Shire of Ravensthorpe

Bushfire Risk Management Plan

2024-2029

Office of Bushfire Risk Management
Bushfire Risk Management (BRM Plan) endorsed 28 October 2024
Local Government Council BRM Plan approval 19 November 2024

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Document control

Document name	Bushfire Risk Management Plan	Current version	3.0
Document owner	CEO Shire of Ravensthorpe	Issue Date	05/09/2024
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Document endorsements

This Bushfire Risk Management Plan has been endorsed by the Office of Bushfire Risk Management as consistent with the standards detailed in the *Guidelines for Preparing a Bushfire Risk Management Plan 2023*.

The approval of the Bushfire Risk Management Plan by the Shire of Ravensthorpe Council signifies support of the plan's implementation and commitment to working with risk owners to manage bushfire risk. Approval does not signify acceptance of responsibility for risk, treatments, or outcomes on land that is not managed by the Shire of Ravensthorpe.

Local Government	Representative	Signature	Date
Shire of Ravensthorpe	Matthew Bird CEO		21/11/24
	Tom Major Shire President		25/11/24

Publication Information

Chapter 1 Introduction

1.1. Background

This Bushfire Risk Management (BRM) Plan provides contextual information to inform a structured approach to identifying, assessing, prioritising, monitoring, and treating bushfire risk. The BRM Plan has been prepared for the Shire of Ravensthorpe, and whilst it is intended to encompass all land within the Shire of Ravensthorpe, and has been written for all stakeholders within that area, the works noted within the plan relate only to Shire owned or managed land and does not bind any other stakeholders. The BRM Plan is informed by consultation and communication with land and asset managers that has occurred throughout its development to ensure an informed and collaborative approach to managing bushfire risk.

The BRM plan has been prepared with due consideration of the requirements stated in the *Guidelines for Preparing a Bushfire Risk Management Plan* (the Guidelines) published by the Office of Bushfire Risk Management (OBRM) including the principles described in *ISO 31000:2018 Risk Management*.

1.2. Objective of the Bushfire Risk Management Planning Program

The BRM planning program supports local governments to reduce the threat posed by bushfire. The Shire of Ravensthorpe BRM Plan will contribute to achieving the objective of the BRM program by:

- Guiding and coordinating a cross-tenure, multi-stakeholder approach to BRM planning, including through the states emergency management framework and targeted working groups.
- Facilitating the effective use of the financial and physical resources available for BRM activities.
- Supporting integration between risk owners, strategic objectives, and tactical outcomes.
- Documenting processes used to monitor and review the implementation of treatments to ensure risk is managed to an acceptable level.

1.3. Legislation, policy and standards

Legislation, policy, and standards that were applied in the development of this BRM Plan can be found in the *Bushfire Risk Management Planning Handbook – Appendix 1 – Summary of Related Legislation, Policy, and Guidelines*.

1.3.1 Legislation

- *Aboriginal Heritage Act 1972*
- *Biodiversity Conservation Act 2016*
- *Building Act 2011*
- *Bush Fires Act 1954*
- *Conservation and Land Management Act 1984*
- *Country Areas Water Supply Act 1947*
- *Emergency Management Act 2005*
- *Environmental Protection Act 1986*

- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Fire Brigades Act 1942*
- *Fire and Emergency Services Act 1998*
- *Heritage of Western Australia Act 1990*
- *Wildlife Conservation Act 1950*
- *National Trust of Australia (WA) Act 1964*
- *Soil and Land Conservation Act 1945*
- *Bush Fires Regulations 1954*
- *Emergency Management Regulations 2006*
- *Planning and Development (Local Planning Scheme) Regulations 2015*

1.3.2 Policies, Guidelines, and Standards

- State Emergency Management Policy
- State Emergency Management Procedures
- State Hazard Plan - Fire
- State Planning Policy 3.4: Natural Hazards and Disasters
- State Planning Policy 3.7: Planning in Bushfire Prone Areas
- AS/NZS ISO 31000: 2018 – Risk Management Guidelines
- AS 3959-2018 Construction of Buildings in Bushfire Prone Areas
- Guidelines for preparing a Bushfire Risk Management Plan
- Guidelines for Planning in Bushfire Prone Areas and Appendices
- National Emergency Risk Assessment Guidelines (NERAG)
- A guide to the Exemptions and Regulations for Clearing Native Vegetation
- A Guide to the Assessment of Applications to Clear Native Vegetation
- A Guide to Burning Under the Native Vegetation Clearing Provisions
- Guidelines for Plantation Fire Protection
- Managing Phytophthora Dieback in Bushland
- A Guide to Constructing and Maintaining Firebreaks
- Building Protection Zone Standards (DFES)
- Aboriginal Heritage Due Diligence Guidelines
- Shire of Ravensthorpe - Local Planning Policy No. 9 – Fire Management Plans
- Shire of Ravensthorpe - Local Planning Policy No. 13 – Farm Forestry
- Shire of Ravensthorpe – Local Planning Policy LO1 – Bushfire Control – Camping and Cooking Fires
- Shire of Ravensthorpe Local Planning Policy LO2 – Bush Fire Advisory Committee
- Shire of Ravensthorpe Local Planning Policy LO3 – Bush Fire Control – Burning Restrictions
- Code of Practice for Timber Plantations in Western Australia – Forest Industries Federation (WA) Inc. Australian Forest Growers (AFG), Forest Products Commission, The Government of Western Australia 2006

1.3.3 Other Related Documents

- National Strategy for Disaster Resilience
- National Statement of Capability for Fire and Emergency Services (AFAC 2017)
- Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Dept. of Health 2007)

- Bushfire Risk Management Planning Handbook 2023
- Bushfire Risk Management System (BRMS) User Guide (DFES 2021)
- Shire of Ravensthorpe - Strategic Community Plan 2020-2030
- Shire of Ravensthorpe - Corporate Business Plan 2020-2030
- Shire of Ravensthorpe - Local Planning Strategy (2015)
- Shire of Ravensthorpe – Emergency Management Local Recovery Management Plan (August 2024)
- Shire of Ravensthorpe - Local Emergency Management Arrangements (August 2024)
- Shire of Ravensthorpe - Evacuation Plan (2022)
- Shire of Ravensthorpe - Municipal Inventory of Heritage Places
- Shire of Ravensthorpe Fire Control and Firebreak Notice 2024/25
- Department of Water and Environmental Regulation Permit to clear
- State Emergency Management Committee – Great Southern District Risk Assessment Summary Risk Results Report.

Chapter 2 The Risk Management Process

The BRM planning process is a cycle of understanding the context and assessing and treating risks (Figure 1). Each of these steps is informed by communication and consultation and supported by monitoring and review. The three products produced during the BRM planning process are the BRM Plan, Asset Risk Register, and Treatment Schedule (Figure 1).

Further details on the guiding principles and process for the development of this plan can be found in Chapter 2 of the Guidelines.

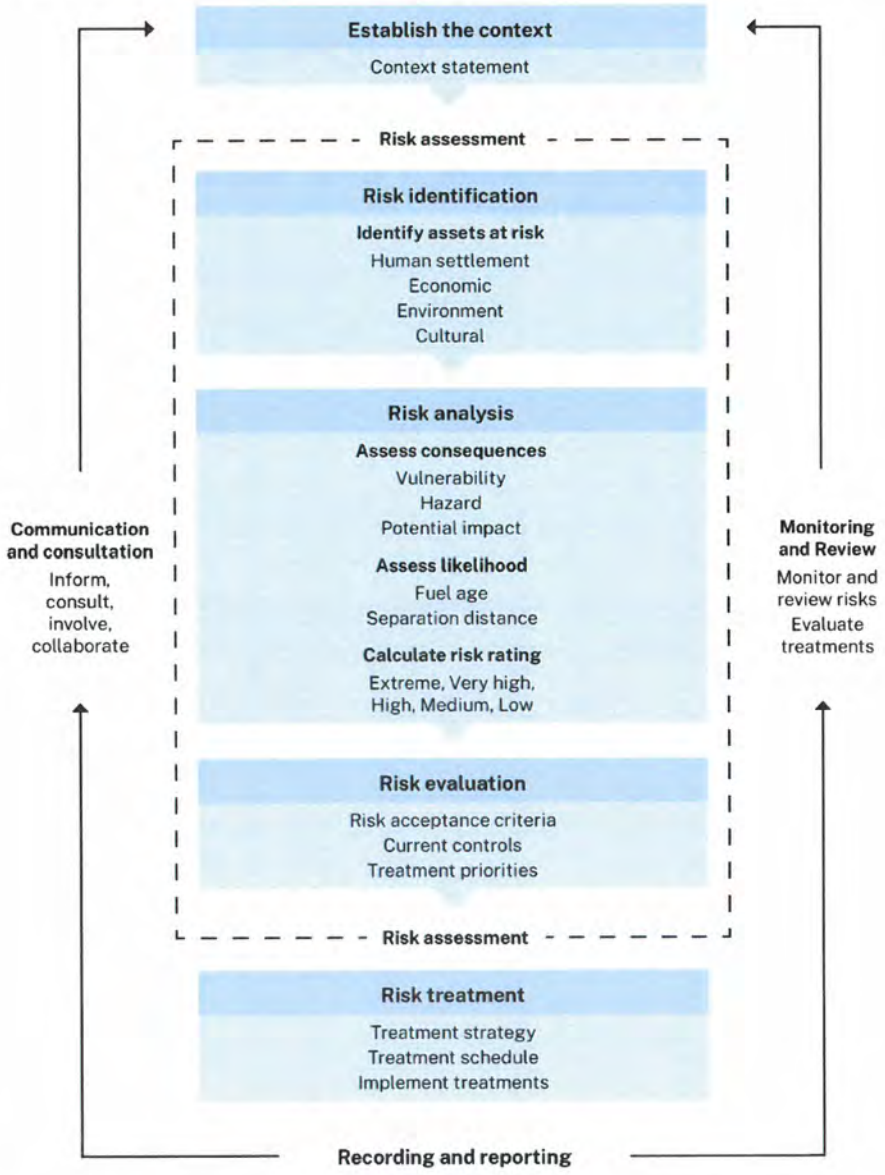

Figure 1: The Bushfire Risk Management planning process

2.1. Roles and responsibilities

The roles and responsibilities of the key stakeholders involved in the development of the BRM Plan are outlined in Table 1.

Table 1: Roles and responsibilities in the Bushfire Risk Management (BRM) planning process

Stakeholder*	Roles and responsibilities
Local Government	• Custodian of the BRM Plan. • Coordinate the development and ongoing review of the BRM Plan. • Undertake bushfire risk assessment of local government area. • Submit the draft BRM Plan to OBRM for review and endorsement. • Develop and implement a Treatment Schedule for local government managed land. • Encourage risk owners to treat identified risks.
DFES	• Contribute to the development and implementation of the BRM Plan. • Facilitate involvement of state and federal government agencies in the BRM planning process. • Undertake treatments on Unmanaged Reserves and Unallocated Crown Land within gazetted town sites. • By agreement, implement treatment strategies for other land managers. • Endorse BRM Plans as consistent with the Guidelines, BRM Program, and dynamic risk environment. • Administer the Mitigation Activity Fund Grants Program.
Department of Biodiversity, Conservation and Attractions (DBCA)	• Contribute to the development of the BRM Plan. • Implement their treatment program on DBCA managed land, and under MOU with DPLH and CALM Act 1984. • Provide advice on environmental assets and appropriate treatment strategies for their protection.
Department of Planning, Lands and Heritage	• Identify managed assets. • Provide the advice on the management of Aboriginal Cultural Heritage
Other State and Commonwealth Government agencies and public utilities	• Identify managed assets. • Provide advice on current risk treatment programs. • Contribute to the development of BRM Plans. • Undertake treatments on lands they manage.

Stakeholder*	Roles and responsibilities
Corporations and private landowners	• Identify managed assets. • Provide advice on current risk treatment programs. • Undertake treatments on lands they manage. • Comply with any s33 Notices
Others • **Relevant Aboriginal Corporations** • **Shire of Ravensthorpe Bush Fire Advisory Committee** • **Shire of Ravensthorpe Local Emergency Management Committee** • **Community Groups** • **Ravensthorpe Wildflower Show** • **Cocanarup Conservation Alliance** • **Arcadium Lithium, FQM and Medallion Mining companies** • **Community members or representatives**	• Participation in and contribution to the development and implementation of BRM Plans and treatment schedules. • Providing advice for the identification of assets that are vulnerable to fire • Providing advice on appropriate treatment strategies for asset protection.

2.2. Communication and consultation

Communication and consultation are fundamental to the development, implementation, and review of the BRM Plan. A Communication Plan describing communication with relevant stakeholders at each stage of the BRM planning process is in Appendix C. A record of engagement with stakeholders is maintained in the Shire of Ravensthorpe's communications log in Appendix C.

Chapter 3 Establishing the Context

The Shire of Ravensthorpe is vulnerable to bushfires due to a number of influences. The mining sector has had fluctuations over the years which has seen a loss of residents for the town. After harvesting some farmers (often also brigade volunteers) leave the Shire for a holiday, which coincides with the bushfire high season. The summer also sees large numbers of tourists coming into the area. This has the overall effect of reducing the number of people who understand the risks of a bushfire, but increasing population in this period. The remote location means the Shire must be fairly self-sufficient, and relies on grants and government funding to prepare and protect the Shire. The Shire has the Fitzgerald Biosphere at its core and includes the Fitzgerald River National Park (FRNP). The Biosphere is recognised by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and includes 1.5 million hectares of conservation estate, state waters, farmland, industrial and urban areas[1].

There has been significant investment in the bushfire mitigation program both in and surrounding the townsites of Ravensthorpe and Hopetoun and these townsites continue to be the BRM Plans focus. Works in previous years has resulted in a substantial reduction in radiant heat impacts on key locations and enhanced the ability to arrest the development of bushfire within the townsites. See Works Programs figure 4 & 5. Within this BRM Plan, the risks and assets located within the Shire will be assessed including the townsites of Ravensthorpe, Hopetoun, Jerdacuttup, Munglinup, and Fitzgerald. The recreation areas of Mason Bay, Starvation Bay, and Hamersley Inlet, which have large congregations of people in the summer months, and some subdivisions, are also a focus within the BRM Plan including Blu Vista, Lakes Entrance, Krystal Park, Whalebay, Seaview, and Steeredale Meadows due to the higher risk involved around the areas.

3.1 Strategic and Corporate Framework

The Shire of Ravensthorpe's strategic and corporate framework is outlined in its Strategic Community Plan 2020-30.

The BRM Plan aims to support the Shire in achieving its vision of "A growing community, thriving and resilient, sharing our natural wonderland with the world" through the following key strategic outcomes:

2. Community - *This is a safe and family-friendly community where people of all ages have access to services and facilities, and there is plenty to blow your socks off.*	
2.2.1	Publicise and celebrate the contribution of groups and volunteers to the community
2.3.1	Protect public health and amenity
2.3.2	Act to reduce the risk of bushfire, and be prepared in case of bushfire in terms of emergency response and disaster recovery
2.3.3	Ensure buildings and structures are safe and provide a healthy living and working environment

[1] SoR (2021) *Strategic Community Plan 2020 – 2030* https://www.ravensthorpe.wa.gov.au/Profiles/ravensthorpe/Assets/ClientData/Integrated_Planning_Suite/2_Strategic_Community_Plan_FINAL_REVIEWED.pdf

3. Built Environment - *The built environment is accessible, honours history, and provides for the economic and social needs of residents, industry, and visitors*	
3.3.1	Ravensthorpe, Munglinup, and Hopetoun have clean and attractive streetscapes that suit the character of each, with adequate and well-maintained planting and seating
3.4.1	Provision of a road network with service levels that meet the needs of industry, residents, and tourists
3.5.1	Ensure that valued heritage sites are listed, and the Shire's built heritage is looked after
4. Natural Environment - *Our unique world class biosphere is valued and protected for the enjoyment of current and future generations*	
4.3.2	Ensure proper land management practices are observed which result in the protection and care of the natural environment
4.3.3	Undertake relevant Shire services in a way that has regard for the protection of bush and habitat
5. Governance and Leadership	
5.1.2	Ensure that there is good communication between the Shire of Ravensthorpe and the community via a range of methods

The Corporate Business Plan 2020 – 2030, is to be reviewed annually to assess the progress of projects and realign actions and priorities with current information and resource availability. The BRM Plan addresses several of the key strategic themes, of a safe and family-friendly community where the biosphere is valued and protected for all to enjoy[2] and the Shire partners with the community to be an effective advocate.

The Shire of Ravensthorpe recognises the importance of leadership and coordination in emergency management. The Shire has eight (8) volunteer Bush Fire Brigades (BFB) with over three hundred (300) members, a Volunteer Fire and Rescue Service (VFRS) and a Volunteer Fire and Emergency Service (VFES) located in the Shire. There is also a Bush Fire Advisory Committee (BFAC) which is a committee of Council that provides both internal and external agency support, coordination and recommendations to Council on numerous bushfire related issues. There is also an established Local Emergency Management Committee (LEMC) with multi-agency membership. The Committee provides an important multiagency forum to consult and work together to complete the treatment works suggested in the BRM Plan.

The LEMC has developed essential criteria and guiding principles for the management of emergencies in the Shire of Ravensthorpe. The BRM Plan is underpinned by these, specifically that;

- Any loss of life is unacceptable;
- Loss of property is to be minimised;
- Harm to the natural environment is to be minimised;
- Harm to the cultural environment is to be minimised;

[2] SoR (2021) *Strategic Community Plan 2020 – 2030* https://www.ravensthorpe.wa.gov.au/Profiles/ravensthorpe/Assets/ClientData/Integrated_Planning_Suite/2__Strategic_Community_Plan_FINAL_REVIEWED.pdf

- Any damage to the bio-diversity of the local government municipality is unacceptable;
- Access to the district hospital must not be compromised;
- Economic loss to be minimised within the business community;
- Control Centers, evacuation areas, emergency services facilities, and schools must not be compromised; and
- to ensure minimal disruption to essential services including water, power, and communications.

