operations.</p> <p>Utilise our agility to adapt to emerging priorities and re-prioritise efforts based on real-time information and utilise our surge capacity (including staff redeployment, recruitment, consultants, contractors and relevant stakeholders) to enable rapid and effective response efforts for the management of priority natural assets.</p>

TABLE 9: Tasmania's Emergency Management Framework: Phase 4 – Recovery

Recovery Phase	Role description
<b>Department of Premier and Cabinet</b>	Lead the recovery phase, which focuses on restoring affected communities, infrastructure, and services.
<b>Local Government</b>	Coordinate local recovery efforts, including debris removal, infrastructure repair, and support for affected residents.
<b>Community/ Non-Government Organisations (NGOs)</b>	Provide assistance and support to affected individuals and communities, including counselling services, financial aid, and advocacy.
<b>State and Federal Government</b>	Provide financial assistance, technical support, and policy guidance to facilitate long-term recovery and rebuilding efforts.
<b>NRM organisations</b>	<p>Lead or support long-term environmental recovery and restoration efforts following emergencies, such as habitat rehabilitation, soil erosion control, and waterway restoration. Collaborate with government agencies, community organisations, and other stakeholders to prioritise and implement post-disaster environmental recovery projects, monitor and assess ecosystem health and resilience over time, share lessons learned and best practices to enhance future disaster resilience and preparedness.</p> <p>Focus on resource recovery actions for the medium to long-term, consolidating immediate post-fire investments and ensuring a seamless transition towards long-term recovery and resilience-building.</p> <p>Advocate for investment that builds resilience of populations, ecosystems, and natural resources for future catastrophic events, leveraging knowledge gained from past emergencies to strengthen preparedness and response mechanisms.</p>



A photograph of a forest stream with a large white number 9 overlaid. The stream flows over rocks and fallen branches, surrounded by trees and dense foliage. The water is a muddy brown color, and the surrounding forest floor is covered in fallen leaves and twigs.

# 9

## Risk management including mitigation strategies

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# 9. Risk management including mitigation strategies

This chapter outlines the key overarching risks associated with NRM South’s implementation of this Plan’s actions and how they can be mitigated. This does not provide an assessment of disaster risks in Tasmania – this can be found in the [Tasmanian Disaster Risk Assessment \(TASDRA, 2022\)](#).

It is essential to recognise these assumptions while interpreting the Plan and utilising the risk matrix, as they significantly affect the likelihood and severity assessments of identified risks. Adjustments may be required as circumstances evolve, particularly regarding funding availability and the actions of external stakeholders involved in emergency response scenarios. outlines the key overarching risks associated with implementation of preparedness, response and recovery actions for biodiversity and agricultural natural-capital assets, and risk mitigation actions.

Ratings for the likelihood, consequence and overall risk were assigned using NRM South’s Risk Management Framework.

In developing the risk matrix for this Plan, the following assumptions have been made regarding the assessment of risks:

- **Funding availability:**  
The assessment of likelihood for identified risks assumes the availability of adequate funding for implementing mitigation measures and response actions. It is acknowledged that implementation of the Plan itself is currently unfunded and assessments attached to most risks are contingent upon the availability of funding.
- **External factors:**  
Numerous risks identified are beyond the direct control and mitigation capabilities of NRM South. Our capacity to influence or control these actions is limited, leading to uncertainties in risk mitigation.

It is essential to recognise these assumptions while interpreting the Plan and utilising the risk matrix, as they significantly affect the likelihood and severity assessments of identified risks. Adjustments may be required as circumstances evolve, particularly regarding funding availability and the actions of external stakeholders involved in emergency response scenarios.

TABLE 10: Key overarching risks associated with implementation of asset preparedness and response actions.

Risk	Likelihood	Consequence	Risk Rating	Risk mitigation action	Residual risk
Assets not adequately identified due to gaps in knowledge, paucity of data or inadequate time or resources	Likely	Moderate	Significant	Identify resource needs and secure funding for asset identification, data collection, and resource allocation. Conduct regular reviews of risk assessment to identify potential threats to biodiversity and agricultural assets.	Moderate
Lack of funding/ resources for spatial mapping updates, preparation planning, or Plan implementation.	Likely	Major	High	Ensure budgets are estimated and funding identified for personnel, equipment, and other necessary resources.	High

Risk	Likelihood	Consequence	Risk Rating	Risk mitigation action	Residual risk
<b>Absence of a detailed preparedness plan leading to uncoordinated and ineffective actions during a disaster.</b>	Moderate	Moderate	Significant	Develop a detailed preparedness plan ahead of emergencies, ensuring it is comprehensive and adaptable to various disaster scenarios.	Moderate
<b>Lack of training and education resulting in misunderstanding or non-compliance with the preparedness plan.</b>	Moderate	Minor	Moderate	Provide training and education to relevant stakeholders on the preparedness plan. Identify gaps in knowledge prior to designing training sessions.	Low
<b>WHS concerns affecting the health, safety, and wellbeing of responders.</b>	Likely	Major	High	Prioritise WHS, implement WHS training and planning to ensure responders are adequately prepared for their roles.	Significant
<b>Unintended environmental impacts, including ecosystem destruction from emergency response actions</b>	Likely	Major	High	Design the preparedness plan to align with emergency services systems and provide it to relevant agencies for use in incident control centres. Socialise the plan through regular planning, training and exercises.	Significant
<b>Inadequate preparedness actions causing significant damage to biodiversity and agricultural assets</b>	Moderate	Moderate	Significant	Develop a detailed emergency response plan that outlines actions to be taken during an event, focusing on minimising damage to biodiversity and agricultural assets.	Moderate
<b>Inadequate coordination leading to disarray and inefficiencies during disasters, lack of knowledge of this Plan or implementation by emergency services organisations.</b>	Likely	Major	High	Establish, expand or extended access to coordination platforms/ tools or mechanisms to ensure effective communication and collaboration among all stakeholders during disasters (e.g. a dedicated communication platforms). Consult with key experts during planning to ensure effectiveness.	Significant

Risk	Likelihood	Consequence	Risk Rating	Risk mitigation action	Residual risk
<b>Delayed response actions due to inability to quickly mobilise resources</b>	Moderate	Minor	Moderate	Ensure resources can be quickly mobilised during an event by identifying capabilities, training needs, and maintaining readiness.	Low
<b>Ineffective communication leading to misinformation and panic</b>	Moderate	Moderate	Significant	Develop a communication strategy or review existing strategies with clear roles and responsibilities for keeping the public informed during disasters, including regular updates, warnings, and advice on protective measures.	Moderate
<b>Insufficient recovery actions hindering the restoration of assets post-emergency.</b>	Likely	Major	High	Conduct a post-disaster assessment to evaluate damage to biodiversity and agricultural assets and identify necessary recovery actions.	Significant
<b>Failure to conduct a thorough post-disaster assessment resulting in inadequate recovery actions</b>	Moderate	Moderate	Significant	Implement restoration activities to recover biodiversity and agricultural assets following emergencies	Moderate
<b>Inadequate restoration activities delaying asset recovery.</b>	Likely	Moderate	Significant	Regularly review risk assessments and update plans to address delays and new or emerging threats to biodiversity and agricultural assets.	Moderate

Risk	Likelihood	Consequence	Risk Rating	Risk mitigation action	Residual risk
<b>Lack of insight from historical lessons leading to recurring errors.</b>	Moderate	Minor	Moderate	Review the effectiveness of preparedness, response, and recovery actions and incorporate lessons learned into future planning. Update and communicate plan changes accordingly.	Low
<b>Lack of monitoring to measure effectiveness and detect impacts</b>	Moderate	Minor	Moderate	Develop a monitoring system to measure the effectiveness of risk management actions and detect impacts on biodiversity and agricultural assets.	Low
<b>Chronic impacts leading to actions not achieving desired outcomes.</b>	Likely	Major	High	Develop strategies to mitigate chronic impacts on biodiversity and agricultural assets, considering long-term sustainability and resilience measures.	Significant



» Photo: Flood recovery in the River Derwent.

A photograph of a riverbank with numerous small white and blue markers placed along the shore. A large pile of driftwood is visible on the right, and a dense forest of green trees is in the background.

# 10

Monitoring  
and data

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# 10. Monitoring and data

This chapter outlines the nature of data collected (or utilised) as part of this Plan and how it is stored, analysed and made accessible.

The maps provided represent a point in time assessment based on current risk ratings and the data on the distribution of the identified biodiversity assets. Some of the input data for assets was limited and it is highly probable that at least some of these factors will change over time. Therefore, the maps should be treated as indicative not definitive. Maps must be updated regularly to ensure the effectiveness and relevance of the Plan is maintained.

## Data utilised

Natural capital asset spatial data were collated using statewide data from various sources, including but not limited to:

- 1 The Tasmanian Government Land Information System (theLIST).
- 2 Australian Government open data portal.
- 3 Geoscience Australia and any other relevant portals.

## Data analysis

The data were filtered based on priorities agreed upon by the Tasmanian NRM organisations. A series of data layers were created for each of the following natural capital asset groups:

- 1 Threatened and important species
- 2 Threatened and important ecological communities
- 3 Important biodiversity areas, soils, and vegetation

Risk assessment models have been developed for each threat addressed by the Plan - Fire, Flood, Coastal Erosion, Coastal Inundation - for both biodiversity and agricultural natural capital assets, where relevant.

The three major components of each risk assessment model are:

- 1 Threat Rating (input): describes the extent and likelihood/severity of the threat.
- 2 Natural Capital Asset Priority Rating (input): describes the extent of the natural capital assets, which are then rated against all other assets in terms of priority for conservation value and/or the asset's vulnerability to the threat.
- 3 Risk Assessment Rating (output): describes the combination of the two above rating models which can be used to identify areas at highest risk to the threat.

Priority setting for natural value assets and the vulnerability of different assets to various emergency scenarios was informed by coordinated stakeholder engagement. A detailed description of the risk assessment modelling process used to create the mapping outputs and the resulting maps are provided in the [Emergency Preparedness – Spatial Analysis and Mapping Report](#) available on our website. These maps detail the distribution of priority assets and their susceptibility to the emergencies outlined in this Plan.

## Data storage, access and sharing

A key deliverable of the plan is to provide an ongoing data analysis resource that the NRM organisations can use in decision-making prior to, during, and after future emergency events. The key data analysis outputs developed as part of this project include:

- A data package including all base layers used, provided for use in Desktop and web feature services (Description of available file geodatabases)
- Biodiversity and agricultural natural capital risk assessment models - one for each threat - and
- A series of heat maps (as PDFs) generated from the Risk Assessment Model for each threat (Appendix A).

To accompany this Plan, PDF Maps and the associated mapping output shapefiles of the biodiversity and agricultural natural capital Risk Assessment Models will be published on the [Emergency Preparedness and Response](#) page of NRM South's website. The full data package and associated biodiversity and agricultural natural capital Risk Assessment Models will be made available to the Australian Government via SIGBOX.

SIGBOX is the Department's preferred method of securely uploading, downloading, and sharing large files. SIGBOX is a web application that can be accessed from any location, allowing data files to be shared securely between departmental staff and external stakeholders. For internal use NRM South will maintain the data in the NRM South SharePoint server, which may be made accessible to other stakeholders on request.

**TABLE 11: Description of available file geodatabases**

File Geodatabase	Description
<b>Biosecurity_Model.gdb</b>	Spatial database that includes feature classes detailing threatened and important species observation records and important breeding areas, mapped areas of biodiversity threats, identified vegetation communities, and observations and mapped areas of declared and priority weeds.
<b>Coastal_Erosion_Risk_Model.gdb</b>	Spatial database that includes features classes detailing the priority ratings and detailed, merged, and final risk assessment models of the vulnerability to the threat of coastal erosion for both biodiversity and agricultural natural capital assets.
<b>Coastal_Inundation_Risk_Model.gdb</b>	Spatial database that includes features classes detailing the priority ratings and detailed, merged, and final risk assessment models of the vulnerability to the threat of coastal inundation for both biodiversity and agricultural natural capital assets.
<b>Fire_Risk_Model.gdb</b>	Spatial database that includes features classes detailing the priority ratings and detailed, merged, and final risk assessment models of the vulnerability to the threat fire for both biodiversity and agricultural natural capital assets.
<b>Flood_Risk_Model.gdb</b>	Spatial database that includes features classes detailing the priority ratings and detailed, merged, and final risk assessment models of the vulnerability to the threat flood for both biodiversity and agricultural natural capital assets.
<b>NRM_Assets.gdb</b>	Spatial database that includes features classes detailing the priority ratings applied to biodiversity and agricultural natural capital assets.
<b>Vulnerable_Soils.gdb</b>	Spatial database that includes features classes soil vulnerability to hillslope erosion, water erosion and wind erosion.

### Monitoring ecosystem resilience

To determine the effectiveness of the Plan in protecting natural assets, it is necessary to track the health of the ecosystem and its level of resilience to hazard exposure, including natural disaster and emergency events. If funded, monitoring should focus on ecosystem resilience, landscape management and landscape hazards. Monitoring needs to be tailored at a suitable scale for the specific ecosystem, and it is likely national scale data will not be adequate at a regional scale.

Monitoring should include (as recommended in the *Scientifically-based monitoring project – final report: Guidelines for ecosystem resilience monitoring, evaluation and reporting within the Victorian Bushfire Monitoring Program* (DELWP 2018):

1 Indicators of ecosystem resilience:

- extent of vegetation and forest cover
- vegetation connectivity and fragmentation
- vegetation condition
- soil health
- water quality
- species abundance

2 Indicators of landscape management:

- landscape modifications
- restoration
- Land use change,
- areas protected for biodiversity conservation
- areas under indigenous land management

3 Indicators of landscape hazards:

- changes in the extent of the landscape exposure to unplanned bushfires
- changes in the extent of the landscape exposure to floods
- Significant biosecurity incursions

Baseline data may exist for some of these and if not, will need to be obtained asap. Regular follow up monitoring to document changes is required.









11

Recommendations

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# 11. Recommendations

The Plan identifies common themes across recommended planning, response and recovery actions. In summary, these can be grouped into the following themes:



## Funding and resources

Each stage of emergency management requires sufficient funding and resources to ensure wholistic, coordinated and streamlined execution. Securing funding and resources to fill known and emerging gaps across the emergency management phases with respect to biodiversity and agricultural natural capital assets will improve environmental outcomes into the future.



## Information and capacity building

Targeted capacity building, which may include information, education and training, with regards to priority and at-risk biodiversity and agricultural natural capital assets, or training a/series of task forces that are equipped to respond to emergencies and deliver management outcomes.



## Planning

To respond efficiently and effectively to natural disasters and emergencies in a manner that supports natural asset resilience and recovery, management actions must consider priority and at-risk biodiversity and agricultural natural capital assets. Informed and integrated planning across the emergency management phases is crucial.



## Communication

Identifying and filling gaps in emergency management communications frameworks and content with respect to natural values and resource managers will enhance holistic emergency management outcomes.



## Onground actions

Building natural capital resilience and recovering from disaster and emergency events can be significantly enhanced by on-ground management actions. Actions should be informed by species, ecological and best practise land management data, information and knowledge. Management actions across tenures or at a catchment of landscape scale provide for the greatest natural asset outcomes.

The information below outlines key opportunities and recommendations for emergency management which considers biodiversity and agricultural natural capital assets across these themes. Other specific opportunities and actions for biodiversity and agricultural natural capital assets and actions are also outlined in those sections of the Plan.

## Funding and resources

- Funding is required to undertake the necessary planning in all stages of responses, but particularly in the preparedness stage. Relevant stakeholders work together to secure funding and/or resources to fill known and emerging data, information, capacity building and planning gaps with respect to biodiversity and agricultural natural capital assets.
- Relevant stakeholders work together to leverage available funding and resources from state, federal governments, and local stakeholders to expedite response and/or recovery process for at-risk and priority natural and agricultural assets.
- Address current gaps in funding for recovery and protection actions between management projects and programs, such as to protect refuges, support non-threatened or locally threatened species and restore ecosystem function.
- Support resilience of Country through Aboriginal community led and driven action. Address current gaps in funding (e.g. outside the availability of Indigenous Protected Area (IPA) funding for specific locations) to support the comprehensive management of threatened species, landscapes, and on-Country initiatives.
- Improve the rapid deployment and flexibility of emergency funding to ensure funding and timing of expenditure can be tailored to local priorities, conditions and the needs of the situation including for at-risk and priority natural and agricultural assets.
- Resource recovery actions for the medium to long-term to consolidate the immediate post-emergency investments.
- Invest in efforts to build up resilience of populations, ecosystems and natural resources for future catastrophic events and long-term recovery.
- Ensure funding systems include the capacity to invest in planning, collaboration and coordination activities post-event to build networked capacity.

## Information and capacity building

- Identify and seek to fill data, information and knowledge gaps for at-risk and priority natural capital and agricultural assets, to inform preparedness, response, and recovery processes and management actions.
- Establish or expand networks to support stakeholders to share data, information, knowledge and expertise to inform and improve planning, response and recovery information for natural and agricultural assets across organisations / jurisdictions and tenures.
- Conduct capacity building activities with key stakeholders including the community via targeted information, education and/ or training to fill identified skills and knowledge gaps for priority and at-risk biodiversity and agricultural natural capital assets across risks, resilience, response and recovery priorities.
- Invest in building capacity to support Indigenous-led recovery response within and beyond emergency management and NRM organisations. Support the Aboriginal community to build information on the impact of emergencies on cultural values and sites, such as muttonbird rookeries, native shellfish habitats, and cider gum populations.
- Prepare or enhance organisational systems and capacities, including surge capacity, network-building, knowledge base and legacy knowledge-sharing systems to support prioritisation and action for at-risk and priority natural and agricultural assets in emergency situations.

### Planning

- Facilitate integration of key biodiversity and agricultural natural capital data and asset information into existing or new emergency planning frameworks, strategies and plans across local and state agencies and non-government organisations.
- Identifying priority data, information and knowledge gaps for natural capital assets in planning processes and resources and work with stakeholder to fill these.
- Identify any gaps in governance structures or processes regarding planning and coordination between agencies with respect to biodiversity and agricultural natural capital assets.
- Minimise duplicated effort by integrating existing plans from relevant organisations (e.g. PWS plans for TWWHA) with statewide or regional emergency plans, systems or information repositories.
- Implement adaptive management by evaluating lessons learned, new or updated interventions and new scientific information for natural capital assets into revised strategies, plans and processes.
- For highest priority natural and agricultural assets, collaboratively develop and approve specific emergency assessment and management plans to target the highest priority risks and inform decision-making and management responses (e.g. Gregory et al 2012).
- Reviewing relevant Acts (e.g. EPBC and/or TSP Acts) or regulations to identify approval and compliance requirements for response and recovery management interventions.
- Explore roles, opportunities, and collaborations with Tasmanian Aboriginal people, including broadening cultural land management practices across different landscapes and tenures to support resilience and recovery, involving the community in planning and management, building capacity for cultural fire practices, and advocating for and supporting cultural practices.

### Communication

- Identify response personnel/teams from relevant organisations and clearly define roles and responsibilities with regards to high priority and at-risk natural assets.
- Establish communication protocols or plans for response personnel/teams for high priority and at-risk natural assets to cover each phase of an emergency management.
- Establish relevant Task forces who can respond to emergencies.
- Identify gaps and opportunities to further engage in communications with the broader community, including landowners, and expand programs like the “Red Hot Tips” initiative to consider natural assets and their management during events.

## On-ground management

On-ground resiliency and recovery work spanned a broad range of management actions and should be prioritised on a risk and asset basis. Actions should be coordinated, targeted and informed by the best available science, data and practise. Appendix C & D provide a more comprehensive summary of asset-based resilience and recovery actions.

Resilience actions include:

- captive breeding for at risk species known to be under potential threat from natural hazard events
- improving seed back collections for at risk flora species, as needed
- threat management activities such as weed and feral animal control
- improvements to biosecurity measures in locations with at risk species
- revegetation and restoration activities for key habitats or riparian areas
- enhancing connectivity between key habitats
- soil conservation measures
- enclosure or exclusion fencing for high value natural capital asset
- managing fuel loads through various methods like controlled burning and slashing, cultural burns, creating fire breaks, and planting less fire-prone species,
- monitoring and survey efforts

Recovery actions include:

- natural capital asset condition or management effectiveness monitoring or surveys
- clean up of debris or infrastructure threatening biodiversity and agricultural natural capital assets
- threat management such as control of pests and weeds
- conducting plant propagation and revegetation
- soil restoration measures
- restoration activities, including priority habitat, riparian etc
- stabilising waterways and riparian erosion area
- developing local area and species recovery plans,
- implementing strategies such as captive breeding, translocations, establishing exclosures and refugia, or
- providing artificial habitat like nest boxes or shelters, and revegetation efforts.



The background of the slide features a close-up photograph of a plant. On the left side, there is a vertical, light green stem with a slightly textured surface. To the right of the stem, several dark, almost black, branches or stems are visible, extending diagonally across the frame. The overall lighting is soft, and the colors are muted, creating a naturalistic and somewhat abstract backdrop.

# 12

## Future review

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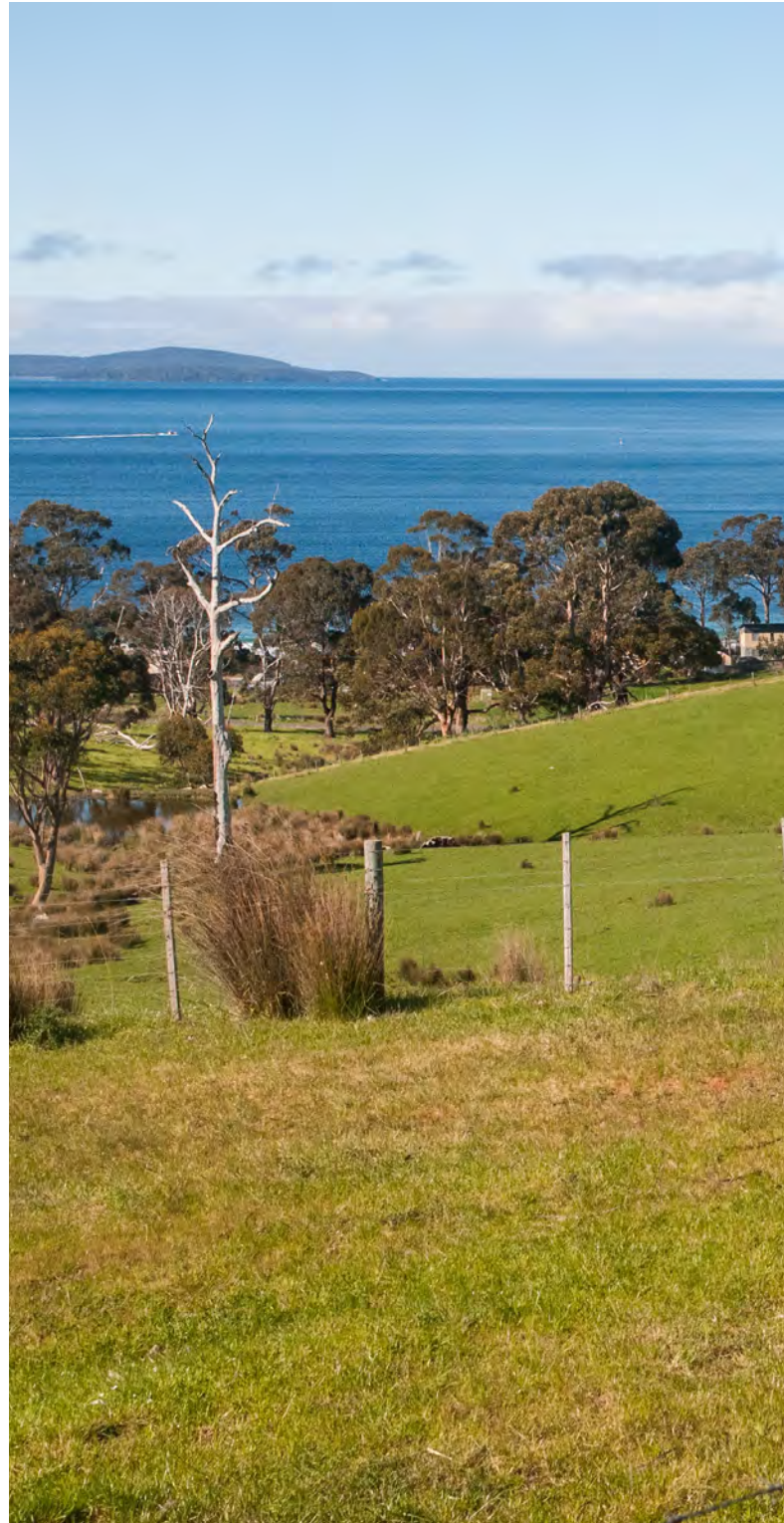
## 12. Future review

As the first of its kind this Plan will require review and updates in the future. Such a review would again be undertaken in consultation with stakeholders and would incorporate learnings from this Plan, progress on any actions and any new data and information.

Additionally, future updates of this Plan and/or the 2030 *NRM Strategy for Southern Tasmania* may consider:

- Out of scope or new values, or issues, or changes to these.
- The impact and response to chronic impacts such as longer-term drying, persistent drought-like conditions, and broader, long-term trends related to climate change.
- Specific priority biosecurity issues, including pests, weeds, diseases, and predicted or likely incursions.
- The impacts of emergencies on aquatic values and systems, and cultural assets and values.
- Understanding and planning for terrestrial and marine heatwaves, including sudden and prolonged periods of unusually warm temperatures impacting ecosystems and production,
- Opportunities and mechanisms to address data gaps in monitoring to inform emergency management for key at-risk and priority biodiversity and agricultural natural assets, and
- Including cultural values and heritage in planning processes and working with/supporting Aboriginal people in their efforts to build the resilience of Country. This encompasses broadening the application of cultural land management practices, involving the Aboriginal community in decision-making, and supporting initiatives that strengthen cultural and environmental stewardship.

The review time frame for this Plan is not set and will be determined by future funding availability.



» Photo: Nathalie Laurence





# Appendices

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# Appendix A: Spatial Analysis Methodology

## Overview

A risk assessment model was developed for each threat identified in this scope (Fire, Flood, Coastal Erosion, Coastal Inundation) both for biodiversity and agricultural natural capital assets where relevant.

The three major components of each risk assessment model are:

- 1 Threat Rating (input): describes the extent and likelihood/severity of the threat.
- 2 Natural Capital Asset Priority Rating (input): describes the extent of the natural capital assets, which are then rated against all other assets in terms of priority for conservation value and/or the asset's vulnerability to the threat.
- 3 Risk Assessment Rating (output): describes the combination of the two above rating models which can be used to identify areas at highest risk to the threat.

The underlying process to update and combine all the input layers was designed and built around a well-structured and semi-automated GIS model using standard ESRI software. The benefit of this approach is that all, or individual inputs to the models can be easily adjusted and the whole model re-run either annually or on-demand to feed into ongoing emergency plan revisions. This means that plans can be kept current and therefore effective, as threat conditions change. Although out of the scope of this project, marine assets and vulnerabilities to heat waves, biosecurity, on-farm drought risk and so on, could also be added via additional inputs as required.

The resolution of the model was determined to ensure it best met the needs of emergency response and decision-making purposes. Similar risk assessment models within Tasmania use a 100m x 100m grid cell to represent mapped features and this has proven to be a good compromise between on-ground accuracy and efficient modelling processes.

Esk Spatial has used the parameters and priorities agreed on by the NRM organisations and external stakeholders to develop for each threat the natural capital asset priority ratings described below such that modelled outputs can directly feed into the framework of each of the three NRM emergency response plans.

A risk assessment model has been developed for each threat using the following methodology:

- 1 A model for the threat was acquired or developed to describe for any given site across the state, the likelihood or hazard associated with that threat rated from highest to lowest likelihood/severity.
- 2 The descriptive likelihood/severity ratings for each site were converted into a numeric risk value to allow for mathematic calculation. For example:
  - a) Low Threat Rating assigned a Threat Value of 1
  - b) Moderate Threat Rating assigned a Threat Value of 2
  - c) High Threat Rating assigned a Threat Value of 3.

## B. Natural Capital Priority Ranking Layer

- 1 A model to represent the location of each natural capital asset was developed and assigned a priority to rate vulnerability to each threat.
- 2 The descriptive priority rating for each natural capital asset was converted into a numeric priority value to allow for mathematic calculation. For example:
  - a) Low Priority Rating assigned a Priority Value of 1
  - b) Moderate Priority Rating assigned a Priority Value of 2
- 3 High Priority Rating assigned a Priority Value of 3. For each site (100m x 100m grid cell) the maximum priority value of all the natural capital assets present on that site was chosen to represent the final natural capital priority value for that site. For example, if three different species or vegetation communities were present within the 100m x 100m grid cell, then the species or vegetation community with the highest priority rating would be used to set the overall priority value for that grid cell.

## C. Risk Assessment Rating Layer

- 1 The risk assessment model was developed by way of multiplication of the two input ratings for each site across the state:
  - a) Risk Assessment Value = Threat Value x Maximum Natural Capital Priority Value
- 2 The resultant Risk Assessment Value calculated for each site across the state describes its overall rank relative to all other sites for the given threat. For example:

a) Any site with the highest risk assessment value (i.e.  $3 \times 3 = 9$ ), has the highest ranking for emergency planning and decision making, as these sites have at least one natural capital asset of highest priority rating which may experience a threat event of the highest threat rating.

b) Any site with a risk assessment value (i.e.  $1 \times 1 = 1$ ) has the lowest ranking.

**APPENDIX TABLE 1: Example Risk Rating Calculation Matrix – Threat Rating x Natural Capital Asset Priority Rating**

Risk Rating Matrix		Natural Capital Priority Rating		
		Low (1)	Moderate (2)	High (3)
Threat Likelihood / Hazard Rating	Low (1)	Very Low (1)	Low (2)	Moderate (3)
	Moderate (2)	Low (2)	Moderate (4)	High (6)
	High (3)	Moderate (3)	High (6)	Very High (9)

The following sections describe in more detail how each of the input components were developed, including source datasets.

### Fire Threat Model

The Fire Threat Rating model for 2024 was sourced from the Tasmanian Parks and Wildlife Service (PWS). PWS express the threat of a bushfire in terms of five 'likelihood' ratings:

- Rare
- Unlikely
- Possible
- Likely
- Almost Certain

This model is developed from a large and varied range of external sources and internal fire weather and vegetation fire behaviour models and accounts for:

- Ignition Potential:
  - Lightning Strike Probability
  - Historic Fire Start Points
- Suppression Capability:
  - Likelihood of Detection
  - Proximity to brigade/air resource.
- Head Fire Intensity:
  - Vegetation Type (defines Rate of Spread based on vegetation specific fire behaviour models)
  - Slope

- Fuel Load (fire age versus fuel accumulation by vegetation type),
- 95% Percentile Historic Weather.

No further work was required on this model, as it had already been assigned threat values which were used directly in the risk assessment modelling undertaken.

### Flood Threat Model

The Flood Threat Rating model was developed from three sources:

- 1 Statewide 1% AEP Climate Change Peak Flood Extent:
  - The State Emergency Service (SES), Department of Police, Fire and Emergency Management (DPFEM) has developed a range of flood hazard models covering a range of annual exceedance probability (AEP) scenarios and for current and 2100 modelled climate change weather scenarios. The flood model chosen for this project used the 2100 climate weather scenario and a 1% AEP. This model was chosen as it models the worst-case scenario in terms of extent affected by flooding.
- 2 Flood Extent June 2016:
  - The extent of the 2016 Floods around Evandale was mapped in August 2016 by the was part of the Flood Recovery Program. Where this 2016 flood mapping extended beyond the modelled statewide flooding extent above, these areas were included in the model.

### 3 LIST Hydrographic Area – Flood Plain

- Where the Flood Plains mapped within the LIST Hydrographic Area layer extended outside the above two layers, these areas were included in the model.

All areas covered by the features described above were assigned a nominal threat rating of 'high', but essentially the extent was used to represent that the areas that would be affected by water in the event of a flood (i.e. presence versus absence of excess water). This was a simplistic approach and could possibly have been further developed with the depth models also created by SES had time permitted.

### Coastal Erosion Threat Model

The Coastal Erosion Threat Rating model was developed using the 'Coastal Erosion Hazard Bands 20161201' dataset as developed by DPAC. The following extract from their technical report<sup>4</sup> describes the hazard bands used to assign Threat Ratings to the model:

*The four coastal erosion hazard bands are:*

- *Acceptable: the area is unaffected by coastal recession until after 2100, and not subject to controls*
- *Low: the area vulnerable to coastal recession by 2100 or is protected by coastal defences,*
- *Medium: the area vulnerable to coastal recession to 2050*
- *High: the area vulnerable to hazardous erosion now, and typically found on sand dunes; for the purpose of SCP, this is considered the area that is a potentially actively mobile landform*
- *Coastal Erosion Investigation area: an area adjacent to the coastline for which there is insufficient information to classify it into Acceptable, Low, Medium, or High hazard bands. The width of the area is the cumulative width of the Low, Medium, and High hazard bands.*

For the purposes of risk modelling, the hazard bands described above were assigned the following Threat Ratings:

**APPENDIX TABLE 2: Assignment of Coastal Erosion Threat Ratings and Values as derived from Coastal Erosion Hazard Bands (DPAC)**

Coastal Erosion Hazard Band	Coastal Erosion Threat Priority	Coastal Erosion Threat Value
Acceptable	Excluded	NA
Coastal Erosion investigation Area	Investigation	0 – these areas were included in the final model to identify areas that may yet be at threat but had no final risk rating assigned
Low	Low	1
Medium	Medium	2
High	High	3

### Coastal Inundation Threat Model

The Coastal Erosion Threat Rating model was developed using the 'Coastal Erosion Hazard Bands 20161201' dataset as developed by DPAC. The following extract from their technical report<sup>5</sup> describes the hazard bands used to assign Threat Ratings to the model:

*The coastal inundation hazard bands are defined as follows:*

- *Low: areas vulnerable to a 1% AEP storm event in 2100; these areas have a medium-term flooding issue*
- *Medium: areas vulnerable to a 1% AEP storm event in 2050; the medium band also contains all of the land that will be impacted by a 0.8 m SLR by 2100*
- *High: areas that will be within a 0.2 m SLR from the mean high tide line by 2050; these areas are currently impacted by the Highest Astronomical Tide*
- *Coastal Investigation: areas that are not covered by LiDAR and are below the 10 m contour and within the coastal zone.*

4 Page 5 of Summary Report of Coastal Hazards, Coastal Hazards in Tasmania, Department of Premier and Cabinet, 1st December 2016

5 Page 7 of Summary Report of Coastal Hazards, Coastal Hazards in Tasmania, Department of Premier and Cabinet, 1st December 2016

**APPENDIX TABLE 3: Assignment of coastal inundation threat ratings and values as derived from coastal inundation hazard bands (DPAC)**

Coastal Inundation Hazard Band	Coastal Inundation Threat Priority	Coastal Inundation Threat Value
Coastal Investigation	Investigation	0 – these areas were included in the final model to identify areas that may yet be at threat but had no final risk rating assigned
Low	Low	1
Medium	Medium	2
High	High	3

### Biodiversity Natural Capital Asset Priority Model

The range or location of each identified biodiversity natural capital asset was derived from a range of sources, including:

- Tasmanian Natural Values Atlas – Observation Records (29/02/2024)
- TASVEG 4.0 - The Digital Vegetation Map of Tasmania
- Forest Practices Authority (FPA) Range Boundary Mapping 2012
- Species of National Environmental Significance 1km Grids February 2024 (DCCEEW)
- Ecological Communities of National Environmental Significance (ECNES) Database.

These were reviewed and where the datasets defining the range/habitat were too coarse (1km grids, or sporadic historic sighting records), an effort was made to derive a more accurate location from other available sources. This was particularly the case for several priority fauna species, so where possible, the habitat description in the conservation or listing advice was interpreted such that vegetation communities within the TASVEG 4 dataset could be extracted to represent the habitat of the fauna required. In the case of bird species, this equated to nesting and foraging habitat.

Once the geographic extent of each biodiversity natural capital asset was defined, a default priority rating value was assigned to each based on the following rules:

- Only biodiversity natural capital assets which are vulnerable to the threat were prioritised - natural capital assets which are not vulnerable to the threat were assigned a priority ranking of zero for that threat.
- The conservation or threatened species listing advice was reviewed and those reported as more vulnerable/susceptible to the threat were assigned a higher priority for that threat.
- The geographic distribution of the natural capital asset was assessed and those species, vegetation communities or sites with a wider distribution were generally assigned a lower priority to those with a narrow distribution, over-riding the priorities assigned based on the conservation/listing advice. The reasoning being that widely distributed populations or habitats would generally be at less risk of extinction or significant loss to a single emergency event likely to happen within a year, than those natural capital assets only found in very concentrated locations.

For the threat of fire only, an additional set of analyses was undertaken to further enhance the priority rating process. Given many species, vegetation communities or sites had very large geographic extents defined in the model, to fine tune areas more vulnerable to fire within those areas, the 'Tolerable Fire Intervals (TFI) for TASVEG Communities<sup>6</sup>,' as developed by the NRE Conservation Science Section, were applied. By applying this fine tuning, the priority assigned to these widely dispersed assets could be downplayed in areas where the impact of fire was likely to be less significant, such that the priority for more narrowly dispersed assets would not be masked in the final risk assessment model where they overlapped.

The TFI concept was developed to assist natural resource managers with planning the timing of prescribed burning programs to balance the need to reduce bushfire hazard against maintenance of functional ecosystems. In terms of the biodiversity natural capital assets in this project, the Tolerable Fire Interval:

- Is a measure that is directly applicable to the flora and vegetation community assets,

<sup>6</sup> <https://nre.tas.gov.au/Documents/Tolerable%20Fire%20Intervals%20for%20TASVEG%20communities%20.pdf>

- Serves as a surrogate for fauna assets by maintaining direct habitat,
- Serves as a surrogate for aquatic fauna asset conservation by maintaining surrounding habitat, preserving water quality, etc.

TFI's provide an upper and lower range of age between fire events within which the frequency of fire is more likely to be acceptable to maintain a vegetation community's identity and function. Too frequent a fire regime will likely impede the ability for plants to recover from fire such that they will persist when subject to a subsequent fire (represented by the 'Minimum TFI' value). Conversely, too infrequent a fire regime may affect species that require disturbance for regeneration, which in turn is often linked to inter-species competition and vegetation successional processes (represented by the 'Maximum TFI' value). A further separation of the Minimum TFI into the frequency of low and high severity fires was also made, and for this exercise, the 'Minimum TFI (high severity fire)' value was chosen to represent the likely impact of a bushfire. Bushfires are not always high severity fires, but this option was chosen to represent the 'worst-case' scenario.

Using the December 2023 Fire History dataset as sourced from LIST, which records fire extents back to 1920, the age since the last fire event was calculated for each location across the state and was overlaid with the Tolerance Fire Intervals as applied to TASVEG 4 communities to highlight areas that would be inside or outside their minimum tolerance fire interval if a fire occurred in 2024. If a portion of the biodiversity natural capital asset overlapped TASVEG communities in which a 2024 fire would be outside the minimum TFI, that portion was assigned a higher priority rating than the remainder of the asset. This process only focused on calculating the age since fire based on the previous fire event, it did not attempt to model areas which might have had two or more prior fires recorded. A multiple fire age history model could be developed further to highlight areas which might be at higher risk again if a subsequent fire occurred.

In modelling terms, if the 'Age Since Fire' value was less than the 'Minimum TFI (high severity fire)' value for a location, then the priority assigned to the biodiversity natural capital asset was elevated for that location in which the historic fire occurred.

## Agricultural Natural Capital Asset Priority Model

The extent of the agricultural natural capital assets was defined using the Tasmanian Land Use (2021) dataset, and the following land classes were included:

- Production from Relatively Natural Environments but excluding:
  - 2.2.0 Production native forests.
- Production from Dryland Agriculture and Plantations but excluding:
  - 3.1.0 Plantation forests
  - 3.1.1 Hardwood plantation forestry
  - 3.1.2 Softwood plantation forestry.
- Production from Irrigated Agriculture and Plantations but excluding
  - 4.1.0 Irrigated plantation forests.

Within this agricultural landscape the soils and the remnant native vegetation were considered to be key natural capital assets to be at risk from the threats modelled in this planning process. The priority rating for the soils and remnant native vegetation was applied as described in the next two sections.

## Agricultural Soils Priority Model

For the threats of flood, coastal erosion and coastal inundation, the potential for water erosion was considered a significant risk to soils.

For coastal inundation, and possibly coastal erosion, the introduction of saline water into the agricultural setting would be an additional risk to soil productivity. It was assumed that loss of productivity due to salinity would have the same risk rating for all sites susceptible to coastal inundation or coastal erosion, so no priority rating was modified to account for increased salinity.

Stakeholders reported that the influx of debris from floods was another possible source of threat to agricultural land, especially where that debris was significant in volume. Again, for the threat of flooding, the likelihood of debris being deposited was assumed to be equal across all sites affected by flood, so no specific priority rating was developed to account for debris. This is unlikely to be the case as the velocity and volume of water present at various stages of the flood's flow, and interaction with fixed objects like trees, fences and vegetation, would likely define where debris would be deposited, but such modelling was beyond the scope of this project.

Based on these assumptions, the vulnerability of the agricultural natural capital assets was prioritised based solely on the vulnerable soils water erosion hazard ratings as developed in 2018 by NRE<sup>7</sup>. The water erosion mapping shows areas where a water erosion hazard might exist if sufficient groundcover is not maintained, which could lead to soil resource degradation through soil, organic matter and nutrient loss, resulting in sedimentation and contamination of drainage lines and waterways after significant rainfall and runoff events. The hazard ratings for water erosion were developed from a combination of Digital Soil Mapping (DSM) inputs of the soil properties Coarse Fragments, Sand %, Silt %, Clay %, Organic Carbon %, Soil Permeability, and Soil Structure, with Slope and Slope-Length (from the SRTM Digital Elevation Model)<sup>8</sup>.

For this modelling exercise it was assumed that the presence of natural vegetation was likely to signify areas of lower erosion potential, and as such vegetated areas were assigned the lowest priority ranking for the threats of flood, coastal erosion, and coastal inundation.

The presence of forest, woodland or native vegetation was modelled using a combination of the National Forest and Sparse Woody Vegetation Data (Version 7.0 - 2022 Release, DCCEEW) and TASVEG 4.0 (NRET). Where forest woodland or native vegetation was identified on a site from these two datasets, this overrode the priority rating previously assigned based on vulnerability to water erosion hazard. The national woody vegetation layer was incorporated into the modelling as it has a finer resolution (25m cells) and is likely to be more current across the whole state than TASVEG 4 given it was mapped from recent imagery, so is more likely to identify linear strips of forest and vegetation along riverbanks, that help mitigate erosion. The effect of salinity from coastal inundation on the forest, woodland and native vegetation were not considered in this modelling exercise.

It was considered that applying the fire risk models used for the threat of bushfire to biodiversity assets would not be appropriate for agricultural assets in terms of impact on soils. As such, bushfire was not modelled for soil-based agricultural natural capital assets as part of this project.

However, where bushfires do start on, or escape onto, agricultural land, the main risk to soils would be subsequent risk of erosion due to wind, water or steep slope and the layers for these potential hazards are provided for reference. It would be recommended that more work be put into modelling the threat of bushfire to the agricultural natural capital assets in future iterations of this modelling based on these erosion hazard ratings. The layers developed by NRET to describe soils vulnerable to wind erosion, hillslope erosion and water erosion have been packaged with the model outputs to assist with emergency response planning, should they need to be consulted when assessing the possible impact of fire on soils.

**APPENDIX TABLE 4: Assignment of agricultural natural capital priority ratings and values as derived from water erosion hazard bands (NRE) and presence/absence of vegetation.**

Water Erosion Hazard Band	Agricultural natural capital asset Priority Rating	Agricultural natural capital asset Priority Value
All hazard bands where forest, woodland or native vegetation is present	Very Low	1
'Very Low' Band where no forest, woodland or native vegetation is present	Very Low	1
'Low' Band where no forest, woodland or native vegetation is present	Low	2
'Moderate' Band where no forest, woodland or native vegetation is present	Moderate	3
'High' Band where no forest, woodland or native vegetation is present	High	4
'Very High' Band where no forest, woodland or native vegetation is present	Very High	5

7 Refer page 12 of Managing Vulnerable Soils under Irrigation in Tasmania ([https://nrmdatalibrary.dpipwe.tas.gov.au/FactSheets/WfW/ListMapUserNotes/Vulnerable\\_soils.pdf](https://nrmdatalibrary.dpipwe.tas.gov.au/FactSheets/WfW/ListMapUserNotes/Vulnerable_soils.pdf))

8 Refer LIST Metadata record for Vulnerable Soils: Hillslope Water Erosion Hazard: <https://www.thelist.tas.gov.au/app/content/data/geo-meta-data-record>

## Agricultural Remnant Native Vegetation Priority Model

For the threats of flood, coastal erosion and coastal inundation, it was considered that the main threat to remnant native vegetation would be the physical interaction of excess flowing running through the vegetation or eroding the underlying soil structure. In the case of the coastal threats, introduction of saline water may also likely have an impact on some vegetation types.

Using the vegetation data modelled in the Agricultural Soils Priority Model, all remnant native vegetation within the Agricultural landscape was assigned a priority rating of High. Inclusion of woody vegetation mapped from the National Woody and Sparse Vegetation Layer (2022) in the model captured riparian vegetation in the modelling to a reasonable level of spatial accuracy.

## Biosecurity Threat

Current known invasive species are typically widespread within Tasmania, and the distribution mapping available to this project was generally limited to point-based observation records, rather than actual or modelled range boundaries. It was considered that use of observation data in this format could produce potentially misleading results if applied to the risk assessment modelling framework for this project. Although the mapping might indicate a species has not been observed in a location, it can't be relied upon to define absence, as the lack of observation records are limited by human access. For example, the locations of observation records frequently follow roads, or walking trails, so don't cover large areas where access is scarce. Further work to interpret the observation mapping into likely ranges would improve the utility of these datasets for risk modelling.

Stakeholder feedback did underscore the importance of considering the presence or absence of pests, weeds, and pathogens in assessing the ecosystem's ability to recover from emergency events. Although the observation records might not be suitable for confirming absence of an invasive species, they certainly can be used to indicate known presence in, or proximity to, natural capital assets. Used with this awareness of their limitations, these datasets can still be important supplemental information for emergency response planning with respect to risks to recovery from other threats. As such, all available information on known invasive species was included with the packaged model outputs.

Although no risk assessment model was prepared for the threat of biosecurity, each of the biodiversity natural capital assets<sup>9</sup> was assigned a vulnerability rating to the main classes of biosecurity threats, as describe below:

- Terrestrial Predator Vulnerability (i.e. cats, rats, etc)
- Aquatic Predator Vulnerability
- Marine Predator Vulnerability
- Habitat Disturbance Vulnerability (i.e. deer, pigs, etc)
- Predatory Wasp Vulnerability
- Phytophthora Vulnerability
- Myrtle Rust Vulnerability
- Weed Vulnerability
- Pathogen Vulnerability.

Using these ratings, biodiversity natural capital assets vulnerable to each biosecurity threat type can be filtered out and viewed in GIS software as needed and compared against known locations of the biosecurity threats.

Risk assessment modelling could be applied to future threats as they become apparent, assuming that areas at risk from the threat can be defined accurately. However, the current Tasmanian biosecurity alerts, including the Small Hive Beetle, Varroa Bee, and Queensland Fruit Fly<sup>10</sup>, do not appear directly relevant as threats to the natural capital assets defined in this project, so were not modelled.

It should be noted that the 'Phytophthora\_susceptibility\_veg\_no\_pc\_records\_region' GIS Layer packaged with this report describes area likely susceptible to Phytophthora but which have no current observation records within them. In terms of risk from Phytophthora. This dataset offers a potential source for future risk assessment modelling and highlights areas meriting attention in the current emergency response planning.

<sup>9</sup> Refer the 'NRM\_Biodiversity\_Natural\_Capital\_Asset\_Priority' GIS layer provided in the GIS Products package.

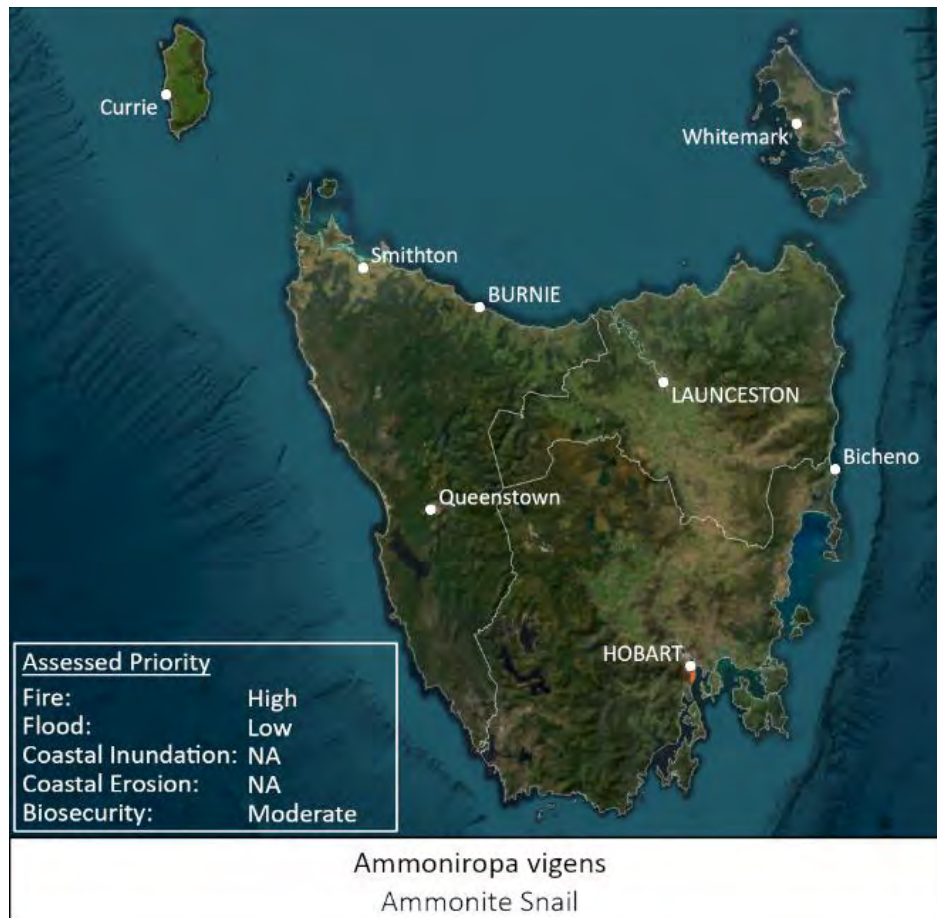
<sup>10</sup> <https://nre.tas.gov.au/biosecurity-tasmania/current-biosecurity-alerts>



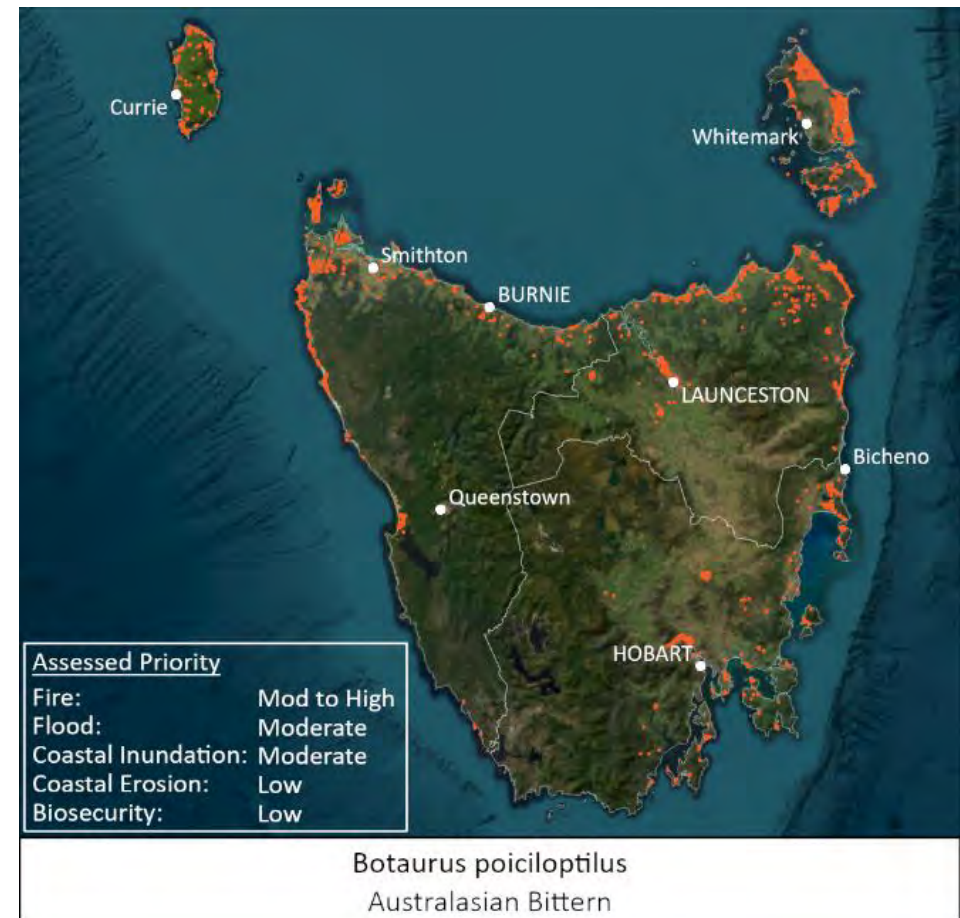
» Grass tree dieback caused by Phytophthora.

## Appendix B: Modelled Range and Priority Ratings of Individual Biodiversity Natural Capital Assets

National priority EPBC listed threatened species



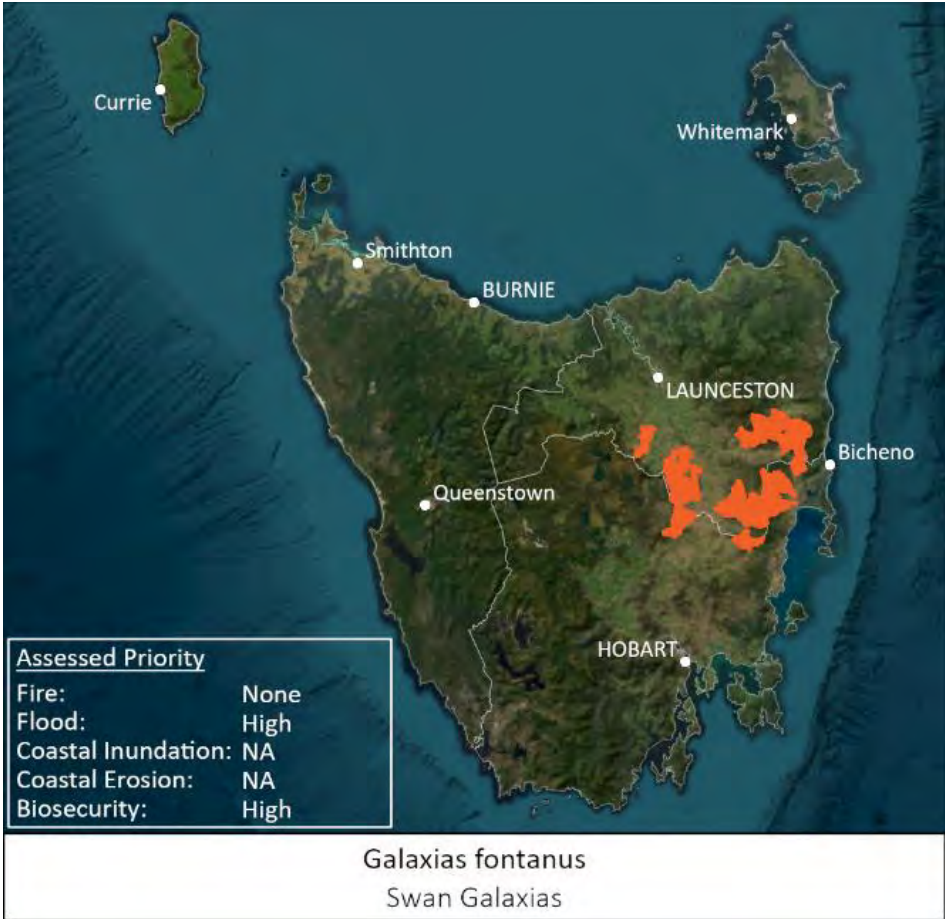
APPENDIX B FIGURE 1



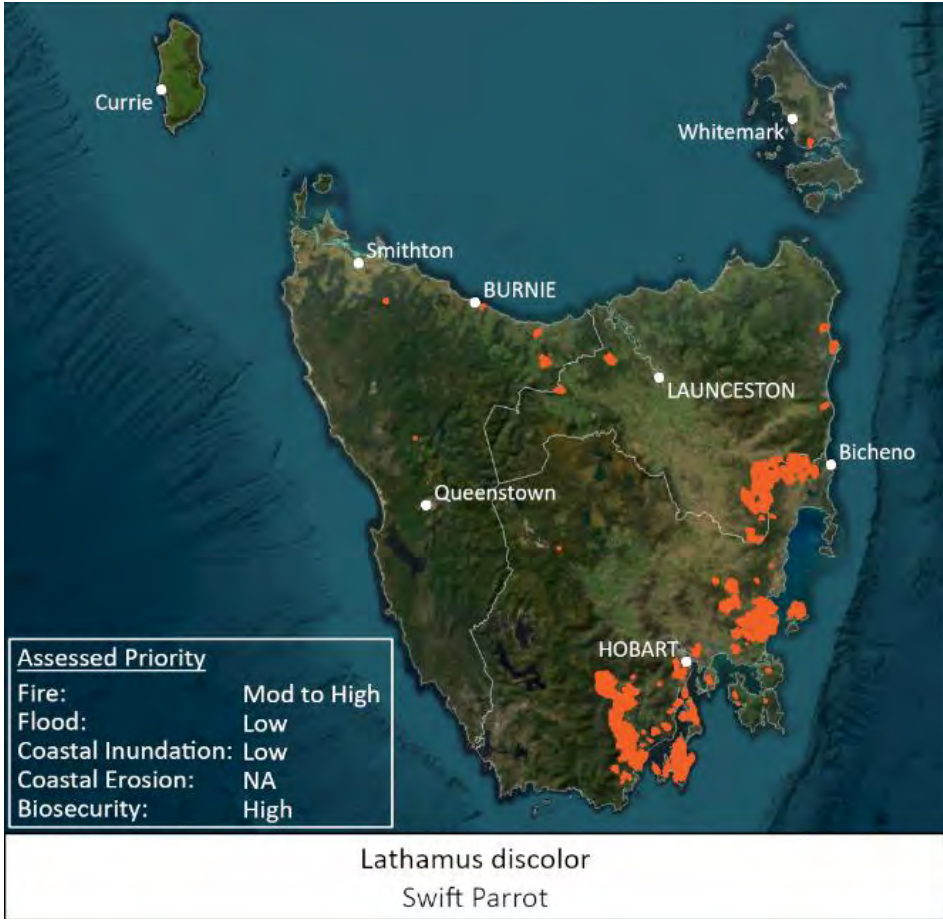
APPENDIX B FIGURE 2



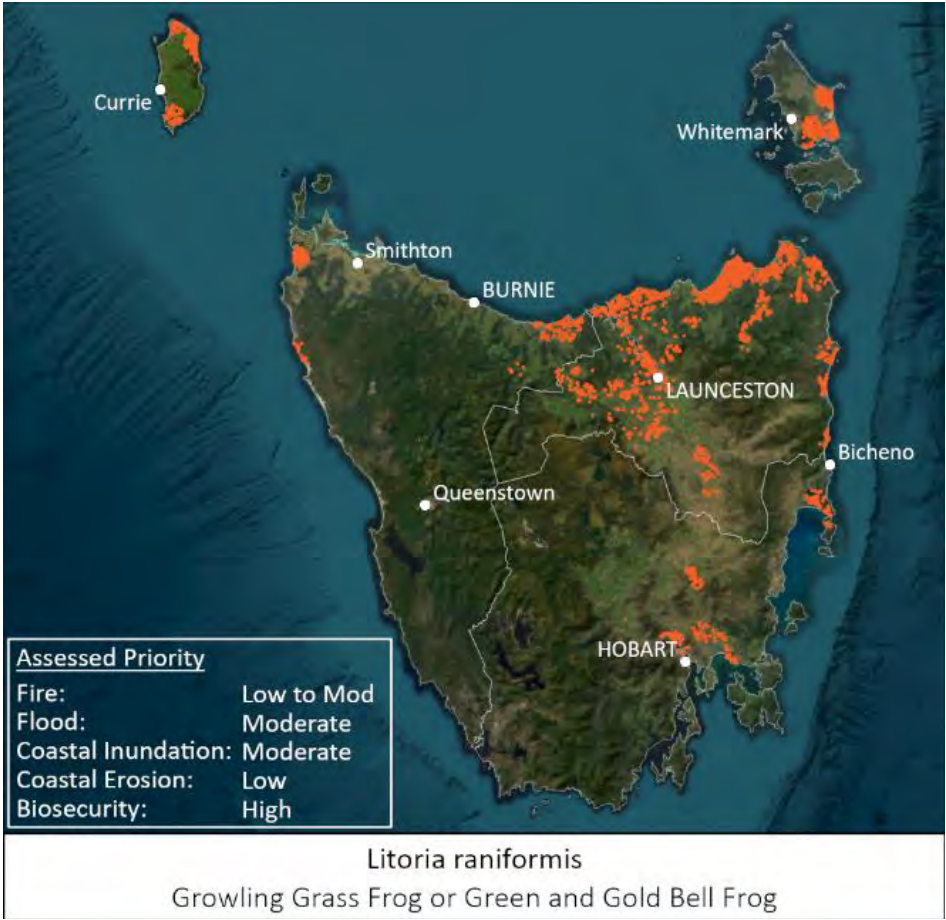
APPENDIX B FIGURE 3



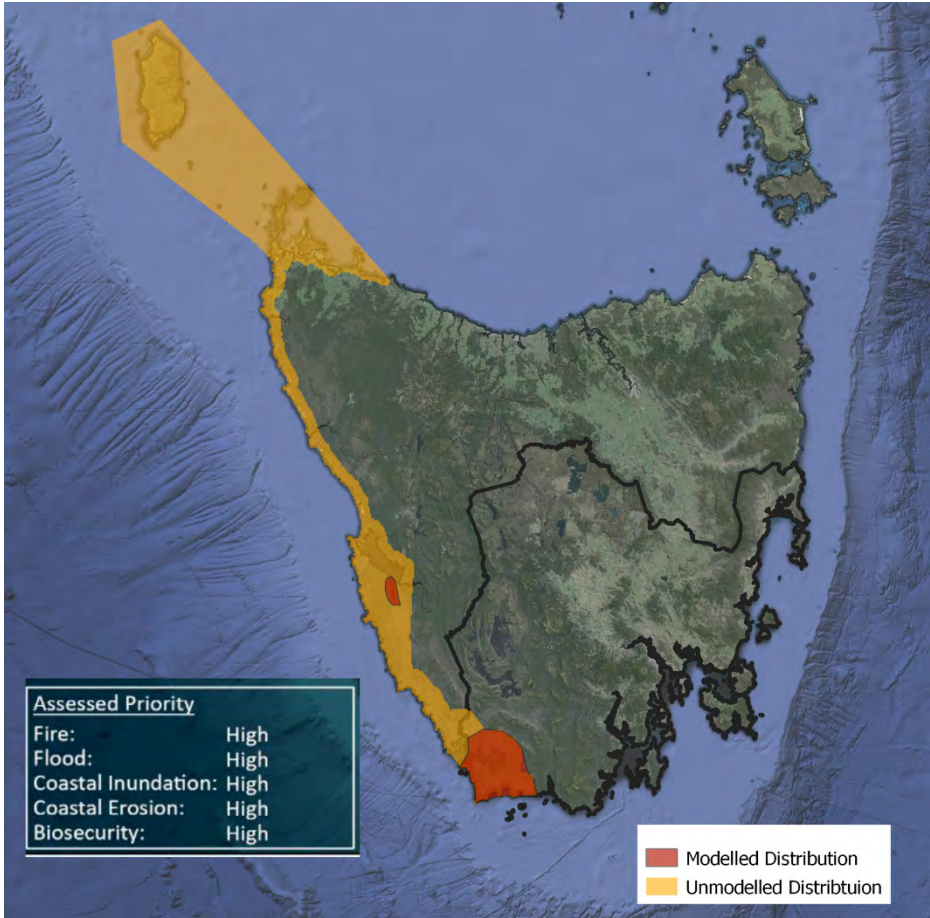
APPENDIX B FIGURE 4



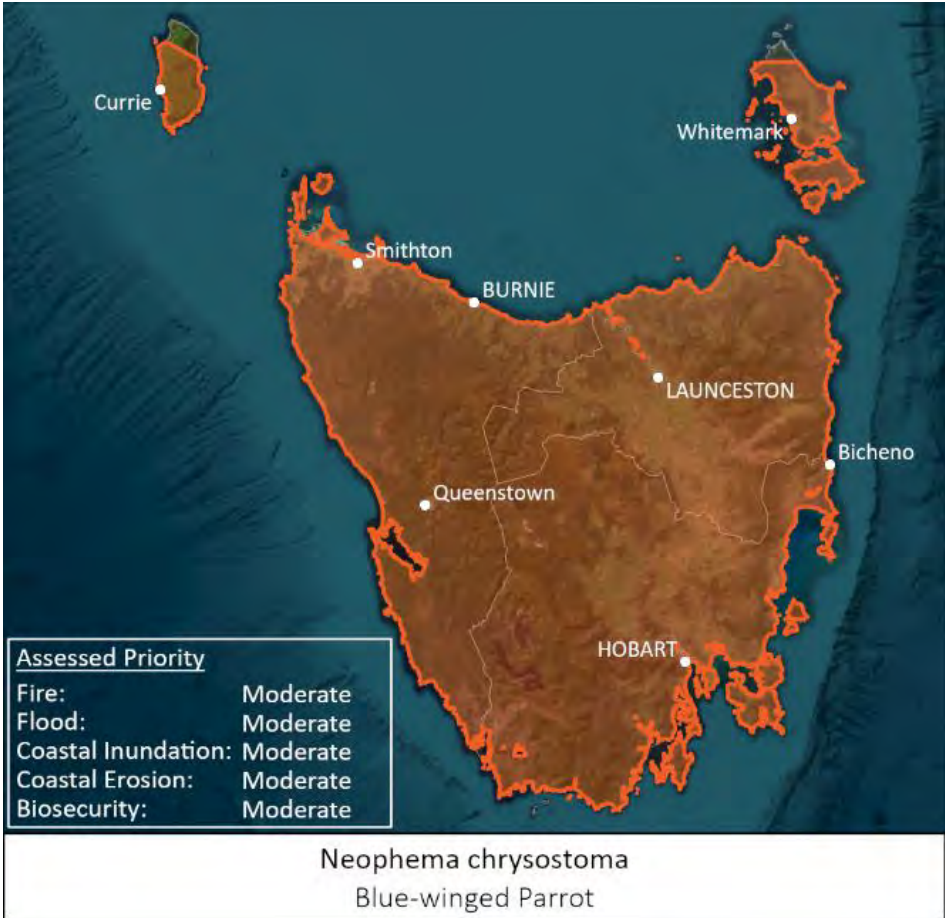
APPENDIX B FIGURE 5



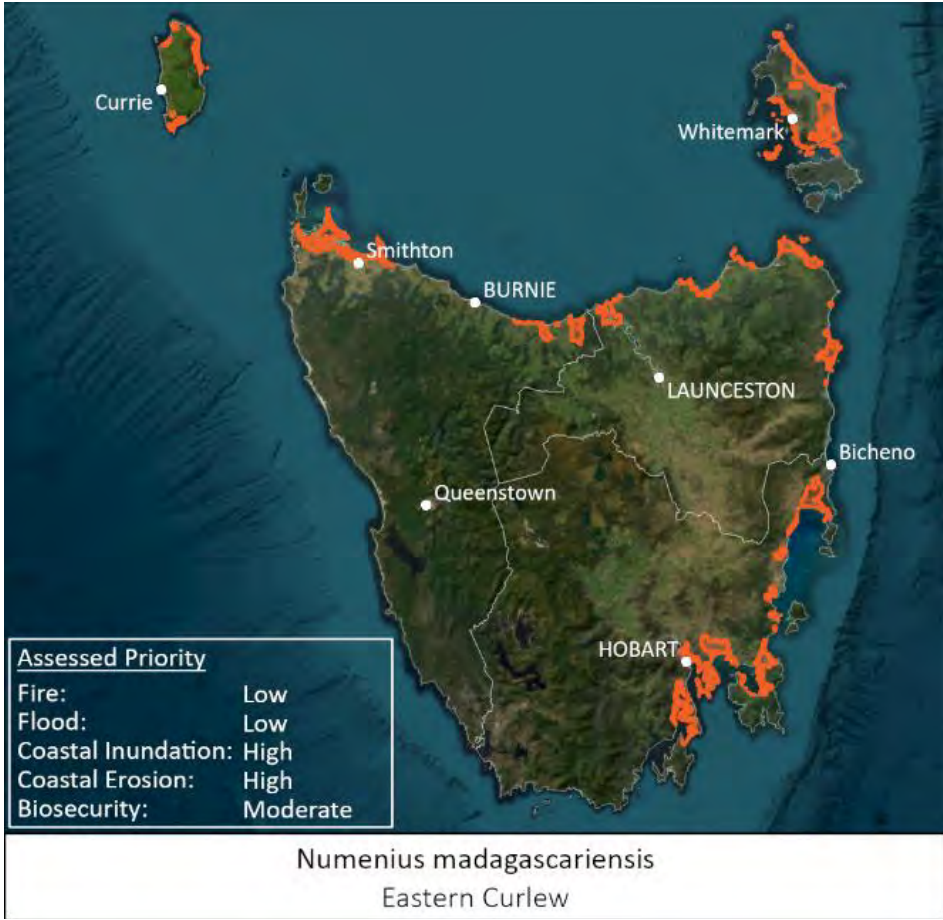
APPENDIX B FIGURE 6



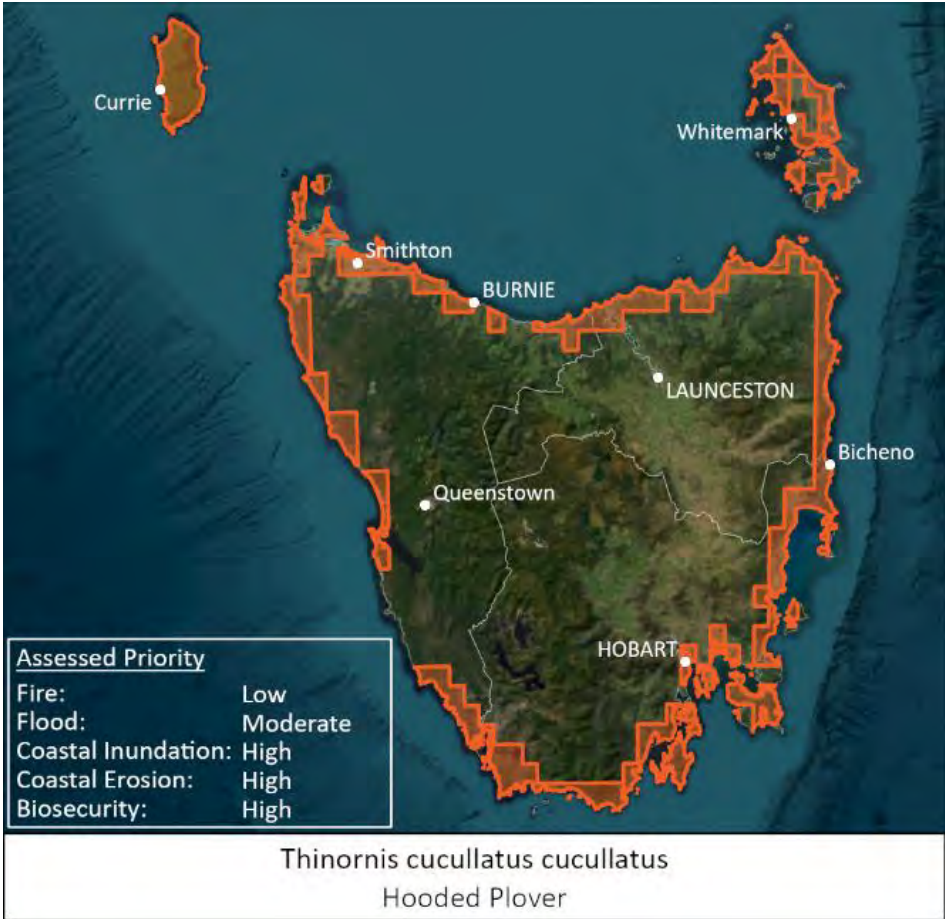
APPENDIX B FIGURE 7: *Neophema chrysogaster* – Orange-bellied parrot



APPENDIX B FIGURE 8



APPENDIX B FIGURE 9



APPENDIX B FIGURE 10

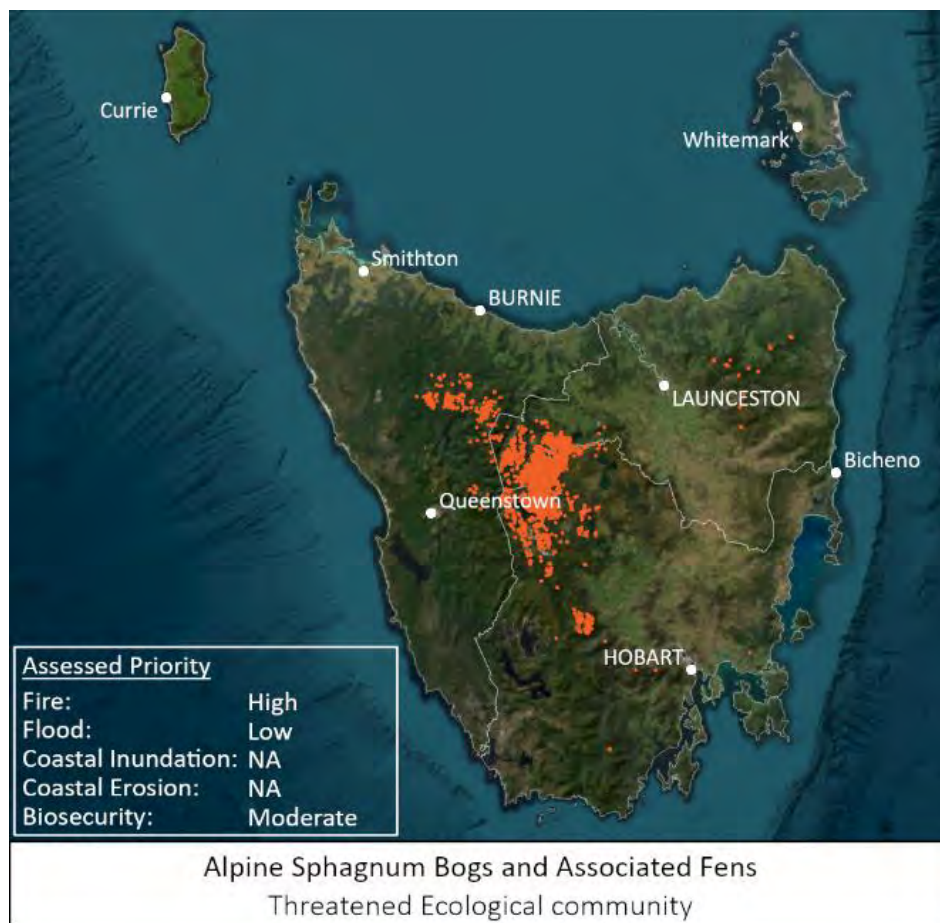


APPENDIX B FIGURE 11

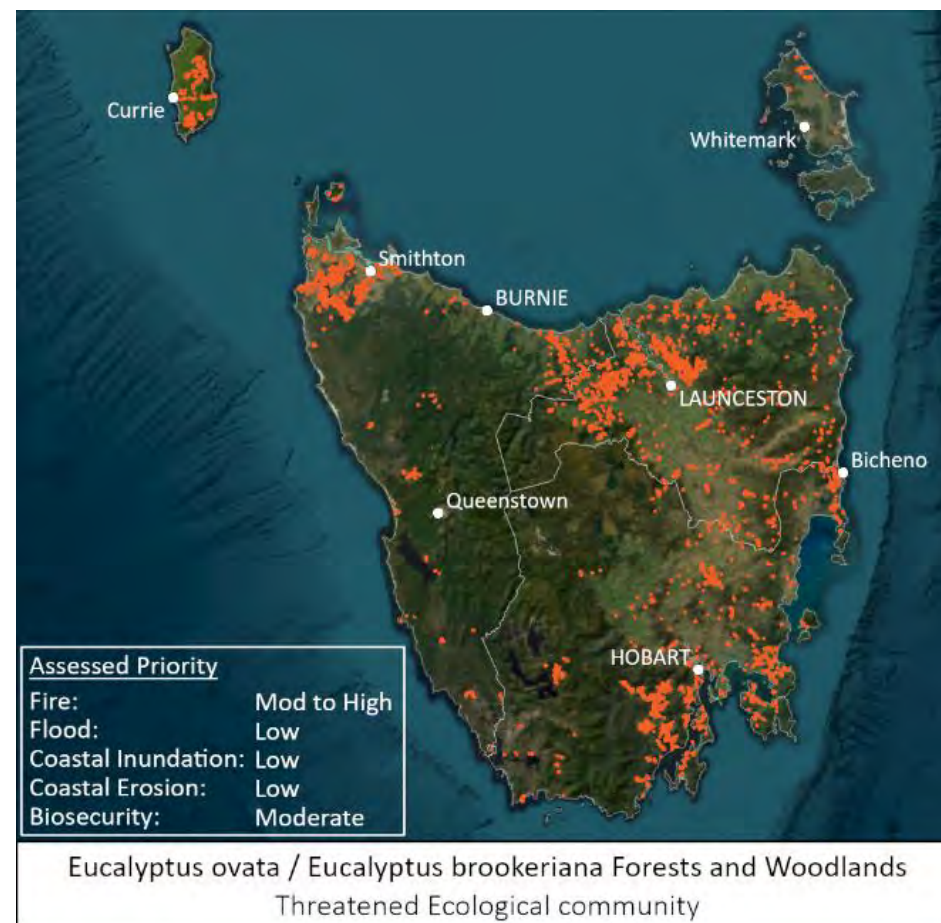


APPENDIX B FIGURE 12

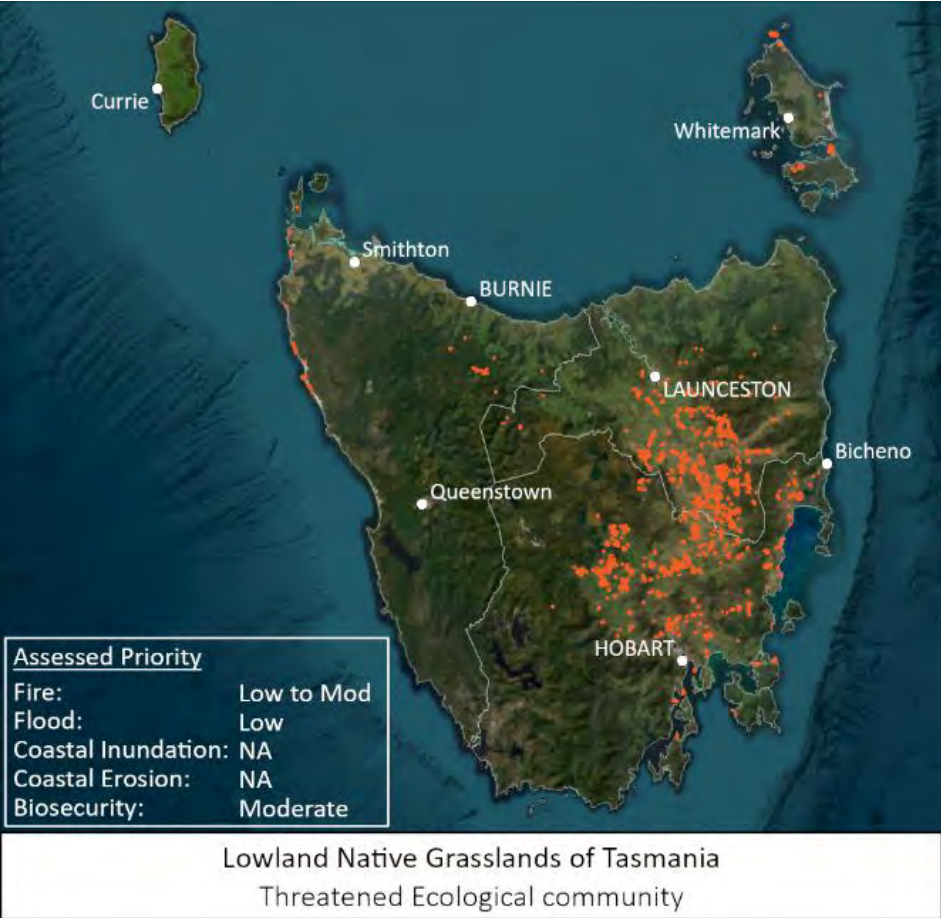
## Nationally threatened ecological communities