The LEMC will continue to have involvement in the BRM Plan as part of the overall local emergency management structure for prevention preparation response and recovery within the Shire.

The Shire of Ravensthorpe Council will have ultimate responsibility and accountability of the BRM Plan. The CEO and Executive Manager of Projects and Regulatory Services will be responsible for the ongoing requirements and operational matters associated with the components of the plan. All mitigation works proposed to be delivered will have appropriately signed off prescriptions and will be the responsibility of the Shires Bushfire Risk Mitigation Coordinator for on the ground works.

3.2 Land use and tenure

The Shire of Ravensthorpe is in the Southern Goldfields-Esperance region of Western Australia (WA), located on National Highway One, which links Albany and Esperance[3], and is approximately 530km southeast of Perth. The Shire covers an area of 1,287,200Ha, over 12,872km^2. The Shire of Ravensthorpe adjoins the Shire of Esperance to the east, the Shire of Jerramungup to the west and the Shire of Lake Grace to the north.

Approximately two-thirds of the Shire of Ravensthorpe is natural bushland with several national parks, including the FRNP[4] on the coast, reserves, and vacant crown land. The remainder is primarily broad acre farmland.

Whilst the Shires focus is on townsites, the FRNP, the Ravensthorpe ranges, the Cocanarup timber reserves and the Jerdacuttup Lakes reserves are located within the shire and are known for their biodiversity value, and are the home of a number of endangered species and endemic flora.

[3] Shire of Ravensthorpe (2014), Local Planning Strategy https://www.wa.gov.au/system/files/2021-11/LST_Ravensthorpe.pdf
[4] UNESCO n.d. https://www.unesco.org/en/mab/fitzgerald

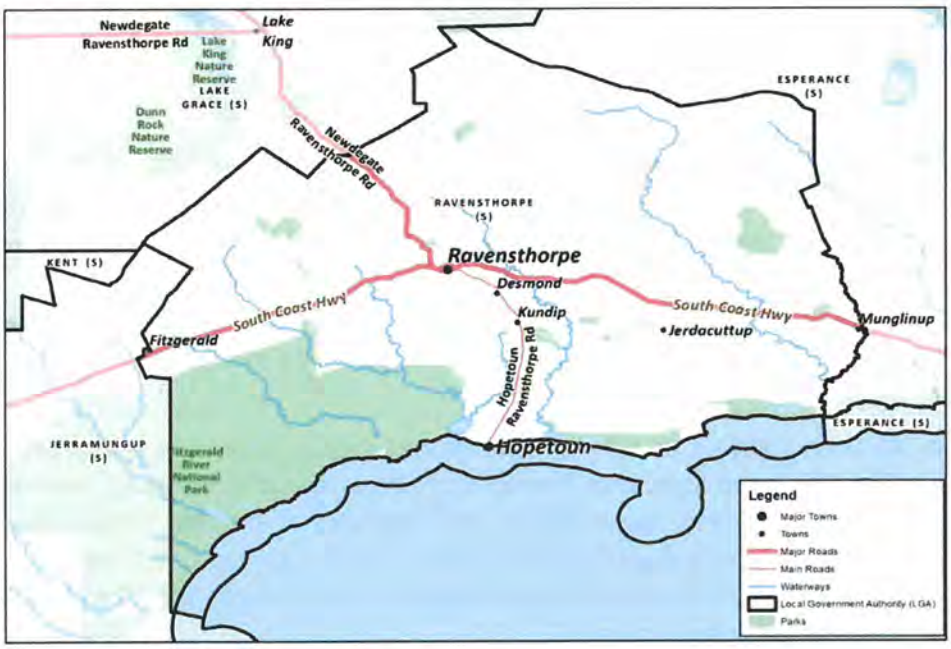

Figure 2: Shire of Ravensthorpe

DBCA is a major bushfire stakeholder with land management responsibility for approximately 238,309.48ha of the vegetated land within the Shire of Ravensthorpe. Another 381,757.45ha is unmanaged reserves (UMR) or unallocated crown land (UCL), falls within the administrative responsibility of DPLH, where DBCA manages pre-bushfire mitigation, feral animals and weeds under an interagency MOU. The *Conservation and Land Management Act WA 1984* (CALM Act) powers are provided through a section 8C agreement for DBCA to undertake works on Crown lands under the functions listed in s33. DBCA has participated in and contributed to the development of this plan and will continue to be involved in the ongoing implementation and review. DBCA uses prescribed burning and has several management plans to ensure the fire regime is not inappropriate for a particular taxon. Due to the different fire regime requirements of threatened species across the region, fire management needs to consider the biological response of the species in particular areas[5].

[5] DBCA (2009) Threatened Species & Ecological Communities Regional Strategic Management Plan https://southcoastnrm.com.au/wp-content/uploads/2021/07/SC_ThreatenedSpeciesRP.pdf

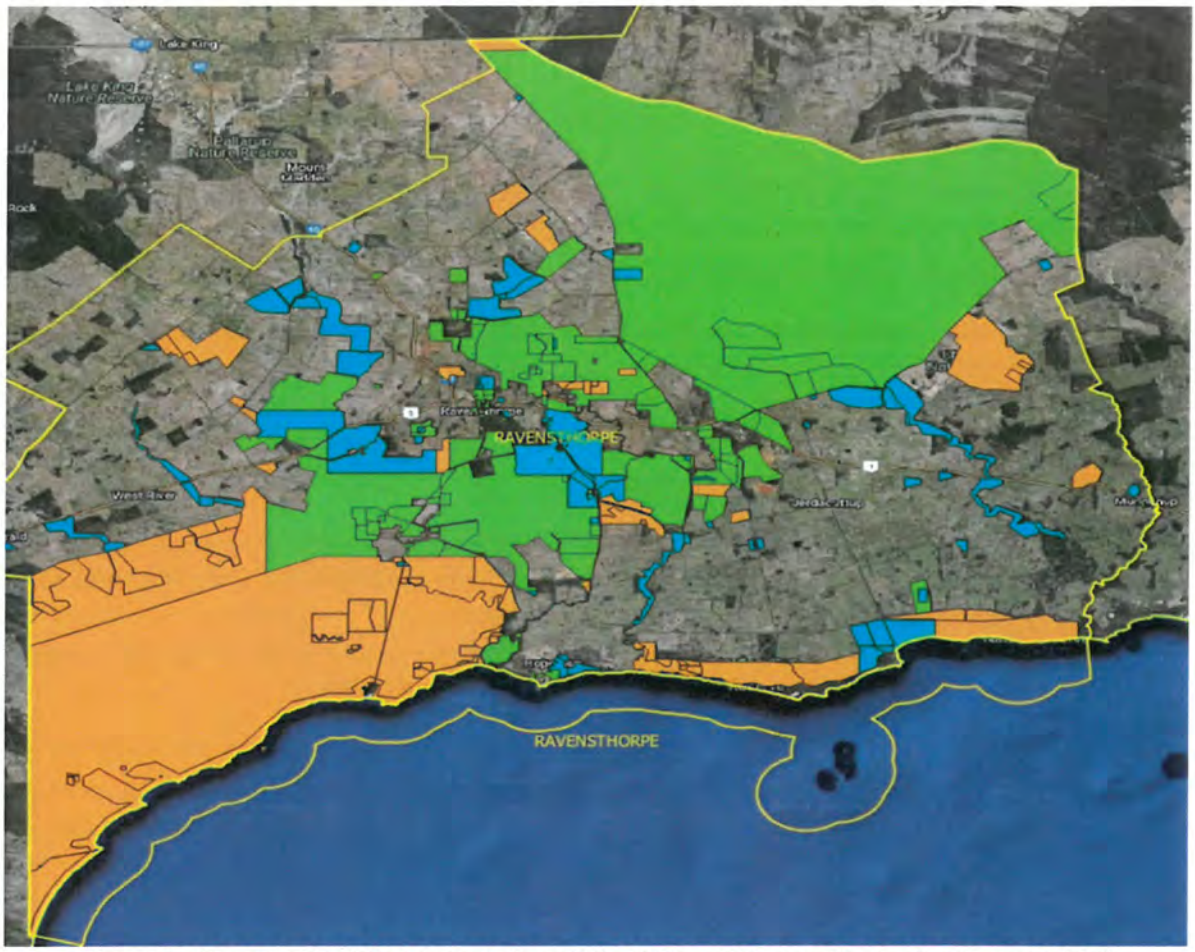

Figure 3: Geographical Representation of the Shire of Ravensthorpe land ownership[6]

Map legend Geographical Representation:

Area Representation	Hectares	% of Geographical Representation
DBCA	238 309	18
UCL	325 880	25
UMR	55 876	5
Shire Crown Reserve	5 905	0.7
Shire Road Reserves	4 000	(included in above)
Private Property	657 230	51.3

Ravensthorpe and the surrounding agricultural hinterland are significantly constrained by the presence of minerals subject to control under the *Mining Act 1979*. The Department of Energy,

[6] Shire of Ravensthorpe (2024) Geographical Representation of the Shire of Ravensthorpe land ownership. Supplied by SoR on 18/6/2024

Mines, Industry Regulation and Safety (DEMIRS) has indicated that the mineral potential is very high for gold, silver and copper[7].

The Shire of Ravensthorpe also has an important Aboriginal heritage. A large part of the Shire falls under the Wagyl Kaip and Southern Noongar Land Use Agreement, and there are many cultural and significant sites in the region. The Wagyl Kaip and Southern Noongar claim for Native Title was made in September 2006. Indigenous Land Use Agreements (ILUA) have now been registered and the Settlement formally commenced on 25 February 2021[8].

The Shire of Ravensthorpe has established a good relationship with major stakeholders and landowners within the Shire in an effort to mitigate bushfire risks. Through proactive measures, compliance with firebreak notices, fire knowledge, and manpower during fire events, DFES, DBCA, mining companies, farmers, volunteers, and the community, work with the Shire to protect life, property and assets before and during a bushfire event.

The State Hazard Plan Fire details responsibility and bushfire mitigation strategies, including land use planning, prescribed burning, vegetation and fuel modifications, firebreaks and other hazard reduction methodologies. State agencies and local governments are reliant on government support via the Mitigation Activity Fund Grants Program (MAFGP) funded through the Emergency Services Levy (ESL) or Royalties to Regions (RtR).

A memorandum of understanding (MOU) in place continuously since 2004 between DFES and the DPLH assigns responsibility for completing the mitigation treatments on townsite UCL and UMR to DFES's BRM Branch. A similar MOU in place between DBCA and DPLH assigns responsibility to DBCA for mitigating bushfire risk outside regional townsites.

Private property owners must abide by the Shires section 33 Fire Control Notice powers and fund these responsibilities themselves.

Where the Shire of Ravensthorpe has tenure over land, the primary focus since the introduction of the MAF grant program has been carrying out mitigation works around the townsites of Ravensthorpe, Hopetoun, Munglingup, Fitzgerald and Jerdacuttup. Works are assessed based on risk, vegetation type, year last burned, and other factors, including the coordination of works with other stakeholders, with appropriate methods prescribed. There are also significant cultural and environmental assets, all of which play a role in determining risk, along with the traditional, and central, objectives of the protection of life and property. The Shire would not have the capacity to undertake these works without the benefit of the MAFGP.

[7] Shire of Ravensthorpe (2014) Local Planning Strategy https://www.wa.gov.au/system/files/2021-11/LST_Ravensthorpe.pdf
[8] Wagyl Kaip Southern Noongar Aboriginal Corporation (2024) https://wagylkaip.org.au/settlement

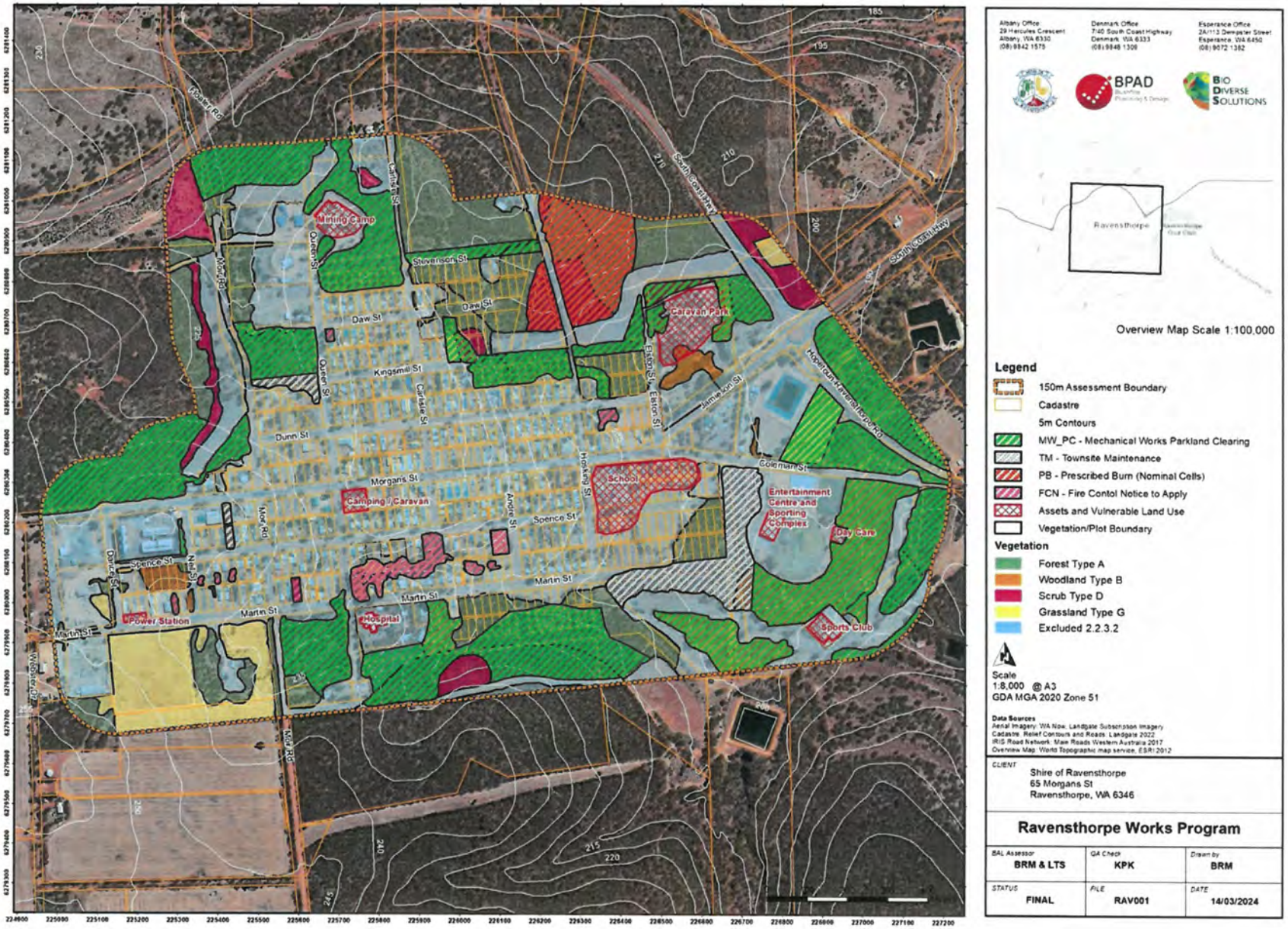

Figure 4: Ravensthorpe Works Program

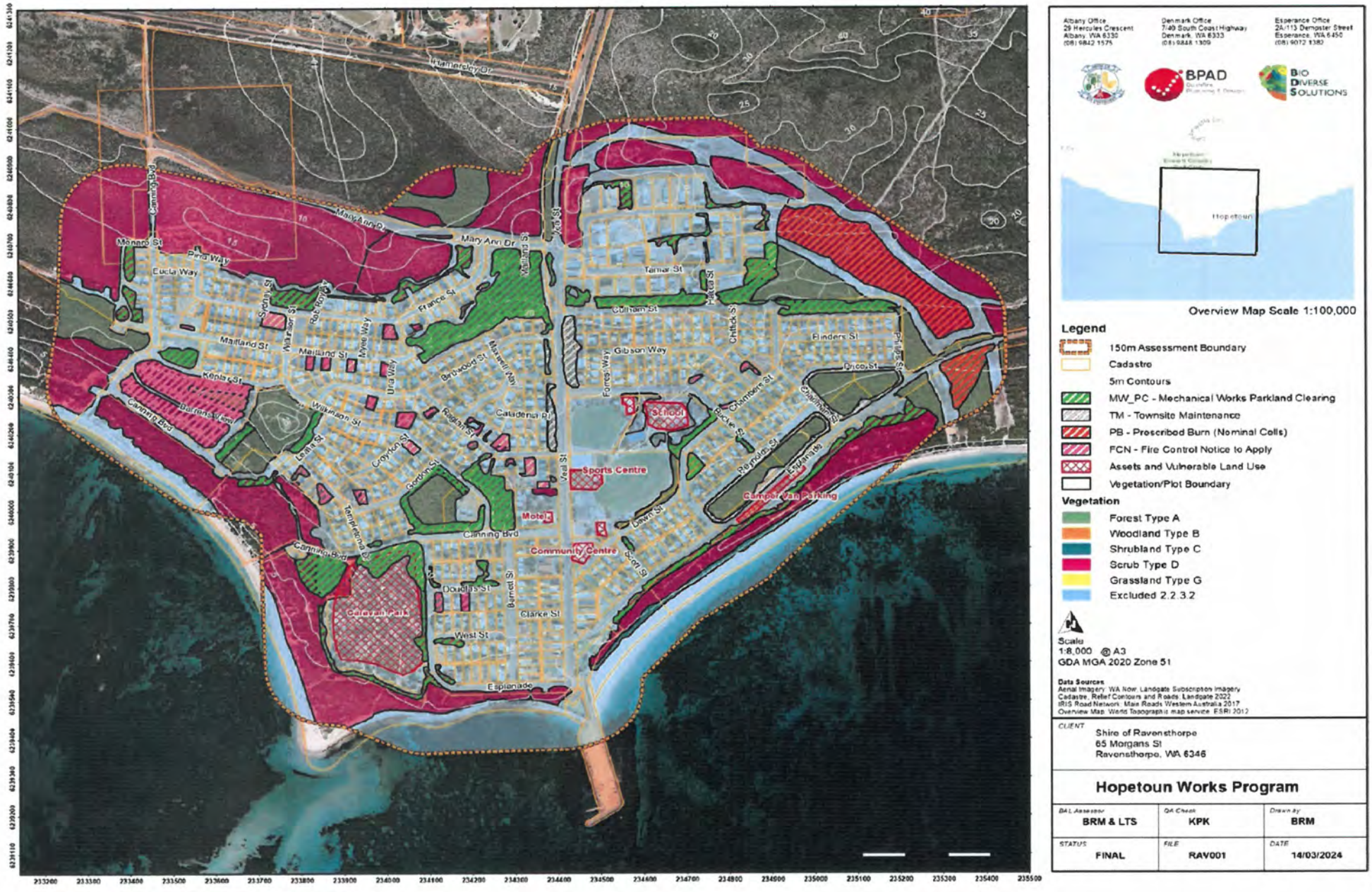

Figure 5: Hopetoun Works Program

3.3 Community demographics and values

The most recent Australian Bureau of Statistics (ABS) data shows the population in the Shire of Ravensthorpe in 2021 as 2,085[9] a decrease of 178 from the previous census in 2016, of which 1,095 are male and 987 are female. The median age is 42. Indigenous residents account for 4.2% of the Shires population which has doubled since 2016. The Shire has a relatively high population of elderly residents in 2021, over double the State average in the 75-79 year old bracket, whereas it is lower, i.e. less than half the state average for 15-19 year olds. Whilst bushfire does not discriminate, the older population could be vulnerable in a bushfire event and may have increased needs for assistance during an evacuation or bushfire season preparation. They may have limited ability to navigate social media for warnings and updates. This group needs to be considered when releasing community information and in what forms to ensure they understand.

Two Hundred and Sixty-Six (266) residents were born overseas, the top three countries were England, New Zealand and South Africa, along with 7.1% who speak another language at home other than English. The Shire has 505 families with 1.9 children per family. There is also a higher number of residents with asthma and lung conditions than the WA average, this group will be affected by bushfire smoke and should be considered when burning off or during major fire incident. The Shire has also benefited from the general trend for the shift to the regions, and relatively low land prices have attracted a number of absentee owners. Little knowledge of bushfire, or an understanding of a property's risk and vulnerability to bushfire, means that messaging and education through various means is essential and forms part of the overall mitigation strategy.

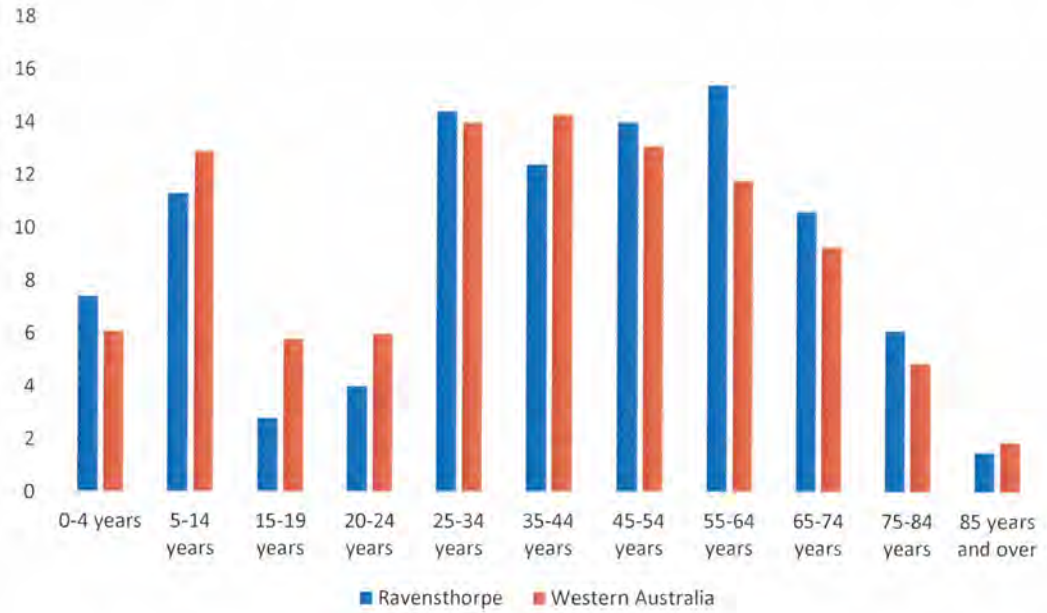

Figure 6: Population in Ravensthorpe compared with Western Australia[10]

[9] Australian Bureau of Statistics (2021) https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA57420
[10] Australian Bureau of Statistics (2021) https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA57420

There are 7 gazetted townsites in the Shire. The focus is on Ravensthorpe and Hopetoun which are the two main population bases. Other areas with resident population, and thus with only minor focus in BRM Plan, are Munglinup has a population of approx. 140 people, Jerdacuttup (183) and Fitzgerald which are not substantially developed and are unlikely to alter significantly in the future[11].

Seasonality of tourism within the Shire of Ravensthorpe is impacted mainly by school holidays, the wildflower season and favourable summer-autumn weather. Peak visitation is December-January, which corresponds with school/Christmas holidays, the warmer summer weather and the bushfire season. The LEMC recognises this in its Local Emergency Management Arrangements (LEMA) in particular that through traffic can increase markedly along with an increase in campers and camp fires in the coastal heath vegetation. The BRM Plan seeks to address the risk presented by the increase in temporary population during the peak bushfire season, in particular the increase in risk from bushfire to the camp sites within the FRNP, Starvation Bay, Masons Bay, Munglinup Beach and the general coastal areas[12].

The LEMA also recognises that the agriculturally based residents leave the area for the holiday period following the completion of harvest during peak fire season and tourist high season. This means less farm fire units are available, less volunteer fire-fighters are available, also creating a further reduced population in the remote areas of the shire to report ignitions.

The BRM Plan considers that while there is generally a high level of awareness of the bushfire risk there is concern as to whether this awareness has been transferred in to tangible preparatory actions. Recently the Shire has been working on recommendations for bushfire mitigation to reduce the risk of bushfire across the whole Shire with partner agencies through the South East Fire Working Group.

While longer-term residents, especially retirees from the agriculture community, are aware of the risk of bushfire based on their experience of living in the area, newer and transient populations especially tourists and employees of the mines are generally less aware. This seems to be in part influenced by the character of the vegetation i.e. areas of low scrub or shrubland that people perceive as not posing a threat. Despite this perception, shrubland fires can be fast moving and intense even under moderate burning conditions[13].

The mining communities would benefit from community engagement around the bushfire risks and opportunities are available to collaborate with the mine companies. The BRM Plan and LEMA consider the tourist population presents a special risk, and special consideration is also needed to be given to educating and engaging the tourist population, as identified within the LEMA. The

[11] Shire of Ravensthorpe (2014) Local Planning Strategy https://www.wa.gov.au/system/files/2021-11/LST_Ravensthorpe.pdf
[12] Shire of Ravensthorpe (2022) Local Emergency Management Arrangements pg 7 https://www.ravensthorpe.wa.gov.au/council-meetings/ordinary-council-meeting/20-december-2022-ordinary-council-meeting/504/documents/minutes-ocm-20-december-2022-confirmed.pdf
[13] Cruz M.G., McCaw W.L., Anderson W.R. and Gould J.S. (2013) *Fire Behaviour Modelling in semi-arid-heath shrublands of southern Australia*, Environmental Modelling & Software, Vol 40 https://doi.org/10.1016/j.envsoft.2012.07.003

BRM Plan also recognises the risk to the remote camping areas which have been assessed as a 'human settlement' asset and treated as such.

A high level of awareness and knowledge of the bushfire risk is of value to the local community and should be harnessed in any engagement strategies. For example, understanding the high numbers of elderly residents, which can create pressure on the emergency and support services, particularly if required to conduct an evacuation. Strategies to address this will include community engagement but also require collaboration and planning with the associated support services. The LEMC Incident Support Coordination Committee is well placed to do this.

The Shire community perception surveys consistently show that the community values fire and emergency services as the most important element of living in the Shire, and most believe the shire performs well in this sector, and support mitigation work, but with improvements being made in communication and community engagement[14].

3.4 Cultural heritage

The Shire of Ravensthorpe has 109 listed heritage places on their Municipal Heritage inventory including the Rabbit Proof Fence, railway station, school, jetty, mine and cemetery. (refer inHerit - State Heritage Office (dplh.wa.gov.au))

The Shire of Ravensthorpe is on land within the following Indigenous Land Use Agreement(s) (ILUAs): Esperance Noongar Native Title Agreement and the Wagyl Kaip & Southern Noongar Indigenous Land Use Agreement.

The ILUAs bind the parties (currently all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended an 'Activity Notice' is issued under the NSHA if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines provide guidance on how to assess the potential risk to Aboriginal heritage when planning and implementing bushfire mitigation treatments so that measures can be put in place to protect the heritage sites. The NSHA does not yet apply to local governments, however it is anticipated that some form of cultural heritage management plan will be required in the coming years.

Consultation with DPLH Aboriginal cultural heritage officers was sought during the preparation of the plan and will continue through its implementation.

During the 2019 Esperance fires DFES sent their Aboriginal Advancement unit with the Incident Management Team to consult with local Aboriginal Elders from Esperance Tjaltjraak Aboriginal Corporation. Their ancestral lands are located from Jerdacuttup to the Shire of Esperance. By being 'on the ground', they were able to facilitate communication between the Elders and response teams so all parties were represented in planning meetings. The meetings provided vital information from the Elders of sites the Traditional Owners wanted left undisturbed. This helped ensure culturally significant and sacred sites were protected when firefighting machinery was deployed. The sites were identified and mapped, but given the sensitivity, maps were only

[14] Shire of Ravensthorpe (2024) 2024 Community Perception Survey https://www.ravensthorpe.wa.gov.au/Profiles/ravensthorpe/Assets/ClientData/2024_CPS_Summary_for_Website_-_Final.pdf

given to operational staff in the area and rangers were sent to guide machinery in creating fire tracks ensuring the culturally significant sites were protected[15].

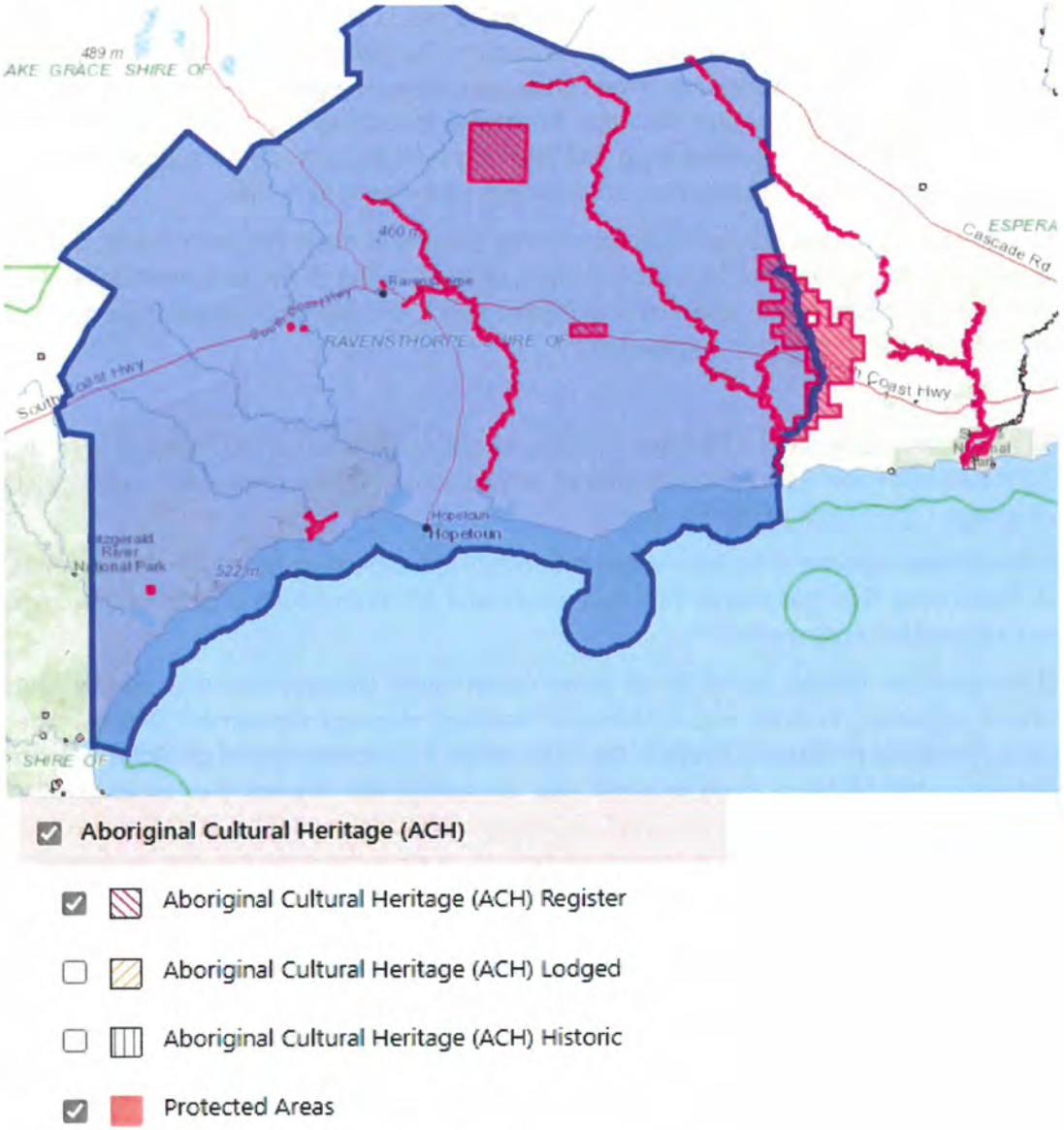

Figure 7: Ravensthorpe Aboriginal Heritage [16]

[15] DFES Annual Report 2018/2019 Esperance fires and Engaging the community https://www.dfes.wa.gov.au/annualreport2019/assets/Uploads/1819EsperanceFires.pdf

[16] Department of Planning Lands and Heritage n.d. Aboriginal Cultural Heritage Inquiry Systemhttps://espatial.dplh.wa.gov.au/ACHIS/index.html?viewer=ACHIS

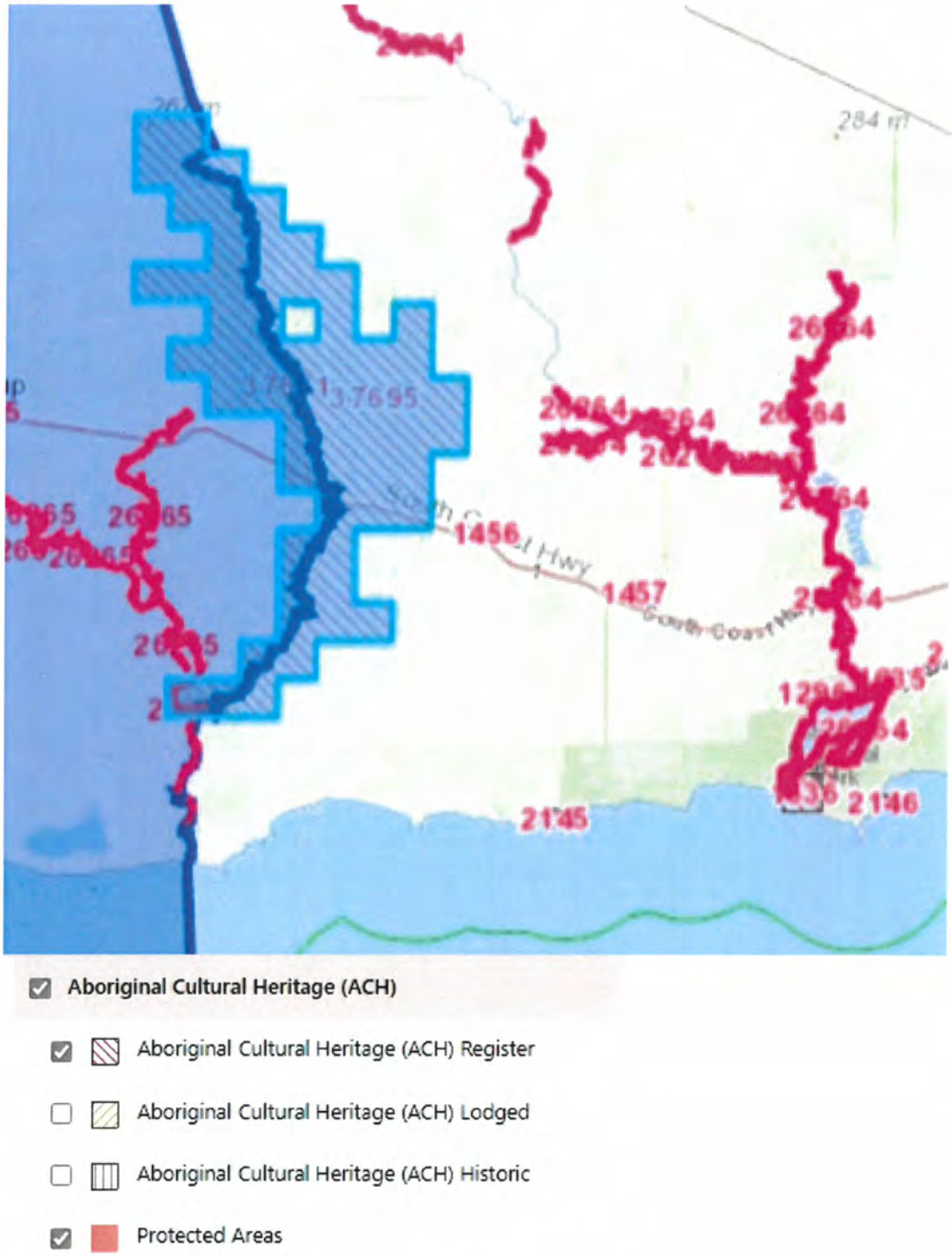

Figure 8: Hopetoun Aboriginal Heritage [17]