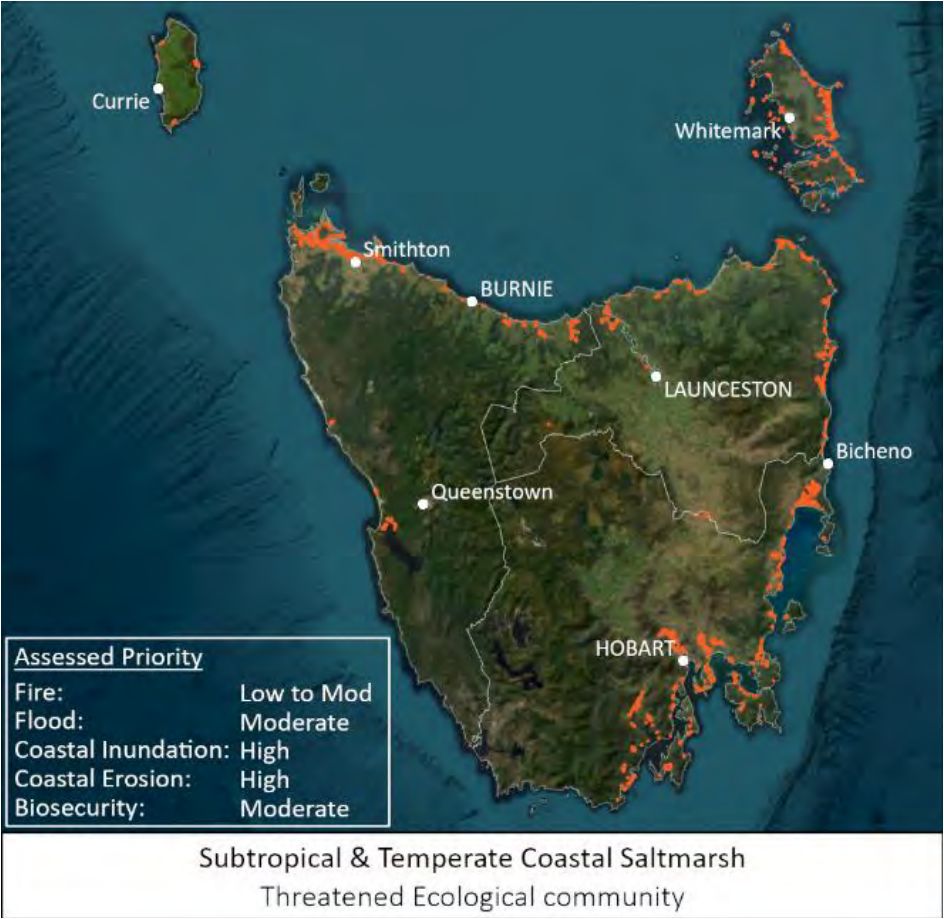
APPENDIX B FIGURE 13



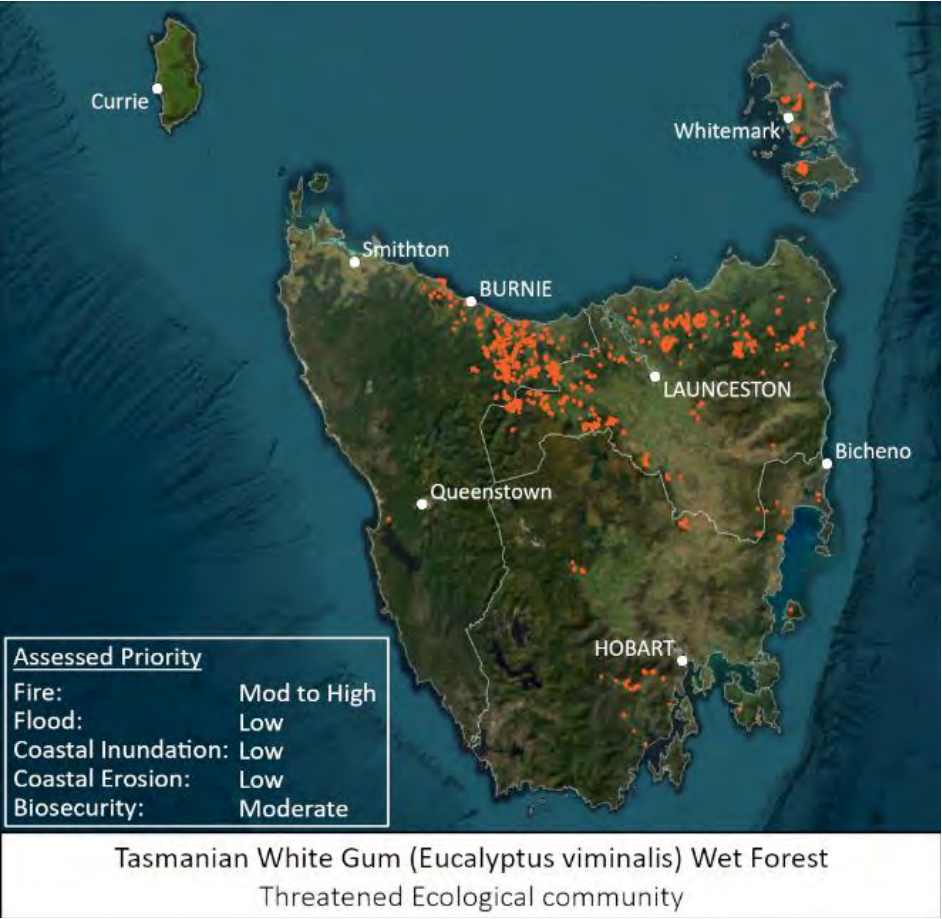
APPENDIX B FIGURE 14



APPENDIX B FIGURE 15



APPENDIX B FIGURE 16



APPENDIX B FIGURE 17

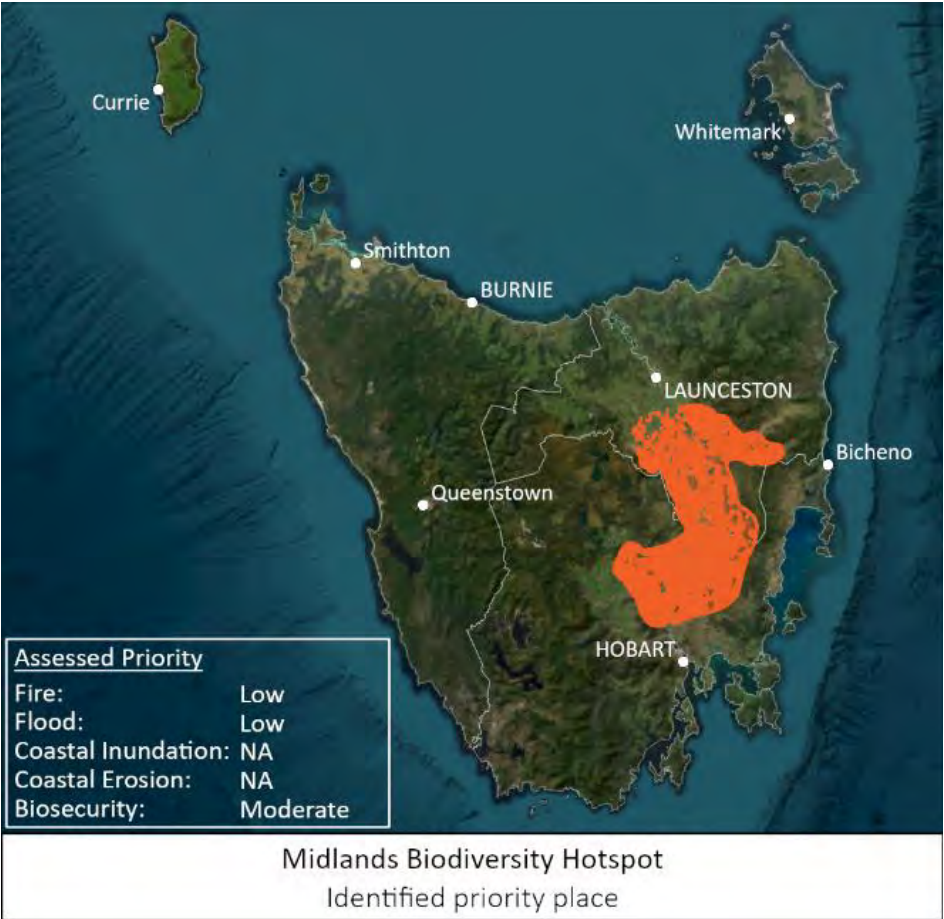


APPENDIX B FIGURE 18

National priority sites



APPENDIX B FIGURE 19



APPENDIX B FIGURE 20



APPENDIX B FIGURE 21



APPENDIX B FIGURE 22

Ramsar sites



APPENDIX B FIGURE 23



APPENDIX B FIGURE 24

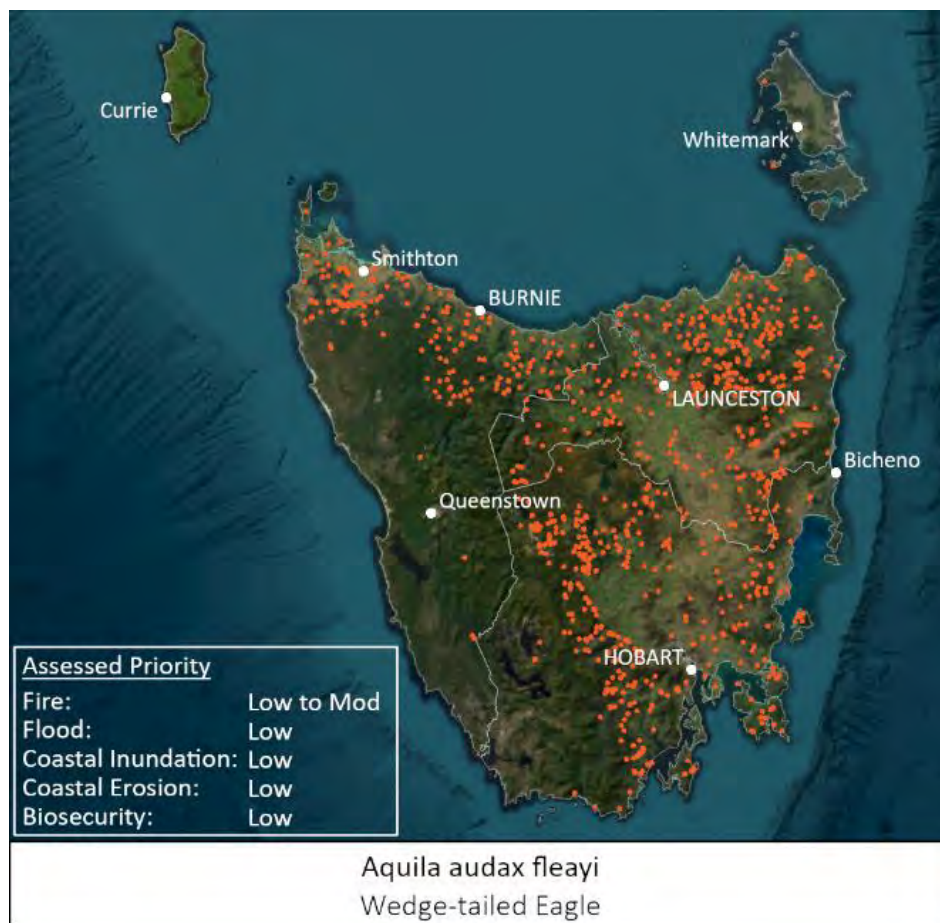


APPENDIX B FIGURE 25

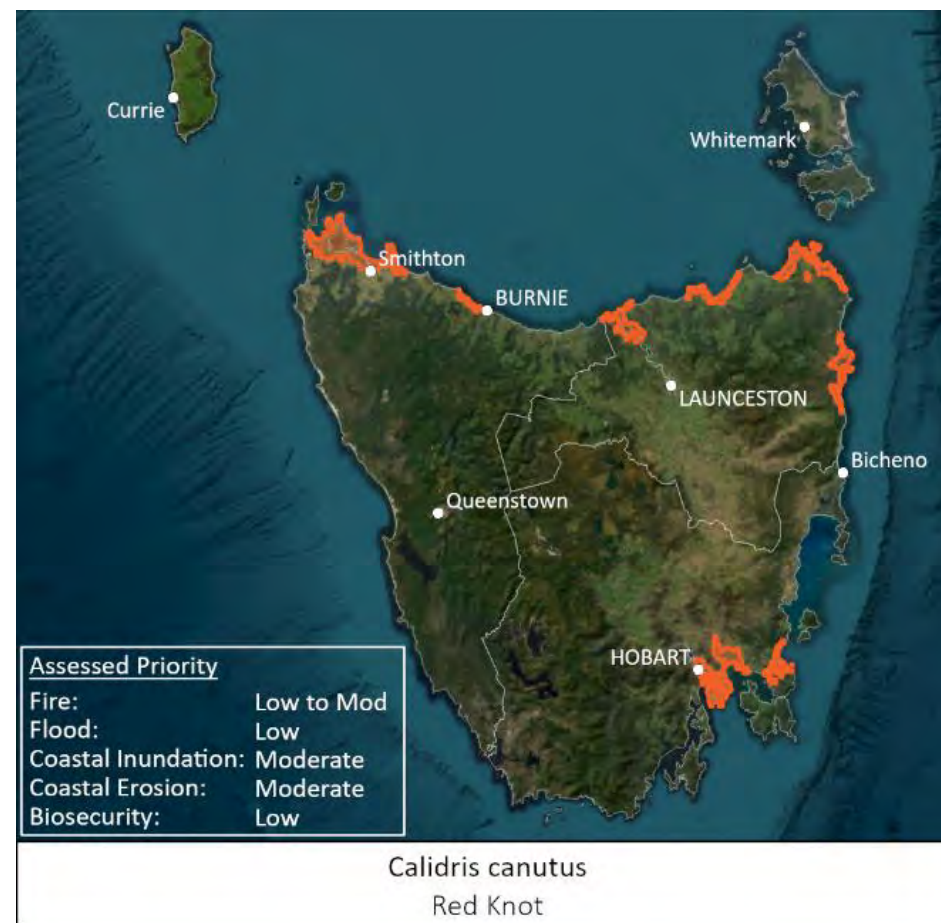


APPENDIX B FIGURE 26

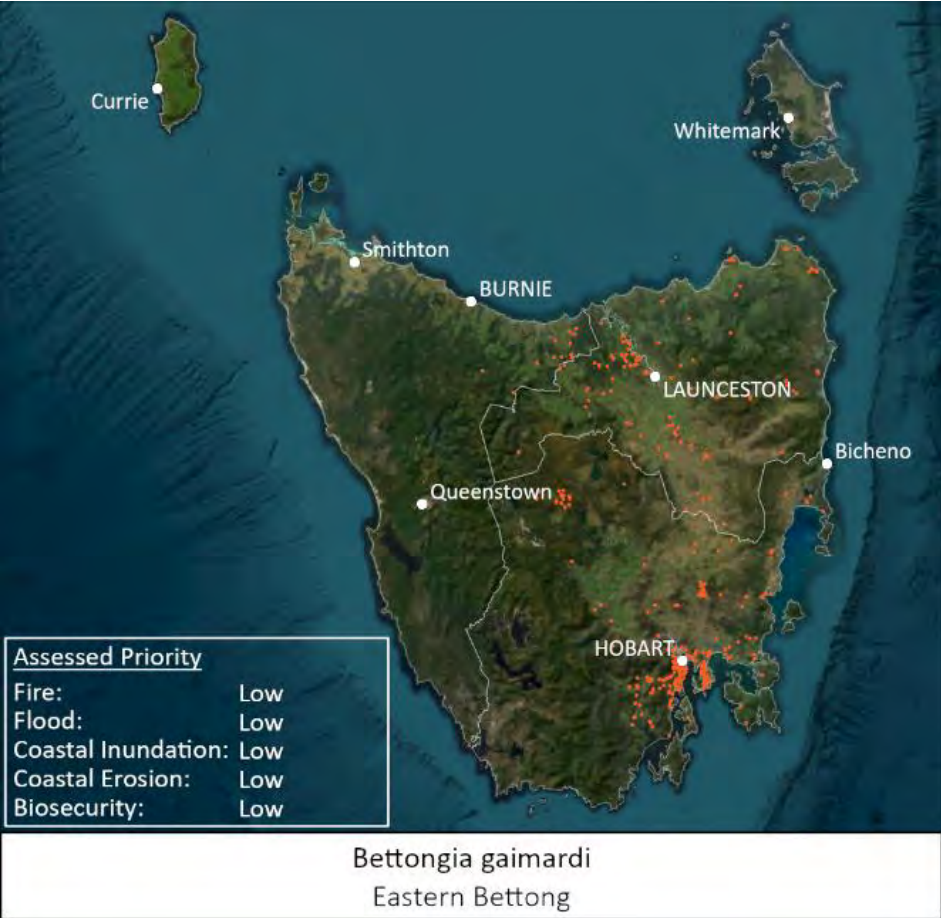
## Regionally threatened and important species



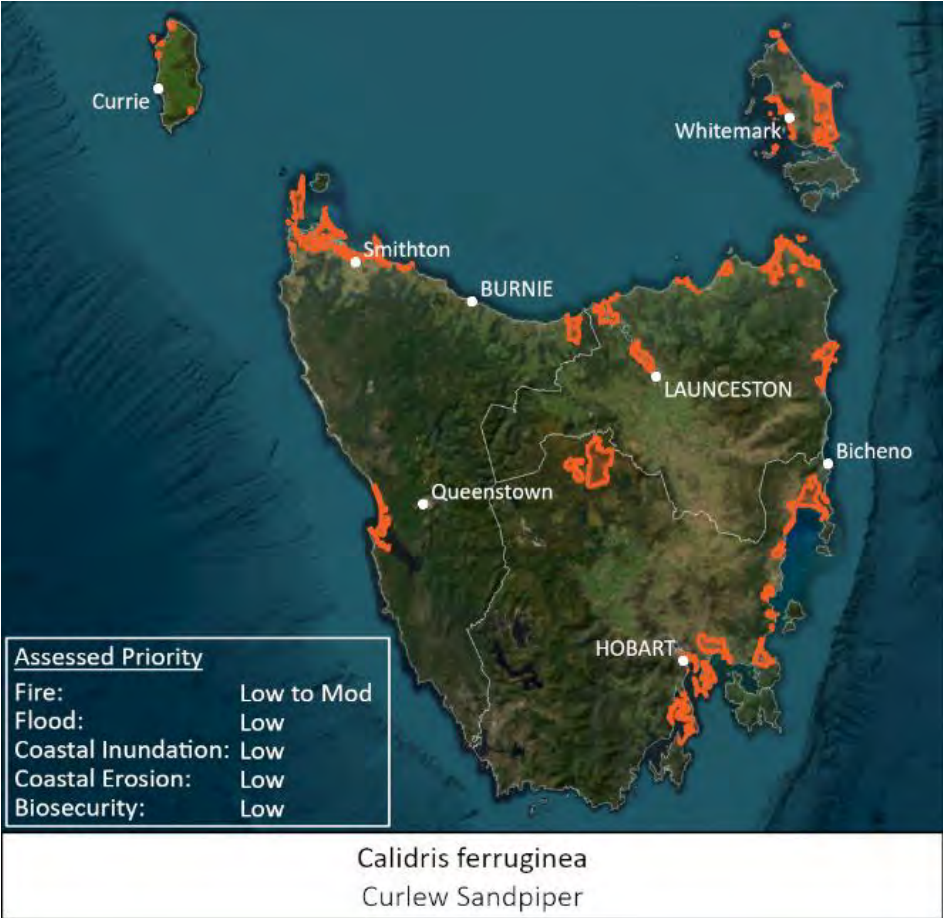
APPENDIX B FIGURE 27



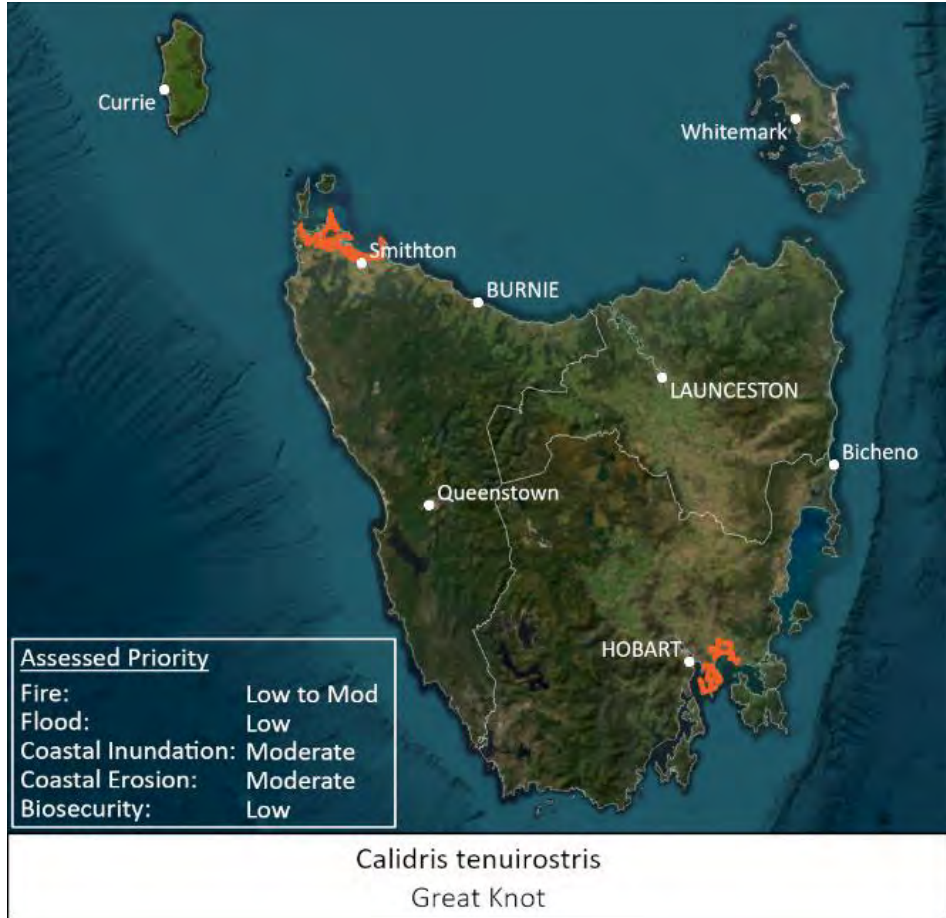
APPENDIX B FIGURE 28



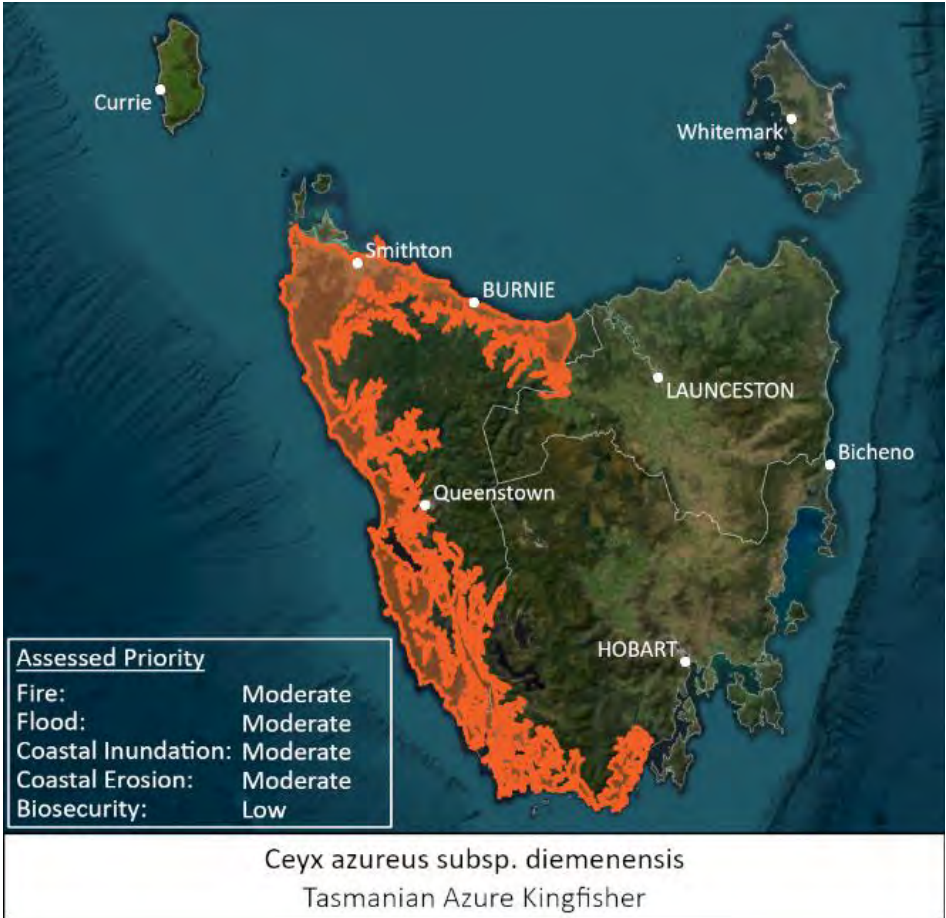
APPENDIX B FIGURE 29



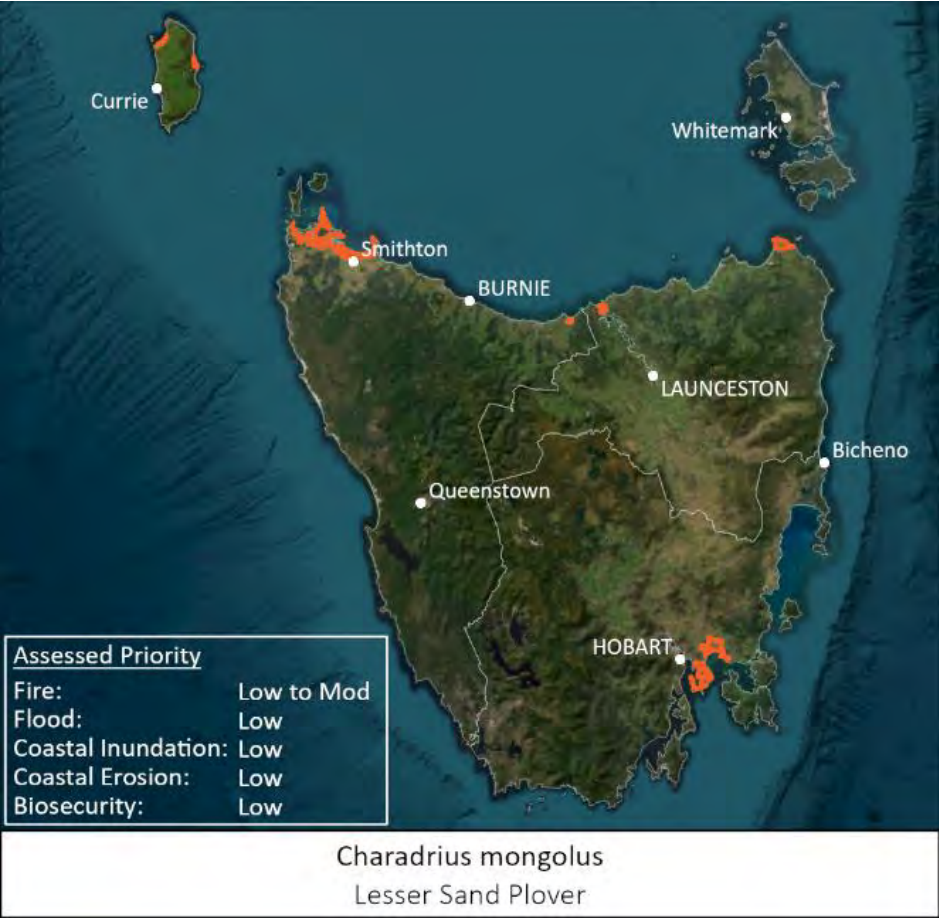
APPENDIX B FIGURE 30



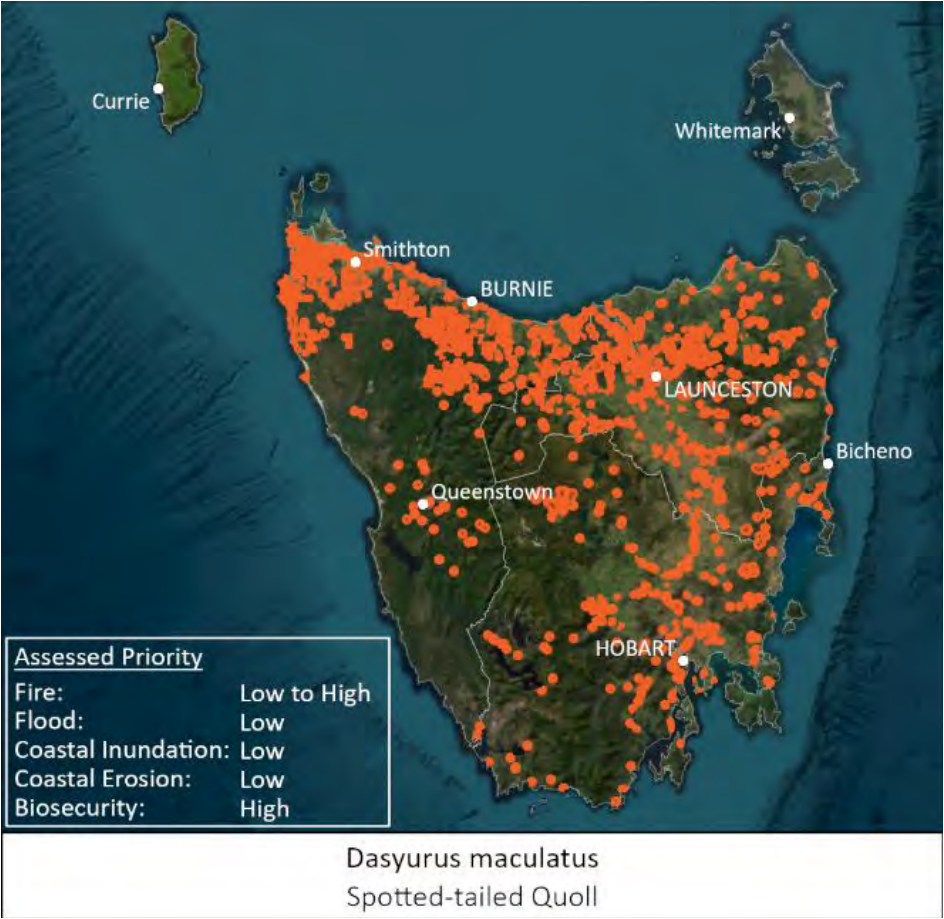
APPENDIX B FIGURE 31



APPENDIX B FIGURE 32



APPENDIX B FIGURE 33



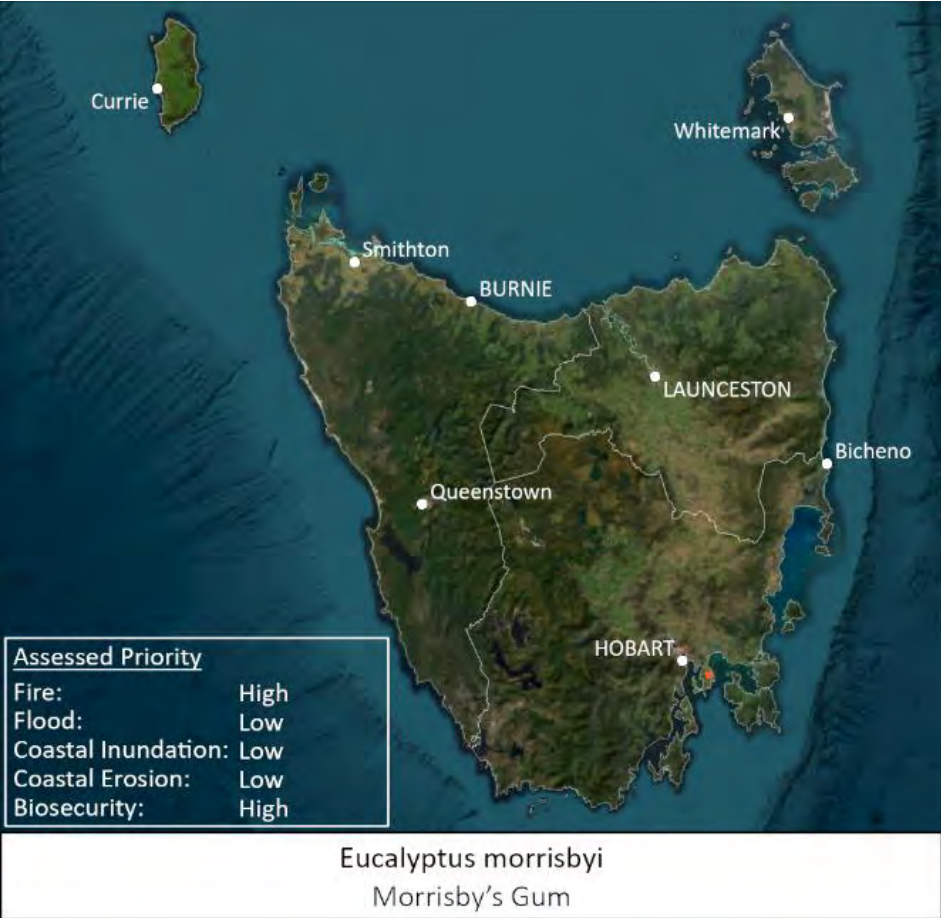
APPENDIX B FIGURE 34



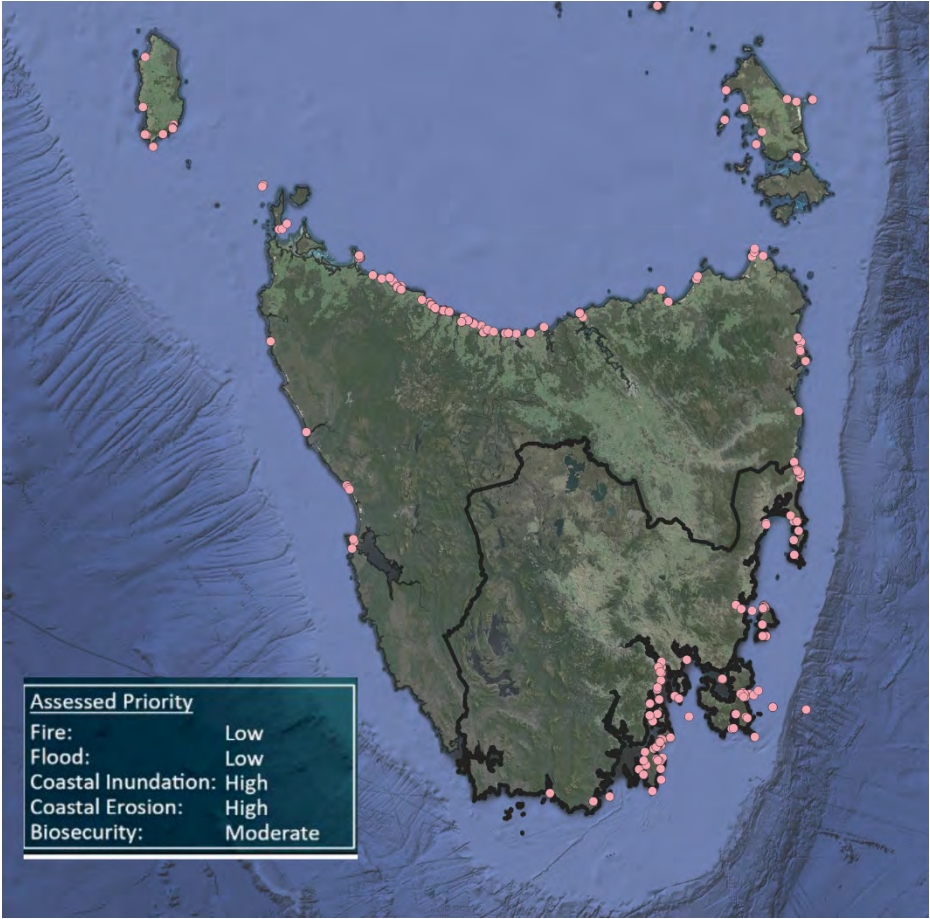
APPENDIX B FIGURE 35



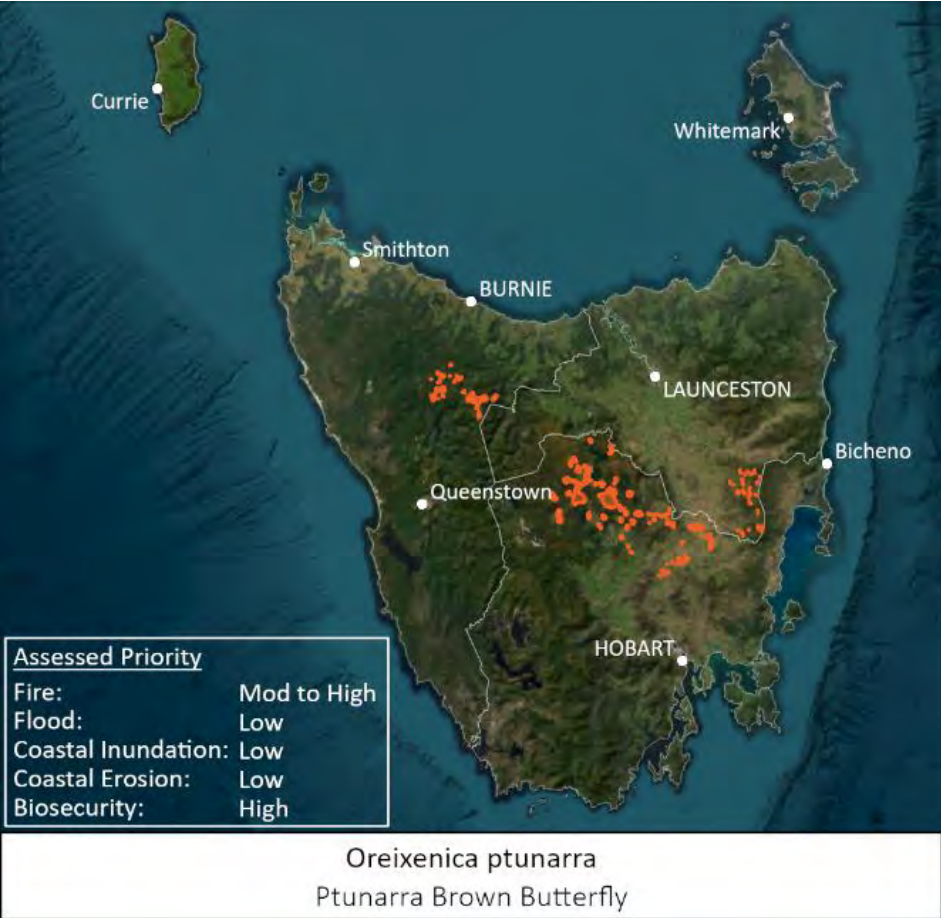
APPENDIX B FIGURE 36



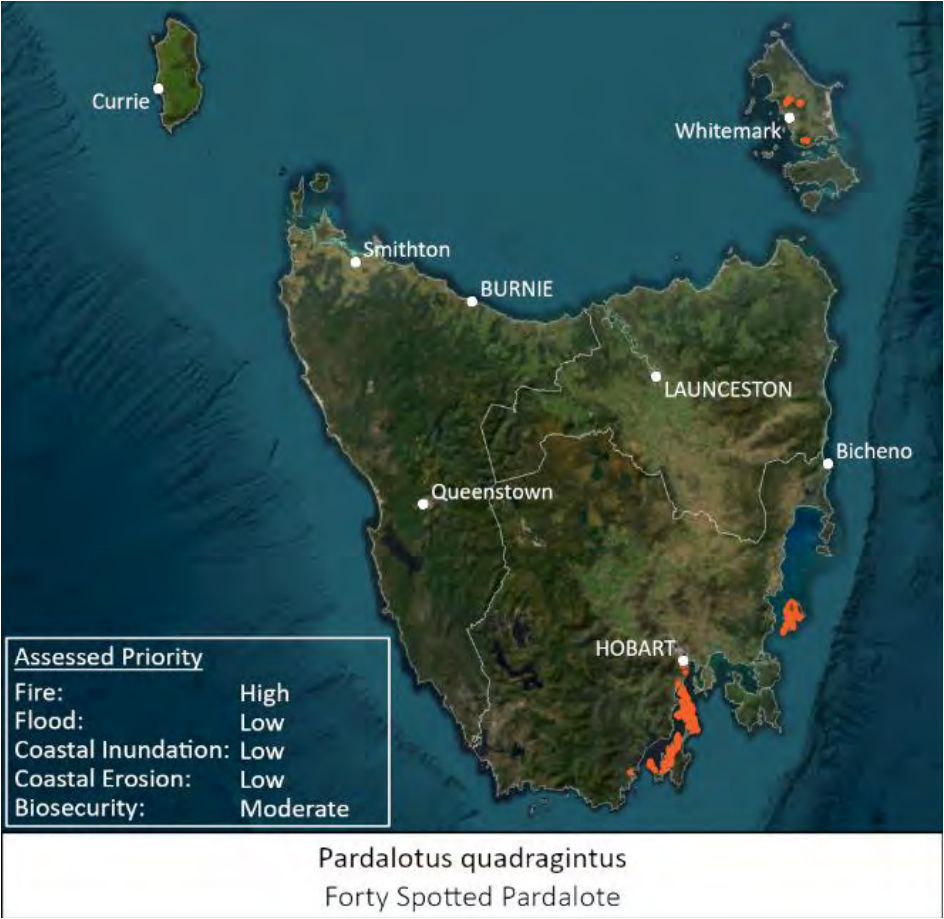
APPENDIX B FIGURE 37



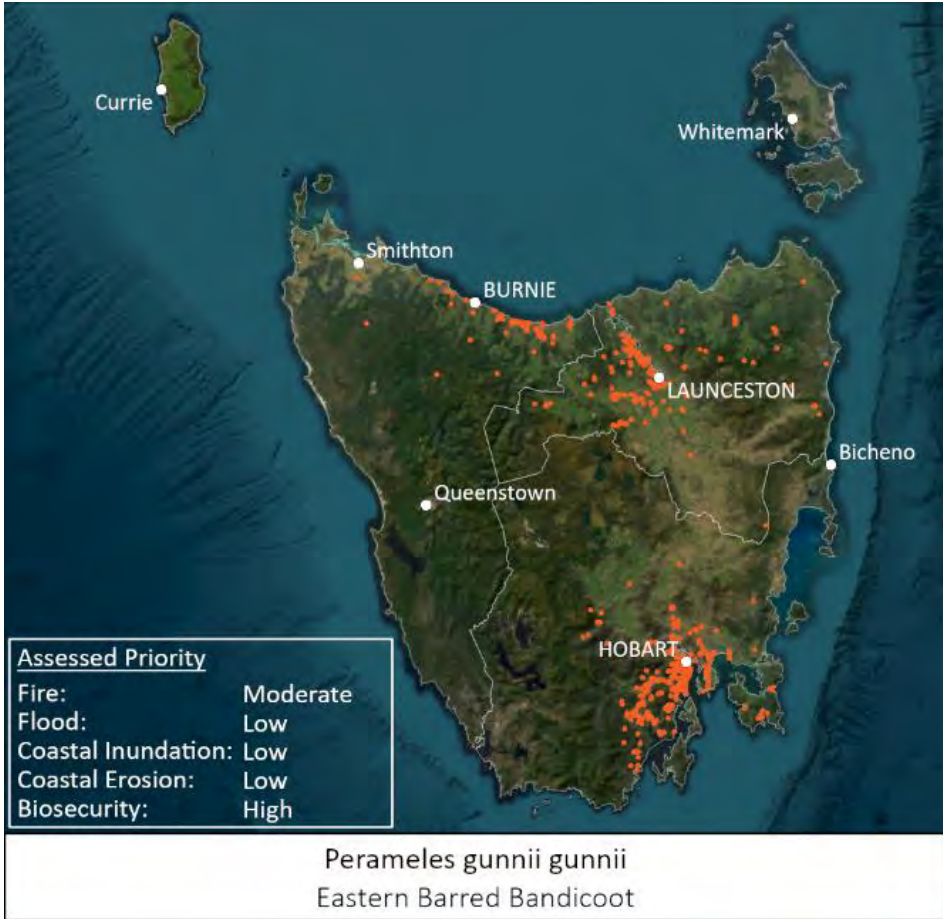
APPENDIX B FIGURE 38 – *Eudyptula minor* – Little penguin



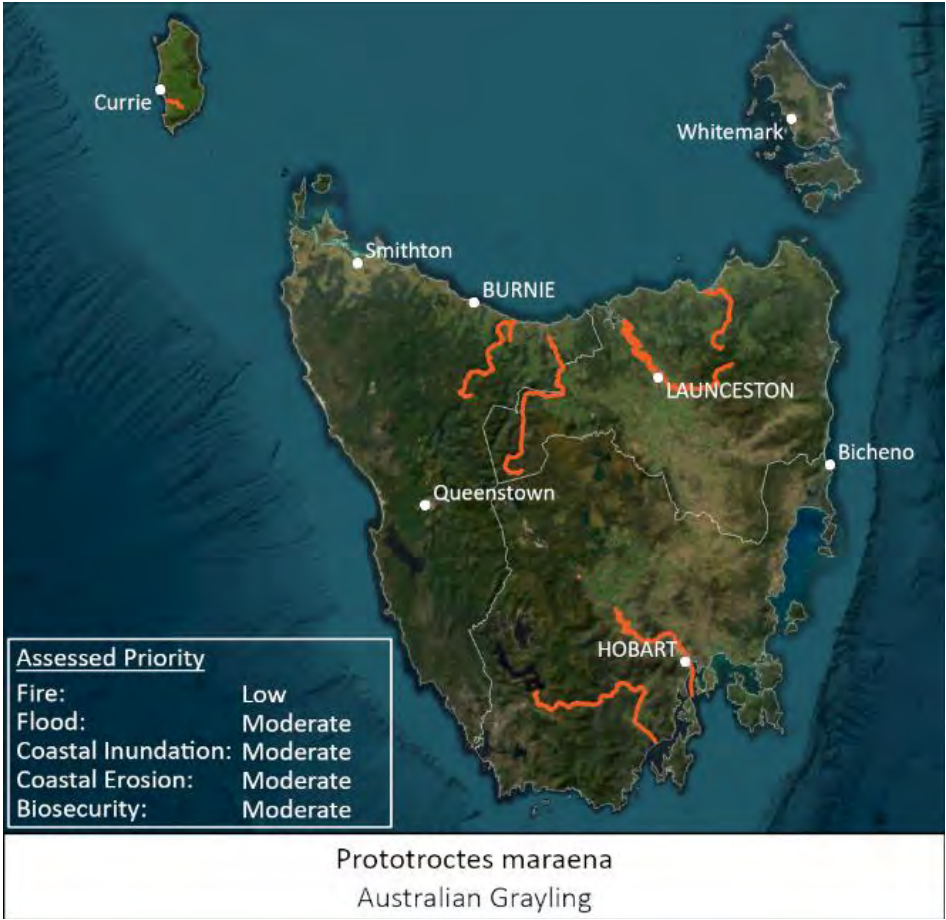
APPENDIX B FIGURE 39



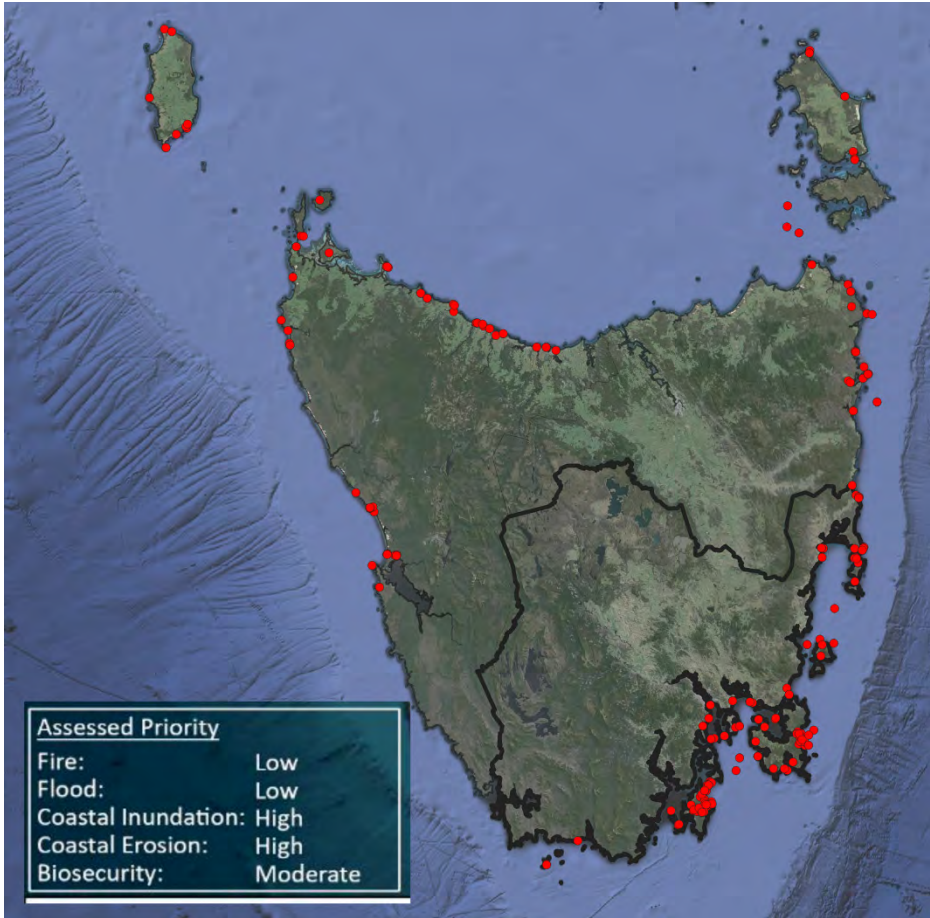
APPENDIX B FIGURE 40



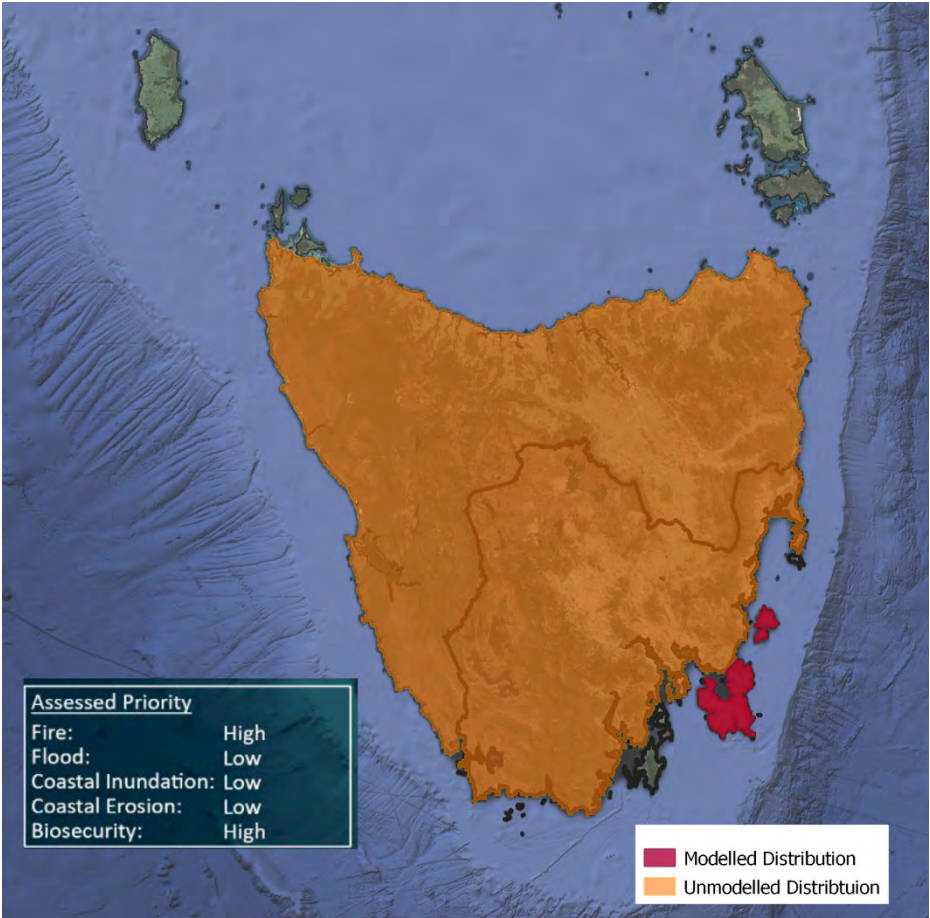
APPENDIX B FIGURE 41



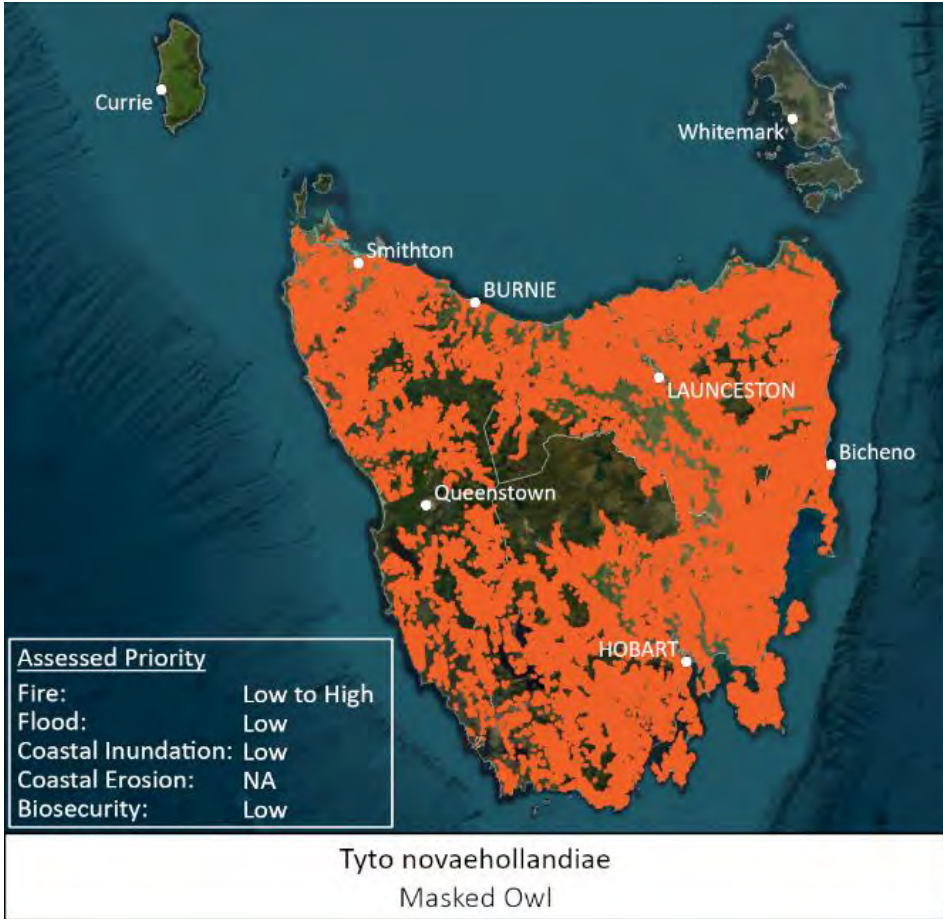
APPENDIX B FIGURE 42



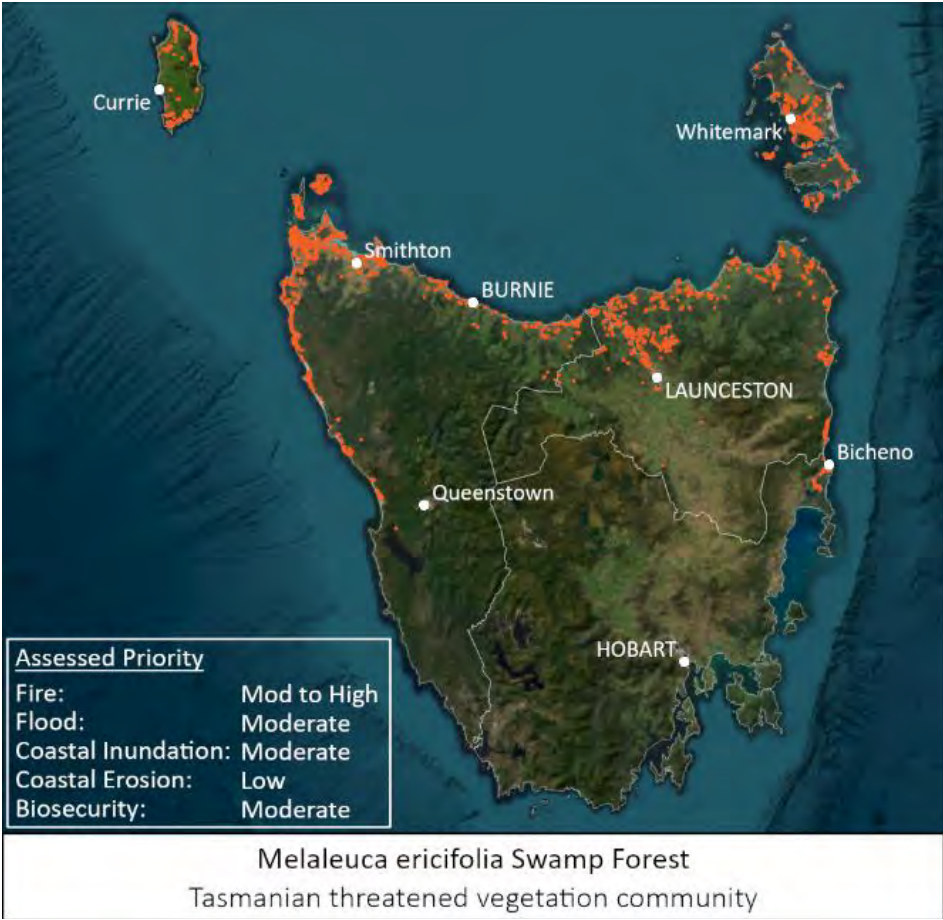
APPENDIX B FIGURE 43 – *Puffinus tenuirostris* – Short-tailed shearwater



APPENDIX B FIGURE 44 – *Sarcophilus harrisii* – Tasmanian devil

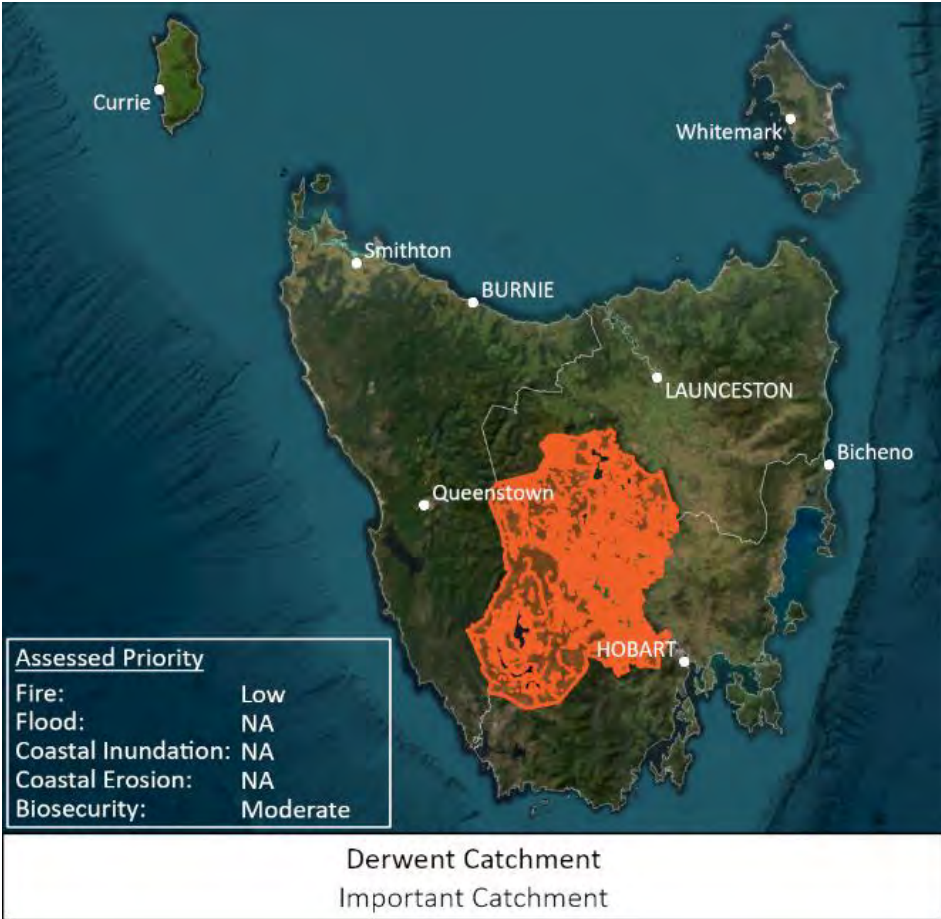


APPENDIX B FIGURE 45

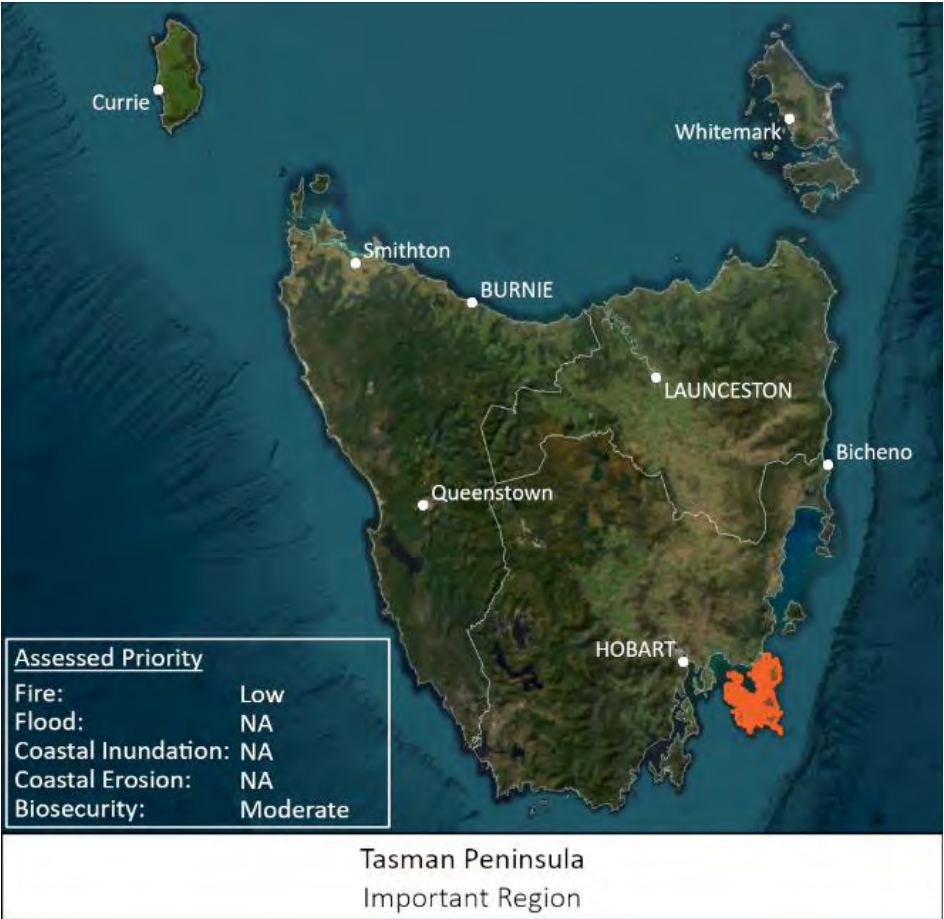


APPENDIX B FIGURE 46

Regionally important places/areas

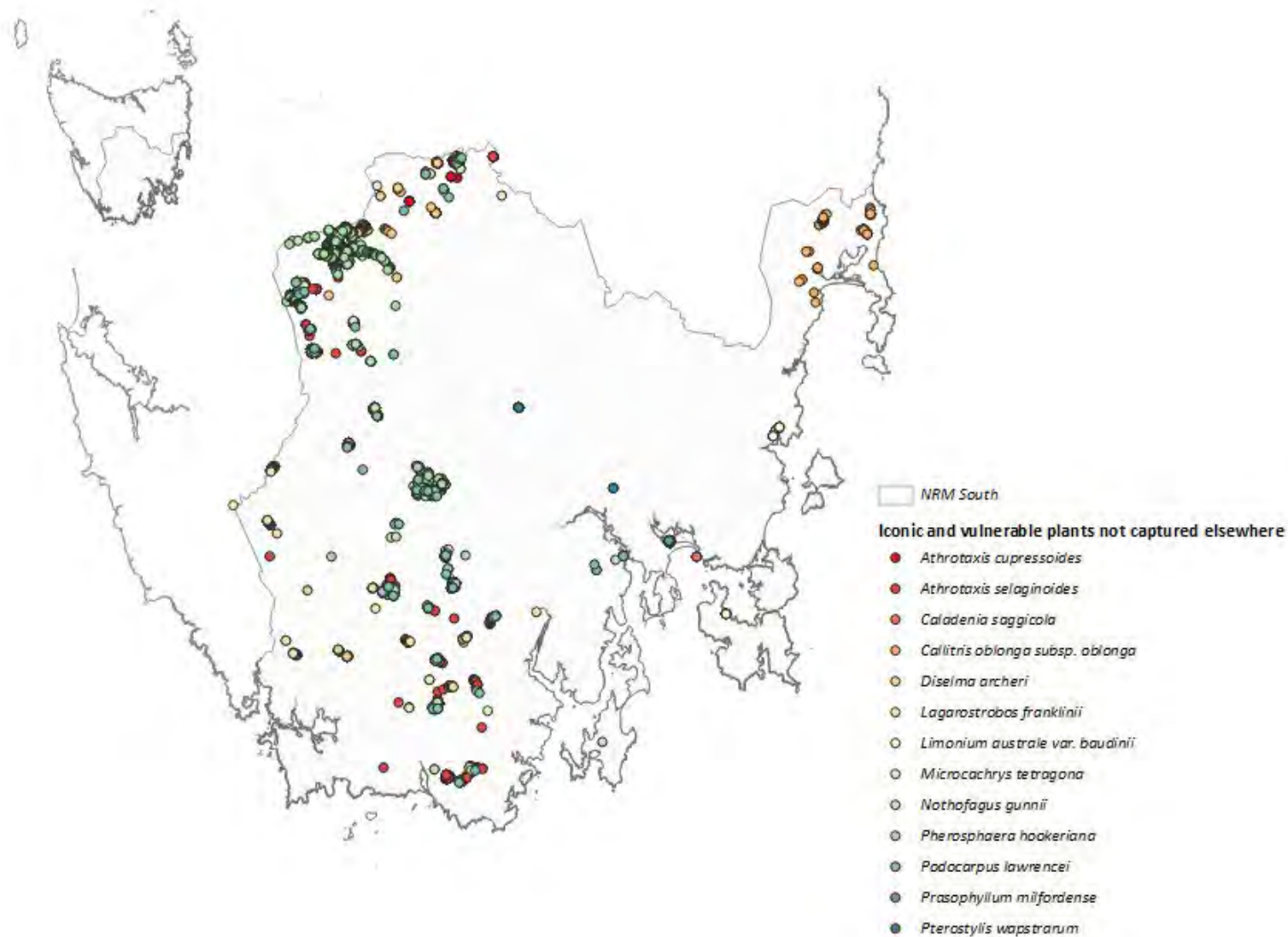


APPENDIX B FIGURE 47



APPENDIX B FIGURE 48

APPENDIX B FIGURE 49: Location of records of additional iconic or vulnerable plant species in the NRM South region



# Appendix C: Biodiversity Priorities

**APPENDIX C TABLE 1: Priority biodiversity assets in the NRM South region and their susceptibility to the emergency events (relevant maps are provided in Appendix B)**

MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY				
Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED ECOLOGICAL COMMUNITIES				
<b>Alpine <i>Sphagnum</i> Bogs and Associated Fens</b> Recovery plan: <a href="http://www.dcceew.gov.au/sites/default/files/documents/alpine-sphagnum-bogs-associated-fens-recovery-plan.pdf">www.dcceew.gov.au/sites/default/files/documents/alpine-sphagnum-bogs-associated-fens-recovery-plan.pdf</a> <u>See Appendix B Figure 13 on p104</u>	Bushfire	The greatest threat from fire is where there are repeated disturbances without adequate time for recovery in vegetation cover and diversity. A high intensity fire is also more likely to reduce vegetation cover and damage underlying peat layers. A reduction in vegetation cover within and adjoining alpine bogs and fens may result in changes in hydrological regimes and increase the risk of invasion by exotic species. Equally, threats that impact on hydrology can exacerbate the impacts from fire.	High	Highly fragmented and isolated remnants. Very high Severity Rating for "fire frequency and intensity" (National Recovery Plan). Statewide – 0% of area outside Fire Risk Model, 39% of area either "Likely" or "Possible" to be impacted (spatial analysis).
	Flood	Flood is not identified as a key threat in National Recovery Plan.	Low	Statewide – Only 1% of area within Flood Risk Zone (spatial analysis). This TEC is not likely to be significantly impacted by floods. Potential for impacts from vehicles or walkers following flood events.
	Biosecurity event	Chytrid fungus is a known pathogen causing the disease Chytridiomycosis in frogs. Although there is no documented suggestion that Chytrid is of significant threat to the ecological community, it unquestionably affects the health of its frog fauna. Chytridiomycosis has not yet been recorded in Tasmania. Other pathogens likely to emerge or become introduced to alpine, sub alpine and montane areas include <i>Phytophthora</i> , myrtle rust and didymo. Although not currently occurring in Australia, Didymo is a highly invasive alga (diatom) of waterways and is an increasingly significant problem in New Zealand (National Recovery Plan).	Moderate	Very high Severity Rating for pathogens / disease in National Recovery Plan for this TEC. Some community elements may be susceptible to spread of existing or new biosecurity threats.
	Coastal inundation	Not identified as a threat	N/A	N/A

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED ECOLOGICAL COMMUNITIES (continued)				
<b><i>Eucalyptus ovata</i> – <i>Callitris oblonga</i> Forest,</b> including South Esk pine <i>Callitris oblonga subsp. oblonga</i>  Recovery plan: <a href="http://www.environment.gov.au/biodiversity/threatened/recovery-plans/recovery-plan-eucalyptus-ovata-callitris-oblonga-forest">www.environment.gov.au/biodiversity/threatened/recovery-plans/recovery-plan-eucalyptus-ovata-callitris-oblonga-forest</a> See Appendix B Figure 18 on p106	Bushfire	High-intensity fire can kill large trees and change the species composition of TEC. Fires at repeated intervals of less than 5–10 years will eventually eliminate <i>Callitris oblonga subsp. oblonga</i> from the community.	High	TEC occurs as very small and isolated areas in highly modified landscape.
	Flood	<i>Eucalyptus ovata</i> – <i>Callitris oblonga</i> Forest occurs predominantly in scattered stands within the flood zone of rivers, and hence the risk of destruction or damage to either the plants or the substrate is great (though also providing opportunities for recruitment).	Moderate	Floodwaters may erode riverbanks and flood-borne debris is capable of wreaking significant damage.
	Biosecurity event	Not identified as a threat in Recovery Plan. However, infection of amphibians with chytrid fungus is an EPBC-listed key threatening process which may be relevant to this TEC. Chytridiomycosis has not yet been recorded in Tasmania.	Moderate	Some community elements may be susceptible to spread of existing or new biosecurity threats.
	Coastal inundation	Not identified as a threat	N/A	N/A
<b><i>Eucalyptus ovata</i> / <i>Eucalyptus brookeriana</i> Forests and Woodlands</b>  Conservation advice: Conservation advice Tas ovata brookeriana forests and woodlands ( <a href="http://environment.gov.au">environment.gov.au</a> ) See Appendix B Figure 14 on p104	Bushfire	High-intensity fire can kill large trees and change the species composition of TEC. Altered fire regimes is listed as a Key Threat in Approved Conservation Advice for Tasmanian Forests and Woodlands dominated by black gum or Brookers Gum. This might be as a result of altered fire frequency or from changes to fire intensity and season, such as occurs during prescribed burning. Note that there are recognised issue with the mapping of this community (identified in NRM south threatened plants project).	High	The community now mainly occurs as scattered remnants in low-lying areas. Statewide – only 1% of area outside Fire Risk Model, and 79% of area either “Likely” or “Possible” to be impacted (spatial analysis).
	Flood	Not identified as a threat in Approved Conservation Advice	Low	Statewide – 15% of area within Flood Risk Zone. This TEC is not likely to be significantly impacted by floods.
	Biosecurity event	Not identified as a threat in Approved Conservation Advice. However, infection of amphibian with chytrid fungus is an EPBC-listed key threatening process which may relevant to this TEC. Chytridiomycosis has not yet been recorded in Tasmania.	Moderate	Some community elements may be susceptible to spread of existing or new biosecurity threats.
	Coastal inundation	Not identified as a threat in Conservation Advice. Small areas of TEC may be impacted by coastal erosion during storm surges.	Low	Statewide – 97% outside Risk Model. Small areas of TEC may be impacted by coastal erosion during storm surges.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED ECOLOGICAL COMMUNITIES (continued)				
<b>Lowland Native Grasslands of Tasmania</b>  Conservation advice: <a href="http://www.environment.gov.au/biodiversity/threatened/communities/pubs/74-conservation-advice.pdf">www.environment.gov.au/biodiversity/threatened/communities/pubs/74-conservation-advice.pdf</a> <i>See Appendix B Figure 15 on p105</i>	Bushfire	Intense bushfire followed by heavy rain may lead to erosion due to loss of ground cover. However, too long intervals between fires may lead to loss of diversity due to dense grass tussocks, whilst grasslands community can be lost due encroachment by native and/or exotic shrubs and trees.	Low	Not likely to be significantly impacted unless bushfire is intense followed by heavy rain.
	Flood	Not identified as a threat in Conservation Advice.	Low	Statewide – 13% of area within Flood Risk Zone (spatial analysis). Floods are not likely to significantly impact lowland native grasslands unless they are too frequent or persistent.
	Biosecurity event	Not identified as a threat in Conservation Advice. However, some grassland species may be susceptible to <i>Phytophthora</i> . Also, infection of amphibians with chytrid fungus is an EPBC-listed key threatening process which may be relevant to this TEC. Chytridiomycosis has not yet been recorded in Tasmania.	Moderate	Some community elements may be susceptible to spread of existing or new biosecurity threats.
	Coastal inundation	Not identified as a threat	N/A	N/A
<b>Subtropical and Temperate Coastal Saltmarsh, including Tasmanian sea-lavender</b> <i>Limonium austarle var. baudanii</i>  Conservation advice: <a href="http://www.environment.gov.au/biodiversity/threatened/communities/pubs/118-conservation-advice.pdf">www.environment.gov.au/biodiversity/threatened/communities/pubs/118-conservation-advice.pdf</a> <i>See Appendix B Figure 16 on p105</i>	Bushfire	Inappropriate fire regimes is identified as a threat in Conservation Advice. Coastal Saltmarsh flora are not well adapted to fire and hence is lethal to many saltmarsh species, particularly succulent chenopods. The recovery of Coastal Saltmarsh after fire is relatively slow and the long-term impacts of burning are uncertain.	Low	Statewide – 15% of area outside Fire Risk Model, 39% of area either “Likely” or “Possible” to be impacted (spatial analysis) <i>Limonium australe var. baudinii</i> has a highly restricted range and total population of less than 1000 mature plants. The localised nature of the <i>Limonium australe var. baudinii</i> sites exposes the taxon to a high risk from stochastic events such as bushfire.
	Flood	Not identified as a threat in Conservation Advice.	Moderate	Statewide – 61% of area within Flood Risk Zone (spatial analysis)
	Biosecurity event	Not identified as a threat in Conservation Advice. However, infection of amphibians with chytrid fungus is an EPBC-listed key threatening process which may be relevant to this TEC. Chytridiomycosis has not yet been recorded in Tasmania.	Moderate	Some community elements may be susceptible to spread of existing or new biosecurity threats.
	Coastal inundation	Increased frequency and intensity of storm events due to climate change are considered severe threats to Coastal Saltmarsh that could result in landward retreat, fragmentation and loss of habitat or function (Conservation Advice).	High	Statewide – 25% of area with High-Risk rating