[17] Department of Planning Lands and Heritage n.d. Aboriginal Cultural Heritage Inquiry System Report https://espatial.dplh.wa.gov.au/Geocortex/Essentials/GCX4142/REST/TempFiles/Search%20Results%20Report.pdf?guid=0ff7585b-2be2-4739-b9e8-367abba8a71b&contentType=application%2Fpdf

Table 2: Aboriginal Cultural Heritage list

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

For further important information on using this information please see the WA.gov.au website's Terms of Use at https://www.wa.gov.au/terms-of-use

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
646	COCANARUP MASSACRE SITE.	No	No	No	No Gender / Initiation Restrictions	Register	Burial; Traditional Structure; Massacre	*Registered Knowledge Holder names available from DPLH	S02896
1455	OLDFIELD RIVER	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	W01738
1646	CLAYTUP SURFACE SCATTER AND GNAMMA HOLE	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Camp; Historical; Traditional Structure; Modified Tree; Water Source	*Registered Knowledge Holder names available from DPLH	W01550
1647	COUJINUP SURFACE SCATTER	No	No	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	W01551
1980	Jerdacuttup River Artefact Scatter	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	W01175
4547	COCANARUP STONE ARRANGEMENT	No	No	No	No Gender / Initiation Restrictions	Register	Traditional Structure	*Registered Knowledge Holder names available from DPLH	S02522
4934	WEST BEACH	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	S01708
5757	FITZGERALD RIVER NAT. PARK	No	No	No	No Gender / Initiation Restrictions	Register	Traditional Structure	*Registered Knowledge Holder names available from DPLH	S00411
18950	Gnamma Hole	Yes	Yes	Yes	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Ritual / Ceremonial; Historical; Traditional Structure; Meeting Place; Other; Water Source	*Registered Knowledge Holder names available from DPLH	
21378	Jerdacuttup River	No	Yes	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
26262	Bandalup Soak (artefact scatter)	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
26264	Young River	No	Yes	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
26265	Oldfield River	No	Yes	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	
26270	Mt Cattlin 2	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
30009	Hamersley Site Complex	No	Yes	No	No Gender / Initiation Restrictions	Register	Camp; Creation / Dreaming Narrative; Historical; Hunting Place	*Registered Knowledge Holder names available from DPLH	
30412	Jerdacuttup River Crossing	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter; Other	*Registered Knowledge Holder names available from DPLH	
30413	Jerdacuttup Ridge Site	No	Yes	No	No Gender / Initiation Restrictions	Register	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	
37695	Munglinup River	Yes	Yes	Yes		Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	

3.5 Economic activities and industry

Historically, the three main economic drivers within the Shire are mining earning $1.4 billion in 2022[18], agriculture industries earning between $400 - $700 million and tourism earning $8 million every year. Mining will significantly reduce with FQM going into care and maintenance, and Arcadium now also in going into care and maintenance for the foreseeable future. In addition to these key industries, the economic growth and development of the Shire and each of the settlements is dependent on the provision of services and infrastructure. The LEMA recognises that the community relies very heavily upon primary producers and mining, any impacts upon this will have a significant effect upon the community. The BRM Plan seeks to support the LEMA by introducing controls and treatments that reduce the risk of bushfire to the economy.

The agriculture industries and tourism are both vulnerable to the long-term effects of bushfire. Farmers can lose thousands of dollars in (sheep and cattle) livestock losses, burnt crops, damaged fencing, loss of topsoil, and contaminated water. If farmers are lucky enough to not have stock losses the damage in fencing and contaminated water will still require help during recovery. If roads are damaged and power lines are down the farmer may not get help or supplies until several days or weeks after the event. By way of example, the 2015 bushfires in the neighbouring Shire of Esperance, the value of crops that were burnt was worth nearly $90 million and the fire burnt through 200,000 hectares of agricultural land. This particular fire traveled 60 kilometers and DFES described the conditions as catastrophic and unstoppable. There are several inherent issues as a consequence of bushfires, such as, if you get livestock out of the paddocks where do you go that is a safer place[19]? It is for this reason that most times only a small number of animals are transported out during a bushfire, an example being horses. As noted above, farmers will travel outside the Shire once harvest is completed during the bushfire season, which can result in a lack of firefighting vehicles that can be used to fight fires[20].

The heavy reliance on the road network for economic purposes highlights the potential impacts of bushfire through smoke or uncontained fire, not just locally but regionally. The South Coast Highway passes through the Shire, and is a major regional transport corridor. Highway 1 travels around Australia and during bushfires can easily be closed to traffic. This will affect trucks traveling to the East Coast or into WA. It is also important to note that the highway provides the only access into and out of Ravensthorpe and presents significant concerns if the highway is closed both east and west of the town, as happened in the Ravensthorpe complex fire in February 2023.

Agricultural production remains the key economic activity underpinning the local economy. Major crops include wheat, barley and canola. Livestock enterprises include cattle and sheep. A majority of the land directly surrounding Ravensthorpe is used for agriculture. Agriculture is of vital importance to the local economy and production continues to increase.

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[18] Goldfields-Esperance Development Commission Economy, Jobs and business Insights 2024 https://app.remplan.com.au/goldfieldsesperanceregion/economy/summary?state=vNvzFpxJzsJb4WzFYmnYkbi6InhgNsV32

[19] Sprague J (18/11/2015) Esperance bushfires claim lives, destroy crops Financial review https://www.afr.com/companies/agriculture/esperance-bushfires-claim-lives-destroy-crops-20151118-gl1vvn

[20] Mo E (21/7/2022) Ravensthorpe bush fire committee raises concerns about lack of firefighting vehicles in the Shire Kalgoorlie miner https://www.kalminer.com.au/news/regional/ravensthorpe-bush-fire-committee-raises-concerns-about-lack-of-firefighting-vehicles-in-the-shire-c-7581952

Bushfire risk increases during the crop harvesting period generally from mid to late October through to late December or early January. Modern harvesters have many potential ignition sources which need to be carefully managed. Bearings, hot exhausts, turbochargers, electrical circuits, and belts combined with dry straw, dust, chaff, oil, and leaking distillate provide the perfect environment for fire. The movement of these vehicles through cured grain paddocks means this is the most likely time for a farm fire. Crop fires tend to have a very rapid rate of spread[21].

The Shire has controls in place pursuant to the *Bush Fires Act 1954*, to reduce the risk of crop related bushfires; these controls are reviewed regularly by the BFAC. The risk is further reduced once harvest is completed and the paddocks are opened to grazing. It is worth noting that canola or rapeseed burns at a higher temperature than grass or other crops and can be harder to extinguish and mop up especially when canola windrows are burning.

Bushfires cause large economic losses to the food system; they create increases in food prices and job losses for communities. Climate change is increasing the severity and intensity of extreme weather events in Australia. By 2090, wheat yields on the 4,200 farms in WA that produce half of Australia's wheat are projected to fall by 41-49%[22]. Adding a bushfire that could destroy the crops would reduce this further. Wheat production is one of the major crops grown in the shire.

Fire can affect soil, weeds, insects and diseases in different ways. Awareness of these changes will assist with targeted crop management and crop monitoring[23]. Hot fires change the plant composition and reduce growth and carrying capacity in the following season[24]. After a fire farmers try to limit erosion and stabilize the paddock. Future planting is affected by the fire intensity, while cool burns have no effect other than erosion. Cereals are better planted after fire as they will tolerate sandblasting and pastures will recover the following year[25].

A very hot burn will sterilize the surface layers of the soil, all plant material, seeds, and sub-clover seed is burnt or sterilized. Organic carbon is reduced and soil organisms are killed[26]. Fire reduces the amount of nitrogen available and can cause short term reductions in microbial biomass and fungi decline. The pasture will need to be resown to increase seed set and seed reserves for the following season. The pasture should not be used for hay or heavy grazing[27] and should recover by the second growing season.

Fires will contaminate water sources from the fire retardants, ash, and soil from burnt paddocks causing pollution, bacteria, and algae in the water. Contamination can lead to blue-green algae

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[21] Department of Fire and Emergency Services (2014), Homeowner Bushfire Survival Manual, pp. 37
[22] Steffen W, Mallon K, Kompas T, Dean A and Rice M (2019) Climate Council COMPOUND COSTS: HOW CLIMATE CHANGE IS DAMAGING AUSTRALIA'S ECONOMY https://www.climatecouncil.org.au/wp-content/uploads/2019/05/Costs-of-climate-change-report.pdf
[23] Department of Primary Industries and regional Development (2022) Cropping after paddock fires https://www.agric.wa.gov.au/grains/cropping-after-paddock-fires
[24] Department of Primary Industries and regional Development (2022) Pasture recovery after fire https://www.agric.wa.gov.au/fire/pasture-recovery-after-fire
[25] Department of Primary Industries and regional Development (2022) Pasture recovery after fire https://www.agric.wa.gov.au/fire/pasture-recovery-after-fire
[26] Department of Primary Industries and regional Development (2022) Cropping after paddock fires https://www.agric.wa.gov.au/grains/cropping-after-paddock-fires
[27] Department of Primary Industries and regional Development (2022) Pasture recovery after fire https://www.agric.wa.gov.au/fire/pasture-recovery-after-fire

and livestock should be removed[28]. Fire also will create a feed shortage for livestock requiring feed to be brought in which in turn creates a biosecurity risk. Animals may need to be destroyed or will require veterinary help. One fire in 2022 killed 10,000 sheep in the area[29] costing farmers substantial losses. The cost of replacing fencing, farm buildings, equipment and livestock can prove costly and have a long-term effects for farmers including farmland values[30]. Farmers only received around 20% of the cost in recovery grants and insurance payouts which are not enough to cover the total costs[31]. In some cases, assets might not be replaced because of insufficient insurance coverage[32].

Over the long-term drought and significantly less rainfall will affect crops and require water to be brought and stored. In addition, livestock number, which have declined over recent years will need to be rebuilt to supply demand. Extreme weather will be challenging for many regions, seasonal variations in rainfall and temperatures are trending towards drier conditions in Western Australia. An increase in extreme fire conditions and length of the fire season is predicted in the long term[33].

With respect to mining, the State Government has indicated that areas of the Shire have a high potential for mineralisation, particularly for gold, copper, nickel, base metals, graphite, and limestone. These areas are generally located through the central region of the Shire. Further exploration is required to determine the full extent and viability of mining. Although with development there generally comes a reduction in vegetation and associated bushfire risk, care also needs to be taken as mining will have an effect on the vulnerable species in the area which should be protected.

Tourism continues to be an important component of economic activity and the Shire policy is to look at ways to expand tourism. In 2023, the Shire had 70% less tourists compared to Esperance. Better advertising of the region and improved facilities and better access to the National Park will help. The pristine coast, vast beaches, and sheltered camping areas attract artists, photographers, and the more adventurous travellers. In spring when the regions' world-renowned wildflowers bloom, visitors arrive from all over the globe to see the exceptional variety on display and the unique flora of the region. The coastal location and the Fitzgerald River National Park, are a popular holiday location. According to The Shire of Ravensthorpe Tourism Strategy (2023),

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[28] Department of Primary Industries and Regional Development (2022) Contaminated farm dams https://www.agric.wa.gov.au/water-management/contaminated-farm-dams-%E2%80%93-western-australia

[29] Kagi J & Shepard B (2022) At least three homes lost in Jerramungup and Hopetoun blazes in WA's Great Southern region https://www.abc.net.au/news/2022-02-12/homes-lost-in-hopetoun-and-jerramungup-blazes/100825118

[30] World Wildlife Fund (2021) Horror Bushfire Season Cost Aussie Farmers up to $5 Billion https://wwf.org.au/news/2021/horror-bushfire-season-cost-aussie-farmers-up-to-5-billion/

[31] Bishop J, Bell T, Huang C et al (2020) Fire on the farm: Assessing the impacts of the 2019-2020 bushfires on food and agricultures in Australia source world wide fund of nature https://www.preventionweb.net/publication/fire-farm-assessing-impacts-2019-2020-bushfires-food-and-agricultures-australia

[32] Reserve Bank of Australia (2020) Macroeconomic Effects of the Drought and Bushfires https://www.rba.gov.au/publications/smp/2020/feb/box-b-macroeconomic-effects-of-the-drought-and-bushfires.html

[33] Reserve Bank of Australia (2020) Macroeconomic Effects of the Drought and Bushfires https://www.rba.gov.au/publications/smp/2020/feb/box-b-macroeconomic-effects-of-the-drought-and-bushfires.html

an estimated average of 71,000 people visit the area annually[34]. With Increased tourism, mitigation works around the shire's campsites and popular beaches must be maintained.

The region is well regarded for its biodiversity both for tourism and conservation reasons and the LEMC considers any damage to the bio-diversity of the local government area as unacceptable[35]. The BRM Plan recognises that any mitigation strategies must be developed for the biodiversity values of the area.

The FRNP is vulnerable to repeated and regular bushfire events that may cause the loss of species, biodiversity, and tourism dollars. Some of the unique species are found nowhere else in the world. Inappropriate fire regimes are a significant threatening process impacting on biodiversity; and further information is required to adequately manage and conserve these systems.

3.6 Topography and Landscape Features

The Shire is dominated by two main landscape types; vast wilderness and cleared broad acre farmland. Approximately two-thirds of the Ravensthorpe Shire is natural bushland, made up of two national parks, the Ravensthorpe Range, reserves, and UCL, all of which are rich in geology, native flora, and fauna, including many rare species.

The western part of the Shire is dominated by the FRNP. Approximately 190,000 ha of the park sits within the Shire of Ravensthorpe. The remaining 140,000ha forms the eastern part of the Shire of Jerramungup. The FRNP, located west of Ravensthorpe and Hopetoun, and easily accessible from both towns, is one of the largest national parks in Australia containing 20% of the State's described plant species.

There is a diversity of topography to the west of the Ravensthorpe Shire. The east of the Shire is under the influence of light sand plains with a few river corridors. The western area of the Shire is primarily made up of UCL and the FRNP which is characterised by significant ranges on the coast and several river catchments with valleys and break-a-ways. The rugged topography poses significant limitations to vehicle access.

There are several river systems across the Shire generally running from north to south. Some of these have significant river valleys with rocky break-a-ways and all of them have remnant vegetation associated with them. These rivers are comprised of the Munglinup, Oldfield, Jerdacuttup, Steere, Phillips, Hamersley, and Fitzgerald Rivers.

The Ravensthorpe Range stretches for about 45km from north of the Ravensthorpe townsite in an easterly direction and in a southerly direction to Kundip.

The expansive areas of vegetation within the Shire present an obvious bushfire risk, this risk is further exacerbated by access challenges. The presence of dieback in areas of the park along with sandy beaches, steep granite outcrops, and dune systems reaching 200m in elevation

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[34] Lenon (2023), *The Shire of Ravensthorpe Tourism Strategy* https://www.ravensthorpe.wa.gov.au/Profiles/ravensthorpe/Assets/ClientData/Tourism_Strategy_Council_Endorsed.pdf

[35] Shire of Ravensthorpe (2015) Local Emergency Management Arrangements Council meeting https://www.ravensthorpe.wa.gov.au/council-meetings/ordinary-council-meeting/17-december-2015/57/documents/minutes_-_december_2015.pdf

means access is a serious challenge for both risk management activities and suppression. Vehicle access in coastal and heavily wooded areas is limited. Careful consideration is required when undertaking bushfire management for both environmental factors and the safety of emergency responders.

In 2003 a bushfire referred to as the Lake Tay fire burnt an area above 300,000 ha. The Lake Tay fire demonstrated the potential for 'remote' fires that, if left to run without early intervention, can travel significant distances and impact assets such as human settlements and major highways. The fire started approximately 100km north-east of Ravensthorpe, it was left to run its course for several days during which time it spread significantly and ultimately threatened the town of Ravensthorpe, the biodiversity of the Ravensthorpe Range, and the Bandalup Corridor[36].

This particular fire led to a decision by Parks and Wildlife (P&W) to increase response capability and undertake extensive mitigation works in the form of access trails to break up the vast expanse of vegetation into management cells. This network consists of approximately 2000km of fire trails. The trail network is maintained largely by P&W but also in an ad hoc manner by neighbouring landowners i.e. farmers. There are currently no on-going allocated funds to maintain the trails and therefore they are not always well maintained. This poses a risk during response as the trails can become inaccessible. The tracks are ideally utilised to fight fires and can provide protection for the firefighters.

It is also recognised that the deliberate containment of remote fires to small areas can lead to extensive areas of long unburnt vegetation, which is also undesirable. A mosaic of fuel ages needs to be established. Wildfires can be managed to achieve an optimal outcome balance against a planned fuel management regime[37].

Topography and landscape features are an important consideration in the Shire of Ravensthorpe as the landscape character is diverse and biosecurity is critical to maintaining the internationally recognised biodiversity values of the region. The BRM Plan seeks to work with the landscape character in developing treatment options.