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED ECOLOGICAL COMMUNITIES (continued)				
<b>Tasmanian White Gum</b> <i>(Eucalyptus viminalis)</i> <b>Wet Forest</b>  Conservation advice: <a href="http://www.environment.gov.au/biodiversity/threatened/communities/pubs/78-conservation-advice.pdf">www.environment.gov.au/biodiversity/threatened/communities/pubs/78-conservation-advice.pdf</a> <i>See Appendix B Figure 17 on p106</i>	Bushfire	germination. More frequent fires may result in simplification of the understory and establishment of weeds. In many cases the ecological community occurs as remnants in agricultural regions, where it is heavily burnt.	High	Statewide – 0% of area outside Fire Risk Model and 86% of area either “Likely” or “Possible” to be impacted (spatial analysis)
	Flood	Not identified as a threat in Conservation Advice.	Low	Statewide – Only 11% of area within Flood Risk Zone (spatial analysis). This TEC is not likely to be significantly impacted by floods.
	Biosecurity event	Not identified as a threat in Conservation Advice. However, infection of amphibian with chytrid fungus is an EPBC-listed key threatening process which may be relevant to this TEC. Chytridiomycosis has not yet been recorded in Tasmania.	Moderate	Some community elements may be susceptible to spread of existing or new biosecurity threats.
	Coastal inundation	Not identified as a threat in Conservation Advice.	Low	Statewide – 99% outside Risk Model. Small areas of TEC may be impacted by coastal erosion during storm surges.
PRIORITY PLACES				
<b>The Midlands region of central Tasmania</b>  <i>See Appendix B Figure 21 on p108</i>	Bushfire	Loss of grassland and decline of remnant woodlands/forests.	Low	Statewide – 4% of area likely and 56% area possible fire risk (spatial analysis), however, area is large and diverse.
	Flood	Not identified as a threat	Low	Statewide – 7% of area within Flood Risk Zone (spatial analysis) – high value TECs not closely associated with this area.
	Biosecurity	Grasslands vulnerable to fungal incursions.	Moderate	Small areas of remnant vegetation types with multiple existing pressures.
	Coastal inundation	Not identified as a threat	N/A	N/A

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
PRIORITY PLACES (continued)				
<b>The Midlands Biodiversity Hotspot</b> <i>See Appendix B Figure 20 on p107</i>	Bushfire	Loss of grassland and decline of remnant woodlands/forests.	Low	Statewide – 14% of area likely and 56% area possible fire risk (spatial analysis) , however, area is large and diverse.
	Flood	Not identified as a threat	Low	Statewide – 2% of area within Flood Risk Zone (spatial analysis)
	Biosecurity	Grasslands vulnerable to fungal incursions.	Moderate	Small areas of remnant vegetation types with multiple existing pressures.
	Coastal inundation	Not identified as a threat	N/A	N/A
<b>Bruny Island</b> <i>See Appendix B Figure 19 on p107</i>	Bushfire	Changing fire regimes, loss of habitat, species-specific impacts, soil exposure, impacts to the forty-spotted population, and the loss of habitat would be a threat to other species endemic to the island.	Low	Statewide – 6% of area likely and 51% area possible fire risk (spatial analysis), however, area is large and diverse.
	Flood	Not identified as a threat	Low	Statewide – 2% of area within Flood Risk Zone (spatial analysis)
	Biosecurity	Direct or indirect threats to several endangered species and ecosystems from a biosecurity incursion.	Moderate	Endemic and restricted biodiversity assets with existing pressures and introduction vectors - visitors, farms (water quality management).
	Coastal inundation	Shoreline recession/movement, increased sediment movement, displacement of shallow marine ecosystems and coastal dune systems. Impacts to species dependent on coastal ecosystems for breeding.	Moderate	Contains some areas with medium risk for coastal inundation (spatial analysis). Additional coastal flooding coupling with existing impacts on dunes and coastal erosion due to visitors.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
PRIORITY PLACES (continued)				
<b>Tasmanian Wilderness World Heritage Area – TWWHA (World Heritage Area)</b>  <u>Tasmanian Wilderness World Heritage Area Management Plan   Department of Natural Resources and Environment Tasmania (nre.tas.gov.au)</u>  <u>Tasmanian Wilderness World Heritage Area – Biosecurity Strategy 2021-2031 (nre.tas.gov.au)</u>  <u>See Appendix B Figure 22 on p108</u>	Bushfire	Historic values in the TWWHA. High intensity fires create uniform fire age histories, reduction in mosaics and changes to vegetation composition undesirable for ecosystem and species health.	Moderate to High	Statewide – 1% area almost certain, 12% of area likely and 42% area possible fire risk (spatial analysis) with high number of susceptible communities.
	Flood	Not identified as a threat.	N/A	Statewide – 1% of area within Flood Risk Zone (spatial analysis) Presumed natural resilience to flooding events.
	Biosecurity	<p>Invasive organisms have the potential to cause extinctions and change entire ecosystems. Pest animals can also spread disease and cause substantial impacts to flora and geodiversity values by digging / burrowing and grazing.</p> <p>The TWWHA Biosecurity Plan considers all biosecurity that might threaten ecological communities. It notes there are high risk weeds not yet present but expected to arrive.</p> <p><i>Phytophthora</i> is recognised as is chytrid is another high risk pathogen. Myrtle rust has not yet been assessed in the TWWHA plan, but is a likely risk.</p> <p>Animal pests (including aquatic pests), trout, lyrebird and European wasp.</p>	Low	High visitation key vector for introduction of pathogens, including <i>Phytophthora</i> , and other species if introduced to the region.
	Coastal inundation	Not identified as a threat	NA	NA

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
RAMSAR SITES				
<b>Apsley Marshes</b> <i>See Appendix B Figure 23 on p109</i>	Bushfire	Loss/disturbance of <i>Eucalyptus ovata</i> forest and woodland and <i>Melaleuca ericifolia</i> swamp forest. Reduced water quality, sedimentation from run-off.	Moderate to High	Statewide – 4% likely and 56% area in possible risk rating for fire (spatial analysis).
	Flood	Reduced water quality, sedimentation.	Moderate	Statewide – 91% area within flood risk zone (spatial analysis) however area more likely to be affected by less freshwater due to declining flows and saltwater permanence with oceanic flooding.
	Biosecurity	Potential for altered composition of vegetation communities, pressure on waterbird breeding and reduced health of amphibians.	Moderate	Multiple existing pressures, including invasive species and pathogens. many vectors for introductions including stock in waterways, eutrophication from surrounding agricultural practices and broad range of visitation/ recreational use.
	Coastal inundation	Salination of areas typically permanently freshwater or otherwise inundated annually with freshwater from river flows. Storm surge flooding of vegetation (paperbark and saltmarsh). Alteration of freshwater/ saltwater ecotone enabling life cycles of many species including threatened species. Erosion of saltmarsh vegetation and wetland habitat.	Moderate	Statewide – 84% of area in med-high risk rating for coastal inundation (spatial analysis).
<b>Interlaken Reserve</b> <i>See Appendix B Figure 24 on p109</i>	Bushfire	Areas becoming increasingly dry due to lack of inundation more vulnerable to being burnt. Not a system that is thought to carry fire.	Moderate to High	Statewide – 27% Area Possible Fire risk (spatial analysis).
	Flood	Inundation of critical habitat.	Moderate	Statewide – 72% area within flood risk zone (spatial analysis), however lake is more impacted by lack of inundation in recent years. Water levels managed by infrastructure.
	Biosecurity	Number of isolated, endemic and rare water species that could be impacted, including deer, invasive predatory fish, or other aquatic pathogens.	Low	Existing pressures, commercial/recreational fishing vectors for introductions.
	Coastal inundation	Not identified as a threat due to its location	N/A	Inland system not subject to any coastal inundation risk.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
RAMSAR SITES (continued)				
<b>Pitt Water – Orielton Lagoon</b> <i>See Appendix B Figure 26 on p110</i>	Bushfire	Although not a system that is thought to carry fire, areas becoming increasingly dry due to lack of inundation more vulnerable to being burnt.	Moderate to High	Risks expected to increase.
	Flood	Sedimentation of topsoil from catchment into Lagoon – supporting eutrophication. Stormwater runoff and associated pollutants. Groundwater seepage contributing to changes in nutrient balance and water quality.	Moderate	Altered/developed catchment area.
	Biosecurity	Supports significant populations of International migratory birds. <i>Phytophthora cinnamomi</i> may be detrimental to some vegetation in the reserve, while chytrid fungus has the potential to affect amphibian populations that may be present in the reserve, such as the threatened green and gold frog. The following national threat abatement plans should be considered where relevant: 'Threat abatement plan for competition and land degradation by rabbits – 2008'; 'Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis – 2006'; and 'Threat abatement plan for dieback caused by the root-rot fungus <i>Phytophthora cinnamomi</i> – 2001'.	Moderate	Altered/developed catchment area, multiple existing pressures, including invasive species and pathogens. Many vectors for introductions including feed in waterways.
	Coastal inundation	Erosion of intertidal feeding areas through storm surge activity; changes to coastal vegetation, habitat loss for species with limited distribution; and changes to food availability for resident and migratory shorebirds.	Moderate	Statewide – 4% are in med-high risk of coastal inundation (spatial analysis).
<b>Moulting Lagoon</b> <i>See Appendix B Figure 25 on p110</i>	Bushfire	Loss/disturbance of <i>Eucalyptus ovata</i> forest and woodland and <i>Melaleuca ericifolia</i> swamp forest. Reduced water quality, sedimentation from run-off.	Moderate to High	Small proportion of area in fire risk model, however, include susceptible communities.
	Flood	Sedimentation of topsoil from catchment into Lagoon – supporting eutrophication.	Moderate	97% inside flood risk area. Catchment areas of the Swan and Apsley rivers total just over 900 sq km and both rivers are subject to intense flooding.
	Biosecurity	Potential for altered composition of vegetation communities, pressure on waterbird breeding and reduced health of amphibians.	Moderate	Closer to populated areas and has range of visitation and use. Hosts large waterbird migrations – possible fluctuation and increase in waterbird numbers and bird deaths higher risk factor for disease incursions.
	Coastal inundation	Erosion of intertidal feeding areas through storm surge activity; changes to coastal vegetation, habitat loss for species with limited distribution; and changes to food availability for resident and migratory shorebirds.	Moderate	8% high to medium risk of inundation

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA				
<b>Eastern quoll</b> <i>Dasyurus viverrinus</i>  Conservation advice: <a href="http://environment.gov.au">Dasyurus viverrinus eastern quoll (environment.gov.au)</a> <u>See Appendix B Figure 3 on p99</u>	Bushfire	Not specifically identified as a threat in Conservation Advice. However, loss of habitat including from severe bushfire would seem to be a threat.	Low	Statewide – *6% outside of fire risk area. 27% likely and 48% possible.
	Flood	Not identified as threat in Conservation Advice	Low	Statewide – 7% inside flood risk area
	Biosecurity	Foxes have been implicated in the extinction of eastern quolls on the mainland, although disease may have been the main contributor. A previous episode of rapid, widespread quoll mortality c.1890–1910 has been anecdotally associated with disease; although the causative pathogen is unknown. Cats are recognised as impacting on juvenile quolls on Bruny Island (Conservation Advice). Anecdotal observations indicated that quolls were suffering parasite loads, potentially transmitted by cats (NRE).	High	There has been no evidence of foxes in Tasmania since July 2011 suggesting they are currently functionally absent from Tasmania. However, consequences are potentially severe if they were to establish in Tasmania and cats also present a threat. Disease is potentially a severe threat to the future viability of quoll populations on Bruny Island, should a novel pathogen be introduced due to the island's small size, and the high density and low genetic diversity of the quoll population.
	Coastal inundation	Not identified as a threat in Conservation Advice.	N/A	N/A
<b>Spotted-tailed quoll</b> <i>Dasyurus maculatus subsp maculatus</i>  Recovery plan: <a href="http://www.environment.gov.au/biodiversity/threatened/recovery-plans/spotted-tailed-quoll">www.environment.gov.au/biodiversity/threatened/recovery-plans/spotted-tailed-quoll</a> <u>See Appendix B Figure 34 on p114</u>	Bushfire	There is scant information available on the effects of bushfire and prescribed burning on spotted-tailed quolls. Quolls were present in areas that were burnt by two high intensity bushfires in state forest in north-eastern NSW, although no quoll was observed to have its entire home range burnt. Long-term post-fire mortality is likely to be influenced by the availability of prey and refugia to provide protection.	Low to High	Aspects of the biology and ecology of spotted-tailed quolls render them especially susceptible to threatening processes. The estimated total number of mature individuals in Tasmania is considered to be limited, and at risk since a high proportion of core habitat occurs on private land.
	Flood	Not identified as threat in Recovery Plan	Low	Statewide – 4% within the flood risk area (whole of Tasmania).
	Biosecurity	Not identified as threat in Recovery Plan. However, potential biosecurity threats for eastern quolls include foxes and disease.	High	Competitive and/or predatory interactions are occurring between spotted-tailed quolls, feral cats, foxes, and wild and domestic dogs may suppress quoll populations. The impacts of introduced predators are likely to be magnified if they occur in conjunction with other threatening processes (Recovery Plan).
	Coastal inundation	Not identified as threat in Recovery Plan	Low	Statewide – 98% outside risk area.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Eastern barred bandicoot</b> <i>Perameles gunnii</i> <u>National Recovery Plan for the Mainland Eastern Barred Bandicoot <i>Perameles gunnii</i> (Victorian subspecies) (dcceew.gov.au)</u> <u>See Appendix B Figure 41 on p118</u>	Bushfire	Habitat/refugia loss and enhanced predation – with associated enhanced risk of infection of <i>Toxoplasma gondii</i> . Needs understory plants to provide shelter, nest sites and food.	Moderate	Statewide – 2% outside fire risk area. 18% likely and 46% possible (spatial analysis), however species has widespread distribution and does not have specific habitat requirements so is unlikely to be significantly affected overall by a severe bushfire event.
	Flood	Not restricted to areas prone to flooding.	Low	Statewide – 9% within flood risk zone. Not restricted to areas prone to flooding.
	Biosecurity	A significant increase in cats or foxes could further expose <i>Toxoplasma gondii</i> .	High	A <i>Toxoplasma gondii</i> is a highly contagious parasite which can cause death in bandicoots.
	Coastal inundation	Not restricted to areas vulnerable to coastal inundation.	Low	Statewide – 98% outside risk model. Not restricted to areas vulnerable to coastal inundation.
<b>Tasmanian devil</b> <i>Sarcophilus harrisii</i> <u>Draft recovery plan: Draft Tasmanian Devil Recovery Plan</u> <u>See Appendix B Figure 44 – <i>Sarcophilus harrisii</i> – Tasmanian devil on p119</u>	Bushfire	Endemic to Tasmania and is found throughout the island. It is not found on Tasmania's offshore islands. It is known from a wide range of habitats, population densities are highest in the dry and mixed sclerophyll forests and coastal heath. The distribution of this species overlaps with the <i>Eucalyptus ovata</i> – <i>Callitris oblonga</i> Forest' and 'Alpine Sphagnum Bogs and Associated Fens' EPBC Act-listed threatened ecological communities (both listed in this report). Bushfire will remove hunting and nesting habitat. Population severely impacted by DFTD.	High	It was not possible to assess the entire range boundary as it covers the entire island. Instead the susceptibility of key populations not affected by DFTD. Off these, Statewide – 2% likely and 24% possible. 0% outside fire risk model. Fire will impact above ground resting sites/ reduce shelter to hide during the day.
	Flood	Impact on underground dens and reduce shelter above ground. Loss of cover for hunting and resting.	Low	Within modelled population areas – 2% within flood risk zone.
	Biosecurity	DFTD is having a significant impact on the Tasmanian Devil with a reported decline in the species of 64% from the mid 1990's to early 2008. It is predicted that the species will have declined by a further 70% or more in the next 10 years with extensive local extinctions also occurring. The tumours make it hard for the animal to eat (which makes the devil weak); they erode bone and soft tissue, and can spread to the liver, kidney and other organs. The disease kills older animals first, then progressively younger devils, and only affects juveniles once the majority of adults have died. Occurrence of DFTD in disease free populations is an emergency biosecurity event. Foxes are a potential threat to Tasmanian Devils if fox numbers increase substantially, as foxes will compete with Tasmanian Devils for food resources, habitat and den sites. Due to their low numbers within Tasmania, foxes are unlikely to be currently affecting devils.	High	There is currently no effective treatment, vaccine or cure for DFTD. DFTD has now been identified across more than 60% of the species' extent of occurrence. spread by 'allograft' – where clonal cancer cells are transferred when an infectious devil bites and injures a healthy devil.
	Coastal inundation	May affect cover for hunting and resting.	Low	Statewide – assessed population areas – 97% outside risk model.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Eastern bettong</b> <i>Bettongia gaimardi</i> (plus cuniculus on listing advice)  Listing advice: <a href="http://www.environment.gov.au/biodiversity/threatened/species/pubs/87603-listing-advice-15022019.pdf">www.environment.gov.au/biodiversity/threatened/species/pubs/87603-listing-advice-15022019.pdf</a> <u>See Appendix B Figure 29 on p112</u>	Bushfire	Not demonstrated, but plausible. require dense understory for protection from feral cats; the loss of protective understory due to fire has negatively impacted the woylie in WA.	Low	Statewide – 15% possible and 48% likely to be impacted by fire. The bettong remains moderately common in suitable habitat.
	Flood	May temporarily affect food source.	Low	Statewide – 3% of population within flood risk zone.
	Biosecurity	Predation by feral cats and foxes.	Low	<i>Toxoplasma gondii</i> , a disease transmitted by feral cats, is highly prevalent across Tasmania (Fancourt and Jackson 2014). However, impacts on eastern bettongs (Tasmania) are uncertain.
	Coastal inundation	Not assessed as a threat	Low	Statewide – 99% outside of risk model
<b>New Holland mouse</b> <i>Pseudomys novaehollandiae</i>  National Recovery Plan for the Pookila (New Holland mouse) ( <a href="http://dcceew.gov.au">dcceew.gov.au</a> ) <u>Not mapped as no records in NRM South region in last ten years</u>	Bushfire	Inappropriate fire management is also a threat to the species. Habitat destruction. Fire may allow easier hunting opportunities by introduced predators.	High	Statewide – 0% outside fire risk area. 74% likely. has a fragmented distribution across Tasmania.
	Flood	Not an identified threat in Conservation Advice.	Moderate	Known Tasmanian range not within flood risk zone.
	Biosecurity	Predation by introduced predators.	High	Fox and cat predation may have severe consequences for species if they were to establish in the species' Tasmania range.
	Coastal inundation	Not an identified threat in Conservation Advice.	High	Recovery plan recognises that the species typically occurs along the coastline.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened Tasmanian Galaxiidae</b>  <i>Galaxias fontanus</i> (Swan Galaxid – Assessed)  <u>See Appendix B Figure 4 on p99</u> ( <i>Galaxias johnstoni</i> , <i>pedderensis</i> , <i>parvus</i> , <i>tanycephalus</i> , <i>auratus</i> ; <i>Paragalaxias eleotroides</i> , <i>dissimilis</i> , <i>mesotes</i> , <i>Julianus</i> – not assessed). Recovery plans: <u>Recovery Plan for the Pedder, Swan, Clarence, Swamp and Saddled Galaxias – DCCEEW</u>	Bushfire	Not assessed as a threat	N/A	N/A
	Flood	Higher and more frequent flood flows due to vegetation clearing are a concern. Climate change may also be a threat if conditions become drier, as the small headwater streams are at risk of drying out. Risk that predatory invasive fish are washed into areas that galaxiids exist.	High	Statewide 20% Swan galaxias within flood risk zone. Most natural populations are in small headwater streams.
	Biosecurity	Accidental and deliberate introduction of brown trout ( <i>Salmo trutta</i> ), redfin perch ( <i>Perca fluviatilis</i> ) and also from the native <i>Galaxias maculatus</i> (jollytail).  Risk is that predatory fish are moved into areas occupied by galaxiids.	Moderate	The species now occurs only in trout-free streams, its distribution prior to the spread of trout is likely to have been more widespread. All habitats occupied by healthy populations are free of other fish species except eels and are protected from trout invasion or establishment by some sort of barrier (waterfall, marsh, variable flow). The major threat to the Swan galaxias is predation and/or competition from introduced fish species.
	Coastal inundation	Not assessed as a threat	N/A	N/A
<b>Australian grayling</b> <i>Prototroctes maraena</i>  Recovery plan: <a href="http://www.dcceew.gov.au/sites/default/files/documents/australian-grayling.pdf">www.dcceew.gov.au/sites/default/files/documents/australian-grayling.pdf</a> <u>See Appendix B Figure 42 on p118</u>	Bushfire	Bushfires affect habitat quality, water quality and have a direct effect on water temperature. bushfires can have direct and indirect effects on the species including changes in water chemistry and changes in the surrounding landscape which can lead to sediment run-off into waterways post-fire events.	Low	Statewide – 41% outside of fire risk area. 10% likely and 26% possible. The biggest indirect impact is post-fire rainfall leading to runoff of sediment, ash, and nutrients or “sediment slugs” into waterways.
	Flood	Poor water quality is a threat to the species, which may increase during flood events.	Moderate	Statewide – 45% within flood risk area.
	Biosecurity	Introduced fish species pose a threat to Australian grayling due to associated diseases. Notable parasites include anchor worm ( <i>Lernaea cyprinacea</i> ) and Trematodes (Family Opecoelidae) (Hall, 1983; Berra, 1987), potentially introduced by European carp, goldfish, or redfin. Fungi also affect grayling. Interactions with other parasites remain unstudied.	Moderate	The parasite does not cause direct mortality to the host, an infestation can cause indirect mortality through poor health and growth as it affects the feeding behaviour of its host.
	Coastal inundation	The species spends its larval stages in marine water and its adult life mainly in freshwater. Coastal inundation of freshwater areas may affect adult species.	Moderate	Statewide – 4% high to medium risk area. Changes in coastal morphology (i.e., the river mouth and its connectivity with the sea) can cause disruptions to migration pathways.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Ptunarra brown butterfly</b> <i>Oreixenica ptunarra</i>  Conservation advice: Approved Conservation Advice for <i>Oreixenica ptunarra</i> (Ptunarra brown butterfly) ( <a href="http://environment.gov.au">environment.gov.au</a> ) <u>See Appendix B Figure 39 on p117</u>	Bushfire	Fire in early autumn may affect food source for adult butterflies. Fire in late autumn may affect eggs in <i>Poa</i> tussocks. Fires over spring/ summer may affect larvae. The habitat ranges from <i>Poa</i> tussock grassland and sedgy grassland to <i>Hakea microcarpa</i> grassy shrubland to grassy open eucalypt woodland. The species occurs within the TWWHA in the Central Plateau Protected Area.	Moderate to High	Statewide – 5% possible, 40% likely. Endemic to the highland <i>Poa</i> grasslands of Tasmania. The caterpillars live and feed within the <i>Poa</i> tussocks until pupation, after which the butterflies emerge and feed on the nectar of flowers in the grasslands. The flight period is March to mid-April. The butterflies are not able to fly long distances through unsuitable habitat, too frequent burning of <i>Poa</i> grassland habitat can cause declines in ptunarra brown butterflies. However, infrequent fires promote the invasion of shrubby species, thus reducing the cover of <i>Poa</i> habitat.
	Flood	Not assessed as a threat.	Low	Only small percent of population within flood risk zone.
	Biosecurity	Predation by introduced European wasps ( <i>Vespula germanica</i> and <i>V. vulgaris</i> ) is a significant threat. Ongoing wasp management is recommended in areas where European wasp numbers are high to protect ptunarra brown butterflies from predation.	High	European wasps have been directly observed killing, dismembering and carrying away adult ptunarra brown butterflies.
	Coastal inundation	Not assessed as a threat	Low	100% is outside of coastal inundation zones.
<b>Green and gold frog</b> <i>Litoria raniformis</i>  <a href="http://www.transport.tas.gov.au/_data/assets/pdf_file/0010/275248/Green_and_Golden_Frog_Litoria_raniformis_Guideline_-_September_2015.pdf">www.transport.tas.gov.au/_data/assets/pdf_file/0010/275248/Green_and_Golden_Frog_Litoria_raniformis_Guideline_-_September_2015.pdf</a> <u>See Appendix B Figure 6 on p100</u>	Bushfire	Impacts to water quality	Low to Moderate	Prime habitat is wetland systems. Statewide – 24% likely and 44% possible, only 3% outside fire risk model.
	Flood	Tadpoles require slow moving water. Flood timing could impact breeding success.	Moderate	Statewide – 31% within flood risk zone but single flooding event not likely to significantly impact species.
	Biosecurity	Biosecurity threats include pathogenic fungi and introduced predatory aquatic species. Chytrid fungus has potential to be a serious threat.	High	Low mortality to amphibian chytrid fungus in infection experiments but presumed decline of species due to this.
	Coastal inundation	Dependent upon permanent freshwater lagoons for breeding.	Moderate	Dependent upon permanent freshwater lagoons for breeding but has been recorded in coastal swamps, marshes, dune swales, lagoons, lakes and other estuary wetlands.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Ammonite snail</b> <i>Ammoniropa vigne</i> (formerly <i>Discocharopa vigne</i> )  Threatened species link: <a href="#">Ammonite Snail – Threatened Species Link</a>  <a href="#">See Appendix B Figure 1 on p98</a>	Bushfire	This species is critically endangered with habitat in dry and wet eucalypt forest on dolerite. Likely to be killed in the event of a fire. The main identified threats are inappropriate fire regimes and habitat loss and fragmentation from urbanisation (Threatened Species Link).	High	Extent of 74 km <sup>2</sup> in the Hobart Metropolitan Area and 0% outside of the fire risk area and a 36% possible risk rating.  <i>Discocharopa vigne</i> is endemic to the NRM South region of Tasmania, recorded at seven locations in the Hobart metropolitan area: Mount Wellington, Mount Nelson, The Domain, Hillgrove, Grasstree Hill, South Hobart and Austins Ferry (Bonham, 2004; DPIWE, 2009). However, the species is likely to be locally extinct at Mount Wellington, Mount Nelson and The Domain, as it has not been recorded at these three sites since 1900 (Bonham, 2004; TSS, 2007). Of the other four populations, the Austins Ferry and Grasstree Hill populations may also be locally extinct (Bonham, pers. comm., 2007), however further surveys are required to confirm this. The population at Grasstree Hill is located within the Mount Direction Conservation Area, and the population at Austins Ferry occurs within Poimena Reserve (DPIWE, 2009).
	Flood	Not assessed as a threat.	Low	None of the known habitat is within the flood risk zone.
	Biosecurity	No mention of biosecurity threats in conservation advice.	Moderate	Small population
	Coastal inundation	Not assessed as a threat	N/A	N/A

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Tasmanian wedge-tailed eagle</b> <i>Aquila audax fleayi</i> (TWTE)  Recovery plan: <a href="http://www.dcceew.gov.au/sites/default/files/documents/tasmanian-wedge-tailed.pdf">www.dcceew.gov.au/sites/default/files/documents/tasmanian-wedge-tailed.pdf</a> See Appendix B Figure 27 on p111	Bushfire	Potential loss or damage of nest trees from bushfire. TWTE nest in patches of intact forest with sheltered aspects, requiring large, established trees (typically of the genus <i>Eucalyptus</i> ) in which to construct their substantial nests. The principal threats to this species include loss of nesting habitat, bushfires and inappropriate fire regimes may also provide an ongoing threat to TWTE due to the potential for the loss and damage of nest trees, and to the surrounding vegetation. Planned burns during the species breeding season may also have an impact on breeding success if the appropriate avoidance and mitigation measures are not implemented.	Low to Moderate	Statewide – 0% is outside the fire risk area. 19% likely and 54% possible. The number of adult eagles in Tasmania has previously been estimated to range between 1,000 and 1,524 individuals, within 426 to 457 territories (Mooney 2005; Threatened Species Section 2006).
	Flood	Could temporarily impact on food sources.	Low	Statewide – 4% of known distribution within the flood risk area.
	Biosecurity	Not assessed as a threat.	Low	Vulnerability of food sources and habitats to biosecurity risks
	Coastal inundation	Could temporarily impact on food sources, but consequence minor.	Low	100% outside of risk areas.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Orange bellied parrot</b> <i>Neophema chrysogaster</i>  Recovery plan: <a href="http://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/orange-bellied-parrot-2016">www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/orange-bellied-parrot-2016</a>  <u>See Appendix B Figure 7: Neophema chrysogaster – Orange-bellied parrot on p101</u>	Bushfire	Catastrophic fires directly impact orange-bellied parrots and their breeding habitat, posing a Very High risk with Moderate evidence of impact (Recovery Plan). Inappropriate fire regimes in breeding areas also pose a Very High risk, with less understood impacts in non-breeding ranges.	High	Breeding orange-bellied parrots in southwest Tasmania (TWWHA) face bushfire risks. Breeding sites in button grass plains from November to March require diverse habitats, including recently burnt moorland and sedgeland plains. Such habitats near Melaleuca Lagoon are crucial for species survival (Recovery Plan).
	Flood	Floods disrupt foraging habitat. Human activities alter hydrological regimes, impacting saltmarshes crucial for orange-bellied parrots. Declining productivity in Coorong Lower Lakes Murray Mouth links to increased salinity from basin stress (Ehmke, unpubl. data), driven by water extraction, and climate change. Hydrological shifts, like increased stormwater drainage, may alter saltmarsh flora.	High	Although Statewide – 0% is within a flood risk zone; drainage or other significant hydrological alterations of wetlands associated with foraging habitat may result in a significant impact on Orange-bellied Parrot foraging habitats (Recovery Plan). Inappropriate hydrological regimes in coastal wetlands and estuaries are known to affect the survival and productivity of key food plant species across the non-breeding range in South Australia and Victoria (Ehmke et al. 2009).
	Biosecurity	Psittacine Beak and Feather Disease is a key threat under the EPBC Act, particularly to small, concentrated populations like orange-bellied parrots. PBFD, affects both wild and captive birds, posing a high risk with moderate evidence of impact (Recovery Plan). Risk of Highly Pathogenic Avian Influenza	High	PBFD is transmitted by wild birds and can't be eradicated. While it caused deaths in captivity, its impact on the wild population is unclear. Limited data show few clinical cases in over 25 years (Holdsworth, unpubl. data). Incidence of non-clinical disease is unknown.
	Coastal inundation	In its non-breeding range, orange-bellied parrots need diverse foraging options near the coast and wetlands but away from developed areas (Ehmke, 2009; Ehmke and Tzaros, 2009). Given the small, elusive population, maximizing survival and reproductive success is crucial for recovery.	High	Inappropriate hydrological changes, altering salinity, pose a Very High risk with Strong evidence of impact. Climate change mitigation efforts like sea walls could worsen pressures on saltmarshes, hindering their migration landwards. Drainage of foraging wetlands could significantly impact orange-bellied parrots (Recovery Plan).

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Forty-spotted pardalote</b> <i>Pardalotus quadragintus</i>  Recovery plan: <a href="http://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/forty-spotted-pardalote-pardalotus-quadraginatus-2006-2010">www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/forty-spotted-pardalote-pardalotus-quadraginatus-2006-2010</a> <u>See Appendix B Figure 40 on p117</u>	Bushfire	Loss and fragmentation of suitable forest and woodland critical habitat supporting Tasmanian white gum by widespread and high intensity fire. Structural changes to the forest habitat that reduce tree canopy cover may lead to reductions in the size of colonies or the local extinction of the forty-spotted pardalote. Fire and dieback are notable causes of this phenomenon. Bushfires have the potential to kill canopy trees and over-firing can reduce the potential for eucalypt recruitment. (Recovery Plan).	High	Statewide – 12% outside the fire risk area. 12% likely and 39% possible. All patches of forest containing Tasmanian white gum between Bicheno and Southport are considered to be habitat critical to the survival of the forty-spotted pardalote.
	Flood	Not identified as threat in Recovery Plan.	Low	Statewide – 3% of area within Flood Risk Zone.
	Biosecurity	Many authors consider invasion by the noisy miner ( <i>Manorina melanocephala</i> ) is a major threat to the forty-spotted pardalote where its habitat has been fragmented and/or opened up by disturbance (Recovery Plan). Parasitic fly, while endemic, can significantly impact the survival of nestlings and therefore breeding success (NRM South project). Risk of Highly Pathogenic Avian Influenza	Moderate	Noisy miners are currently absent from all known colonies of the forty-spotted pardalote and all recent extinctions have been associated with the invasion of the species' habitat by noisy miners. Noisy miners are absent from Maria Island which supports the most robust population of the forty-spotted pardalote in Tasmania (Recovery Plan).
	Coastal inundation	Not identified as threat in Recovery Plan.	Low	Statewide – 6% of area within Coastal Inundation Risk Model.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Hooded plover</b> <i>Thinornis cucullatus cucullatus (also rubricollis)</i>  Conservation advice: <a href="#">66726-conservation-advice.pdf</a> (environment.gov.au) See Appendix B Figure 10 on p102	Bushfire	Not mentioned in conservation advice.	Low	Statewide – 2% almost certain, 31% likely 43% possible, 3% outside fire risk area.
	Flood	Not mentioned in conservation advice. However, flood waters may reduce available habitat, and contribute to egg/ chick mortality if events occur during breeding season (Aug to March).	Moderate	Statewide – 5% within flood risk area. Habitat includes creek mouths, inlet entrances, freshwater lakes and lagoons.
	Biosecurity	Predation by invasive species such as foxes ( <i>Vulpes vulpes</i> ) and cats. Risk of Highly Pathogenic Avian Influenza	High	Egg predation is a major cause of breeding failure in many plover species (Baird and Dann, 2003). The hooded plover's habit of leaving the nest and not returning until the source of disturbance has disappeared renders the eggs and chicks vulnerable to predators. The species' long incubation period in relation to egg size, of about 26 to 28 days, also exposes the eggs to a high risk of failure.
	Coastal inundation	Inundation of nests by high tides appears to be an important cause of loss of beach-nesting birds' clutches (McGarvie and Templeton 1974, Murlis 1989, Stewart 1989). About 7% of 79 nests were flooded in Tasmania (Hanisch 1998, Weston 2003). Hooded plover inhabits ocean beaches, particularly wide beaches backed by dunes with large amounts of seaweed, creek mouths and inlet entrances. It may also occur on near-coastal saline and freshwater lakes and lagoons, tidal bays and estuaries. Coastal inundation can flood nests and erode suitable habitat. Coastal inundation will also affect availability of food sources – polychaetes, molluscs, crustaceans, insects, turions and seeds.	High	Statewide – 93% outside risk model. Hooded plovers are largely sedentary with 95% moving over distances of less than 20 km, however, it is widely distributed around Tasmania's coasts and offshore islands, which have an estimated minimum breeding population of 600 breeding pairs, or 1200 mature individuals.
<b>Masked owl (Tasmania)</b> <i>Tyto novaehollandiae subsp castanops</i>  Conservation advice: <a href="#">www.environment.gov.au/biodiversity/threatened/species/pubs/67051-conservation-advice.pdf</a> See Appendix B Figure 45 on p120	Bushfire	Bushfires over summer period may impact breeding - nests and fledglings that can't escape from fire. Bushfires / too frequent fires may impact food sources and nesting sites.	Low to High	Breeding is reported to be highly seasonal in Tasmania (Mooney, 1997), with most females laying in mid-October to early November (Green, 1982; Mooney, 1997). Nesting occurs in large tree hollows of living or dead trees, but sometimes in vertical spouts or limbs (Bell et al., 1997; Higgins, 1999).
	Flood	Not mentioned in conservation advice.	Low	Small percent of range within flood zone.
	Biosecurity	Not mentioned in conservation advice.	Low	N/A
	Coastal inundation	Not mentioned in conservation advice.	Low	Most of modelled range outside risk model.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Australasian bittern</b> <i>Botaurus poiciloptilus</i>  Recovery plan: <a href="http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/australasian-bittern">www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/australasian-bittern</a> See Appendix B Figure 2 on p98	Bushfire	Wetland habitat loss through bushfires after a dry period. Intense and frequent bushfires or prescribed burning in wetlands reduces the density and cover of vegetation that forms the core habitat of the Australasian bittern. Many wetlands that support Australasian bittern have deep peat beds. Severe fires can burn these peat beds and convert wetlands from shallow wetlands suitable for Australasian bittern to deep wetlands with only minimal fringing vegetation which do not support Australasian bittern.	Moderate to High	Statewide – 6% outside fire risk model. 18% likely, 35% possible. With a drying climate and the prediction of more intense fires, habitat is likely to be under increased susceptibility. In seasonal wetlands the time period that wetlands are dry is increasing and thus increasing the threat of fire destroying wetland vegetation.
	Flood	Habitat degradation/ loss or alteration of wetland habitats. Pollution from floods is likely to cause a decline in many of the prey species of the Australasian bittern, such as eels, freshwater crayfish and frogs which in turn may have a negative effect on bittern populations and their health (Marchant and Higgins 1990).	Moderate	Statewide – 35% within flood risk zone. Because of its comparatively specialised habitat requirements (i.e. densely vegetated wetlands), the species is much more sensitive to habitat loss than many other wetland birds.
	Biosecurity	Foxes predate on nests and could have a significant effect on the population (see draft recovery plan).	Low	Minor risk rating in recovery plan
	Coastal inundation	Coastal inundation of bittern habitat would impact food sources.	Moderate	Statewide – 7% high. 70% of population outside risk model.
<b>Swift parrot</b> <i>Lathamus discolor</i>  Recovery plan: National Recovery Plan ( <a href="http://dcceew.gov.au">dcceew.gov.au</a> ) See Appendix B Figure 5 on p100	Bushfire	Regular and intense fires reduce nesting hollows and nectar availability, threatening swift parrots. Reduced flowering and tree collapse harm foraging resources and tree mortality. Intensive fires disrupt <i>Eucalypt</i> flowering and reduce nectar-rich plants, impacting foraging (Recovery Plan).	Moderate to High	Statewide – 0% outside of fire risk model. A single cooler fire is likely to have a negligible effect. There could be catastrophic loss of habitat from intense fires, as habitat is restricted and fragmented. A severe bushfire that destroys the canopy would remove foraging opportunities.
	Flood	Not mentioned in recovery plan.	Low	Statewide – 1% within the flood risk zone.
	Biosecurity	Psittacine beak and feather disease. Psittacine Beak and Feather Disease (PBFD) is a common and potentially deadly disease of parrots caused by a circovirus. While the disease is known to occur in swift parrots in the wild and in captive birds, the prevalence and pathogenicity of the disease is currently not known.  Sugar gliders are a recognised threat to breeding swift parrots. Risk of Highly Pathogenic Avian Influenza	High	The potential effects of the disease on parrot populations range from inconsequential to devastating, depending on environmental conditions and the general health of the parrots. This disease could potentially have serious implications for the swift parrot population should the general health of these birds be reduced from stress associated with competition for nesting and food resources (Saunders and Tzaros, 2011).
	Coastal inundation	Not mentioned in recovery plan.	Low	Statewide – 100% outside risk model

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Great knot</b> <i>Calidris tenuirostris</i> <a href="#">See Appendix B Figure 31 on p113</a>	Bushfire	No mention in Conservation Advice.	Low to Moderate	Statewide – Great knot 3% likely, red knot 7% likely.
	Flood	Changes to hydrological regime listed as a threat for impact on specialised feeding techniques for red knot.	Low	Statewide – Great knot 34% of population within flood risk zone, red knot 24% of population within. Indirect loss of food sources may occur due to changes in water quality. Red knots are particularly susceptible to slight changes in prey sources and foraging environments.
	Biosecurity	No mention in Conservation Advice. Risk of Highly Pathogenic Avian Influenza	Low	The red knot is susceptible to avian influenza and so may be threatened by future outbreaks of the virus.
	Coastal inundation	Habitat critical to the survival of great knot includes a mosaic of feeding and roosting habitat. Feeding habitat includes exposed sandy or soft mud substrates on intertidal flats and beaches. The species typically roosts along sheltered coastal habitats such as inlets, bays, harbours, estuaries, and lagoons. Selected areas tend to be associated with nearby large intertidal mud and sandflats which are utilised for feeding. The red knot roosts on sandy beaches, spits and islets, and mudflats. Coastal inundation could have a major impact on the red knot due to loss of intertidal habitat which reduces the availability of foraging and roosting sites. Coastal wetlands may be particularly vulnerable, where a reduction in the area of land available for feeding and roosting is likely, and nutrient and sediment flows will likely be altered.	Moderate	Statewide – Great knot 4% high, 67% outside of risk area. Red knot 1% high, 87% outside of risk area. Great knots feed along the water's edge of intertidal mudflats. The species may be highly selective about foraging environments due to its specialised feeding techniques. Red knot is a regular visitor, in small numbers, to the coasts of Tasmania. Red Knot has very high energy demands and need for habitat networks containing both roosting and foraging sites. This affects the ability of the birds to build up the energy stores required for successful migration and breeding. Some sites are important all year round for juveniles who may stay in Australia throughout the breeding season until they reach maturity.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Curlew sandpiper</b> <i>Calidris ferruginea</i> See Appendix B Figure 30 on p112	Bushfire	No mention in conservation advice.	Low to Moderate	Statewide – Sandpiper 15% likely. Sandpiper generally forage within mudflats and nearby shallow water. The species may be highly selective about foraging environments due to its specialised feeding techniques.
	Flood	Flood may impact on feeding habitat which includes exposed sandy or soft mud substrates on intertidal flats and beaches.	Low	Statewide – Sandpiper 24% of population within flood risk zone. Sandpiper generally forage within mudflats and nearby shallow water. The species may be highly selective about foraging environments due to its specialised feeding techniques.
	Biosecurity	No mention in conservation advice Risk of Highly Pathogenic Avian Influenza	Low	N/A
	Coastal Inundation	Inundation may be contributing to loss of foraging habitat at some sites due to a reduction in the area of land available for feeding and roosting, and nutrient and sediment flows will likely be altered.	Low	Statewide – 83% of sandpiper population outside risk zone. In southern Australia tidal range of species is small.
<b>Greater sand plover</b> <i>Charadrius leschenaultii</i>	Bushfire	No mention in conservation advice.	Low to Moderate	Statewide – Lesser sand plover 10% likely, greater sand plover 2% almost certain, 34% likely.
<b>Lesser sand plover</b> <i>Charadrius mongolus</i> (See Appendix B Figure 33 on p114) <b>and subspecies Mongolian plover</b> <i>Charadrius mongolus subsp mongolus</i> (rated as same species)	Flood	Changes to the water regime listed as a threat in conservation advice. Loss of marine or estuarine vegetation, can alter the dynamic equilibrium of sediment banks and mudflats and expose acid sulphate soils.	Low	Statewide – Lesser sand plover 28% of population, greater sand plover 8% of population within flood risk zone.
	Biosecurity	No mention in conservation advice. Risk of Highly Pathogenic Avian Influenza	Low	Since, 1992, the viral disease testing of Charadriiformes from coastal northwest Australia has not detected any evidence of avian influenza virus excretion in the lesser sand plover or any other shorebird species tested.
	Coastal inundation	Inundation could impact on the lesser sand plover due to loss of intertidal and coastal habitat. Lesser sand plover are sensitive to certain threats due to their high site fidelity, tendency to aggregate, very high energy demands required for migration, and need for habitat networks containing both roosting and foraging sites. Inundation could increase loss of marine or estuarine vegetation, which is likely to alter the dynamic equilibrium of sediment banks and mudflats.	Low	Statewide – greater plover 69%, lesser plover 67% of population outside of risk zone. During the non-breeding season, the species is almost strictly coastal, preferring sandy beaches, mudflats of coastal bays and estuaries, sandflats and dunes near the coast. The lesser sand plover mainly feeds on extensive, freshly exposed areas of intertidal sandflats and mudflats in estuaries or beaches.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Tasmanian azure kingfisher</b> <i>Ceyx azureus subsp. diemenensis</i>  Listing statement: <a href="https://nre.tas.gov.au/Documents/Tasmanian-Azure-Kingfisher-listing-statement.pdf">https://nre.tas.gov.au/Documents/Tasmanian-Azure-Kingfisher-listing-statement.pdf</a> <i>See Appendix B Figure 32 on p113</i>	Bushfire	Subspecies is restricted to Tasmania where it is thought to number fewer than 250 mature individuals	Moderate	Statewide – 49% possible, 20% likely to be impacted by bushfire.
	Flood	Flood could impact nests. The nest is in the end of a narrow tunnel drilled in an earth bank beside or very close to water. The entrance is usually near the top of the bank.	Moderate	Statewide – 3% within flood risk zone, however, high risk to nests.
	Biosecurity	No mention in conservation advice. Risk of Highly Pathogenic Avian Influenza	Low	N/A
	Coastal inundation	May impact populations food source and nesting on river systems near coastal areas.	Moderate	Statewide – 97% of population outside of risk areas
<b>Eastern curlew</b> <i>Numenius madagascariensis</i>  Conservation advice: Conservation Advice Numenius madagascariensis eastern curlew (environment.gov.au) <i>See Appendix B Figure 9 on p102</i>	Bushfire	Bushfires in coastal areas may affect roosting sites.	Low	Statewide – 1% almost certain, 20% possible. 14% of population outside of fire risk model.
	Flood	Feeding habitat of sheltered intertidal sandflats or mudflats that are open and without vegetation or covered with seagrass. Prolonged flood could impact feeding areas.	Low	Statewide – 19% within flood risk zone.
	Biosecurity	No biosecurity issues mentioned in conservation advice. Risk of Highly Pathogenic Avian Influenza	Moderate - low	
	Coastal inundation	Within Australia, the eastern curlew has a primarily coastal distribution. Coastal inundation may reduce feeding areas and food sources.	High	Statewide – 2% high risk. 78% of population outside risk model. the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. Forages during the non-breeding season on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, mainly eating crustaceans (including crabs, shrimps and prawns), small molluscs, as well as some insects.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FAUNA (continued)				
<b>Maugean skate</b> <i>Zearaja Maugeana</i> Conservation advice: Conservation Advice for <i>Zearaja maugeana</i> (Maugean skate) (environment.gov.au) See Appendix B Figure 12 on p103	Bushfire	Not identified as a threat	N/A	N/A
	Flood	Increased river flows could affect dissolved oxygen and increase the deposit of contaminated sediments in the harbour. Changes in the estuarine environment, degradation of water quality	Low	Direct effect of low oxygen on the skate and bioaccumulation of heavy metals in high trophic levels such as the skate. However, range is not in high flood hazard area.
	Biosecurity	Biotoxins can bioaccumulate in high trophic positions.	High	The toxin producing dinoflagellate ( <i>Gymnodinium catenatum</i> ) is present in Bathurst Harbour. The toxin may affect high trophic species like the skate through biomagnification.
	Coastal inundation	Changes in the estuarine environment, degradation of water quality	High	Although outside the risk model, is highly susceptible to changes in salinity and dissolved oxygen
<b>Red handfish</b> <i>Thymichthys politus</i> Conservation advice: Approved Conservation Advice for <i>Thymichthys politus</i> (red handfish) (environment.gov.au) See Appendix B Figure 11 on p103	Bushfire	Not identified as a threat	Low	Statewide – 83% outside fire risk area
	Flood	Not identified as a threat	Low	Statewide – 0% in flood risk area.
	Biosecurity	Habitat degradation from introduced and range shifting native species	High	Red hand fish reliant on green alga for spawning
	Coastal inundation	Potential changes to water quality and siltation.	Low	Statewide – 97% outside risk
<b>Little penguin</b> <i>Eudyptula minor</i> See Appendix B Figure 38 – <i>Eudyptula minor</i> – Little penguin on p116	Bushfire	Not identified as a risk	Low	Statewide – 96% outside fire risk.
	Flood	Not identified as a risk	Low	Statewide – 0% in flood risk area.
	Biosecurity	Susceptible to cat, fox and dog predation Risk of Highly Pathogenic Avian Influenza	Moderate	A fox incursion could be devastating
	Coastal inundation	Breed in burrows, risk of inundation.	High	Statewide – 11% potentially affected by inundation.
<b>Short-tailed shearwater</b> <i>Ardenna tenuirostris</i> (formerly <i>Puffinus tenuirostris</i> ) See Appendix B Figure 43 – <i>Puffinus tenuirostris</i> – Short-tailed shearwater on p119	Bushfire	Soil erosion after fire can reduce breeding habitat	Low	Statewide – 98% outside fire risk.
	Flood	Not identified as a risk	Low	Statewide – 0% in flood risk area.
	Biosecurity	Susceptible to cat, fox, and dog predation	Moderate	A fox incursion could be devastating
	Coastal inundation	Breed in burrows, risk of inundation.	High	Statewide – 7% potentially affected by inundation.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FLORA				
<b>Morrisby's gum</b> <i>Eucalyptus morrisbyi</i> <a href="http://dcceew.gov.au">dcceew.gov.au</a> See Appendix B Figure 37 on p116	Bushfire	<i>Eucalyptus morrisbyi</i> is somewhat adapted to fire, which stimulates the release of seed from capsules retained in the canopy. However, frequent fires will cause a decline in populations. While larger trees can resprout from lignotubers and epicormic buds, smaller trees and seedlings be killed by fire and if fires are too frequent seed bank will not be replenished (Recovery Plan).	High	Statewide – 3% of area outside Fire Risk Model. <i>Eucalyptus morrisbyi</i> is highly susceptible because of its very restricted distribution. Only two known populations 21km apart with around 2000 plants occurring in the wild. The small Risdon population is particularly at risk from fire as the mortality rate would be high given the poor health of the individuals, and its recruitment potential is poor as very little seed is being produced. Only 3% is outside fire risk area. (Recovery Plan).
	Flood	Mature trees unlikely to be impacted by flood. However, populations are on poorly drained areas and prolonged inundation may affect seedling recruitment.	Low	Statewide – 22% of area within Flood Risk Zone.
	Biosecurity	Trees in poor health can be smothered by a native parasitic vine downy dodder-laurel <i>Cassytha pubescens</i> . Seedling regeneration limited by sheep and possibly rabbit grazing.	High	Many trees are already in poor health.
	Coastal inundation	Prolonged inundation may affect seedling recruitment.	Low	Statewide – 87% of area outside Coastal Inundation Risk Model.
<b>Southport heath</b> <i>Epacris stuartii</i> Recovery plan: <a href="#">Epacris stuartii Recovery Plan – DCCEEW</a> Conservation advice: <a href="#">Conservation Advice Epacris stuartii Southport heath (environment.gov.au)</a> See Appendix B Figure 35 on p115	Bushfire	High mortality during moderate to high intensity fires. Too frequent burning may reduce and deplete soil seedbank and burn re-sprouting seedlings, resulting in the population not being able to replace individuals at the same rate at which they are being destroyed.	High	Very restricted distribution and population size. <i>Epacris stuartii</i> is known from a single locality on Southport Bluff, about 6 km south-east of Southport township, and Southport Island in far south-eastern Tasmania. It is estimated there are less than 1000 plants in the wild occupying an area of approximately 0.3ha over a range of about 300m.
	Flood	Not identified as a threat.	Low	Statewide – 0% of area within Flood Risk Zone.
	Biosecurity	Known to be susceptible to dieback from <i>Phytophthora cinnamomi</i> .	Moderate	<i>P. cinnamomi</i> is known to be present in close proximity to the wild population of Southport heath, with a walking track within 1 km of the population. The introduction of the fungus into the population poses a potential threat that could have significant implications on the species' survival.
	Coastal inundation	Not identified as a threat.	Low	Statewide – 75% of area outside Coastal Inundation Risk Model.

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FLORA (continued)				
<b>Swamp Forest</b> <i>Melaleuca ericifolia</i> 30. <i>Melaleuca ericifolia</i> swamp forest.pdf (nre.tas.gov.au) See Appendix B Figure 46 on p120	Bushfire	Long regenerating old-growth stands with absence of catastrophic disturbance are very rare	Moderate to High	Statewide – 3% outside fire risk area
	Flood	Generally occurs at poorly draining sites	Moderate	Statewide – 19% of area within Flood Risk Zone.
	Biosecurity	Phytophthora and weed infestations. Unfenced livestock and deer grazing wetlands and surrounding forest.	Moderate	Small distribution
	Coastal inundation	Occurs at the fringe of saltmarshes	Moderate	Statewide – 9% within high to medium risk zone
<b>Miena cider gum</b> <i>Eucalyptus gunnii</i> subsp. <i>divaricata</i> Threatened Species Listing: <a href="http://www.environment.gov.au/biodiversity/threatened/species/e-g-divaricata.html">www.environment.gov.au/biodiversity/threatened/species/e-g-divaricata.html</a> See Appendix B Figure 36 on p115	Bushfire	With coppice and lignotuber regrowth following fire being more palatable to browsers than adult foliage, post fire mortality of stressed <i>Eucalyptus gunnii</i> subsp. <i>divaricata</i> is thought to be relatively high, particularly as browsers are attracted to recently burnt areas by increased food supplies. As well as killing seedlings and young saplings, frequent firing can also deplete the understory, removing shrubby protection of survivors from grazers.	High	Statewide – 0% of area outside Fire Risk Model. Bushfires in 2019 had a severe impact, with the remaining population in poor condition and displaying poor reproductive capacity. The population is estimated to now be less than 2,500 mature individuals with a projected estimated decline within 5 years.
	Flood	Flood not identified as threat	Low	Statewide – 0% of area inside Flood Risk Model.
	Biosecurity	<i>Eucalyptus gunnii</i> subsp. <i>divaricata</i> is highly palatable, with selective browsing by sheep, brushtail possums, wallabies, deer and rabbits, as well as leaf eating and sap sucking insects (including the introduced European wasp).	High	As a consequence of low recruitment through browsing by rabbits, sheep and deer as well as wallabies and possums, most live stands consist mainly of over-mature trees which are more susceptible to stressors and as a result are often in poor condition (Threatened Species Listing Statement).
	Coastal inundation	Not assessed as a threat.	Low	N/A

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
THREATENED SPECIES – FLORA (continued)				
<b>Threatened Orchids:</b> <b>Sagg spider orchid</b> <i>Caladenia saggicola</i> <b>Milford leek-orchid</b> <i>Prasophyllum milfordense</i> <b>Fleshy greenhood</b> <i>Pterostylis wapstrarum</i> Not included in risk assessment <u>See Appendix B Figure 49: Location of records of additional iconic or vulnerable plant species in the NRM South region on p122</u>	Bushfire	Fire occurring during the non-dormant stage (May to November) of the orchids can impact survival and the reproductive cycle. Mechanical disturbance of small, isolated populations in bushfire recovery efforts could significantly reduce populations. Australian orchids do not produce a seed bank, so are reliant on re-sprouting post fire.	Moderate	Susceptibility to severe bushfire is unknown. However very small populations highly susceptible to mechanical disturbance during bushfire response and recovery.
	Flood	Prolonged flooding can impact survival and the reproductive cycle. Small populations are known to be susceptible to stochastic events, and less likely to recover post event.	High	Due to low numbers of individuals and a small number of disjunct populations, recovery without intervention is unlikely.
	Biosecurity event	Invasion of habitat by weeds, rabbits, <i>Phytophthora</i>	High	Due to low numbers of individuals and a small numbers of populations. Any proposed development or activity that has the potential to introduce <i>Phytophthora cinnamomi</i> (root rot fungus) to the habitat of an important subpopulation is likely to have a significant impact on that species.
	Coastal inundation	Not assessed as a threat	N/A	N/A

## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
OTHER SPECIES – NOT MODELLED				
<b>Blue winged parrot</b> <i>Neophema chrysostoma</i> not a national or regional priority the species, but rated in spatial analysis.  Not included in risk assessment due to poor range model  Conservation advice: <a href="http://www.environment.gov.au/biodiversity/threatened/species/pubs/726-conservation-advice-31032023.pdf">www.environment.gov.au/biodiversity/threatened/species/pubs/726-conservation-advice-31032023.pdf</a>  <u>See Appendix B Figure 8 on p101</u>	Bushfire	Blue-winged parrots breed in Tasmania, coastal south-eastern South Australia and southern Victoria. During the breeding season (spring and summer), birds occupy eucalypt forests and woodlands. Fires destroy key nesting habitat and remaining trees may be deemed unsafe by fire authorities and removed, causing further decline of old large/mature trees. Blue-winged parrot habitat occurs across a wide range of land tenures and ownership arrangements, including on private land, travelling stock routes and reserves, state forests and state reserves, and National Parks (including the TWWHA).	Moderate	Statewide – 1% of area outside Fire Risk Model. Total 1% area Almost certain, 18% area Likely and 49% area Possible in bushfire risk model (spatial report) Increased likelihood of extreme events such as bushfire due to climate change.
	Flood	Not identified as threat in Conservation Advice.	Moderate	Statewide – 4% area within Flood Risk Model (spatial report). Some areas of habitat may be susceptible to extreme rainfall events and flood.
	Biosecurity	Psittacine Beak and Feather Disease (PBFD) is a widespread, lethal parrot disease, typically transferring between adults, nestlings and contaminated nest hollows. Predation by feral cats is a threat to blue-winged parrots. Foxes may kill some birds on the mainland, given the species forages on the ground. Predation by introduced sugar gliders. While considered a species native to the Australian mainland, sugar gliders are thought to be introduced to mainland Tasmania. Nest predation by sugar gliders may pose a threat to blue-winged parrots breeding in Tasmania as inferred by research on swift parrots.	Moderate	Moderate risk from predation by sugar gliders, cats and foxes Moderate risk from Psittacine Beak and Feather Disease (PBFD) (Conservation Advice). Although blue-winged parrots are susceptible to PBFD, the threat level is currently relatively low. However, with decreasing nesting hollows and intensified competition, it is possible that the likelihood of disease transmission could be greater in the future. The threat of cats may be amplified by bushfires as they take advantage of recently burnt areas as they prefer to hunt in open habitats. The species also susceptible to fox predation if foxes establish in Tasmania. Sugar gliders not only prey on nesting young and eggs of swift parrots, but also often kill the sitting female.
	Coastal inundation	Before migrating from Tasmania in autumn, many birds congregate on saltmarshes and agricultural land before departing north. Potential impacts on coastal saltmarsh foraging habitat due to episodic storm surge. Note: Subtropical and Temperate Coastal Saltmarsh is listed as a Threatened Ecological Community	Moderate	Statewide – 99% area outside Risk Model for inundation (spatial analysis).


## MANAGEMENT UNIT ASSETS AND SUSCEPTIBILITY

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why it's susceptible
OTHER SPECIES – NOT MODELLED (continued)				
<b>Chaostola skipper</b> <i>Antipodia chaostola subsp. leucophaea</i> .  Not included in risk assessment Conservation advice: <a href="https://www.environment.gov.au/biodiversity/threatened/species/pubs/77672-conservation-advice.pdf">https://www.environment.gov.au/biodiversity/threatened/species/pubs/77672-conservation-advice.pdf</a>	Bushfire	Chaostola skipper has been found in dry lowland vegetation communities (open eucalypt forest) supporting the food plants of <i>Gahnia radula</i> (thatch sawsedge) and <i>G. microstachya</i> (slender sawsedge). Research suggests that the chaostola skipper is a 'fire succession species', although its relationship with fire is considered a gap in the ecological knowledge required for the conservation management of the species. Observations on the Australian mainland suggest that chaostola skipper is most abundant for a few years following fire. Regrowth of <i>Gahnia</i> species is encouraged by fire, but too frequent fires will remove both the butterfly and food plant	Moderate	While the Tasmanian chaostola skipper is considered to be very localised and uncommon there are no estimates of the total number of mature individuals, nor of the size of individual populations. Given dry open eucalypt forest habitat and small number of known populations with low numbers of individuals it seems likely they are at least moderately susceptible to extreme events such as intense and widespread fire.
	Flood	Not identified as threat in Conservation Advice	N/A	N/A
	Biosecurity	Not identified as threat in Conservation Advice	N/A	N/A
	Coastal inundation	Not identified as threat in Conservation Advice	N/A	N/A

## Priority biodiversity asset preparedness

Note: In Appendix C Table 1 on p123 we refer to "current roles" as those with legislated responsibility such as the relevant government departments, or key lead organisations.

We recognise that there are many other key organisations and groups that contribute to the monitoring, research and management of these assets, including community groups, Non-Government Organisations (such as Landcare, TLC), Aboriginal groups, research organisations, local government and some consultants. The distribution maps for these assets are provided in Appendix B.


The  logo indicates that NRM South has worked on a project related to that asset in the last five years.

In the preparedness phase, NRM South's role can be to assist across the key areas presented in this plan, namely information and capacity building, planning, communications and supporting o-ground works.

APPENDIX C TABLE 2: Preparedness responses for identified biodiversity priorities under each emergency scenario

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
<b>THREATENED ECOLOGICAL COMMUNITIES</b>				
<b>Alpine Sphagnum Bogs and Associated Fens</b>	General approaches	<ul style="list-style-type: none"> <li>Identify ecological knowledge required for conservation management.</li> <li>Develop specific plans to prepare for emergencies (who, what, where).</li> <li>Embed processes in relevant emergency response teams.</li> <li>Build resilience by undertaking actions to reduce other threatening processes such as reducing the harvesting of moss and damage from invasive species such as deer, stock grazing. Manage weeds</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE (including PWS)</li> <li>Landowners and managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop appropriate fire regimes in fire management plans, assessing how to control bushfires with minimal damage to the TEC, identify priority areas for intervention and assess likely effectiveness of mitigation strategies.</li> <li>Plan and undertaken strategic fire suppression in adjoining areas to reduce the risk of fire.</li> <li>Undertake communication on the above.</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE (PWS)</li> <li>Landowners and managers</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Develop appropriate actions in plans to slow surface water.</li> <li>Manage weeds and diseases and revegetate to reduce the risk of erosion from floods.</li> </ul>	Throughout range, particularly in the upper Derwent and Ouse catchments where the TEC occurs.	<ul style="list-style-type: none"> <li>NRE (PWS, Water branch)</li> <li>Landowners and managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Develop strategies to monitor for relevant new disease outbreaks and emerging pest and weed threats.</li> <li>Manage identified outbreaks at the TEC and in surrounding areas.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions.</li> </ul>	Throughout range.	<ul style="list-style-type: none"> <li>NRE (Biosecurity Tasmania, Threatened species, PWS)</li> <li>Landowners and managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
<b>THREATENED ECOLOGICAL COMMUNITIES (continued)</b>				
<b><i>Eucalyptus ovata</i> – <i>Callitris oblonga</i> Forest</b> including <b>South Esk pine</b> <i>Callitris oblonga</i> subsp. <i>Oblonga</i>	General approaches	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Develop specific plans to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Build resilience by undertaking actions to reduce other threatening processes (wood hooking and other forms of clearing, damage from invasive species such as deer, stock grazing) to build resilience.</li> <li>Reduce other threatening processes (such as stock management and fencing to protect the community, restore riparian vegetation).</li> <li>Collect seed of <i>Callitris oblonga</i> subsp. <i>oblonga</i> for long-term storage and use in restoration following emergencies.</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop appropriate fire regimes for the TEC in fire management plans, assessing how to control bushfires with minimal damage to the TEC, identify priority areas for intervention and assess likely effectiveness of mitigation strategies.</li> <li>Undertake strategic fire suppression in areas adjoining the TEC, which may include construction and maintenance of fire breaks in critical locations.</li> </ul>	In riparian zones along Swan, Cygnet and Apsley Rivers mainly on private land and within Freycinet NP.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Implement stock management and fencing to protect community, to reduce the risk of erosion in the event of a flood.</li> </ul>	In riparian zones along Swan, Cygnet and Apsley Rivers mainly on private land and within Freycinet NP.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Undertake monitoring for new disease outbreaks and emerging threats, including <i>Phytophthora cinnamoni</i> dieback and myrtle rust</li> <li>Manage identified outbreaks.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions.</li> </ul>	Throughout its range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
<b>THREATENED ECOLOGICAL COMMUNITIES (continued)</b>				
<b><i>Eucalyptus ovata</i> / <i>Eucalyptus brookeriana</i> Forests and Woodlands</b>  	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these, particularly mapping the community properly.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (wood hooking and clearing, damage from invasive species such as deer, stock grazing, inappropriate fire regimes) to build resilience.</li> <li>Raise awareness about the TEC with private landowners.</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop and implement appropriate fire management regimes, and communicate these.</li> <li>Undertake strategic fire suppression in adjoining areas, which may include construction and maintenance of fire breaks in critical locations</li> </ul>	Throughout its range but note that the mapping for this community is poor.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Vigilance for new disease outbreaks and emerging threats, including <i>Phytophthora cinnamoni</i> dieback, myrtle rust and chytridiomycosis fungus</li> <li>Manage identified outbreaks.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions.</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		


Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED ECOLOGICAL COMMUNITIES (continued)				
Lowland Native Grasslands of Tasmania	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (weed management, grazing from stock, and clearing/conversion) to build resilience.</li> </ul>	Throughout its range, particularly Midlands and East Coast.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop and implement appropriate fire management regimes.</li> </ul>	Throughout its range, particularly Midlands and East Coast.	<ul style="list-style-type: none"> <li>Landowners</li> <li>NRE</li> <li>Midlands Conservation Partnership</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for new disease outbreaks and emerging threats, including <i>Phytophthora cinnamomi</i> dieback.</li> <li>Manage identified outbreaks.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions.</li> </ul>	Where the event occurs.	<ul style="list-style-type: none"> <li>Landowners</li> <li>NRE</li> <li>Midlands Conservation Partnership</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
<b>THREATENED ECOLOGICAL COMMUNITIES (continued)</b>				
<b>Subtropical and Temperate Coastal Saltmarsh, including Tasmanian sea-lavender</b> <i>Limonium austarale</i> <i>var. baudanii</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (such as deer, stock grazing, weed control, restoring hydrology and restricting vehicle access) to build resilience.</li> <li>Collect seed from subpopulations of Tasmanian sea-lavender for long-term storage and use during recovery.</li> </ul>	Various locations in SE Tas and East Coast, Derwent Estuary, Ramsar sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>RTBG</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop and implement appropriate fire management regimes and communicate these.</li> <li>Ensure controlled/planned burns in areas surrounding the ecological community don't spread into the ecological community.</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for new disease outbreaks and emerging threats, including chytridiomycosis fungus</li> <li>Manage identified outbreaks.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions.</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>While not identified as a threat, manage erosion and restore natural tidal flows to build resilience</li> </ul>	Throughout its range.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> </ul>




Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED ECOLOGICAL COMMUNITIES (continued)				
<b>Tasmanian White Gum (<i>Eucalyptus viminalis</i>) Wet Forest</b>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (reduce wood hooking and clearing, reduce impacts of deer and stock grazing) to build resilience.</li> </ul>	The community is scattered through the region.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Implement appropriate fire management regimes.</li> <li>Ensure controlled/planned burns in areas surrounding the ecological community don't spread into the ecological community.</li> </ul>	Where the event occurs.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Vigilance for new disease outbreaks and emerging threats, including <i>Phytophthora cinnamoni</i> dieback, myrtle rust and chytridiomycosis fungus</li> <li>Manage identified outbreaks.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions.</li> </ul>	Where the event occurs in its range.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		


Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
PRIORITY PLACES				
<b>The Midlands region of central Tasmania</b>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (reducing clearing or conversion of grasslands, such as stock management and fencing to protect the community, inappropriate fire regimes, weed management) to build resilience.</li> </ul>	Throughout the area.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>Midlands Conservation Partnership</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Implement appropriate fire management regimes.</li> <li>Ensure controlled/planned burns in areas surrounding the ecological community don't spread into the area.</li> </ul>	Throughout the area	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>Midlands Conservation Partnership</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor and remain vigilant for new disease outbreaks and emerging threats.</li> <li>Manage identified outbreaks.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions.</li> </ul>	Throughout the area	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>Midlands Conservation Partnership</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		


Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
PRIORITY PLACES (continued)				
<b>Bruny Island</b> 	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (clearing, inappropriate fire regimes, weed, pest and disease management) to build resilience.</li> </ul>	Bruny Island and associated offshore islands	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> <li>Local government</li> <li>SETAC</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Implement appropriate fire management regimes.</li> <li>Ensure controlled/planned burns in areas surrounding the ecological community don't spread into the ecological community.</li> </ul>	Bruny Island and associated offshore islands	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> <li>Local government</li> <li>SETAC</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Conduct ongoing monitoring for new disease outbreaks, pests and weeds, and emerging threats.</li> <li>Manage identified outbreaks.</li> <li>Ensure hygiene measures are implemented to reduce risk of incursions at areas with high visitation.</li> <li>Conduct pest and weed management.</li> <li>Visitor management – education and awareness raising about values and how to protect them.</li> </ul>	Bruny Island and associated offshore islands	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Minimise coastal erosion impacts from vehicles, visitation and infrastructure.</li> <li>Rehabilitate degraded areas to minimise erosion and build resilience against threats caused by sea-level rise and storm surges.</li> <li>Identify and protect important areas on adjacent private properties to enable the landward retreat of coastal vegetation from the reserve.</li> </ul>	Bruny Island and associated offshore islands	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> <li>Local government</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
PRIORITY PLACES (continued)				
TWWHA	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Work with PWS to assist with any planning to prepare for emergencies.</li> <li>Undertake actions to reduce other threatening processes (protecting key values, managing visitors and biosecurity threats, control invasive species such as deer and weeds) to build resilience.</li> <li>Ensure appropriate fire regimes are used in the various parts of the TWWHA</li> <li>Manage potential threats, such as weed, pest and disease incursions on surrounding private land to reduce the risk of spread to the TWWHA.</li> <li>Ensure appropriate fire management occurs at properties surrounding the TWWHA.</li> </ul>	Whole of TWWHA	<ul style="list-style-type: none"> <li>NRE (particularly PWS)</li> <li>Surrounding landowners and managers</li> <li>Local governments</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Implement appropriate fire management regimes, recognising the variety of flora and communities.</li> <li>Ensure there is adequate management of visitors on issues such as use of fire rules</li> <li>Continue to develop and implement targeted approaches for protecting key parts of the TWWHA in the event of fire, e.g. Sprinkler systems for vulnerable plant communities.</li> </ul>	Whole of TWWHA	<ul style="list-style-type: none"> <li>NRE (particularly PWS)</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Ongoing monitoring for new disease outbreaks and emerging threats.</li> <li>Manage pests and weeds.</li> <li>Manage identified outbreaks as soon as they are detected.</li> <li>Ensure that biosecurity and hygiene protocols are implemented throughout the TWWHA.</li> <li>Raise awareness with key users of the TWWHA about biosecurity risks, including freshwater fishers and recreational boaters in places such as Port Davey.</li> </ul>	Whole of TWWHA	<ul style="list-style-type: none"> <li>NRE (PWS) and surrounding Landowners and managers</li> <li>Local governments</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Although not identified as a threat, there are risks to cultural and natural assets in parts of the coastline.</li> <li>Rehabilitate degraded areas to minimise erosion and build resilience against threats caused by sea-level rise and storm surges.</li> </ul>	Western and Southern TWWHA boarder	<ul style="list-style-type: none"> <li>NRE (PWS)</li> <li>AHT</li> </ul>


Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
RAMSAR SITES (continued)				
<b>Moulting Lagoon and Apsley Marshes</b>  	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (water extraction, damage from invasive species such as deer, fencing for stock grazing, weed management) to build resilience.</li> <li>Raise awareness about values and threats amongst private landowners abutting the site and in the catchment.</li> </ul>	Whole catchment	<ul style="list-style-type: none"> <li>NRE (PWS)</li> <li>Surrounding Landowners and Managers</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Identify locations of fire threatened assets and develop targeted actions and communicate these.</li> <li>Ensure appropriate fire regimes are used.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE (PWS)</li> <li>Surrounding Landowners and Managers</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Restore the natural hydrology wherever possible and maintain environmental flows.</li> <li>Raise awareness about land practices that will help protect the site.</li> <li>Conduct water quality monitoring and address issues as they are detected.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE</li> <li>Local Government</li> <li>Surrounding Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Conduct ongoing monitoring for new disease outbreaks and emerging threats.</li> <li>Manage identified outbreaks.</li> <li>Raise awareness amongst private landowners about biosecurity and how to manage issues.</li> <li>Ensure biosecurity management and hygiene protocols are implemented on public land.</li> <li>Undertaken pest and weed management.</li> <li>Conduct routine monitoring for biotoxins and water quality parameters.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners</li> <li>Land managers</li> <li>Local government</li> <li>Tasmanian Department of Health and Community Services</li> <li>Local seafood industry</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Rehabilitate degraded areas to minimise erosion and build resilience against threats caused by sea-level rise and storm surges.</li> <li>Identify important areas on adjacent private properties to enable the landward retreat of coastal vegetation from the reserve.</li> <li>Manage access by vehicles and impacts from visitation and infrastructure to reduce coastal erosion.</li> </ul>	Coastal areas	<ul style="list-style-type: none"> <li>Local government</li> <li>NRE</li> <li>Landowners and managers</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
RAMSAR SITES (continued)				
<b>Interlaken Reserve</b>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (damage from invasive species particularly deer, other invasive species and predatory fish, inappropriate fire regimes, clearing, weed management) to build resilience.</li> <li>Raise awareness amongst landowners and visitors about the values of the site and how to minimise impacts.</li> </ul>	Whole Catchment (specifically Lakes Sorell and Crescent)	<ul style="list-style-type: none"> <li>Local government</li> <li>NRE</li> <li>Landowners and managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Identify locations of key fire sensitive assets and develop targeted strategies to protect them.</li> <li>Ensure that appropriate fire regimes are in place and communicated.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE</li> <li>Hydro Tasmania</li> <li>Landowners and Managers</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Work with the Lakes Sorell and Crescent Water Management Plans to ensure that the system is managed in the event of a flood.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE</li> <li>Hydro Tasmania</li> <li>Local government</li> <li>Landowners and managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Conduct ongoing monitoring for new disease outbreaks and emerging threats.</li> <li>Manage identified outbreaks.</li> <li>Ensure that biosecurity measures and hygiene protocols are used on public land.</li> <li>Raise awareness with the local landowners and visitors about biosecurity and how to minimise risks.</li> <li>Conduct pest and weed management</li> <li>Conduct routine monitoring for biotoxins and water quality parameters.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE (IFS, BT)</li> <li>Hydro Tasmania</li> <li>Landowners and managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
RAMSAR SITES (continued)				
<b>Pitt Water-Orielton Lagoon</b>  	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (damage from invasive species, exclude stock, weed management, inappropriate fire regimes, clearing, altered hydrological regimes) to build resilience.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>Landowners and Managers</li> <li>NRE</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>While not assessed as a threat, it is still important to identify locations of fire sensitive assets and develop appropriate fire regimes for these and nearby areas.</li> <li>Manage weeds in the catchment.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Restore natural hydrology</li> <li>Manage drainage channels on adjacent land to minimise erosion and water inflow quality.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local Government</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Raise awareness amongst visitors and private landowners about biosecurity threats and how to manage them.</li> <li>Conduct ongoing monitoring for new disease outbreaks and emerging threats.</li> <li>Manage identified outbreaks.</li> <li>Implement biosecurity management and hygiene protocols in public areas.</li> <li>Conduct pest and weed management.</li> <li>Conduct routine monitoring for biotoxins and water quality parameters.</li> </ul>	Whole Catchment	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local Government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Rehabilitate degraded areas to minimise erosion and build resilience against threats caused by sea-level rise and storm surges.</li> <li>Identify important areas on adjacent private properties to enable the landward retreat of coastal vegetation from the reserve.</li> </ul>	Coastal areas	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA				
<b>Threatened invertebrates including:</b> <b>Ammonite snail</b> <i>Ammoniropa vignes</i> <b>Ptunarra brown butterfly</b> <i>Oreixenica ptunarra</i> <b>Tasmanian chaostola skipper</b> <i>Antipodia chaostola subsp. Leucophaea</i>	General approaches	<ul style="list-style-type: none"> <li>Identify gaps in knowledge, including distribution and population size and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (loss of habitat, including that from development and land use practices) to build resilience.</li> <li>Identify sources of competition and threats to the butterfly's food and host plants</li> <li>Raise awareness about species in the local community including how to protect the species and habitat.</li> <li>Enable connectivity between populations.</li> </ul>	<p>Ammonite – Areas with Dolerite soils close to Hobart e.g. Grasstree Hill, Austins Ferry, Mount Wellington, Mount Nelson, The Domain, Hillgrove, South Hobart.</p> <p>ptunarra – private and public land (e.g. the Vale of Belvoir by the TLC, and at Surrey Hills by Forico Ltd).</p> <p>Chaostola – East Coast, Hobart and near Freycinet, coast mostly south from Hobart and Huon Valley</p>	<ul style="list-style-type: none"> <li>Local government</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Identify and implement use of appropriate fire regimes (including the intensity, frequency and season) e.g. burn habitat in a mosaic pattern, with cool, low-intensity fires, on an appropriate rotation of 5–10 years outside important times of year (breeding, dispersal).</li> <li>Identify distribution and share this information to relevant organisations and landowners involved in fire responses.</li> <li>Mark key areas to avoid during controlled burning.</li> </ul>	<p>Throughout range:</p> <p>ptunarra – (Fire management of native grasslands occurs on some areas of public land, as well as on private land such as the Vale of Belvoir by the Tasmanian Land Conservancy, and at Surrey Hills by Forico Ltd).</p>	<ul style="list-style-type: none"> <li>Local government</li> <li>NRE</li> <li>TFS</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for new diseases that may impact current populations as well as the impact and distribution of invasive carnivorous snail species.</li> <li>Ptunarra – Control European wasp at priority sites. Establish undisturbed vegetation buffers around grasslands to keep wasps out of sites containing ptunarra brown butterflies</li> </ul>	<p>Throughout range, particularly sites where wasp numbers are high.</p>	<ul style="list-style-type: none"> <li>NRE (Biosecurity Tasmania, Threatened species)</li> <li>Land Managers and owners</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened frogs:</b> <b>Green and gold frog</b> <i>Litoria raniformis</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (loss of habitat, water quality, clearing of riparian vegetation, damage from invasive species such as deer, stock grazing) to build resilience.</li> <li>Raise awareness about species in the local community including how to protect the species and habitat.</li> <li>Plan to enable connectivity between populations e.g. dedicated terrestrial habitat corridors, of a minimum of 100 meters in width.</li> <li>Plan to incorporate buffer zones of at least 200 meters around water bodies.</li> <li>Maintain, improve/retain terrestrial habitat of logs, rocks and riparian vegetation etc.</li> </ul>	Throughout range, particularly modified landscapes, such as primary industry land	<ul style="list-style-type: none"> <li>NRE (Threatened species)</li> <li>Landowners and Managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>While not assessed as a threat, loss of vegetation at key sites will impact them. Hence, incorporate buffer zones of at least 200 meters around water bodies to protect vegetation.</li> <li>Maintain dedicated terrestrial habitat corridors, of a minimum of 100 meters in width; improve/retain terrestrial habitat of logs, rocks and riparian vegetation etc., to provide a diversity of overwintering habitat.</li> </ul>	Throughout range, particularly modified landscapes, e.g. on primary industry land	<ul style="list-style-type: none"> <li>NRE (Threatened species)</li> <li>TFS</li> <li>Local governments</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Plan for flood events and ensure flood mitigation activities don't impact known sites.</li> <li>Develop strategies to slow water so that tadpoles are not impacted.</li> </ul>	Throughout range	<ul style="list-style-type: none"> <li>NRE (Threatened species)</li> <li>Local governments</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Provide information and raise awareness about biosecurity threats.</li> <li>Conduct ongoing monitoring for new disease outbreaks and emerging threats.</li> <li>Manage identified outbreaks.</li> <li>Ensure that biosecurity management and hygiene protocols are used, particularly in the transfer of water.</li> <li>Conduct pest and weed management to improve habitat.</li> </ul>	Throughout range	<ul style="list-style-type: none"> <li>NRE (Threatened species, BT)</li> <li>Local governments</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Incorporate buffers around water bodies.</li> </ul>	In areas near the coast.	<ul style="list-style-type: none"> <li>Local Governments</li> <li>Landowners and Managers</li> <li>NRE</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened fish:</b> <b>Tasmanian galaxiids</b> <i>Galaxiidae</i> <b>Australian grayling</b> <i>Prototroctes maraena</i> 	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (create refuges from predatory fish, warmer water and climate, ensure barriers are in place to exclude predatory fish) to build resilience.</li> <li>Raise awareness about species in the local community including the threat from introduced predatory fish.</li> <li>Plan to ensure important populations and locations are protected from stocking of trout.</li> <li>Establish populations in disparate trout free locations to minimize the impact of introduced predatory fish movement during floods, on threatened fish species.</li> <li>Plan for habitat connectivity.</li> </ul>	Swan Apsley, Little Swanport and Macquarie catchments	<ul style="list-style-type: none"> <li>NRE (Inland Fisheries Service, Threatened Species)</li> <li>Landowners and managers, including Hydro Tasmania, STT</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop plans, ensuring fire mitigation activities don't disturb riparian vegetation on and upstream of threatened fish populations or physically disturb waterbodies.</li> </ul>	In the catchment where the fire occurs	<ul style="list-style-type: none"> <li>NRE (Inland Fisheries Service, Threatened Species)</li> <li>TFS</li> <li>Landowners and managers, including Hydro Tasmania, STT</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Develop plans, ensuring any flood mitigation activities avoid disturbance to stream beds and channels on or upstream of Swan, or other threatened, galaxias populations, and physical disturbance of waterbodies in or near dwarf galaxias populations.</li> <li>Plan to maintenance or restoration of quality and width of riparian vegetation at levels necessary to maintain stream temperature and light regimes, maintain input of organic materials, and filter surface runoff under heavy rainfall conditions.</li> </ul>	Relevant catchments	<ul style="list-style-type: none"> <li>NRE (Inland Fisheries Service, Threatened Species)</li> <li>Landowners and managers, including Hydro Tasmania, STT</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Improve education and awareness in relevant fishing and regional communities about pest fish species.</li> <li>Remove introduced fish that could breach barriers or have invaded key sites.</li> </ul>	Relevant catchments	<ul style="list-style-type: none"> <li>NRE (Inland Fisheries Service, Threatened Species, BT)</li> <li>Landowners and managers, including Hydro Tasmania, STT</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A (although there may be a risk to grayling as it spends its larval stage in marine waters)</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds – raptors:</b> <b>Tasmanian wedge-tailed eagle</b> <i>Aquila audax fleayi</i> (WTE) <b>Masked owl (Tasmania)</b> <i>Tyto novaehollandiae subsp castanops</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these, particularly in relation to demographics and anthropogenic impacts.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertaken actions to reduce other threatening processes (indirect climate change effects, lead poisoning, other anthropogenic impacts) to build resilience.</li> <li>Ensure that relevant information on nest locations available to emergency-service staff and fuel reduction teams.</li> </ul>	Statewide	<ul style="list-style-type: none"> <li>NRE</li> <li>FPA</li> <li>Landowners and managers, including, STT and private forests</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Ensure that prior to burning, assessments for WTE and masked owl nest management is undertaken, to minimise disturbance and other impacts.</li> <li>Ensure that appropriate fire regimes are used, including time of year and frequency.</li> <li>Ensure that maps and information about location data, ecological information and potential habitat is available to emergency-service staff and avoided in bushfire risk management and mitigation activities.</li> <li>Retain unburnt vegetation within burns to provide habitat.</li> </ul>	Statewide	<ul style="list-style-type: none"> <li>NRE</li> <li>FPA</li> <li>TFS</li> <li>Landowners and managers, including STT and private forests</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Currently not identified as a threat, but continual monitoring for impacts or emerging threats should occur. Indirect impacts could occur if a disease were to impact nesting habitat.</li> </ul>	Statewide	<ul style="list-style-type: none"> <li>NRE</li> <li>FPA</li> <li>Landowners and managers, including STT and private forests</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		




Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds – migratory parrots:</b> <b>Orange-bellied parrot</b> <i>Neophema chrysogaster</i> (OBP) <b>Swift parrots</b> <i>Lathamus discolor</i> (SP)	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (habitat protection, predator control) to build resilience.</li> </ul>	OBPs – Within 10km of Melaleuca Lagoon, and migratory route in Tasmania (west coast). SP – SPIBAs and priority habitat BWP – Statewide particularly in breeding areas of north-western, central and eastern parts of Tasmania	<ul style="list-style-type: none"> <li>NRE (PWS, Threatened species)</li> <li>Landowners and managers in key parts of range</li> <li>Local governments</li> </ul>
<b>Blue-winged parrot</b> <i>Neophema chrysostoma</i> (BWP)	Bushfire	<ul style="list-style-type: none"> <li>OBPs – Incorporate ecological fire management requirements into relevant burn planning systems at breeding site and on migratory route.</li> <li>OBPs – Implement appropriate fire regime to protect foraging habitat improving burning regimes to increase the amount of native food resources.</li> <li>Manage risks to habitats from bushfire management activities throughout the range of all species, especially nesting sites during the nesting season.</li> <li>SP – Design controlled burning in relation to the intensity, frequency and timing of burns to reduce impacts to habitat and breeding.</li> <li>Actively manage the landscape to minimise the risk of very large bushfires, particularly of very large high intensity bushfires.</li> </ul>	OBPs – Within 10km of Melaleuca Lagoon, and migratory route in Tasmania (west coast). SP – SPIBAs and priority habitat BWP – Statewide particularly in breeding areas of north-western, central and eastern parts of Tasmania	<ul style="list-style-type: none"> <li>NRE (PWS, Threatened species)</li> <li>Landowners and managers in key parts of range</li> <li>TFS</li> <li>Local governments</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>OBPs – Monitor and minimise hydrological changes to nationally important wetlands through appropriate management of water allocations, wetland drainage, estuary management and stormwater management.</li> <li>Ensure flood mitigation activities don't impact foraging habitat.</li> </ul>	OBPs – Within 10km of Melaleuca Lagoon; Wetlands and saltmarshes on migratory route SP – key habitat	<ul style="list-style-type: none"> <li>NRE (PWS, Threatened species)</li> <li>Landowners and managers in key parts of range</li> <li>Local governments</li> </ul>



Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds – migratory parrots:</b> <b>Orange-bellied parrot</b> <i>Neophema chrysogaster</i> (OBP) <b>Swift parrots</b> <i>Lathamus discolor</i> (SP) <b>Blue-winged parrot</b> <i>Neophema chrysostoma</i> (BWP)	Biosecurity	<ul style="list-style-type: none"> <li>Conduct regular testing of wild and captive populations for PBFD and other diseases.</li> <li>Develop protocols on transport, handling and disposal procedures for dead birds and their tissues to prevent PBFD infected biological material from entering the outside environment and potentially infecting wild parrots.</li> <li>Implement actions identified in threat abatement plan.</li> <li>Develop methods for reducing the impact of introduced sugar gliders (<i>Petaurus breviceps</i>) on nesting swift parrots (potential risk to OBPs and BWPs)</li> <li>Monitor for other introduced predators that might impact the species.</li> </ul>	OBPs - Within 10km of Melaleuca Lagoon; Wetlands and saltmarshes on migratory route SP- key habitat	<ul style="list-style-type: none"> <li>NRE (PWS, Threatened species)</li> <li>Landowners and managers in key parts of range</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Rehabilitate degraded areas to minimise erosion and build resilience against threats caused by sea-level rise and storm surges.</li> <li>Identify important areas on adjacent private properties to enable the landward retreat of coastal vegetation from the reserve.</li> <li>Evaluate the value of modification of roads and levee banks that form barriers preventing retreat of saltmarsh communities.</li> </ul>	South and west coasts - within 10 km of the coast and 200 m of coastal wetlands and waterbodies	<ul style="list-style-type: none"> <li>NRE (PWS, Threatened species)</li> <li>Landowners and managers in key parts of range</li> <li>Local government</li> </ul>




Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds:</b> <b>Forty-spotted pardalotes</b> <i>Pardalotus quadragintus</i> 	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (indirect climate change effects, parasitic fly, habitat loss and degradation) to build resilience.</li> <li>Protect and expand critical habitat and enhance connectivity through management interventions and revegetation works.</li> <li>Work with weetaipoona Aboriginal Corporation to build on previous work, manage nest boxes, improve habitat, and stimulate white gum regeneration.</li> </ul>	Range of the species	<ul style="list-style-type: none"> <li>NRE (PWS, Threatened species)</li> <li>Landowners and managers in key parts of range</li> <li>Local government</li> <li>WAC, SETAC</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Plan and incorporate appropriate guidelines for fire management in forty-spotted pardalote habitat into fire management plans.</li> <li>Raise awareness about suitable fire regimes.</li> </ul>	East Coast, primarily on Maria and Bruny islands and south-east coastline	<ul style="list-style-type: none"> <li>NRE (PWS, Threatened species)</li> <li>TFS</li> <li>Landowners and managers in key parts of range</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Investigate the nest parasite <i>Passeromyia longicornis</i> to better understand its role and impact. In the interim manage the parasite in key breeding areas.</li> <li>Continue to monitor for pests and diseases and emerging threats</li> <li>Manage any incursions, including weeds that degrade habitat.</li> </ul>	Across the species range	<ul style="list-style-type: none"> <li>NRE</li> <li>ANU</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A (could be a threat in the future)</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds:</b> <b>Australasian bittern</b> <i>Botaurus poiciloptilus</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Raise awareness about the species and its habitat.</li> <li>Undertake actions to reduce other threatening processes (impacts to their key habitat – wetlands,) to build resilience.</li> <li>Restore key habitat.</li> </ul>	Key habitat	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Appropriate fire regimes (including protecting key vegetation, the frequency and intensity and time of year).</li> <li>Establish 10m buffer around wetlands and waterways and prevent burns and works from impacting on these.</li> </ul>	Key habitat	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local</li> <li>TFS government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Plan for the management of key wetlands.</li> <li>Ensure flood mitigation activities don't impact foraging sites.</li> </ul>	Key habitat	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for signs of invasive species.</li> <li>Implement feral cat management actions.</li> </ul>	Key habitat	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Ensure coastal inundation mitigation activities don't impact feeding sites.</li> </ul>	Coastal areas near key habitat	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds:</b> <b>Azure kingfisher</b> <i>Ceyx azureus subsp. diemenensis</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (restore and protect key habitat) to build resilience.</li> <li>Awareness raising amongst landowners and managers about the bittern.</li> <li>Increase habitat by restoring natural hydrology.</li> <li>Fence areas to keep stock from key habitat.</li> </ul>	Across the species range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop appropriate fire regimes and communicate these.</li> </ul>	Port Davey, Huon and Gordon-Franklin catchments	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Ensure mitigation activities such as levee building doesn't impact nesting sites</li> </ul>	Port Davey, Huon and Gordon-Franklin catchments	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for signs of invasive species.</li> <li>Manage for weeds and pests to improve habitat quality.</li> </ul>	Across the species range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Ensure mitigation activities such as levee building doesn't impact nesting sites.</li> </ul>	Port Davey, Huon and Gordon-Franklin catchments	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds – shorebirds:</b> <b>Hooded plover</b> <i>Thinornis cucullatus</i> <b>(also rubricollis)</b> <b>Short-tailed shearwater</b> <i>Puffinus tenuirostris</i> <b>Little penguin</b> <i>Eudyptula minor</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (reducing impacts to nesting plovers) to build resilience.</li> <li>Awareness raising for visitors in areas where hooded plovers nest.</li> <li>Employ measures to reduce impact from dogs on hooded plovers.</li> </ul>	At key sites in the species range	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Ensure that maps and information about location data, ecological information and potential habitat is available to emergency-service staff and avoided in bushfire risk management and mitigation activities.</li> <li>Ensure that actions to control fires don't impact their habitat</li> </ul>	At key sites in the species range	<ul style="list-style-type: none"> <li>NRE</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Ensure flood mitigation activities don't impact nesting sites.</li> </ul>	At key sites in the species range	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor nesting sites for predation e.g. cats and dogs.</li> <li>Manage weeds in their habitat.</li> </ul>	At key sites in the species range	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Consider nesting sites and nesting habitat before implementing coastal erosion control measures such as brush matting, seawalls and other measures to protect infrastructure against rising sea levels.</li> </ul>	Foredunes, primary and secondary dunes	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened birds – migratory waders:</b> <b>Greater sand plover</b> <i>Charadrius leschenaultii</i> <b>Lesser sand plover</b> <i>Charadrius mongolus</i> <b>Mongolian plover subspecies</b> <i>Charadrius mongolus subsp mongolus</i> , <b>Great knot</b> <i>Calidris tenuirostris</i> <b>Red knot</b> <i>Calidris canutus</i> <b>Curlew sandpiper</b> <i>Calidris ferruginea</i> <b>Eastern curlew</b> <i>Numenius madagascariensis</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (impacts to foraging sites) to build resilience.</li> <li>Raise awareness amongst visitors and the community in areas where migratory birds forage and roost.</li> <li>Apply measures to reduce impact from dogs.</li> </ul>	Coastal areas and key wetlands	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Ensure that maps and information about location data, ecological information and potential habitat is available to emergency-service staff and avoided in bushfire risk management and mitigation activities.</li> <li>Ensure that downstream effects of fire are managed to minimise impacts to foraging areas.</li> </ul>	Coastal areas and key wetlands	<ul style="list-style-type: none"> <li>NRE</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Ensure flood mitigation activities don't impact feeding and roosting sites.</li> </ul>	Coastal areas and key wetlands	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Test any dead birds for avian influenza as per AUSVETPLAN</li> <li>Monitor for other diseases.</li> </ul>	Coastal areas and key wetlands	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Ensure coastal inundation mitigation activities don't impact feeding and roosting sites.</li> </ul>	Coastal areas and key wetlands	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened species – mammals – quolls and bandicoots:</b> <b>Eastern quoll</b> <i>Dasyurus viverrinus</i> <b>Spotted-tailed quoll</b> <i>Dasyurus maculatus subsp maculatus</i> <b>Eastern barred bandicoot</b> <i>Perameles gunnii</i> 	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (protecting and restoring habitat, reducing impacts from invasive species and diseases) to build resilience.</li> <li>Establish a captive population to ensure preservation of genetic representation and increase genetic diversity of potential insurance populations for future translocations and reintroductions.</li> </ul>	Known locations and suitable habitat	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Plan to ensure unburnt refuge areas are retained during fuel reduction burning operations.</li> <li>Ensure appropriate fire regimes are used.</li> <li>Fire management authorities and land management agencies establish suitable maps and install fire markers to avoid damage to threatened species and their habitat during fire preparedness and suppression activities.</li> <li>Retain unburnt vegetation within burns to provide refuges and habitat.</li> </ul>	Known locations and suitable habitat	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Continue cat control at key sites.</li> <li>Examine some of the potential diseases including <i>Toxoplasmosis gondii</i>.</li> <li>Monitor for new and emerging threats</li> </ul>	Statewide	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		


Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened mammals:</b> <b>Tasmanian devil</b> <i>Sarcophilus harrisii</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Continue to undertake actions to reduce other threatening processes (e.g. DFTD, habitat protection and restoration) to build resilience.</li> </ul>	Throughout its range, particularly priority populations.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Ensure appropriate fire regimes are used.</li> <li>Develop and implement fire regime to maintain complex, patchy habitats suited to the species.</li> <li>Develop and communicate fuel reduction burning and clearing guidelines for land managers to retain habitat.</li> </ul>	Throughout its range, particularly priority populations.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Ensure flood mitigation activities don't impact feeding and roosting sites.</li> </ul>	Throughout its range, particularly priority populations.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Continue to monitor impact of DFTD (1 and 2)</li> <li>Monitor for new and emerging threats</li> </ul>	Throughout its range, particularly priority populations.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Ensure coastal inundation mitigation activities don't impact feeding and roosting sites.</li> </ul>	Throughout its range, particularly priority populations.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened mammals:</b> <b>Eastern bettong</b> <i>Bettongia gaimardi</i> (and <i>cuniculus</i> on listing advice)	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (habitat restoration and protection, anthropogenic impacts) to build resilience.</li> </ul>	Throughout its range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Implement fire regime to maintain complex, patchy habitats with open areas and dense vegetation.</li> <li>Develop and communicate fuel reduction burning and clearing guidelines for land managers to minimise potential impacts on habitat.</li> <li>Retain unburnt vegetation within burns to provide refuges and habitat.</li> </ul>	Throughout its range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for signs of <i>Toxoplasma gondii</i> in bettong populations</li> <li>Monitor for new and emerging threats</li> </ul>	Throughout its range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FAUNA (continued)				
<b>Threatened mammals:</b> <b>New Holland mouse</b> <i>Pseudomys novaehollandiae</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these, including the distribution of the species across the state.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (invasive predator control, weeds and disease management that might impact their habitat) to build resilience.</li> </ul>	Throughout its range. Within NRM South region records and core range only in Freycinet NP. Potential range extends from Bicheno along coastal areas south to Swanport River.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Identify appropriate intensity and interval of fire to create patches of habitat of different successions for the species.</li> <li>Ensure fire mitigation actions do not impact the species or habitat.</li> </ul>	Throughout its range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>TFS</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Implement appropriate management actions to minimise the adverse impacts and spread of existing <i>Phytophthora cinnamomi</i> infestations</li> <li>Conduct cat control at key sites.</li> <li>Monitor for new and emerging threats</li> </ul>	Throughout its range	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FLORA				
<b>Threatened eucalypts</b> <b>Morrisby's gum</b> <i>Eucaus morrisbyi</i> (Morrisby) <b>Miena cider gum</b> <i>Eucalyptus gunii subsp. divaricata</i> (Miena)	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (protection of existing populations from other impacts, expansion of the range, etc.) to build resilience.</li> <li>Collect seed to enhance quantity and genetic diversity of seed banked reserves to allow for future conservation plantings with maximum adaptive capacity.</li> </ul>	Morrisby - Calverts Hill Nature Reserve, East Risdon State Reserve Miena - Mainly on Central Plateau near Great Lake, Arthurs Lake and Lake Sorrel on Conservation Areas and other publicly managed lands, privately managed lands under conservation covenant and private freehold lands	<ul style="list-style-type: none"> <li>NRE</li> <li>TFS</li> <li>TAC</li> <li>TLC and other Land Mangers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Morrisby - Exclude fire from Calvert's Hill stand until most of the wild and planted seedlings are large enough to survive a burn.</li> <li>Appropriate fire regimes.</li> <li>Miena Work with the Tasmanian Aboriginal Centre to map current extent of Miena cider gum with a specific focus on mapping and protecting scar trees.</li> </ul>	Throughout their range.	<ul style="list-style-type: none"> <li>NRE</li> <li>TFS</li> <li>TAC</li> <li>TLC and other Land Mangers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>		
	Biosecurity	<ul style="list-style-type: none"> <li>Develop and implement measures to prevent invasion of recruitment niches by Chilean needle grass (<i>Nassella neesiana</i>).</li> <li>Miena - Fence additional key sites, band additional mature trees, cage additional wild seedlings and young juveniles (particularly in the core stand at Shannon Lagoon), extend cages if necessary to protect from grazing by stock and deer.</li> <li>Monitor for new and emerging threats</li> </ul>	Throughout their range.	<ul style="list-style-type: none"> <li>NRE</li> <li>TLC and other Land Mangers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		



Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FLORA (continued)				
<b>Other threatened plants:</b> <b>Southport heath</b> <i>Epacris stuartii</i> 	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (weed control, protection of seedlings, seed collection and propagation) to build resilience.</li> <li>Seed collection and long-term storage to manage the risk of losing genetic diversity and use during post emergency recovery.</li> <li>Establish and maintain a representative ex situ collection of living plants at a suitable location remote from the wild population.</li> </ul>	At the sites the species exist (Southport Lagoon Conservation Area and George III Monument Historic Site) and offsite.	<ul style="list-style-type: none"> <li>NRE (PWS, threatened species)</li> <li>RTBG</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Ensure that location of population is known to emergency agencies and staff by installing field markers and incorporated this information into bush fire management plans.</li> <li>Ensure fire mitigation actions do not impact the species or habitat.</li> <li>Ensure that fires do not occur within populations before a seedbank large enough to replace the number of fire- killed standing plants has been accumulated.</li> </ul>	At locations of species	<ul style="list-style-type: none"> <li>NRE (PWS, threatened species)</li> <li>TFS</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Unlikely to be an impact but protect populations as much as possible.</li> </ul>	At locations of species	<ul style="list-style-type: none"> <li>NRE (PWS, threatened species)</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Implement hygiene protocols including a hygiene management plan and risk assessment to protect known populations from further outbreaks of <i>P. cinnamomi</i>.</li> <li>Ensure that areas that are <i>P. cinnamomi</i> free are sign posted and hygiene stations are implemented and maintained.</li> <li>Monitor for new and emerging threats</li> </ul>	At locations of species	<ul style="list-style-type: none"> <li>NRE (BT, PWS, threatened species)</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Ensure coastal inundation mitigation activities don't impact the populations.</li> <li>Maintenance of ex situ plantings that represent the genetic diversity of the species</li> </ul>	At locations of species	<ul style="list-style-type: none"> <li>NRE (PWS, threatened species)</li> </ul>

Asset	Emergency scenario	Actions	Where at risk	Who has current roles:
THREATENED SPECIES – FLORA (continued)				
<b>Threatened Orchids:</b> <b>Sagg spider orchid</b> <i>Caladenia saggicola</i> <b>Milford leek-orchid</b> <i>Prasophyllum milfordense</i> <b>Fleshy greenhood</b> <i>Pterostylis wapstrarum</i>	General	<ul style="list-style-type: none"> <li>Identify gaps in knowledge and address these.</li> <li>Undertake planning to prepare for emergencies (who, what, where) and communicate these.</li> <li>Embed processes in relevant emergency response teams.</li> <li>Undertake actions to reduce other threatening processes (clearing, inappropriate fire regimes, grazing) to build resilience.</li> <li>Collect diversity of seed based on genetic study for restoration.</li> <li>Ensure symbiotic fungi collected and stored ex-situ for restoration</li> </ul>	Throughout their range	<ul style="list-style-type: none"> <li>NRE (PWS, threatened species)</li> <li>Local government</li> <li>Landowners and managers</li> </ul>
	Bushfire	<ul style="list-style-type: none"> <li>Develop specific plans identifying approaches such as restricting controlled burning at sites when orchid species are dormant</li> <li>Identify and implement appropriate fire management plans for the species</li> <li>Restrict mechanical disturbance at sites when conducting fire control prevention measures</li> <li>Construct fire breaks (either mechanically or via planned burning) to protect populations from bushfires when flowering.</li> </ul>	Throughout their range	<ul style="list-style-type: none"> <li>NRE (PWS, threatened species)</li> <li>TFS</li> <li>Local government</li> <li>Landowners and managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Maintenance of <i>ex situ</i> plantings that represent the genetic diversity of the species.</li> </ul>	Throughout their range	<ul style="list-style-type: none"> <li>NRE (PWS, threatened species)</li> <li>Local government</li> <li>Landowners and managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Implement <i>Phytophthora cinnamomi</i> hygiene guidelines when visiting or using machinery in catchments supporting threatened orchid habitat.</li> </ul>	Throughout their range	<ul style="list-style-type: none"> <li>NRE (PWS, BT, threatened species)</li> <li>Local government</li> <li>Landowners and managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>		

APPENDIX C TABLE 3: Specific responses for identified biodiversity priorities during and after emergency events

RESPONSE PLAN			DURING			AFTER	
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED ECOLOGICAL COMMUNITIES							
<b>Alpine Sphagnum Bogs and Associated Fens (TEC)</b>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires and/or undertake asset protection of priority sites.</li> <li>Avoid damage to the ecological community from activities associated with fire suppression operations (e.g. control line construction vehicle access, back burning)</li> </ul>	Midlands FMA at known impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement targeted management responses for fire affected areas as identified in planning (e.g. pest plant and animal control, restricted access to prevent further damage)</li> </ul>	Midlands FMA Known impact sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	Few actions available, but manage any displaced injured animals.			<ul style="list-style-type: none"> <li>Implement management responses identified in planning (e.g. pest plant and animal control, restricted access to prevent further damage).</li> </ul>	Upper Derwent and Ouse Catchments	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Contain or control incursions.</li> <li>Landowners and Managers and walkers.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans to either eradicate, contain the risk in areas that threaten the ecological community.</li> <li>Prevent further spread.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED ECOLOGICAL COMMUNITIES (continued)							
<b><i>Eucalyptus ovata</i> – <i>Callitris oblonga</i> Forest (TEC) including South Esk pine <i>Callitris oblonga</i> subsp. <i>oblonga</i></b>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires</li> <li>Attempt to protect priority areas where asset exists.</li> <li>Avoid damage to the ecological community from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> </ul>	East Coast FMA Known impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement targeted management responses, which may include pest plant and animal control</li> <li>Restoration including enrichment planting with South Esk Pine if required</li> </ul>	East Coast FMA Impact sites	<ul style="list-style-type: none"> <li>NRE</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Implement Plans for restoration which may include repair of stock exclusion fencing, enrichment planting with South Esk Pine if required</li> </ul>	Swan-Apsley Catchment At known impact sites on or adjoining grazed lands	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Contain or control incursion.</li> <li>Landowners and Managers and walkers.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE (BT)</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions from plan including biosecurity hygiene regime for vehicles and walkers.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING			AFTER	
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED ECOLOGICAL COMMUNITIES (continued)							
<b><i>Eucalyptus ovata</i> / <i>Eucalyptus brookeriana</i> Forests and Woodlands (TEC)</b>	Bushfire	<ul style="list-style-type: none"> <li>Suppress/control the fire and undertake asset protection at sites at risk or impacted.</li> <li>Avoid damage to the ecological community from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> </ul>	All FMAs Impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement management responses identified in plans (e.g. pest plant and animal control)</li> <li>Restore the community including enrichment planting with <i>E. brookeriana</i> if necessary</li> </ul>	All FMAs Known impacts sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>					
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for incursions including <i>Phytophthora</i> dieback</li> <li>Contain or control new incursions where they threaten the ecological community.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Eradicate, contain or control the incursion where it threatens the ecological community.</li> <li>Implement biosecurity hygiene measures e.g. for vehicles and walkers</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED ECOLOGICAL COMMUNITIES (continued)							
Lowland Native Grasslands of Tasmania (TEC)	Bushfire	<ul style="list-style-type: none"> <li>Implement suppression of fire</li> <li>Avoid damage to the ecological community from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> </ul>	Midlands and East Coast FMAs Known impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified management responses which may include weed and animal control.</li> </ul>	Midlands and East Coast FMAs Known impacts sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>					
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for incursions including <i>Phytophthora</i> dieback and new incursions, e.g. myrtle rust</li> <li>Contain or control incursions where it threatens the ecological community.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>Eradicate, contain or control incursions where they threaten the ecological community.</li> <li>Implement hygiene actions e.g. restrict vehicular access and walkers.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN		DURING			AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED ECOLOGICAL COMMUNITIES (continued)							
Subtropical and Temperate Coastal: Saltmarsh (TEC) including Tasmanian sea-lavender <i>Limonium austarale</i> <i>var. baudanii</i>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires and undertake asset protection of priority sites.</li> <li>- Avoid damage from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> </ul>	Known impact  Sites where the TEC occurs	<ul style="list-style-type: none"> <li>TFS</li> <li>Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions for restoration which may include enrichment planting with Tasmanian sea-lavender, pest plant and animal control, restricted access.</li> </ul>	SE Tas and East Coast FMAs at impacted sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>					
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for signs of incursions e.g. <i>Phytophthora</i> dieback, and new incursions e.g. myrtle rust</li> <li>Contain or control new incursions when they threaten the ecological community.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Land Managers</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Eradicate, contain or control pathogens and diseases where they threaten the ecological community.</li> <li>Implement biosecurity hygiene regime for vehicles and walkers.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>No actions possible during coastal inundation</li> </ul>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified management responses which may include pest plant and animal control, restricted access.</li> <li>Plan for restoration including enrichment planting with Tasmanian sea-lavender if required.</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED ECOLOGICAL COMMUNITIES (continued)							
<b>Tasmanian White Gum</b> ( <i>Eucalyptus viminalis</i> ) <b>Wet Forest (TEC)</b>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires and/or undertake asset protection of known sites.</li> <li>Avoid damage to the ecological community from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> </ul>	All FMAs Known impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified management responses for fire affected areas, which may include pest plant and animal control, restricted access.</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>					
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for signs of incursions, e.g. <i>Phytophthora</i> dieback, and new incursions, e.g. myrtle rust</li> <li>Contain or control incursions where they threaten the ecological community.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>Eradicate, contain or control incursion where it threatens the ecological community</li> <li>Implement hygiene regime e.g. for vehicles and walkers.</li> </ul>	Areas impacted where TEC occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
PRIORITY PLACES							
<b>The Midlands region of central Tasmania</b>	Bushfire	<ul style="list-style-type: none"> <li>Suppress/contain the fire</li> <li>Minimise impact of fire response operations on the area.</li> </ul>	Impacted sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Landowners and Managers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration site.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At impacted sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Clean up and implement identified actions.</li> </ul>	At impacted sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor for incursions</li> <li>Contain or eradication the incursion.</li> </ul>	At incursion sites and surrounding areas.	<ul style="list-style-type: none"> <li>BT</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for incursions</li> </ul>	Around known and previous incursion sites, and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (BT)</li> <li>Local government</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
PRIORITY PLACES (continued)							
<b>Bruny Island (Priority Place)</b>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fire and/or undertake asset protection at at-risk areas.</li> <li>Avoid damage to priority biodiversity assets from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning).</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Land Managers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions for restoration.</li> </ul>	At impacted sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>					
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor, contain or eradication incursion.</li> </ul>	At incursion sites and surrounding areas.	<ul style="list-style-type: none"> <li>BT</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring to and if necessary, control</li> </ul>	At previous incursion sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>BT</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Install barriers/ infrastructure to protect priority assets</li> <li>Support any displaced or injured animals</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Local government</li> <li>NRE</li> <li>Wildlife carers</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions from planning.</li> <li>Rehabilitate impacted areas.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
PRIORITY PLACES (continued)							
<b>Tasmanian Wilderness (World Heritage Place)</b>	Bushfire	<ul style="list-style-type: none"> <li>· Suppress fires</li> <li>· Undertake asset protection.</li> <li>· Avoid damage to priority biodiversity assets from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning).</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>· TFS</li> <li>· Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>· Implement plans for restoration of area.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>· NRE (PWS)</li> <li>· Surrounding landowners and managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>· Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>· Wildlife carers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Implement plans to restore the area.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>· NRE (PWS)</li> <li>· Surrounding landowners and managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>· Monitor for incursions</li> <li>· Contain or eradication the threat.</li> </ul>	At impacted sites and associated buffer areas	<ul style="list-style-type: none"> <li>· BT</li> <li>· PWS</li> <li>· Surrounding landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>· Implement actions identified in the Biosecurity Emergency response plan for the TWWHA.</li> </ul>	At impacted sites and associated buffer areas.	<ul style="list-style-type: none"> <li>· NRE (PWS)</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>· N/A although there could be impacts to some values in southern areas</li> </ul>					