Strategic bushfire risk management in the area is undertaken to reduce risk but also to facilitate suppression. Strategic breaks are often designed to enable back burning during response. In many cases, suppression of bushfires involves 'dry' suppression i.e. burning large blocks of vegetation to achieve containment. Lack of access tracks (e.g. in the Great Western Woodlands), inaccessible terrain, extreme fire behaviours, cost and resource availability, and the risk of introducing *Phytophthora* dieback or disturbance of environmentally sensitive areas, limits the

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[36] Barrett. S, Comer. S, McQuoid. N, Porter. M, Tiller. C, Utber. D (2009), *Identification and Conservation of Fire Sensitive Ecosystems and Species of the Southcoast Natural Resource Management Region.* Department of Conservation and Land Management and Southcoast Natural Resource Management. https://www.researchgate.net/publication/369066306_IDENTIFICATION_AND_CONSERVATION_OF_FIRE_SENSITIVE_ECOSYSTEMS_AND_SPECIES_OF_THE_SOUTH_COAST_NATURAL_RESOURCE_MANAGEMENT_REGION

[37] Barrett. S, Comer. S, McQuoid. N, Porter. M, Tiller. C, Utber. D (2009) *Identification and Conservation of Fire Sensitive Ecosystems and Species of the Southcoast Natural Resource Management Region.* Department of Conservation and Land Management and Southcoast Natural Resource Management. https://www.researchgate.net/publication/369066306_IDENTIFICATION_AND_CONSERVATION_OF_FIRE_SENSITIVE_ECOSYSTEMS_AND_SPECIES_OF_THE_SOUTH_COAST_NATURAL_RESOURCE_MANAGEMENT_REGION

opportunity to implement direct-attack strategies (building a fire line using earth moving machinery directly on the fire edge).

For example, to the north of Ravensthorpe town site are two 30-50m wide breaks that have been installed with a 'sacrificial' vegetation cell of several kilometres in between. On the western edge of Hopetoun, the last of these strategic breaks is referred to as the 'last stand'. The 'last stand' was instrumental in slowing the run of the February 2021 lightning caused, "Whalebay bushfire", into the Hopetoun townsite. In the event of a fire, the vegetation cell can be ignited to create a low fuel buffer. Such breaks are considered critical around townships due to the vast areas of vegetation that surround them and the limited response capability. Bushfires that can access such large areas of fuel with limited suppression have a better opportunity to develop into bigger fires that generate their energy and pose the greatest risk to the community.

The BRM Plan seeks to work with the existing network of breaks and treatment strategies to establish a balance between landscape based treatments, hazard separation zone or asset protection zone (HSZ/APZ) treatments and community engagement.

3.7 Climate and weather

The climate of the Southern Goldfields-Esperance region is typically semi-arid climate with a Mediterranean rainfall pattern, with warm to hot dry summers and mild, wet winters. The majority of rainfall, up to 500mm per annum, occurs between May and September, with the heaviest falls during the winter months from July to September. The southern oceans moderate the effect of temperature in the coastal areas of the Shire providing smaller diurnal and seasonal variations and a milder climate than inland areas. Mean daily temperatures vary from around 7 degrees in August to 29 degrees in January.

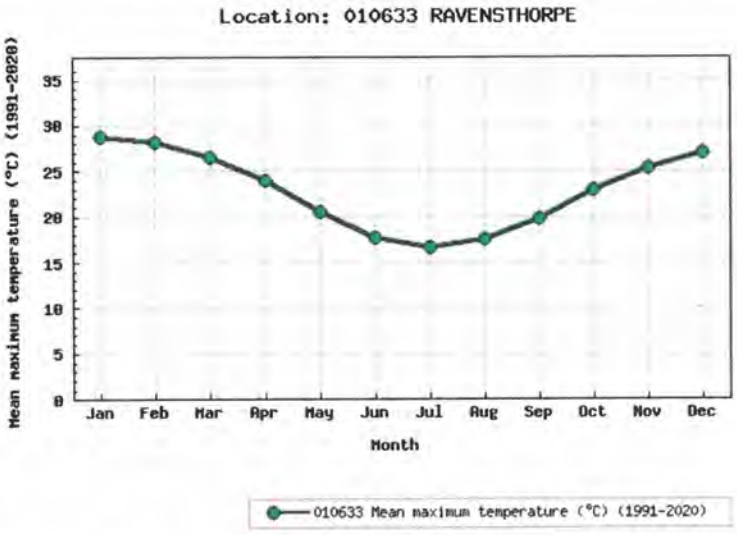

Figure 9: Ravensthorpe Temperatures[38]

[38] Bom Climate statistic for Australian locations n.d.
http://www.bom.gov.au/climate/averages/tables/cw_010633.shtml

Summers are very dry, with December to February receiving a monthly average of around 30mm of rain. Summers are typically very warm and cloudless although cooling afternoon sea breezes are common. The hot dry summers and seasonal strong winds create an environment where there is a significant risk of bushfires, therefore a high degree of caution is required by residents and visitors.

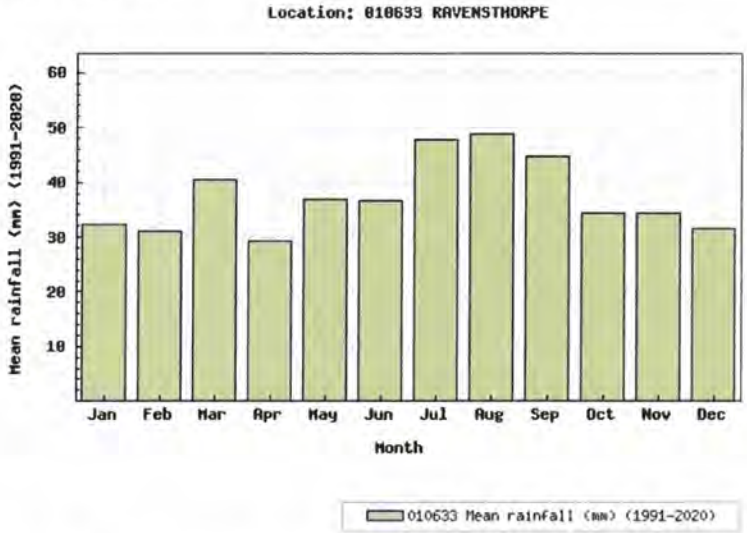

Figure 10: Ravensthorpe Rainfall[39]

The early to mid-summer is generally dominated by weekly weather cycles and movements of the west coast trough through the area producing thunderstorms and lightning. This is one of the main causes of bushfires in the Shire.

The extreme fire danger period occurs between December to February (inclusive) due to higher temperatures and low relative humidity. For 2024 the bushfire season was extended by DFES until the end of Autumn, with the weather continuing to be hot, dry, and windy conditions. The soil dryness indicator (SDI) also showed very elevated soil dryness. The South West Land Division recorded the second hottest year on record in 2023, resulting in a drier autumn. The Southern Goldfields-Esperance fire season is heavily influenced in January – March by frequent lightning events triggered by the confluence of the cool moist air from the Southern Ocean and the warm inland dry air. The state saw an increase of 33% in the number of bushfires in 2023[40] due to "dry" lightning strikes.

Prevailing winds are from the northwest and southeast which can prove challenging during suppression because they are generally strong, hot, and dry (refer to Figure 11 below). The north-west wind prevails between January and March which is the peak bushfire period. The mean number of days over 30 degrees in this same period is 28.9.

[39] Bom Climate statistic for Australian locations n.d.
http://www.bom.gov.au/climate/averages/tables/cw_010633.shtml
[40] DFES media (1/3/24) https://news.dfes.wa.gov.au/media-releases-feature-stories/dfes-extends-large-air-tanker-s-stint-in-wa-in-response-to-increased-risk-of-bushfires-in-autumn/

As a consequence, the area regularly experiences a fire danger rating (FDR) of 'High' or above[41].

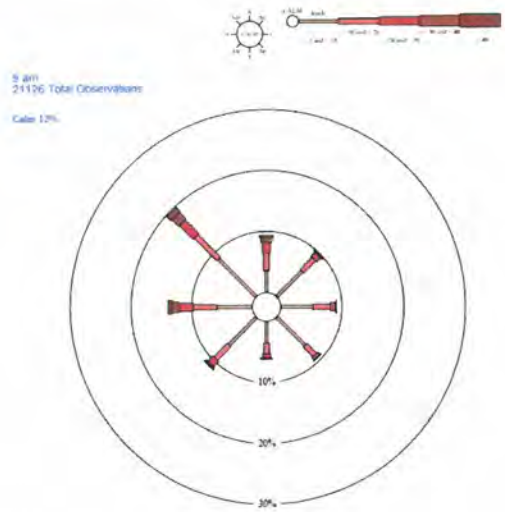

Figure 11: Ravensthorpe Wind Rose[42]

This period is shouldered by a moderate fire danger period, of November and March influenced by warmer temperatures, and at times strong easterly winds in the November period.

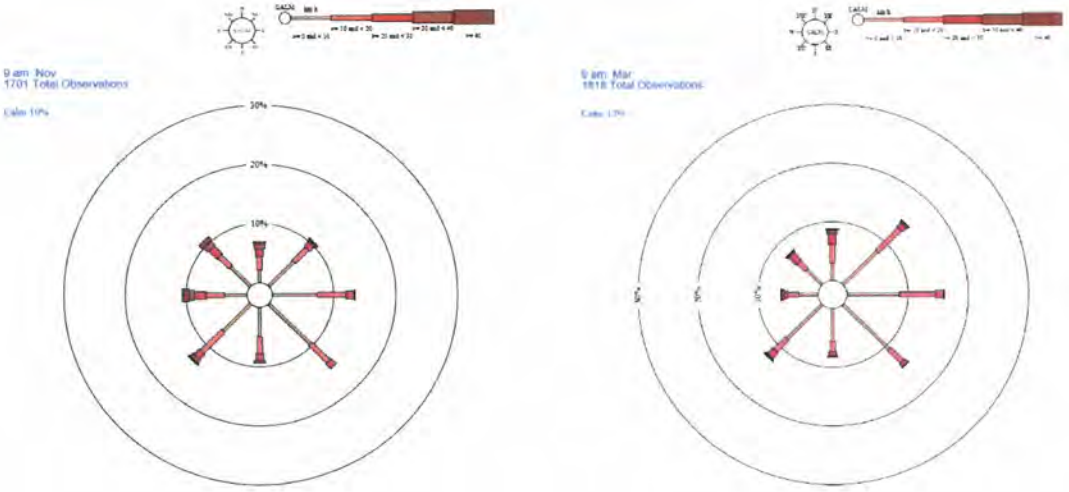

Figure 12: Ravensthorpe November[43] and March[44]

[41] Bom Climate statistic for Australian locations n.d.
http://www.bom.gov.au/climate/averages/tables/cw_010633_All.shtml
[42] Bom Climate statistic for Australian locations (10/8/2023)
http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.010633.9am.pdf
[43] Bom Climate statistic for Australian locations (11/8/2023)
http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.010633.9amNov.pdf
[44] Bom Climate statistic for Australian locations (11/8/2023)
http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.010633.9amMar.pdf

The Shire of Ravensthorpe has a varied climate between the north and south ends of the Shire with Hopetoun on the coast and Ravensthorpe 50 kilometres inland. It also has significant variations in individual seasons.

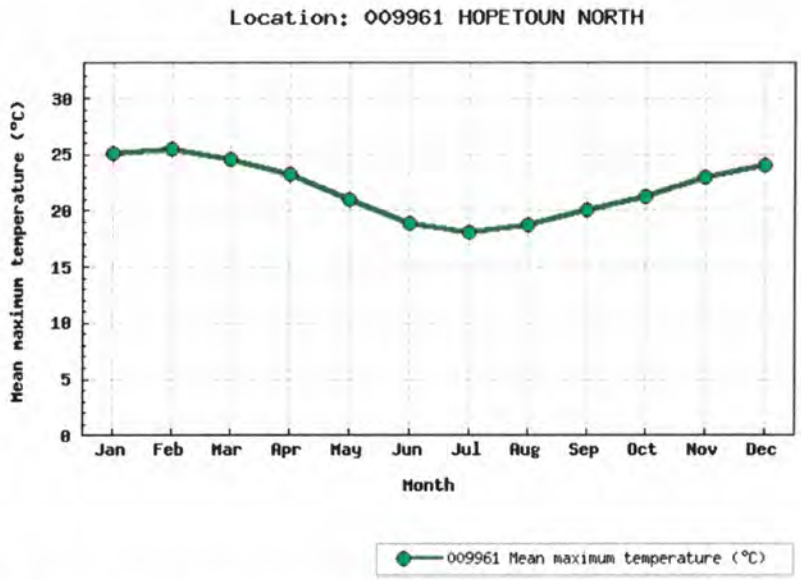

Figure 13: Hopetoun Temperature[45]

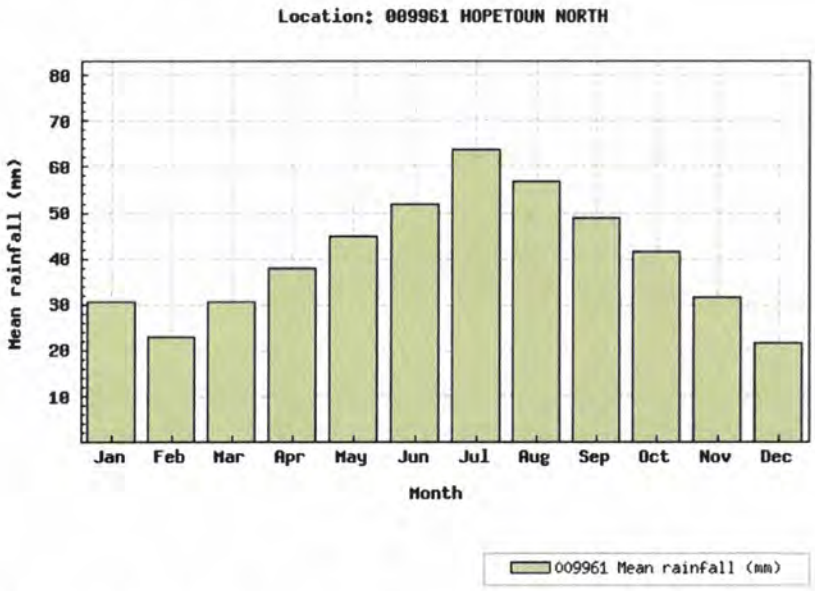

Figure 14: Hopetoun Rainfall[46]

[45] Bom Climate statistic for Australian locations (06/6/2024)
http://www.bom.gov.au/climate/averages/tables/cw_009961.shtml
[46] Bom Climate statistic for Australian locations (06/6/2024)
http://www.bom.gov.au/climate/averages/tables/cw_009961.shtml

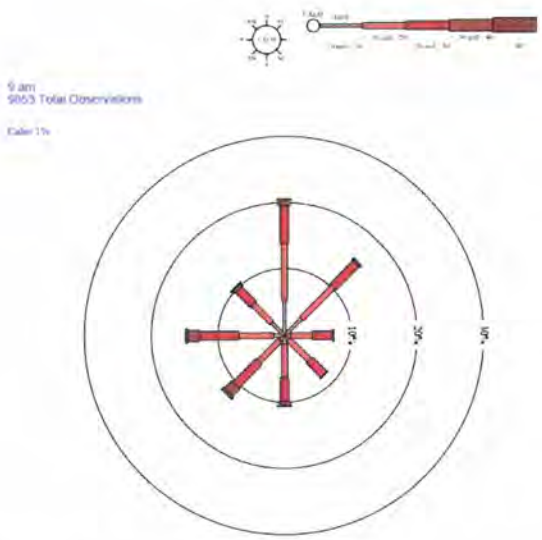

Figure 15: Hopetoun Wind Rose[47]

The climate in combination with a highly volatile vegetation structure means most areas of the Shire can sustain a bushfire almost all year round. A two to three week period with no rain will allow for suitable conditions for the vegetation to burn and lower humidity and strong winds will produce strong fire behaviour. The Shire of Ravensthorpe has 'Restricted Burning' conditions, with some unrestricted burning for rural areas, for the parts of the year that it is not in 'Prohibited Burning'. The average rainfall for Ravensthorpe is 426mm a year which mainly occurs between May and September. Hopetoun has an average rainfall of 480mm which is from June- August.

As a consequence, the Shire of Ravensthorpe under sections 17 and 18 of the *Bush Fires Act 1954* has declared the following restricted and prohibited burning times:

- 1 November to 31 January: Prohibited Burning
- 1 February – 31 October: Restricted Burning (permits required)
- Burning is prohibited on ALL Public Holidays and on Sundays, except between 1 March and 19 September

The climate affects the use of prescribed burning as a treatment strategy, as often there are limited windows to safely conduct burns. Typically, autumn is the preferred period for burning due to a higher soil moisture content, and shorter daylight hours, reducing the impact of fire intensity on susceptible species. Burning is however used extensively as a treatment method, and is used in balance with mechanical treatments such as parkland clean up, mulching, and scrub rolling. Treatment strategies must be well coordinated to minimise the cost impacts of mobilisation etc. Historically the bushfire stakeholders in the area work well together to coordinate the implementation of treatment strategies and work plans.

[47]Bom Climate statistic for Australian locations (10/8/2024)
http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.009961.9am.pdf

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	
Temperature															
Mean maximum temperature (°C)	28.8	28.2	26.6	24.0	20.5	17.7	16.7	17.6	19.8	22.9	25.3	27.0	22.9	30	1991 2020
Mean minimum temperature (°C)	14.5	14.9	13.9	12.2	9.9	8.1	7.0	6.9	7.6	9.3	11.3	13.0	10.7	30	1991 2020
Rainfall															
Mean rainfall (mm)	32.4	31.1	40.5	29.2	36.8	36.7	47.7	48.8	44.6	34.3	34.3	31.6	448.0	30	1991 2020
Decile 5 (median) rainfall (mm)	12.6	18.6	29.6	23.2	31.2	32.2	41.7	45.0	36.2	29.6	28.8	22.2	466.7	30	1991 2020
Mean number of days of rain ≥ 1 mm	4.2	4.4	5.5	5.1	6.9	7.8	9.3	9.7	8.3	6.3	6.3	4.8	78.6	30	1991 2020
Other daily elements															
Mean daily sunshine (hours)															
Mean number of clear days	8.5	8.2	7.0	6.1	6.3	6.3	6.5	5.9	5.3	4.6	5.7	8.6	79.0	20	1991 2010
Mean number of cloudy days	9.1	9.4	10.0	11.6	12.4	9.4	10.2	9.6	12.1	11.6	11.8	9.2	126.4	20	1991 2010
9 am conditions															
Mean 9am temperature (°C)	21.0	20.8	19.7	17.4	14.9	11.7	10.9	11.8	13.9	16.2	18.8	20.0	16.4	20	1991 2016
Mean 9am relative humidity (%)	65	68	69	72	75	81	80	76	71	63	62	63	71	17	1991 2016
Mean 9am wind speed (km/h)	9.4	8.8	9.0	9.2	9.6	11.2	11.6	11.5	13.0	11.2	10.8	10.2	10.5	19	1991 2016
9am wind speed vs direction plot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
3 pm conditions															
Mean 3pm temperature (°C)	26.1	26.1	24.9	22.3	19.2	16.1	15.3	16.0	17.7	20.2	22.5	24.4	20.9	20	1991 2010
Mean 3pm relative humidity (%)	52	53	52	55	58	62	62	59	56	52	52	50	55	17	1991 2010
Mean 3pm wind speed (km/h)	13.3	12.7	11.6	10.4	10.4	12.0	13.4	13.6	14.7	13.9	13.5	14.1	12.8	17	1991 2010
3pm wind speed vs direction plot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

red = highest value blue = lowest value

Table 3: Ravensthorpe Climate[48]

[48] Bom Climate statistic for Australian locations (6/6/2024) http://www.bom.gov.au/climate/averages/tables/cw_010633.shtml

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	
Temperature															
Mean maximum temperature (°C)	25.1	25.5	24.8	23.3	21.1	18.9	18.0	18.7	20.2	21.3	23.0	24.0	22.0	26	1996 2024
Mean minimum temperature (°C)	15.3	15.8	14.6	12.7	10.4	8.7	7.8	7.8	8.7	10.3	12.3	14.0	11.5	26	1996 2024
Rainfall															
Mean rainfall (mm)	30.6	23.0	30.5	38.8	44.8	52.0	63.8	56.8	48.7	41.7	31.7	21.5	480.8	28	1996 2024
Decile 5 (median) rainfall (mm)	7.0	14.4	21.7	31.6	43.4	45.8	60.4	54.8	42.4	38.4	22.4	15.0	476.1	28	1996 2024
Mean number of days of rain ≥ 1 mm	3.1	3.2	4.4	5.8	6.6	9.0	9.7	9.8	7.6	6.6	5.0	3.2	74.0	27	1996 2024
Other daily elements															
Mean daily sunshine (hours)															
Mean number of clear days															
Mean number of cloudy days															
9 am conditions															
Mean 9am temperature (°C)	21.5	21.5	20.5	18.6	16.1	13.3	12.3	13.5	15.6	17.4	19.4	20.4	17.5	15	1996 2010
Mean 9am relative humidity (%)	62	64	65	69	72	73	74	70	64	60	60	60	66	15	1996 2010
Mean 9am wind speed (km/h)	21.2	20.3	19.2	18.0	16.6	18.3	18.4	19.3	21.7	21.5	21.2	21.4	19.8	14	1996 2010
9am wind speed vs direction plot															
3 pm conditions															
Mean 3pm temperature (°C)	22.2	22.6	22.2	20.9	19.5	17.5	16.5	17.1	17.9	18.4	20.0	21.3	19.7	15	1996 2010
Mean 3pm relative humidity (%)	63	63	62	62	59	56	57	56	56	59	61	60	60	15	1996 2010
Mean 3pm wind speed (km/h)	29.0	28.4	26.7	22.3	20.2	21.5	21.6	22.5	25.3	26.5	27.8	28.2	25.0	14	1996 2010
3pm wind speed vs direction plot															

red = highest value blue = lowest value

Table 4: Hopetoun Climate[49]

[49] Bom Climate statistic for Australian locations (6/6/2024) http://www.bom.gov.au/climate/averages/tables/cw_009961.shtml

3.8 Vegetation and fuel

The vegetation in the Shire of Ravensthorpe is recognised as significant both for the threat it poses in terms of bushfire and also for its biodiversity and conservation value. The BRM Plan considers vegetation both as a source of risk and as an asset integral to balancing the environmental and conservation values of the region.

While fuel load is a significant factor in fire behaviour, the BRM planning process looks at many other factors which need to be considered when determining the overall risk to an asset – asset vulnerability and likelihood have a far greater influence over the final risk rating than fuel load.

The BRM Plan also respects the need to manage the impact of fire on vegetation for its conservation value. Conserving the nature of complex Mediterranean-type ecosystems such as those of the South Coast region is a challenge. Fire is a major disturbance factor with the potential to become more influential with the increasing impact of climate change[50].

The vegetation in the Shire of Ravensthorpe is broadly referred to as the '*Esperance Bioregion'*, an area that extends approximately 40 kilometers in from the coast between Albany and Point Culver on the south coast of Western Australia. It is bounded to the north by the Mallee region and to the west by the Jarrah Forest region.

The main vegetation formation of the Esperance Plains region is characterised by Proteaceous scrub and mallee heath; which covers about 58% of the region. Other significant vegetation forms include mallee (17%), scrub heath (13%), and coastal dune scrub (4%). There is very little woodland; the woodland communities are some *Eucalyptus oleosa (*Ravensthorpe oil mallee*), Eucalyptus Salmonopholia (*Salmon Gum*)* and *E. occidentalis* (Flat-topped Yate) woodlands in low-lying areas[51].

A study into fire behaviour modelling in semi-arid mallee-heath shrublands recognised that ecosystems in fire-prone climates, such as the kwongan and mallee characteristic of the Shire of Ravensthorpe, are renowned for their flammability. Shrubland fires can be fast-moving and intense even under moderate burning conditions. They have the potential to burn extensive areas under extreme conditions leading to severe impacts on human populations, water catchments, and a broad range of environmental values. It also found that extensive fires, typically greater than 10,000ha but also greater than 100,000ha when spreading under extreme burning conditions have the potential to burn a high proportion of remnant vegetation in these landscapes and cause the local extinguishment of certain species [52].

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[50] Barrett. S, Comer. S, McQuoid. N, Porter. M, Tiller. C, Utber. D (2009), *Identification and Conservation of Fire Sensitive Ecosystems and Species of the Southcoast Natural Resource Management Region.* Department of Conservation and Land Management and Southcoast Natural Resource Management. https://www.researchgate.net/publication/369066306_IDENTIFICATION_AND_CONSERVATION_OF_FIRE_SENSITIVE_ECOSYSTEMS_AND_SPECIES_OF_THE_SOUTH_COAST_NATURAL_RESOURCE_MANAGEMENT_REGION

[51] Wikipedia Esperance Plains (2023) https://en.wikipedia.org/wiki/Esperance_Plains

[52] Cruz M.G., McCaw W.L., Anderson W.R. and Gould J.S. (2013) *Fire Behaviour Modelling in semi-arid-heath shrublands of southern Australia*, Environmental Modelling & Software, Vol 40. https://www.sciencedirect.com/science/article/abs/pii/S1364815212002009

Some of the flora and ecological communities have adapted to fire while others are fire sensitive. It is important to note that those who have developed adaptions for living with fire may not be adapted to fire *per se* but to a particular fire regime. The key aspects to consider for any fire regime are frequency, intensity, spatial extent and season, and the sensitivity of the vegetation or ecological community to any one or a combination of these traits. For example, fires in semi-arid woodlands can kill mature trees and it may take over 100 years for these woodlands to recover structurally[53]. Woodland systems including moort and mallet woodlands are good examples of vegetation systems particularly sensitive to fire interval. The fire interval affects both the creation and maintenance of the system, and the development of structures suitable for fauna habitat, such as hollows for birds to nest in. While the areas of woodland are limited in the Shire there are pockets of mallet and moort that occur. Fire is not considered as a treatment strategy in these pockets.

As prescribed burning is not always an appropriate fuel reduction method the plan seeks to establish appropriate fuel management according to the respective vegetation community impacted.

Any vegetation management treatments proposed by the BRM Plan, including prescribed burning, but in particular mechanical clearing, will need to carefully consider the impact on the vegetation from an ecological perspective. There is also a legislative requirement under the Department of Water and Environmental Regulations to obtain a permit when native vegetation works is not being undertaken in respect of the *Bush Fires Act, 1954*. Any fuel reduction treatments will require a thorough assessment of the vegetation and approval to be sought for the clearing of the vegetation. In instances where the proposed work is new, a flora survey may be required in order to get the necessary approval.

Of concern also is the spread of 'Dieback' (*Phytophthora cinnamomi* and other related pathogens) which is an important factor when determining bushfire risk management and suppression strategies. The biodiversity and social values of the region, in particular the FRNP and the Ravensthorpe Range, are threatened by *Phytophthora* dieback. The soil-borne pathogen infests native plant communities causing the death of susceptible species[54]. Existing land management and bushfire management strategies undertaken in the area recognise such challenges to maintaining and managing diversity. A key existing management strategy for the FRNP has been to divide the large areas of wilderness into management cells for both environmental and bushfire

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[53] Barrett. S, Comer. S, McQuoid. N, Porter. M, Tiller. C, Utber. D (2009), *Identification and Conservation of Fire Sensitive Ecosystems and Species of the Southcoast Natural Resource Management Region.* Department of Conservation and Land Management and Southcoast Natural Resource Management. https://www.researchgate.net/publication/369066306_IDENTIFICATION_AND_CONSERVATION_OF_FIRE_SENSITIVE_ECOSYSTEMS_AND_SPECIES_OF_THE_SOUTH_COAST_NATURAL_RESOURCE_MANAGEMENT_REGION

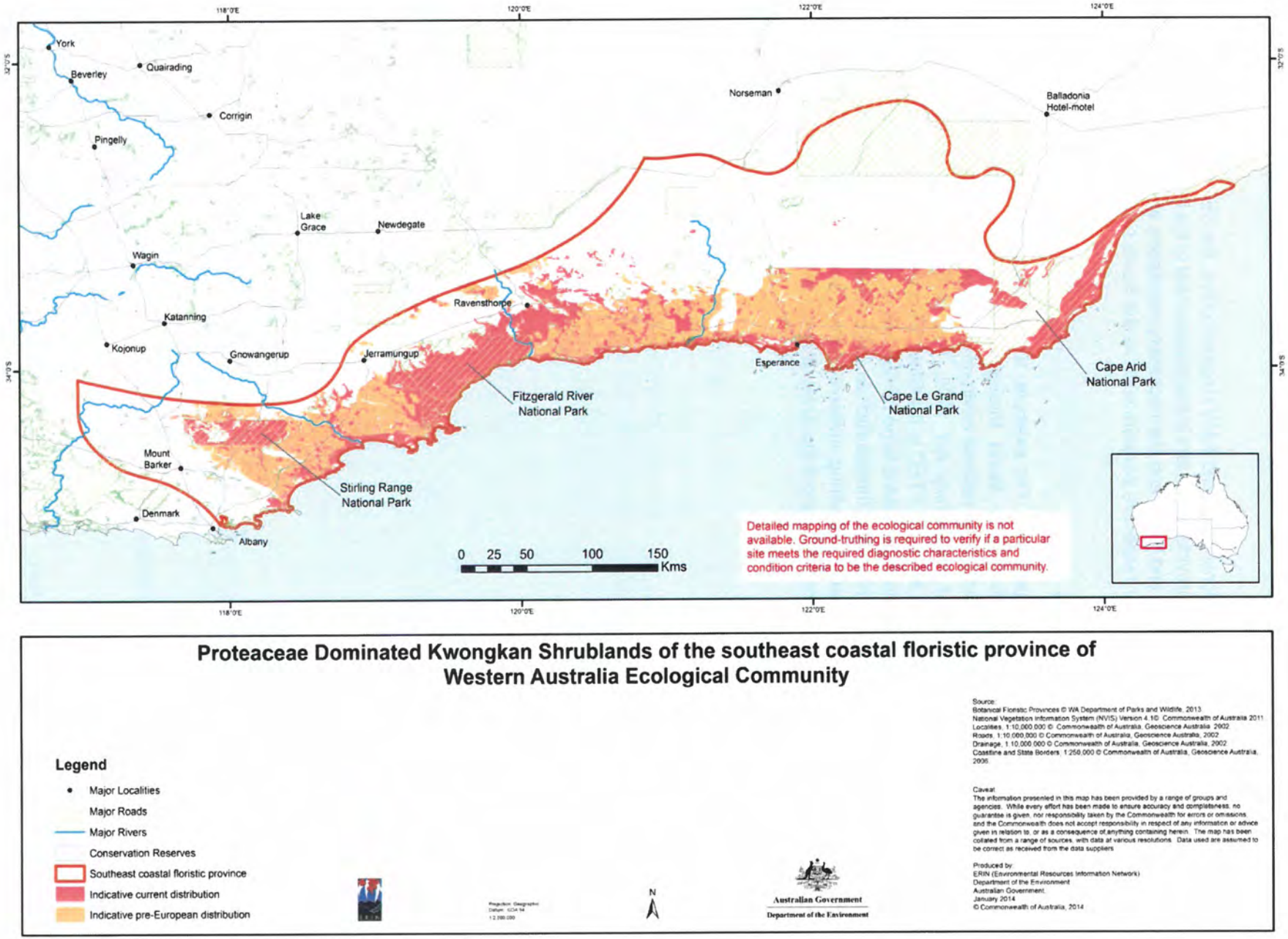
[54] Barrett. S, Comer. S, McQuoid. N, Porter. M, Tiller. C, Utber. D (2009) *Identification and Conservation of Fire Sensitive Ecosystems and Species of the Southcoast Natural Resource Management Region.* Department of Conservation and Land Management and Southcoast Natural Resource Management. https://www.researchgate.net/publication/369066306_IDENTIFICATION_AND_CONSERVATION_OF_FIRE_SENSITIVE_ECOSYSTEMS_AND_SPECIES_OF_THE_SOUTH_COAST_NATURAL_RESOURCE_MANAGEMENT_REGION

management purposes. The cells are defined by cleared access trails. The cells still represent vast areas of natural vegetation.

The Shire has established a working relationship with the P&W Regional office, the SEFWG and the FRNP Fire Working Group, who have provided comment in the development of the BRM Plan. The available data and mapping on flora and fauna and the necessary vegetation assessment has been provided through P&W and their respective partners such as the South Coast Natural Resource Management.

3.9 Important species and communities

Much of the vegetation in the Shire is protected. For example, the Kwongkan Shrubland a *Proteaceae* dominated vegetation community is found throughout the Shire. Kwongkan Shrubland is a threatened ecological community of national environmental significance as listed under the *Environmental Protection and Biodiversity Act 1999*. This particular Threatened Ecological Community (TEC) is ranked as a Priority 3 TEC in the State of Western Australia. The Kwongkan ecological community is important because a large portion has already been lost and the remaining areas are vulnerable to the impacts of threats such as dieback due to *Phytophthora cinnamomi*, changing fire regimes, historical land clearing, invasive species, and climate change. The Kwongkan community occurs in patches throughout the Shire refer to Figure 16 below.



Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia Ecological Community

Legend

- Major Localities
- Major Roads
- Major Rivers
- Conservation Reserves
- Southeast coastal floristic province
- Indicative current distribution
- Indicative pre-European distribution

N

Australian Government
Department of the Environment

Source:
Botanical Floristic Provinces © WA Department of Parks and Wildlife, 2013.
National Vegetation Information System (NVIS) Version 4.1© Commonwealth of Australia 2011
Localities, 1:10,000,000 © Commonwealth of Australia, Geoscience Australia, 2002
Roads, 1:10,000,000 © Commonwealth of Australia, Geoscience Australia, 2002
Drainage, 1:10,000,000 © Commonwealth of Australia, Geoscience Australia, 2002
Coastline and State Borders, 1:250,000 © Commonwealth of Australia, Geoscience Australia, 2006.

Caveat
The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of anything contained herein. The map has been collated from a range of sources, with data at various resolutions. Data used are assumed to be correct as received from the data suppliers.

Produced by:
ERIN (Environmental Resources Information Network)
Department of the Environment
Australian Government
January 2014
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Figure 16: Map of Kwongkan Threatened Ecological Community

The FRNP dominates the western part of the Shire. The FRNP is the core area of the Fitzgerald Biosphere first recognised by the UNESCO *Man and Biosphere Program*.

The Fitzgerald Biosphere Reserve is recognised as being a 'hotspot' within one of Earth's 34 global biodiversity 'hotspots'. The FRNP has approximately 1,660 plant taxa, containing over one-quarter (29%) of the south-west's flora. The protection of biodiversity is increasingly seen as a global concern. This change in perspective has been associated with an increasing number of international instruments addressing biodiversity conservation issues. Some of these instruments, such as those relating to Biosphere Reserves, have been given some recognition in the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*.

The Ravensthorpe Range is also included in the greater Fitzgerald Biosphere Reserve. Recent vegetation surveys describe twenty-one different floristic communities[55]. The Ravensthorpe Range has a large number of geographically restricted species, species listed as threatened, and species being considered for listing. Despite the high conservation values of the range, there are only two small A-class nature reserves off the main range. These reserves are not representative of the full diversity of flora and communities on the range. Mineral exploration and mining are currently active or proposed for parts of the range, and mining tenements cover most of the area of the range. The impacts of exploration, mining, fire, and *Phytophthora* present significant challenges when managing the significant biodiversity of the region.

According to the Threatened Species and Ecological Communities Regional Strategic Management Plan (Management Plan)[56], there are 57 threatened fauna species, 433 threatened flora species and 6 threatened ecological communities in the South Coast Region. The region covers 9.7 million hectares of which the Shire of Ravensthorpe forms part. The South Coast Region contains many short-range endemic species that are found in a very restricted area, generally less than 10,000 km[57], in particular in the flora, invertebrates and amphibian groups[58]. The plan recognises 8 significant impacts on threatened species in the area. One of which is an inappropriate fire regime. Fire regime may not be optimal for all species, but large-scale, intense fires present the greatest threat to species in the region due to the fragmentation of the landscape.

The Management Plan recognises that despite the flora and fauna of the region having adapted to particular fire regimes some are threatened if the fire regime is inappropriate. Many threatened fauna species are restricted to, and appear to require areas of long unburnt vegetation. The Management Plan recognises that for many of the threatened species, the most suitable post-fire age of the vegetation required to support them is unknown.