RESPONSE PLAN			DURING			AFTER	
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
RAMSAR SITES							
<b>Moulting Lagoon and Apsley Marshes</b>	Bushfire	<ul style="list-style-type: none"> <li>· Suppress fires</li> <li>· Undertake asset protection of known sites.</li> <li>· Avoid damage to priority biodiversity assets from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> <li>· Manage any displaced injured animals</li> </ul>	Impact areas	<ul style="list-style-type: none"> <li>· TFS</li> <li>· Landowners and Managers</li> <li>· Wildlife carers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Implement plans for Implement plans for recovery and restoration.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>· NRE</li> <li>· Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>· Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>· Wildlife carers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Implement identified actions in plans</li> <li>· Recover and restore site.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>· Landowners and Managers</li> <li>· NRE</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>· Monitor</li> <li>· Contain or eradicate threat</li> </ul>	Areas impacted occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>· NRE (BT)</li> </ul>	<ul style="list-style-type: none"> <li>· Implement actions in plans.</li> </ul>	Areas impacted occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>· Landowners and managers</li> <li>· NRE (BT)</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>· Surveillance of area to identify event impacts – species displacement or mortalities</li> </ul>		<ul style="list-style-type: none"> <li>· Landowners and Managers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Implement identified actions in plans</li> <li>· Recover and restore site.</li> </ul>	Impact area	<ul style="list-style-type: none"> <li>· Landowners and Managers</li> <li>· NRE</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
RAMSAR SITES (continued)							
Interlaken Reserve	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires and/or undertake asset protection of known sites.</li> <li>Avoid damage to priority biodiversity assets from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> <li>Support any displaced/distressed animals</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Landowners and Managers</li> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Water releases in anticipation of flooding conditions to maintain water levels at prescribed heights</li> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions for restoration and rehabilitation</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Contain or eradication programs for biosecurity incursion.</li> </ul>	Areas impacted occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE (BT)</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Monitor and continue to contain or eradicate.</li> </ul>	Areas impacted occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING			AFTER	
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
RAMSAR SITES (continued)							
Pitt Water-Orielton Lagoon	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires and/or undertake asset protection of known sites.</li> <li>Avoid damage to priority biodiversity assets from activities associated with fire suppression operations (e.g. control line construction, vehicle access, back burning)</li> <li>Support any displaced/</li> <li>Manage injured or distressed animals</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Landowners and Managers</li> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions from planning to restore and rehabilitate</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions identified in plan.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Contain or eradicate the threat.</li> </ul>	Areas impacted occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Surrounding landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans to restore and rehabilitate.</li> </ul>	Areas impacted occurs and surrounding (buffer) areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Manage any displaced/injured animals.</li> <li>Install barriers to limit impacts</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration and rehabilitation.</li> </ul>	Pittwater Nature Reserve At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Local government</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA							
<b>Threatened invertebrates including:</b> <b>Ammonite snail</b> <i>Ammoniropa vigne</i> <b>Ptunarra brown butterfly</b> <i>Oreixenica ptunarra</i> <b>Tasmanian chaostola skipper</b> <i>Antipodia chaostola subsp. Leucophaea</i>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires.</li> <li>Protect known populations</li> <li>Ensure there are no impacts from fire</li> <li>suppression.</li> </ul>	Where fires occur at known species sites	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions identified, which may include weed control, habitat restoration.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>Monitor and restore habitat</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Ptunarra: Implement targeted wasp control program during outbreaks / high wasp numbers</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (BT),</li> <li>Local government</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions identified.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (BT), Local government</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened frogs:</b> <b>Green and gold frog</b> <i>Litoria raniformis</i>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fires and/or undertake habitat protection</li> <li>Protect known populations and critical aquatic habitat from accidental damage during fire suppression.</li> </ul>	Where fires occur at known species sites	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified plans for recovery and restoration. Monitor impact on populations</li> <li>Remove or manage exotic fish incursions post flood (for example carp, trout and redfin).</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>		<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified plans for recovery and restoration.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Implement biosecurity hygiene practices</li> </ul>	At known impact sites and surrounding areas	<ul style="list-style-type: none"> <li>NRE (BT)</li> <li>Landowners and managers</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Monitor impact on populations</li> <li>Implement plans for restoration.</li> <li>Establish infected and non- infected areas/ zones</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>Land Managers</li> <li>Landowners and Managers</li> <li>NRE (BT, IFS)</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At impacted sites	<ul style="list-style-type: none"> <li>NRE (BT)</li> <li>Landowners and managers</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Land Managers</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING			AFTER	
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened fish:</b>  <b>Threatened Tasmanian Galaxiidae</b>  <b>Australian grayling</b> <i>Prototroctes maraena</i>	Bushfire	<ul style="list-style-type: none"> <li>Protect known populations and riparian habitat from damage</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE (BT)</li> <li>Landowners and managers</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions which may include reduce sediment run-off into catchments</li> <li>Assess water quality and riparian vegetation.</li> </ul>	In catchments identified to contain source populations and impacted.	<ul style="list-style-type: none"> <li>NRE (IFS)</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE (BT)</li> <li>Landowners and managers</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Assess and repair barriers (that prevent movement of introduced species) impacted by flood. Ensure any barriers don't impact negatively on native populations</li> <li>Implement identified actions which may include restoring water quality and riparian vegetation.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE (IFS)</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor and eradicate or contain the threat</li> <li>Prepare for and implement translocations if required</li> </ul>	At known impact sites and surrounding areas	<ul style="list-style-type: none"> <li>NRE (IFS)</li> </ul>	<ul style="list-style-type: none"> <li>Monitor, implement identified actions which may include restoring habitat and translocations.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (IFS)</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened birds – raptors:</b> <b>Tasmanian Wedge-tailed eagle</b> <i>Aquila audax fleayi</i> <b>Masked owl (Tasmania)</b> <i>Tyto novaehollandiae subsp castanops</i>	Bushfire	<ul style="list-style-type: none"> <li>Protect nesting trees as asset during response</li> <li>Suppress fires</li> <li>Ensure fire suppression does not cause impacts.</li> <li>Manage any injured birds</li> </ul>	Known locations.	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Wildlife carers</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>Restore impacted habitat.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>N/A</li> </ul>					
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>Restore impacted habitat.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened birds – migratory parrots:</b> <b>Swift parrot</b> <i>Lathamus discolor</i> <b>Orange-bellied parrot</b> <i>Neophema chrysogaster</i> <b>Blue-winged parrot</b> <i>Neophema chrysostoma</i>	Bushfire	<ul style="list-style-type: none"> <li>Protect nesting trees as asset during response</li> <li>Suppress fires</li> <li>Ensure fire suppression does not cause impacts.</li> <li>Manage any injured birds.</li> </ul>	Where fires occur in species range	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE (PWS)</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions</li> <li>Restore and rehabilitate habitat.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>NRE (PWS)</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>No actions possible</li> </ul>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Contain the outbreak and eradicate if possible, which may include culling diseased birds</li> <li>Pest control (e.g. sugar gliders)</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (BT and threatened species)</li> </ul>	<ul style="list-style-type: none"> <li>Continue to monitor</li> <li>Continue to control or eradicate the threat</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (Threatened species, BT)</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Forty-spotted pardalote</b> <i>Pardalotus quadragintus</i>	Bushfire	<ul style="list-style-type: none"> <li>Protect nesting trees as asset during response</li> <li>Suppress fires</li> <li>Ensure fire suppression does not cause impacts.</li> <li>Manage any injured birds.</li> </ul>	Where fires occur in species range	<ul style="list-style-type: none"> <li>TFS</li> <li>PWS</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions, which might include installing nest boxes to increase nesting habitat</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>No actions possible</li> </ul>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Implement actions which could include habitat restoration</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Appropriately manage nest parasites (e.g. <i>Passeromyia longicornis</i>) and monitor for other incursions.</li> <li>Implement control measures.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowner and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement ongoing control as necessary.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>No actions identified</li> </ul>			<ul style="list-style-type: none"> <li>Implement plans for restoration</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened birds:</b> <b>Australasian bittern</b> <i>Botaurus poiciloptilus</i>	Bushfire	<ul style="list-style-type: none"> <li>Protect habitat from accidental damage during fire suppression.</li> <li>Suppress fires</li> <li>Ensure suppression does not impact on habitat or species</li> </ul>	Impacted sites	<ul style="list-style-type: none"> <li>TFS</li> <li>PWS</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions which may include establishing or restoring breeding and roosting sites.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Control or eradicate the threat (e.g. feral cats and deer)</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions which is likely to include continued control or eradication.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Little can be done, other than manage any injured birds.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions which are likely to include protecting and restoring feeding, roosting and nesting sites</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING			AFTER	
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened birds:</b>  <b>Azure kingfisher</b> <i>Ceyx azureus</i> subsp. <i>diemenensis</i>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fire</li> <li>Protect known populations and habitat</li> <li>Ensure suppression does not result in impacts.</li> </ul>	Impact sites where species is known to occur	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified management actions, which are likely to include habitat restoration.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	Impact sites where species is known to occur	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Hydro Tasmania</li> <li>other Land Managers and owners</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions and restore habitat.</li> </ul>	Impact sites where species is known to occur	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Hydro Tasmania</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Control or eradicate invasion</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Hydro Tasmania</li> <li>other Land Managers and owners</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions and restore habitat.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (BT)</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Little can be done, other than manage any injured birds.</li> </ul>	Impact sites where species is known to occur	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions and restore habitat.</li> </ul>	Impact sites where species is known to occur	<ul style="list-style-type: none"> <li>Local governments, NRE</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened birds:</b> <b>Shorebirds</b> <b>Hooded plover</b> <i>Thinornis cucullatus</i> <i>cucullatus (also rubricollis)</i>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fire</li> <li>Protect known populations and habitat</li> <li>Ensure suppression does not result in impacts.</li> <li>Support displaced/distressed birds.</li> </ul>	Known locations. At impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions and restore habitat.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	Known nesting sites	<ul style="list-style-type: none"> <li>Local Governments</li> <li>NRE</li> <li>Surrounding Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions.</li> </ul>	Known nesting sites	<ul style="list-style-type: none"> <li>Local Governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Control or eradicate invasion</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions</li> <li>Continue to control or eradicate and monitor</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Support any displaced/distressed chicks</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration, provide temporary shelters where needed.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN		DURING			AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened birds – migratory waders:</b> <b>Greater sand plover</b> <i>Charadrius leschenaultii</i> <b>Lesser sand plover</b> <i>Charadrius mongolus</i> <b>Mongolian plover subspecies</b> <i>Charadrius mongolus subsp mongolus</i> <b>Great knot</b> <i>Calidris tenuirostris</i>	Bushfire	<ul style="list-style-type: none"> <li>Identify and protect roosting sites. Assess need for and implement floating roost sites.</li> <li>Suppress fire</li> <li>Protect known populations and habitat</li> <li>Ensure suppression does not result in impacts.</li> </ul>	Identified locations	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration, provide temporary shelters where needed.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals. Assess need for and implement floating roost sites.</li> </ul>	Identified locations	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> <li>Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>Monitor impact on feeding and roosting sites. Assess need for an implement floating roost sites.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Contain or eradicate</li> <li>Implement biosecurity response actions as per avian influenza response plan</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> <li>Commonwealth government* Note this warrants a national response as per AUSVETPLAN</li> </ul>	<ul style="list-style-type: none"> <li>Implement biosecurity response actions as per avian influenza response plan</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> <li>Commonwealth</li> </ul>
<b>Red knot</b> <i>Calidris canutus</i> <b>Curlew sandpiper</b> <i>Calidris ferruginea</i> <b>Eastern curlew</b> <i>Numenius madagascariensis</i>	Coastal inundation	<ul style="list-style-type: none"> <li>Identify and protect roosting sites.</li> <li>Assess need for an implement floating roost sites.</li> </ul>	Identified locations	<ul style="list-style-type: none"> <li>NRE</li> <li>Local government</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions such as floating roost sites.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>Local governments</li> <li>NRE</li> <li>Local government</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened species – mammals – quolls and bandicoots:</b> <b>Eastern quoll</b> <i>Dasyurus viverrinus</i> <b>Spotted-tailed quoll</b> <i>Dasyurus maculatus subsp maculatus</i> <b>Eastern barred bandicoot</b> <i>Perameles gunnii</i>	Bushfire	<ul style="list-style-type: none"> <li>Suppress fire</li> <li>Protect known populations and habitat</li> <li>Ensure suppression does not result in impacts.</li> <li>Support any displaced/distressed animals</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement plans for restoration, e.g. restore habitat corridors. Perform further translocations, if necessary, to re-establish the species at sites where it has become locally extinct</li> </ul>	At impact sites. Suitable translocation sites need to be identified	<ul style="list-style-type: none"> <li>Local governments,</li> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions</li> <li>Restore habitat</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Undertake pest management control and monitor for incursions</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (TS, PWS, BT),</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Continue to manage incursion and monitor</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (PWS, BT),</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>Manage any displaced/injured animals</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers, NRE</li> </ul>	<ul style="list-style-type: none"> <li>Monitor impact on populations</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened mammals:</b> <b>Tasmanian devil</b> <i>Sarcophilus harrisii</i>	Bushfire	<ul style="list-style-type: none"> <li>· Suppress fire</li> <li>· Ensure suppression does not result in impacts.</li> <li>· Support any displaced/distressed animals</li> <li>· Protect the most sensitive areas (e.g. known breeding dens or disease free populations)</li> </ul>	At impact sites Known locations.	<ul style="list-style-type: none"> <li>· Wildlife carers</li> <li>· NRE</li> <li>· TFS</li> </ul>	<ul style="list-style-type: none"> <li>· Plan for restoration, e.g. restore habitat corridors. Ensure ongoing post-fire pest plant and animal control.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>· Local governments</li> <li>· NRE</li> <li>· Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>· Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>· Wildlife carers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Implement identified actions.</li> </ul>	At impact sites.	<ul style="list-style-type: none"> <li>· NRE</li> <li>· Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>· Monitor around incursion sites to determine extent of spread.</li> <li>· Follow disease/population management advice from NRE specialists.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Continue to monitor incursion sites for presence of the disease</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>· NRE,</li> <li>· Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>· Support any displaced/distressed animals</li> <li>Support any displaced/distressed animals</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>· Wildlife carers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Monitor impact on vegetation and plan for restoration.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>· NRE</li> <li>· Landowners and Managers</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened mammals:</b> <b>Eastern bettong</b> <i>Bettongia gaimardi</i> (plus cuniculus on listing advice)	Bushfire	<ul style="list-style-type: none"> <li>· Suppress fire</li> <li>· Protect known populations and habitat</li> <li>· Ensure suppression does not result in impacts.</li> <li>· Manage any displaced injured animals</li> </ul>	Where fires occur at known species sites	<ul style="list-style-type: none"> <li>· TFS</li> <li>· Wildlife carers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Implement identified actions including restoration, e.g. restore habitat corridors.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>· NRE</li> <li>· Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>· Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>· Wildlife carers</li> <li>· NRE</li> </ul>	<ul style="list-style-type: none"> <li>· Implement identified actions including restoration, e.g. restore habitat corridors.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>· NRE</li> <li>· Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>· Identify and contain or control outbreaks of new or established diseases e.g. toxoplasma.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>· NRE (BT)</li> <li>· Land Managers</li> </ul>	<ul style="list-style-type: none"> <li>· Monitor for signs of disease including <i>Toxoplasma gondii</i> in bettong populations</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>· NRE</li> <li>· Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>· N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FAUNA (continued)							
<b>Threatened mammals:</b>  <b>New Holland mouse</b> <i>Pseudomys novaehollandiae</i>	Bushfire	<ul style="list-style-type: none"> <li>Ensure minimal disturbance in areas where the New Holland Mouse occurs- protect known populations and habitat from accidental damage during fire suppression.</li> <li>Manage any displaced or injured animals</li> </ul>	Where fires occur at known species sites	<ul style="list-style-type: none"> <li>TFS</li> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions including restoration, e.g. restore habitat corridors</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>	At impact sites	<ul style="list-style-type: none"> <li>Wildlife carers</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement identified actions including restoration, e.g. restore habitat corridors.</li> </ul>	At known impact sites.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Monitor</li> <li>Contain or eradicate threat</li> <li><i>Phytophthora</i> may damage habitat.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Integrate <i>Phytophthora</i> management with other compatible land management programs such as revegetation, fire, weed and pest management</li> <li>Ensure immediate and ongoing feral predator control within known habitat.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN		DURING			AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FLORA							
<b>Threatened eucalypts:</b> <b>Morrisby's gum</b> <i>Eucalyptus morrisbyi</i> <b>Miena cider gum</b> <i>Eucalyptus gunii</i> <i>subsp. divaricata</i>	Bushfire	<ul style="list-style-type: none"> <li>Avoid damage to populations from activities associated with fire suppression operations.</li> </ul>	Morrisby – Hobart FMA Miena – Mainly Central Plateau	<ul style="list-style-type: none"> <li>TFS</li> <li>PWS</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement targeted management responses in the post fire recovery period for fire affected areas (e.g. pest plant and animal control etc.)</li> <li>Plan for restoration and monitor regeneration over time including enrichment planting and protection of saplings from browsers</li> </ul>	All known populations	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>Few actions available, but manage any displaced injured animals.</li> </ul>			<ul style="list-style-type: none"> <li>Monitor condition of population if inundation is prolonged</li> </ul>	All known populations	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>Treat outbreaks of defoliating insects in spring, summer and into autumn.</li> <li>Active control of Chilean needle grass (<i>Nassella neesiana</i>) incursion (Morrisby's) Monitor for disease.</li> <li>Susceptibility of Miena cider gum to Phytophthora or Myrtle Rust not known</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>	<ul style="list-style-type: none"> <li>Monitor and follow-up treatment of defoliating insects</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FLORA (continued)							
<b>Other threatened plants:</b> <b>Southport heath</b> <i>Epacris stuartii</i>	Bushfire	<ul style="list-style-type: none"> <li>Physical damage to the habitat and individuals of the threatened species must be avoided during and after fire operations.</li> <li>Ensure water contaminated with <i>Phytophthora cinnamomi</i> spores is not used for firefighting purposes.</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>TFS</li> <li>NRE</li> </ul>	<ul style="list-style-type: none"> <li>Implement targeted management responses in the post fire recovery period for fire affected areas (e.g. pest plant and animal control, restricted access)</li> <li>Plan for restoration and monitor regeneration over time including enrichment planting of Southport heath if required</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>NRE (PWS)</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>N/A</li> </ul>					
	Biosecurity	<ul style="list-style-type: none"> <li>Treatment and quarantine of <i>Phytophthora</i> infected areas in vicinity of Southport heath population (Recovery Plan)</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (PWS, BT))</li> </ul>	<ul style="list-style-type: none"> <li>Monitor for impacts of <i>Phytophthora</i>. Follow up treatment and maintain quarantine if required</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE (PWS)</li> </ul>
	Coastal inundation				<ul style="list-style-type: none"> <li>Monitor and assess impacts of costal inundation on Southport heath</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>NRE (PWS)</li> </ul>

RESPONSE PLAN			DURING		AFTER		
Asset	Emergency scenario	Actions	Where	Current roles	Actions	Where	Current roles
THREATENED SPECIES – FLORA (continued)							
<b>Threatened Orchids:</b> <b>Sagg spider orchid</b> <i>Caladenia saggicola</i> <b>Milford leek-orchid</b> <i>Prasophyllum milfordense</i> <b>Fleshy greenhood</b> <i>Pterostylis wapstrarum</i>	Bushfire	<ul style="list-style-type: none"> <li>Plan for restoration of threatened orchid populations including by enrichment planting or translocations if required.</li> </ul>	Known sites in Hobart and Midland FMAs Hobart FMA for sagg spider orchid and Milford leek- orchid, Hobart and Midlands FMAs for fleshy greenhood	<ul style="list-style-type: none"> <li>TFS</li> <li>Landowners and Managers</li> <li>RTBG</li> </ul>	<ul style="list-style-type: none"> <li>Implement targeted management responses in the post fire recovery period for fire affected areas (e.g. pest plant and animal control, restricted access)</li> <li>Monitor and assess fire impacts on threatened orchid populations</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Flood	<ul style="list-style-type: none"> <li>No actions possible during flood event</li> </ul>			<ul style="list-style-type: none"> <li>Monitor and assess flood impacts on threatened orchids</li> </ul>	Known impact sites	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Biosecurity	<ul style="list-style-type: none"> <li>If <i>Phytophthora</i> is detected treatment and quarantine of <i>Phytophthora</i> infected areas in vicinity of threatened species populations.</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and managers</li> </ul>	<ul style="list-style-type: none"> <li>Implement targeted management responses in recovery period for fire affected areas (e.g. pest plant and animal control, restrict access)</li> <li>Plan for restoration of threatened orchid populations by enrichment planting or translocations if required</li> <li>Monitor for impacts of <i>Phytophthora</i>.</li> <li>Follow up treatment and maintain quarantine if required</li> </ul>	At known impact sites and surrounding areas.	<ul style="list-style-type: none"> <li>NRE</li> <li>Landowners and Managers</li> </ul>
	Coastal inundation	<ul style="list-style-type: none"> <li>N/A</li> </ul>					

# Appendix D: Agricultural Priorities

APPENDIX D TABLE 1: Priority agricultural natural capital assets of the NRM South region and susceptibility

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
<b>Threatened Ecological Communities (TEC)</b>	Bushfire	A bushfire has the potential to destroy the habitat of TEC on agricultural land and damage soil and water quality. Post event, there would be an increased threat of weeds and invasive species, increased erosion and overall loss of biodiversity.	High	TECs on agricultural land are currently highly susceptible to bushfire. There are limited natural barriers (e.g. rivers or rocky outcrops), there is a significant amount of accumulated fuel and there has been limited suitable fire regimes (appropriate intensity and frequency) in the area for the last several years. Climate change is exacerbating the risk, intensity and frequency of fire.
	Flood	A flood has the potential to exacerbate erosion and sedimentation in the TEC on agricultural land, destroy habitat and displace species who are not well adapted to aquatic or semiaquatic conditions. A flood may also introduce weeds or diseases.	Medium	TECs on agricultural land are less susceptible to flood, as significant effort has been made to control erosion and, where appropriate, many of the plants are somewhat flood resistant.
<b>Priority Places (i.e. Biodiversity Hotspot)</b>	Bushfire	A bushfire has the potential to destroy the habitat of Priority Place(s) that include agricultural land and damage soil and water quality. Post event, there would be an increased threat of weeds and invasive species, increased erosion and overall loss of biodiversity.	Moderate	Priority place on agricultural land are currently highly susceptible to bushfire. There are limited natural barriers (e.g. rivers or rocky outcrops), there is a significant amount of accumulated fuel and there has been only appropriate (frequency and intensity) controlled burns in the area for the last several years.
<b>Threatened Species</b>	Bushfire	A bushfire has the potential to destroy the only known population of the species, which occurs on agricultural land, and to reduce or destroy key habitat. Post event, there would be an increased threat of weeds and invasive species, competition from other species and over browsing from native and feral herbivores.	High	The population site of the species is currently highly susceptible to bushfire. There is a significant amount of accumulated fuel and there has been limited controlled burns in the area for the last several years. Climate change is exacerbating the risk, intensity and frequency of fire.

Asset	Emergency scenario	Why it poses a threat	Susceptibility	Why
<b>Agricultural natural capital assets (e.g. Shelterbelts, remnant vegetation, soil)</b>	Bushfire	<p>A bushfire has the potential to destroy or significantly impact our natural agricultural assets. For example, it can:</p> <ul style="list-style-type: none"> <li>· Burn vegetative ground cover, leading to high susceptibility to erosion.</li> <li>· Destroy habitats and displace pollinating insects.</li> <li>· Damage shelterbelts</li> <li>· Immediately decline water quality from ash, debris, and burnt vegetation (harmful to plants and animals).</li> </ul>	High	Agricultural natural capital assets are highly susceptible to bushfire. There is a significant amount of accumulated fuel and there has been limited controlled burns in the area for the last several years. Climate change is exacerbating the risk, intensity and frequency of fire.
	Flood	<p>A flood has the potential to destroy or significant impact agricultural assets. For example, it can cause:</p> <ul style="list-style-type: none"> <li>· Soil erosion and deposition of nutrients</li> <li>· Crop loss and pasture loss due to debris deposition and flood waters.</li> <li>· Dispersal of invasive species</li> <li>· Increasing susceptibility to diseases for crops</li> </ul>	High	A number of flood events have occurred in recent years with ongoing impacts localised to highly susceptible areas.
	Biosecurity	<p>A biosecurity has the potential to cause substantial decline of fauna and floral species on agricultural land or beyond.</p> <p>Disease and pest incursions may significantly impact on farm vegetation, soils, and farm productivity. For example, it can:</p> <ul style="list-style-type: none"> <li>· Spread unwanted invasive species through waterways, soils, livestock, and/or wind.</li> <li>· Devastating loss of produce, especially if located in a control/contamination zone.</li> </ul>	High	Disease and pest incursions may significantly impact on-farm vegetation and farm productivity

APPENDIX D TABLE 2: Emergency scenarios impacting Soil natural Capital assets of NRM South region

Emergency scenario	Actions	Where	Current roles	Potential role of NRM South
<b>Bushfire</b>	Controlled burns	Catchment-wide. Location to be determined by TFS, Tasmanian NRE (NRE), Sustainable Timber Tasmania (STT), councils, and land managers.	The Fuel Reduction Program (TAS government) is a state-wide coordinated program for controlled burns through TFS, NRE, and STT. The burns are undertaken on behalf of and with the agreement of land managers or organisations (councils). Scheduled burns and permits are actively underway, with updates given online by TasAlert (TAS government) and TFS. Land managers can also conduct controlled burns with appropriate permits from their local Fire Permit Officer.	Facilitate collaborative approaches to controlled burns as a proactive measure to improve resilience of natural capital assets. Awareness mechanisms to ensure burning regimes are suitable for biodiversity outcomes. Education about values in the region.
	Cultural burns	Location to be determined by Aboriginal community and groups	Aboriginal community and groups (including Tasmanian Aboriginal Centre, Firesticks Alliance, SETAC and weetaapoonna Aboriginal Corporation) undertake cultural burns, identify priorities, facilitate learning, and connection to Country.	Support community to secure resources, funds and/or access to Country to undertake cultural burn programs as a proactive measure for landscape resilience
	Fire breaks	Location to be determined by land managers and TFS.	Land managers, TFS, private forestry companies, GBEs, and other agencies (including state and local government) coordinate and/or lead fire break planning and implementation. Tools and resources are available (e.g. TFS Fuel Break Guidelines and Tasmanian Fire Service Fuel Break Design Tool)	Ensuring existing collaborations (TFS, NRE, STT, and councils) value natural agricultural assets.
	Vegetation management	All landholders, with a focus on high-risk areas.	All land managers, State and local government play a role.	Providing practical advice and strategies for landholders and communities to limit fire risks (e.g. fuel management, gorse and other weed control). Increase awareness, provide resources to mitigate risk and protect native vegetation, including vegetation control (maintenance), and planting of less fire-prone native vegetation.

Emergency scenario	Actions	Where	Current roles	Potential role of NRM South
<b>Flooding (river and stream flooding)</b>	Support landholders to maintain vegetative ground cover, aiming for >70% cover.	All of catchment, especially floodplain areas.	All land managers, State and local government, peak bodies (e.g. TasFarmers), researchers (e.g. Utas), TasFarm Innovation Hub, and grassroots organisations (e.g. Landcare Tasmania, Derwent Catchment Project) play a role.	Educational support advice, tools, and resources through projects (e.g. Farming Forecaster, Statewide Flood Recovery, and Derwent Pasture Network website). On-ground support for soil conservation measure to reduce erosion, enhance water infiltration, and mitigate the impact of floods.
	Testing soils susceptible to erosion. Focus on documentation/monitoring soil health and level of compaction.	Soil zones with high vulnerability to soil compaction and erosion.	All land managers, State and local government play a role. NRE Tasmania have recognised that north-facing dolerite slopes can be at severe risk to erosion in our catchment.	Coordination and soil health data improvement to identify susceptible areas, target interventions to mitigate soil degradation and minimise the impact of flooding events.
<b>Biosecurity emergency</b>	Maintain appropriate biosecurity provisions, such as on-farm vehicle hygiene, weeds on the property and actively monitoring for advertised threats on <i>Current Biosecurity Alerts</i> on the NRE website.	Catchment-wide.	All land managers, State and local government, and grassroots organisations (e.g. Landcare Tasmania, Derwent Catchment Project) play a role. Specific examples include <i>Tasmanian Highly Invasive Grasses Project</i> and working group and the <i>Tasmanian Weeds Action Fund</i> (WAF).	Coordination and education (e.g. Biosecurity Network), on-farm vehicle hygiene measures, monitoring and addressing threats, and securing funding for strategic initiatives (e.g. <i>Tasmanian Weeds Action Fund</i> , managed collaboratively by the three NRM organisations).
	Focus on maintaining healthy soils and crops to improve disease resistance, such as avoiding soil compaction and nutrient-derived crops.	Catchment-wide.	All land managers, State and local government, and grassroots organisations (e.g. Landcare Tasmania, Derwent Catchment Project) play a role.	Education and outreach programs to promote practices such as soil conservation and nutrient management (e.g. Soil Extension Project), aimed at maintaining healthy soils and crops to enhance disease resistance and mitigate the impact of soil compaction and nutrient-derived diseases.

APPENDIX D TABLE 3: Emergency scenarios impacting water (rivers, creeks, wetlands, estuaries, lakes, dams) natural capital assets of the NRM South region

Emergency scenario	Actions	Where	Current roles	Potential role of NRM South
<b>Bushfire</b>	Controlled burns	Catchment-wide. Location to be determined by TFS, Tasmanian NRE (NRE), Sustainable Timber Tasmania (STT), councils, and land managers.	The Fuel Reduction Program (TAS government) is a state-wide coordinated program for controlled burns through TFS, NRE, and STT. The burns are undertaken on behalf of and with the agreement of land managers or organisations (councils).  Scheduled burns and permits are actively underway, with updates given online by TasAlert (TAS government) and TFS.  Land managers can also conduct controlled burns with appropriate permits from their local Fire Permit Officer.	Facilitate collaborative approaches to controlled burns as a proactive measure to improve resilience of natural capital assets. Awareness mechanisms to ensure burning regimes are suitable for biodiversity outcomes. Education about values in the region.
	Cultural burns	Location to be determined by Aboriginal community and groups.	Aboriginal community and groups (including Tasmanian Aboriginal Centre, Firesticks Alliance, SETAC and weetapoonna Aboriginal Corporation) undertake cultural burns, identify priorities, facilitate learning, and connection to Country.	Support community to secure resources, funds and/or access to Country to undertake cultural burn programs as a proactive measure for landscape resilience
	Fire breaks	Location to be determined by land managers and TFS, NRE.	Land managers, TFS, NRE, private forestry companies, GBEs, and other agencies (including state and local government) coordinate and/or lead fire break planning and implementation.  Tools and resources are available (e.g. TFS Fuel Break Guidelines and Tasmanian Fire Service Fuel Break Design Tool).	Ensuring existing collaborations (TFS, NRE, STT, and councils) value natural agricultural assets.
	Vegetation management	All landholders, with a focus on high-risk areas.	All land managers, State and local government play a role.	On-ground support for landholders and community to limit fire risks (e.g. fuel management, gorse, and other weed control). Increase awareness, provide resources to mitigate risk and protect native vegetation, including vegetation control (maintenance), and planting of less fire-prone native vegetation. Restore riparian corridors of 'damp' vegetation and bank-stabilising root systems.

Emergency scenario	Actions	Where	Current roles	Potential role of NRM South
<b>Flood</b>	Monitoring and maintenance of levees, reservoirs, floodwalls, and large dams.	Catchment-wide.	State and local government play a role. Resources are available (e.g. NRE manuals on waterway and floodplain management).	Educational support advice, tools, and resources through projects.
	Support land managers to maintain vegetative ground cover, aiming for >70% cover. Focus on erosion mitigation near streams and rivers.	All of catchment, especially floodplain areas.	All land managers, State and local government, peak bodies (e.g. TasFarmers), researchers (e.g. UTAS), Tas Farm Innovation Hub, and community groups (e.g. Landcare Tasmania, Derwent Catchment Project) play a role.	Educational support advice, tools, and resources through projects (e.g. Farming Forecaster, Statewide Flood Recovery, and Derwent Pasture Network website). On-ground support for soil conservation measure to reduce erosion, enhance water infiltration, and mitigate the impact of floods. Restore riparian corridors of 'damp' vegetation and bank-stabilising root systems (maintain microclimate).

APPENDIX D TABLE 4: Emergency scenarios impacting vegetation (agroforestry, environmental plantings, native vegetation, riparian land) natural Capital assets of the NRM South region

Emergency scenario	Actions	Where	Current roles	Potential role of NRM South
<b>Bushfire</b>	Controlled burns	Catchment-wide. Location to be determined by TFS, Tasmanian NRE (NRE), Sustainable Timber Tasmania (STT), councils, and land managers.	The Fuel Reduction Program (TAS government) is a state-wide coordinated program for controlled burns through TFS, NRE, and STT. The burns are undertaken on behalf of and with the agreement of land managers or organisations (councils).  Scheduled burns and permits are actively underway, with updates given online by TasAlert (TAS government) and TFS.  Land managers can also conduct controlled burns with appropriate permits from their local Fire Permit Officer.	Facilitate collaborative approaches to controlled burns as a proactive measure to improve resilience of natural capital assets. Awareness mechanisms to ensure burning regimes are suitable for biodiversity outcomes. Education about values in the region.
	Cultural burns	Location to be determined by Aboriginal community and groups.	Aboriginal community and groups (including Tasmanian Aboriginal Centre, Firesticks Alliance, SETAC and weetaipoona Aboriginal Corporation) undertake cultural burns, identify priorities, facilitate learning, and connection to Country.	Support community to secure resources, funds and/or access to Country to undertake cultural burn programs as a proactive measure for landscape resilience
	Fire breaks	Location to be determined by TFS, NRE, STT, and land managers	Land managers, TFS, private forestry companies, GBEs, and other agencies (including state and local government) coordinate and/or lead fire break planning and implementation.  Tools and resources are available (e.g. TFS Fuel Break Guidelines and Tasmanian Fire Service Fuel Break Design Tool).	Ensuring existing collaborations (TFS, NRE, STT, and councils) value natural agricultural assets.
	Vegetation management by fire and other methods, such as removing fuel by slashing and grazing.	All landholders, with a focus on high-risk areas.	All land managers, State and local government play a role.	On-ground support landholders and community to limit fire risks (e.g. fuel management, gorse control, and other weed control). Increase awareness, provide resources to mitigate risk and protect native vegetation, including vegetation control (maintenance), and planting of less fire-prone native vegetation.

Emergency scenario	Actions	Where	Current roles	Potential role of NRM South
<b>Flood</b>	Preservation of riparian vegetation (such as dry forest, rainforest, and tussock grasses).	Catchment-wide.	All land managers, State and local government play a role.	Increase awareness, provide education and resource tools, introduce on-ground support to actively protect undisturbed native vegetation.
	Management of riparian land, such as revegetation and fencing off these areas.	Catchment-wide.	All land managers, private companies, non-for-profit organisations (including Landcare Tasmania for riparian restoration and revegetation) and other agencies (including state and local government, such as Derwent Catchment Project (DCP) for river restoration support).	Facilitate collaborative approaches to riparian management as a proactive measure to improve resilience of natural capital assets. Resources are available (e.g. NRM South Landholder Series Healthy Waterways).
	Control invasive weeds throughout valuable agricultural land to prevent weed spread by flood waters.	Catchment-wide, focused on waterways and floodplains.	All land managers, non-for-profit organisations (including Landcare Tasmania and the NRM projects, such as Tasmanian Weeds Action Fund), and other agencies (including state and local government).	Facilitate collaborative approaches to weed control as a proactive measure to improve resilience of vegetative assets of the catchment.

APPENDIX D TABLE 5: Bushfire scenarios impacting agricultural natural capital assets in the NRM South region

Asset	Actions	Where	Who (best placed)
While event is occurring			
<b>Agricultural natural capital assets (e.g. Shelterbelts, remnant/on-farm vegetation, ground cover, soil, riparian areas, water, environmental plantings, agroforestry, fauna including native pollinators)</b>	Fire suppression	At identified fire source.	Emergency and local fire services (TFS).
	Protecting most sensitive areas, such as vulnerable soils	Sensitive areas within a close vicinity to the fire	Emergency and local fire services (TFS) with input from NRM South to land managers.
	Monitor/assess impacts of bushfire	At identified impact sites and potential impact sites.	Emergency and local fire services (TFS) with support from property owners.

After event has occurred			
<b>Agricultural natural capital assets (e.g. Shelterbelts, remnant/on-farm vegetation, ground cover, soil, riparian areas, water, environmental plantings, agroforestry, fauna including native pollinators)</b>	Immediate clean-up to facilitate an accelerated recovery of natural assets.	At identified impact site(s).	Emergency services (TAS RECOVERY), assistance from land managers, and input and advice from NRM South.
	Implement recovery actions for short-term and long-term restoration, with identified priority for sensitive areas, such as removing stock from vulnerable soils.	At identified priority impact sites.	Land managers, local government (councils), and local communities, with support from emergency services (TAS RECOVERY) and advice from NRM South and Indigenous community groups.
	Support Indigenous-led response for long-term natural asset resilience to bushfires by building capacity and providing funding with and beyond NRM organisations.	All of catchment.	NRM South, Firesticks, TAC, Indigenous community groups would be best placed.
	Build upon knowledge gained through the bushfires to strengthen preparedness and effective actions for future events.	All of catchment.	TFS, NRE, TAS RECOVERY, NRM South, local government (council), and other organisations (private forestry and private landholders) to assist with an effective future preparation action plan. Guidance from Australian Government.
	Provide financial support for effective restoration, such as fencing off fire affected areas to minimise soil disturbance and encourage reestablishment of groundcover and shelterbelts.	At identified priority impact sites.	Federal government, TAS RECOVERY (state government), and advice/coordination from NRM South and local governments (council).
	Improve the rapid deployment of emergency funding to ensure accessibility and flexibility to effected land managers. This action will assist with rebuilding the resilience of natural assets without delay.	At identified impact site(s).	Federal and state government, with advice and coordination from NRM South, local communities, and local governments (councils). Best placed organisations to inquire effected land holders on identified issues surrounding accessibility and flexibility of funding.

## CASE STUDY: Flood scenarios impacting the agricultural natural capital assets of the NRM South region

Asset	Actions	Where	Who (best placed)
While event is occurring			
<b>Water Capital and other natural assets</b>	Protection of water quality during flooding event, such as avoiding fertiliser application to prevent excessive runoff into waterways. Implement erosion control by protecting ground cover.	At identified impact sites.	Land managers, with advice from NRM South, state government, and local governments (council).
	Rapid assessment of impact, with clear lines of responsibility between agencies.	At identified impact sites and other flood-prone areas.	Rapid assessment from state government, with support from local government and advice/coordination from NRM South, state agencies and local governments.
	Immediate cleanup of debris causing risk to assets or safety to decrease risk and accelerate recovery of natural assets. Note that in-stream debris may be important to create safe habitat for native fish.	At identified impact sites	State emergency government (Tas Recovery), assistance from land managers, and input and advice from NRM South, state agencies, GBEs, and local governments (council).

After event has occurred			
<b>Water Capital and other natural assets</b>	Restoration of waterways, including riverbank revegetation in low vegetation areas to support soil resilience for future flooding events.	At identified impact sites.	Land managers, local government (councils), and local community organisations (Landcare Tasmania), with advice and input from NRM South, state agencies, GBEs, and Indigenous community groups.
	Provide financial support for effective restoration, such as covering costs of revegetation on riverbanks and replacing flood effected fences to minimise livestock movement on saturated and disturbed soils.	At identified impact sites.	Federal government, TAS RECOVERY (state government), and advice/coordination from NRM South and local governments (council).
	Improve the rapid deployment of emergency funding to ensure accessibility and flexibility to effected land managers. This action will assist with rebuilding the resilience of natural assets without delay.	All of catchment.	Federal and state government, with advice and coordination from NRM South, state agencies, GBEs, local communities, and local governments (councils). Best placed organisations to inquire effected land holders on identified issues surrounding accessibility and flexibility of funding.
	Support with labour force to implement on ground remediation to facilitate an accelerated recovery of natural assets, such as removal of debris from blocked waterways.	At identified impact sites.	Land managers, local government (councils), and local community organisations (Landcare Tasmania), with prioritisation assistance from NRM South, state agencies, and GBEs.
	Assess effectiveness of interventions that occurred during flooding event. Build upon knowledge gained through the flooding event to strengthen preparedness and effective actions for future events. Establish a network-building, knowledge-sharing system to support action and prioritisation during a flooding event.	All of catchment.	TFS, NRE, TAS RECOVERY, NRM South, local government (council), and other organisations (private forestry and private landholders) to assist with an effective future preparation action plan. Guidance from Australian Government.

APPENDIX D TABLE 7: Biosecurity scenarios impacting agricultural natural capital assets of the NRM South region

Asset	Actions	Where	Who (best placed)
While event is occurring			
Crop or on-farm natural asset	Implement actions/guidance from NRE's <i>Biosecurity Emergency Management and Preparedness Plan</i> , such as isolation measurements.	At identified impact site(s).	Assistance from NRM South to educate the community on important preventative actions recommended by NRE, other state agencies and local government.
	Rapid assessment of impact and monitor impacts.	At identified impact site(s).	NRE, other state agencies and local government would be best placed. Land managers to assist with monitoring impacts if located in vicinity of biosecurity incursion.
	Implement containment of disease/pest and attempt to eradicate (if deemed possible).	At identified impact site(s).	Land managers to support NRE. Advice and input from NRM South, state agencies, TIA, and local government (councils).
After event has occurred			
Crop or on-farm natural asset	Assess effectiveness of interventions that occurred during event. Build upon knowledge gained through the biosecurity to strengthen preparedness and effective actions for future events. Establish a network-building, knowledge-sharing system to support action and prioritisation during biosecurity.	At identified impact site(s).	Federal and state governments (e.g., preventative actions of NRE), with advice and input from NRM South, state agencies, and local governments (councils) for land managers.
	Implement recovery actions for short-term and long-term restoration, with identified priority for most affected sites.	At identified impact site(s).	Land managers and local government (councils) with support from emergency services (TAS RECOVERY), advice from NRE, and input from NRM South and state and federal government.
	Provide financial support for impacted land managers to facilitate an accelerated recovery of natural assets.	At priority impact sites.	Federal and state governments (e.g. NRE), with input and advice from NRM South, state agencies, local governments (council), and other organisations (STT)
	Support with labour force to implement on-ground remediation, such as removal of contaminated product.	At identified impact site(s).	State and local government (councils), with prioritisation assistance from NRM South, state agencies, and GBEs to land managers.



» Critically endangered Southport heath (*Epacris stuartii*)

# Appendix E: Acronyms

<b>AEP</b>	Annual Exceedance Probability
<b>ANU</b>	Australian National University
<b>BT</b>	Biosecurity Tasmania
<b>DCCEEW</b>	Department of Climate Change, Energy, the Environment and Water
<b>DFTD</b>	Devil Facial Tumour Disease
<b>DPAC</b>	Department of Premier and Cabinet
<b>DPFEM</b>	Department of Police, Fire and Emergency Management
<b>DSM</b>	Digital Soil Mapping
<b>EPBC</b>	<i>Environment and Biodiversity Conservation Act 1999</i> (C'wlth)
<b>EM</b>	Emergency Management
<b>ESRI</b>	Environmental Systems Research Institute
<b>FMA</b>	Fire Management Area
<b>FPA</b>	Forest Practices Authority
<b>GIS</b>	Geographic Information System
<b>GSBC</b>	Glamorgan Spring Bay Council
<b>IBAs</b>	Important Bird Areas
<b>IFS</b>	Inland Fisheries Service
<b>LiDAR</b>	Light Detection and Ranging
<b>MEMP</b>	Municipal Emergency Management Plans
<b>MNES</b>	Matters of National Environmental Significance
<b>NHT</b>	Natural Heritage Trust
<b>NRE</b>	Department of Natural Resources and Environment
<b>NVA</b>	Tasmanian Natural Values Atlas
<b>OSEM</b>	Office of Security and Emergency Management
<b>PBFD</b>	Psittacine Beak and Feather Disease
<b>PWS</b>	Tasmanian Parks and Wildlife Service
<b>SES</b>	Tasmanian State Emergency Service
<b>SPIBA</b>	Swift Important Parrot Breeding Areas
<b>SRTM</b>	Shuttle Radar Topographic Mission
<b>STT</b>	Sustainable Timber Tasmania
<b>TAC</b>	Tasmanian Aboriginal Centre
<b>TEC</b>	Threatened Ecological Communities
<b>TFI</b>	Tolerable Fire Intervals
<b>TFS</b>	Tasmanian Fire Service
<b>TLC</b>	Tasmanian Land Conservancy
<b>TSP</b>	Tasmanian <i>Threatened Species Protection Act 1995</i>
<b>TEMA</b>	Tasmanian Emergency Management Arrangements
<b>TWWHA</b>	Tasmanian Wilderness World Heritage Area
<b>UTAS</b>	University of Tasmania

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