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[55]Markey. A, Kern, S Gibson N (2012) *Floristic communities of the Ravensthorpe Range, Western Australia* Conservation Science W. Australia 8 (2): pp187-239 (2012). https://www.researchgate.net/publication/286978068_Floristic_communities_of_the_ravensthorpe_range_western_australia

[56] Department of Parks and Wildlife, South Coast NRM (2009) *Threatened Species and Ecological Communities Regional Strategic Management Plan* https://library.dbca.wa.gov.au/static/FullTextFiles/923605.pdf

[57] Gilfillan S, Mitchell P, Newell J, Danks A & Comer S (2009) South Coast Threatened Species and Ecological Communities Strategic Management Plan https://library.dbca.wa.gov.au/static/FullTextFiles/923605.pdf

[58] Gilfillan S, Mitchell P, Newell J, Danks A & Comer S (2009) South Coast Threatened Species and Ecological Communities Strategic Management Plan https://library.dbca.wa.gov.au/static/FullTextFiles/923605.pdf

Many species of fauna are sensitive to fire due to their specialised habitat requirements, limited ability to produce an abundance of offspring, or poor dispersal or mobility. Some specific examples of fauna considered to be fire sensitive include the Noisy Scrub Bird and Western Ground Parrot. The Western Ground Parrot requires long unburnt vegetation for habitat to breed, but younger vegetation for feeding[59].

The UNESCO site Fitzgerald River National Park has 41 species recognised as being threatened with 33 also listed by the Commonwealth[60]. While there are some 253 species not protected under legislation they are identified as a priority for survey and research[61]. For the critically endangered Western Ground Parrot, endangered Carnaby's Black-Cockatoo, Western Bristlebird, Dibbler, Red-tailed Phascogale, and the Numbat the inappropriate fire regimes with intense and high frequency fires are the greatest risk to the species[62]. See Appendix A: Threatened Species list.

Most threatened Flora is affected by fire in one of three ways. The following flora are affected by high frequency and/or intensity fires and are also endangered; Oval-leaved *Adenanthos,* Mauve *Coopernookia,* and the Mount Barren Featherflower. The critically endangered *Kunzea similis subsp. Similis* will fail to thrive if there are insufficient intervals between fires to allow seed bank regeneration, as with the following species; Long-sepalled *Daviesia,* Paddle-leaved *Daviesia,* Bremer or Red-flowered Moort and Crowded or Twertup Featherflower. Another inappropriate fire regime is a fire during the Spring growth period which affects the Hopetoun Beard Orchid which is critically endangered and the Dwarf Spider Orchid which is endangered[63]. See Appendix A: Threatened Species list.

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[59] Barrett. S, Comer. S, McQuoid. N, Porter. M, Tiller. C, Utber. D (2009) *Identification and Conservation of Fire Sensitive Ecosystems and Species of the Southcoast Natural Resource Management Region.* Department of Conservation and Land Management and Southcoast Natural Resource Management. https://library.dbca.wa.gov.au/FullTextFiles/025042.pdf

[60] Ravensthorpe Wildflower Show Fitzgerald Biosphere Launch (2018) https://wildflowersravensthorpe.org.au/fitzgerald-biosphere-launch/

[61] Department of Environment and Conservation (2012) Fitzgerald Biosphere Recovery Plan: A Landscape Approach to Threatened Species and Ecological Communities Recovery and Biodiversity Conservation https://www.dcceew.gov.au/sites/default/files/documents/fitzgerald-biosphere-recovery-plan.pdf

[62] Department of Climate Change, Energy, the Environment and Water (2012) FITZGERALD BIOSPHERE RECOVERY PLAN: A landscape approach to threatened species and ecological communities for recovery and biodiversity conservation. https://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/fitzgerald-biosphere-recovery-plan-2012

[63] Department of Environment and Conservation (2011) FITZGERALD BIOSPHERE RECOVERY PLAN A landscape approach to threatened species and ecological communities for recovery and biodiversity conservation. https://www.dcceew.gov.au/sites/default/files/documents/fitzgerald-biosphere-recovery-plan.pdf

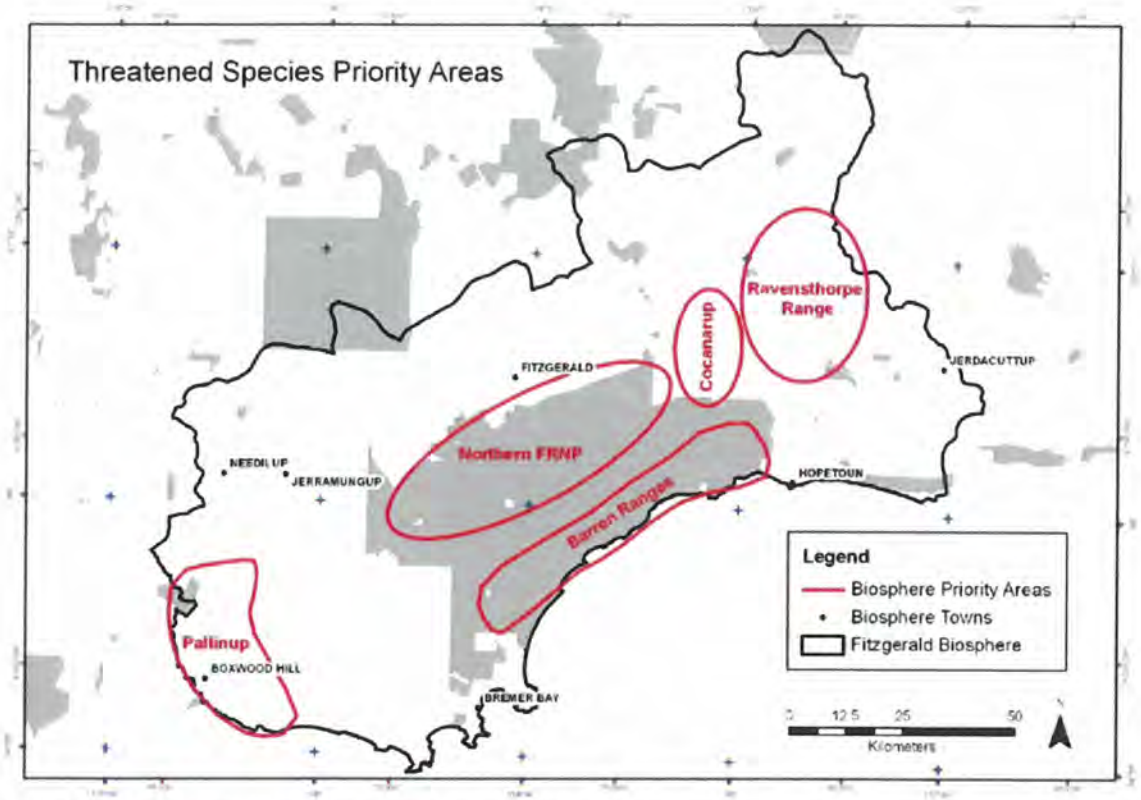

Figure 17: The 5 threatened Species Priority Areas[64]

Five (5) areas of habitat are Priority areas for threatened Flora and Fauna within the Biosphere. The Shire of Ravensthorpe has 4 areas within the Shire they include the Ravensthorpe Range, Cocanarup, the Barren Ranges, and Northern FRNP.

For the Fitzgerald Biosphere, the most significant concern to threatened species and ecological communities is inappropriate fire regimes followed by *Phytophthora cinnamomi*, other plant diseases, species loss, fragmentation, and degradation of habitat. In addition to these, three factors have been identified as hampering the implementation of programs, they include:

- insufficient resources,
- lack of appreciation of the values of the Biosphere amongst the community and
- incomplete ecological knowledge.

[64] Department of Environment and Conservation (2012) Fitzgerald Biosphere Recovery Plan: A Landscape Approach to Threatened Species and Ecological Communities Recovery and Biodiversity Conservation https://www.dcceew.gov.au/sites/default/files/documents/fitzgerald-biosphere-recovery-plan.pdf

3.10 Remnant Vegetation

The survey area lies within the Esperance Plains bioregion and Fitzgerald (ESP01) subregion. Comer et al (2001) describes the Esperance bioregion as "*characterised by myrtaceous and proteaceous scrub and mallee heaths on sandplain overlying Eocene sediments; rich in endemics. Herbfields and heaths (rich in endemics) on abrupt granite tors and quartzite ranges that rise from the plain. Eucalypt Woodlands occur in gullies and alluvial foot-slopes*"[65]. The ESP01 subregion has variable relief, comprising subdued relief on the sandplains of the coastal region, punctuated with metamorphosed granite and quartzite ranges both inland and on the coastal plain[66]. It lies mainly on the Bremer Sedimentary Basin and the eastern and western sections of the ESP01 subregion within the Albany-Fraser Orogen of the Yilgarn Craton. It has extensive western plains over Eocene marine sediment basement with small areas of Gneiss outcropping. Archaean greenstones – sand sheets with varying levels of lateralization with gravel soils also occur. The region is dominated by duplex soils and deep and shallow sands on the plains and dissected areas and by shallow sandy soils on the mountain ranges".

The vegetation has been mapped on a broad scale by J.S. Beard[67] in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form, and vegetation characteristics[68]. Vegetation units were regarded as associations and were grouped into Vegetation Systems representing a particular pattern of association distribution within a given area. A GIS search of J.S. Beards[69] vegetation classification places the LG area within 1121 Vegetation Associations[70], refer to Figure 18. Remnant vegetation has been mapped over the Shire with a total of 983,502 ha, with the total contained within the local government area being 876,774 ha which equates to 89.1%.

This is relevant to bushfire risk management due to the excessive extent of remnant vegetation in the shire.

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[65] Comer S, Gilfillan S. Barrett S, Grant M, Tiedemann K and Lawrie K (2001) Esperance 2 (ESP2 – Recherche subregion) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002 https://library.dbca.wa.gov.au/static/FullTextFiles/021927.pdf

[66] Comer s, Gilfillan s. Barrett s, Grant M, Tiedemann K and Lawrie K (2001) Esperance 2 (ESP2 – Recherche subregion) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002 https://library.dbca.wa.gov.au/static/FullTextFiles/021927.pdf

[67] Shepherd DP, Beeston GR and Hopkins AJM (2002) Native Vegetation in Western Australia, extent Type and Status. Technical Report 249 https://library.dpird.wa.gov.au/rmtr/235/

[68] Sandiford EM and Barrett S (2010) Albany Regional Vegetation Survey, Extent Type and Status. A project funded by the Western Australian Planning Commission (EnviroPlanning "Integrating NRM into Land Use Planning" and State NRM Program), South Coast Natural Resource Management Inc. and City of Albany for the Department of Environment and Conservation. Unpublished report. https://www.epa.wa.gov.au/sites/default/files/Publications/Albany-RVS-report_aug_2010.pdf

[69] Beard J S, Beeston GR, Harvey JM, Hopkins A J M and Shepherd D P (2013) The vegetation of Western Australia at the 1:3,000,000 scale. Explanatory memoir. Second edition. Conservation Science Western Australia 9: 1-152. https://library.dbca.wa.gov.au/static/Journals/080559/080559-09.001.pdf

[70] DPIRD, Department of Primary Industries and Regional Development (2019a). Soil Landscape Mapping - Best Available (DPIRD-027) dataset. https://library.dpird.wa.gov.au/gis_maps/15/

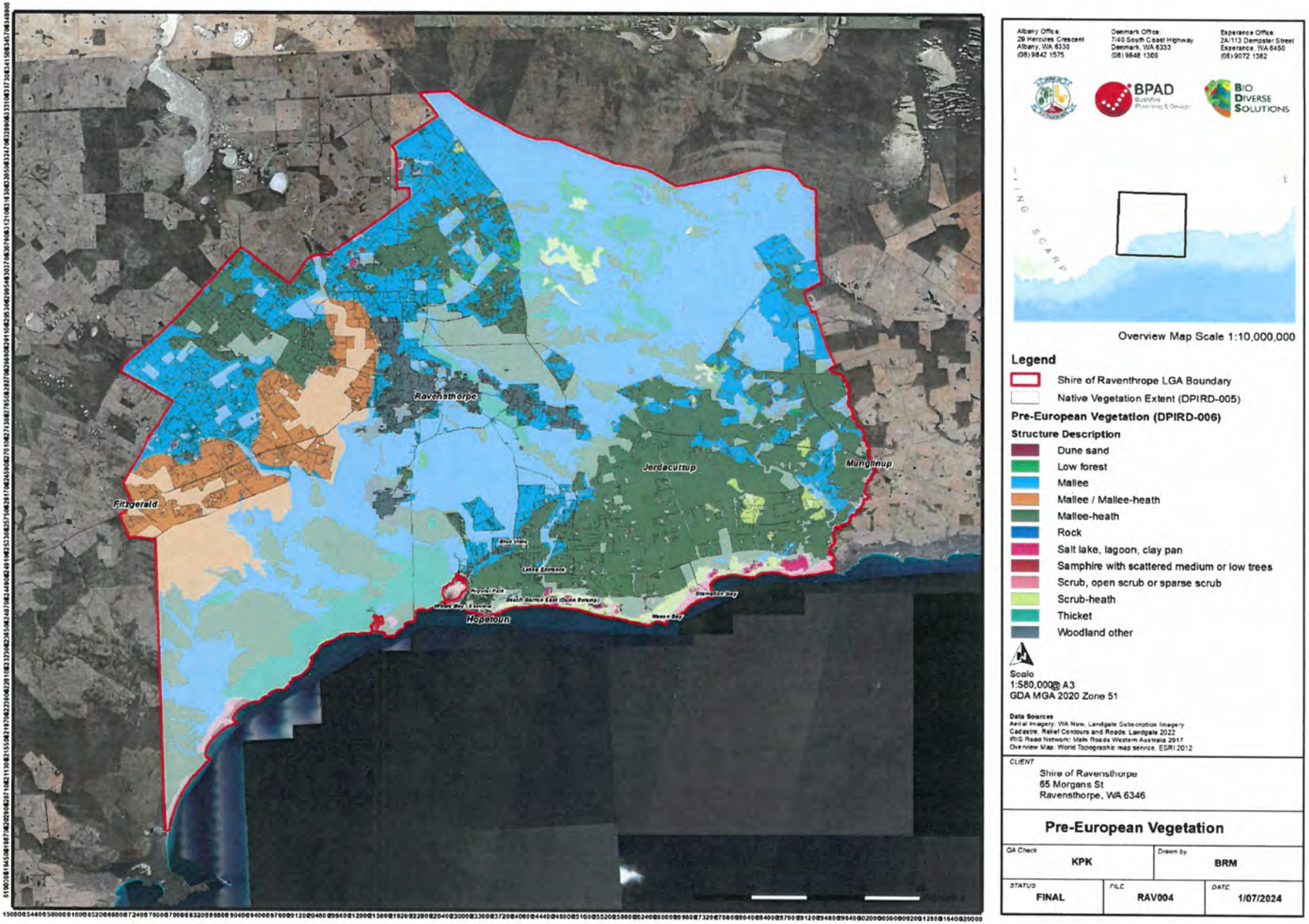


Figure 18: Pre-European Vegetation

3.11 Vegetation units near assets - townsites, settlements and key recreation sites

Vegetation Units Surrounding the Town sites, Subdivisions and Key Recreation Sites within the Shire of Ravensthorpe and Recommended Fire Management Guidelines

The vegetation community descriptions for this element of the BRM Plan relates directly to those that occur within and surrounding the townsites, subdivisions and key recreation sites which are the focus of the bushfire risk mitigation program. It is not intended to be a comprehensive list of those plant communities that occur across the entire Shire of Ravensthorpe. These vegetation types are as described by JS Beard, Vegetation mapping Ravensthorpe. 1:250000 sheet, maps and memoirs, 1973.

Blue Mallee, *Eucalyptus pluerocarpa (formerly E tetragona)* dominated Scrub containing Proteaceae and Myrtaceae understorey

This vegetation community is the most extensive in occurrence within and around the town sites and subdivisions in the Shire of Ravensthorpe, being present around Hopetoun, Jerdacuttup, Munglinup and Fitzgerald town sites, Whalebay Seaview, Beach Barren estate, Lakes Entrance, Blue Vista subdivisions and the Mason and Starvation Bay recreation sites.

The key characteristics of this plant community is the elevated occurrence of members from the Proteaceae family within the scrub understorey, which have particular needs in relation to exposure to fire to ensure successful regeneration of all elements of the family. The extensive presence of this family in this vegetation community dictates the optimum fire return interval periods for this plant community.

The plants in this family have canopy stored seed within their, often, woody fruit which is only generally released upon exposure to elevated temperature fire events. This survival and recruitment mechanism is a feature of their adaption to the high intensity nature of fire in this plant community. However, to ensure that there is sufficient canopy stored seed set prior to their next exposure to fire this plant community requires considerable time to achieve this optimum levels of stored seed.

The plants within the Proteaceae family ideally require minimum fire return intervals of between 18 and 35 years post exposure across the rainfall gradients of the Shire to achieve this level of canopy stored seed.

On the coast in the 500mm rainfall zone these Proteaceae family members are capable of successfully regenerating at a fire return interval of at least 18 years and ideally out at 25 years post last exposure to fire.

Whereas up at the Fitzgerald townsite in the 400mm rainfall zone these Proteaceae family members require a minimum fire return interval of around 30 to 35 years post last exposure to fire to ensure successful regeneration.

These recommended minimum fire return intervals result in complex planning considerations to ensure that adjoining management cells around the townsites and subdivisions are burnt at precisely half of the minimum fire return interval. This approach ensures that available fuel levels from regenerating native vegetation does not create unnecessary wicks of opportunities for bushfires to enter developed landscapes.

Delays in the implementation of prescribed burns in the adjoining cells can easily result in vegetation maturing past the 10-12 and 15-17 years for the two rainfall zones. By this stage of maturity, the native vegetation is more than capable of burning under bushfire weather conditions and will provide conduits for bushfire entry into the developed landscapes.

***Banksia speciosa* dominated Scrub**

This plant community is present within the Hopetoun and Jerdacuttup town sites, Whalebay Seaview, Lakes Entrance subdivisions and the Mason and Starvation Bay recreation sites.

This particular plant community is again dominated by the presence of the Proteaceae family members in both the over storey and understorey of the scrub. The fire return period for this plant community is driven entirely due to the large representation of this Family within the plant community.

Banksia speciosa has a particular requirement of having its fruit, which is located out on the extremities of their limbs, subjected to high intensity fire in order to successfully desiccate the fruit for effective release of their contained seed. This feature makes *Banksia speciosa* vulnerable to not successfully regenerating in the event that the fire intensity is too mild and does not result in sufficient temperatures around the fruit for satisfactory seed release.

On the coast in the 500mm rainfall zone these Proteaceae family members are capable of achieving adequate canopy stored seed for successful regeneration at a fire return interval of at least 18 years and with an ideal preference of 25 years post last exposure to fire.

Banksia speciosa and the other Proteaceae family members in the Jerdacuttup town site within the 400mm rainfall zone require a minimum fire return interval of around 25 to 30 years growing time to achieve sufficient canopy stored seed for successful regeneration.

Again, this extended period of recommended fire return interval results in complex planning considerations within the small management cells surrounding the focus of the bushfire risk mitigation program.

With prolonged absence of fire in the landscape these woodlands become over mature at around 60 years of age and start to senesce with large limbs in the huge specimens falling off the trees, which results in complete tree death. Over time this continued process results in the stocking rates of these trees falling from upwards of 1000 trees to the hectare to less than 100 trees to the hectare.

At these levels of stocking rates there is the inherent risk of complete demise of these characteristic plants in the sandplains. In addition, the very large nature of these mature trees makes it increasingly difficult to ensure fire intensity is sufficient to achieve desiccation and subsequent effective release of seeds in the fruit.

Unfortunately, the once extensive occurrence of the *Banksia speciosa* plants within the Jerdacuttup town site has nearly collapsed in the prolonged absence of any fire events. At the moment there are less than a dozen individual plants remaining from a once extensive population.

Coastal Eucalypt Low Forests

This plant community occurs only along the coastline in the Shire of Ravensthorpe and is a feature within the town site of Hopetoun, a backdrop to the Whalebay Seaview subdivisions and has scattered occurrence either side of the Mason and Starvation Bay recreation sites.

These low forests are dominated by a mix of mallee species of Eucalypts that regenerate from lignotubers such as *Eucalyptus falcata* and *E angulosa* and or are species of Mallets, which are obligate re-seeders such as *Eucalyptus utilis*, which form dense stands of even aged regeneration.

These plant communities are generally open in nature within the understorey and do not have large abundance or accumulation of ladder fuels. *Acacia cochlearis* is a feature of the understorey which acts as a stabilising plant on the sand exposures that occur post tree fall and or exposure to fire.

Unfortunately, these plant communities leave a considerable amount of biomass, i.e. dead trunks and limbs, in the landscape post exposure to planned and or bushfire events. The result is generally very detractive in nature and certainly does not provide amenity value after such events.

To date the Shire of Ravensthorpe have not advocated for any hazard reduction programs in these woodlands using just fire but have adopted approaches of Parkland clean up through crown lifting by removing lower limbs and thinning the woodlands to remove the suppressed and weak individuals whilst promoting and encouraging the larger crown plants to dominate. This approach has been the basis of the parkland clean up within and around the Hopetoun town site road and coastal reserves.

Occasionally where these woodlands are located within a management cell that does not lend itself to being parkland cleared due to its size and the proximity away from built structures the only way to achieve successful prescribed burning is to chain the patch in order to ensure that all biomass is burnt and improve post burn amenity value.

There are only two active management cells where this approach has been utilised and these are in the north east and eastern edges of the Hopetoun town site within the inner and outer strategic low fuel zones.

Coastal Rottnest Island Ti-tree, *Melaleuca lanceolata over Acacia rostellifera*

This particular plant community is entirely confined to the narrow strip of deep white coastal sands along the coast of the Shire of Ravensthorpe.

The dense and tightly knit canopies mesh together and form obstructions to the strong coastal winds and minimise the potential for soil erosion to occur.

These woodlands are generally very mature in nature and have significant amenity value such as the Mason Bay recreation site and the coastal foreshore reserve around Hopetoun and within the Hopetoun caravan park.

The Shire of Ravensthorpe have implemented limited hazard reduction measures within the immediate strips of this plant community against the foredune and have opted for parkland cleanup some thirty to forty metres inland from the foredune where this plant community forms an eco-tone with the Coastal low woodlands of Eucalyptus species.

Though there is considerable debate about the ability of this plant community to recover post exposure to bushfire events and the concerns associated with foredune de stabilising there is little to no evidence apparent when sites are inspected some five and ten years post exposure to bushfire events.

Acacia rostellifera, a native re-sprouting wattle species, plays a key role in this plant community by being able to quickly stabilise the sandy soils post disturbance, whether fire and or physical disturbance. The far-reaching sub surface runners and abundant emergent sprouting shoots are a feature of the resilience of this plant community in a high erosion risk environment.

Salmon gum Woodlands, *Eucalyptus salmonophloia*

This plant community is confined in occurrence to around the Ravensthorpe town site within the Shire of Ravensthorpe in relation to the Bushfire Risk Management planning focus and is not present in and or near any of the other town sites and or subdivisions.

These woodlands are all generally very mature in nature, have elevated levels of accumulated fuels, such as dead limbs, trunks, leaf/bark litter and dead understorey plant species. The vast majority of the mature trees also have tree trunks with dry sides, hollow trunks and surface root exposure that all lend themselves to being points of fire incursion.

In order to achieve hazard reduction practises in these woodlands and primarily due to the large accumulation of combustible fuels there is a requirement for mechanical intervention to be undertaken to windrow and stockpile this accumulated debris before any leaf and bark litter burning can be considered.

Once the windrows of debris are burnt the implementation of the remaining litter burning can be considered. However, due to the large number of trees with dry sides and the extent of the leaf and bark litter accumulation around the base of the trees the practise of "advance mop up", where these extensive accumulations are physically removed by raking the materials away from the tree provide the means of using fire with reduced opportunity of fire ingress into the trees and subsequent risk of tree fall.

Experience to date with managing this plant community in and around the Ravensthorpe town site indicates that following initial parkland clean up burning of subsequent accumulation of leaf and bark litter is required at four to five year intervals in order to maintain these locations in appropriate low fuel states.

There is 46 hectares of this plant community within the Ravensthorpe townsite focused management program of which 24 hectares has been parkland cleared and another 22 hectares remaining to be treated.

Mallett Woodlands, *Eucalyptus annulatta*

This plant community is confined in occurrence to the landscape around the Ravensthorpe town site and the Hamersley Inlet recreation reserve within the Shire of Ravensthorpe Bushfire risk management planning focus.

This plant community is entirely comprised of the obligate reseeding mallet species, *Eucalyptus annulatta* and grows upon the red cracking clay soils formed on either weathered dolerite dykes and or weathered basalt parent rock material around Ravensthorpe and on weathered limestone substrate at the Hamersley Inlet recreation reserve.

These mallet woodlands are typically all even aged stands of the Eucalypt having all regenerated following a single disturbance event and possess little to no understorey element. These plants have very thin bark on their trunks and are extremely fire sensitive and are easily killed by the slightest exposure to elevated temperatures.

Any prescribed burning works undertaken in these woodlands requires considerable amounts of effort to remove all available fuel out from underneath the stands into openings suitable for subsequent burning of the accumulated debris.

These stands can and are successfully thinned using mechanical intervention where the suppressed and sub dominant plants are physically removed in order to achieve parkland clean up.

An alternative approach can be the establishment of large clumps of mature thickets being left with cleaned up avenues established in the natural openings between mature thickets. Dead and suppressed trees can be windrowed in preparation for subsequent burning.

There is 6 hectares of this plant community in the focus of the mitigation program in the Ravensthorpe townsite, of which 3ha has been treated and another 3ha remains to be treated. A further 1ha of this plant community has been treated in the Hammersley Inlet, Shire of Ravensthorpe, Recreation Reserve.

Ravensthorpe Oil Mallee Woodlands, *Eucalyptus oleosa corvina, JS Beard described as York Gums*

Known locally as the Ravensthorpe black butt there are extensive stands of these woodlands within and surrounding the town site of Ravensthorpe and are not represented in any other of the townsites and or subdivisions.

Unfortunately, the vast majority of these woodlands are now exceedingly long unburnt with considerable amounts of fallen accumulated tree and understorey debris within these woodlands.

To date, we have not witnessed and significant bushfire incidents occurring within these woodlands. It is expected that high intensity bushfire will result in considerable tree collapse and a likely "resetting" of the community back to mallee suckering will occur.

In addition, these woodlands are very difficult to implement prescribed burning within due to the extent of the tree trunk and limb hollows. Experience with planned use of fire in these mature woodlands has resulted in considerable ingress of fire into the hollows which results in significant tree fall. "Advance mop up" within this plant community is also difficult due to the nature of the multiple stems of the trees and restriction this poses in raking back the accumulated debris.

The approach to these woodlands is to now implement mechanical intervention and remove the fallen tree material and individual suppressed tree specimens into windrows in openings within the woodlands for subsequent burning.

A follow up mulching treatment of the ladder fuels is then able to be implemented within the understorey of the woodlands.

Subsequent chemical control works are required in the year or two post treatment to manage re-sprouting lignotubers of the removed suppressed specimens in these stands.

The resulting approach is one of improving amenity value without compromising structural resilience of the woodlands and removing the ladder fuel element in order to minimise potential for crown fire development in the event of a bushfire incident.

There is 84ha of this plant community in the Ravensthorpe townsite focused management program of which 46ha has been parkland cleared with another 38ha remaining to be treated.

Flat Topped Yate Woodlands, *Eucalyptus occidentalis*

These woodlands of *Eucalyptus occidentalis* are present within the town sites of Munglinup and Ravensthorpe and within the creek lines of the East branch of the Steere adjacent to the Blu Vista subdivision within the focus of the Shire of Ravensthorpe Bushfire Risk management program.

These woodlands are all very mature in nature and typical of all the large trees across the Shire they have consistent occurrences of dry sides and large openings into the core of the trees. Unfortunately, when exposed to fire these trees have consistent ingress of fire into them which results in considerable tree fall.

Raking of the debris around the trees using the "Advance mop up" technique is an important feature of managing tree fall when considering the planned use of fire in these woodlands. Again, the parkland clearing technique as deployed within the Salmon gum woodlands is strategic approach to deal with the once again elevated levels of accumulated debris in the understorey.

Observations with the rate of leaf and bark litter accumulation post the parkland clean up suggests that these woodlands can be re exposed to fire at 3 to 5 year intervals in order to maintain them in low fuel states to minimise bushfires impacts.

Observations with the rate of leaf and bark litter accumulation post the parkland clearing suggests that these woodlands can be re-exposed to fire at 3 to 5 year intervals in order to maintain them in low fuel states to minimise bushfire impacts. At these low fuel load levels fire intensity can be kept sufficiently low enough to avoid tree canopy scorch and death of mature trees.

In the town situations these trees are generally present as isolated individuals and/or in clusters and as such are not forming a specific vegetation unit but are woodlands with Salmon gum and/or woodlands with mallee species as an understory element.

Sheoak Groves of *Allocasuarina huegliana*

Though the stands of Sheoak are not located within the town sites in the Ravensthorpe Shire they are located within the Water Reserves just to the south and south east of the Ravensthorpe town site and will be part of the focus of addressing elevated hazard adjacent to this particular town site.

Sheoak groves of *Allocasuarina huegliana* have the ability to colonise adjoining mallee and woodlands in the prolonged absence of fire.

The needle bed accumulation within these groves can be considerable and fortunately for this species of Sheoak they are generally tolerant to moderate intensity fire events.

However, this accumulation of available fuels results in elevated fire intensity crown fires in summer bushfire situations which results in complete collapse of the Sheoak stands.

Advance mop up in these groves is not that practical due to the nature of the rocky soils and actual rocks that the Sheoak favour.

Prescribed use of fire in this plant community should aim for moderate to low intensity needle bed fire to ensure that the fires do not develop into crown fires. Observations suggest that these needle beds are capable of being exposed to reintroduction of fire around 3 to 5 year intervals.

Broombush Thickets of *Melaleuca uncinata*

These thickets are located on granite derived soil types in and around the Ravensthorpe town site within the Shire of Ravensthorpe Bushfire risk management planning focus.

All of the three main occurrences are very mature in nature with average height of the thickets being around 3 to 4m. There is very little to no understorey present within this plant community and all have significant weed invasion from bridal creeper and Freesia.

This plant community enable bushfires to travel extremely fast when on fire in summer months due to the ability of the wind to be in direct contact with the canopy of the plant community. This increased rate of spread is of course also due to the fine fuel structure of the tall elongated plant stems.

Unfortunately, when in a mature state like these current thickets are around the Ravensthorpe town site it is very difficult to consider planned use of fire due to the inability of being able to obtain ideal results of reducing available fuel loads in the late autumn prescribed burning window.

The more considered and ideal way to manage such vegetation units in and around towns is to scrub roll the thicket in order improve success of available fuel reduction and managing the prescribed burn under milder late autumn conditions.

There is 16 hectares of this plant community around the Ravensthorpe town site of which 11 hectares has been treated with a remaining 5 hectares to be treated.

Tiered assets in SOR

The mapped vegetation units surrounding the townsites, subdivisions and key recreation sites (Assets) within the Shire of Ravensthorpe have been separated into two tiers, being:

Tier one: Major settlement assets

- Ravensthorpe
- Hopetoun
- Munglinup
- Jerdacuttup east
- Fitzgerald

Tier Two: Subdivisions

- Blu Vista
- Whalebay/Seaview
- Krystal Park
- Steeredale Meadows
- Beach Barren Estate (Dunn's Swamp)
- Lakes Entrance North and South

Tier two: Recreation sites

- Starvation bay
- Mason bay
- Hammersley Inlet

The vegetation community descriptions overlaid on the tiered settlements is shown in the following pages, see Figures 19 to 25.

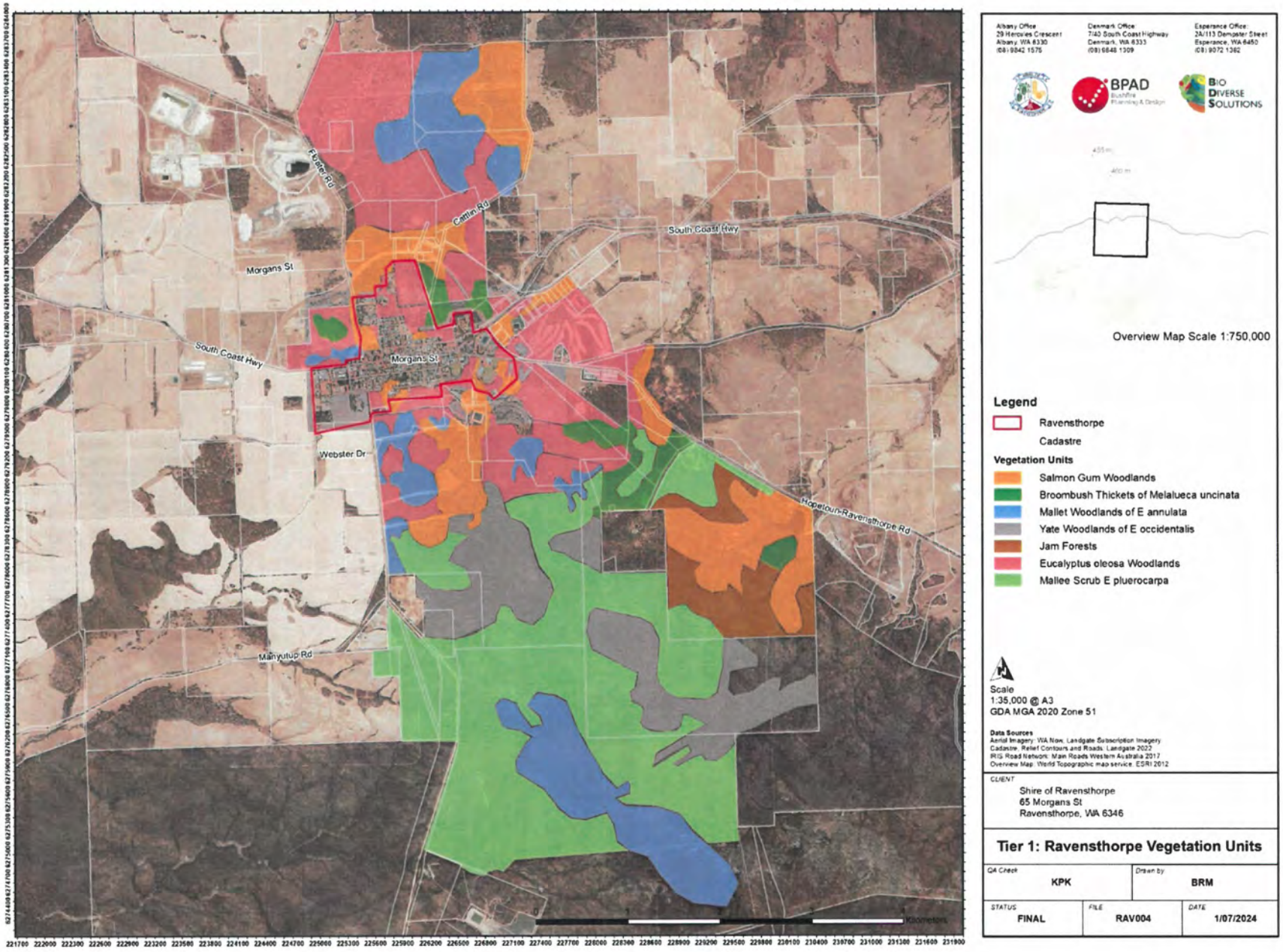


Figure 19: Ravensthorpe Vegetation Units

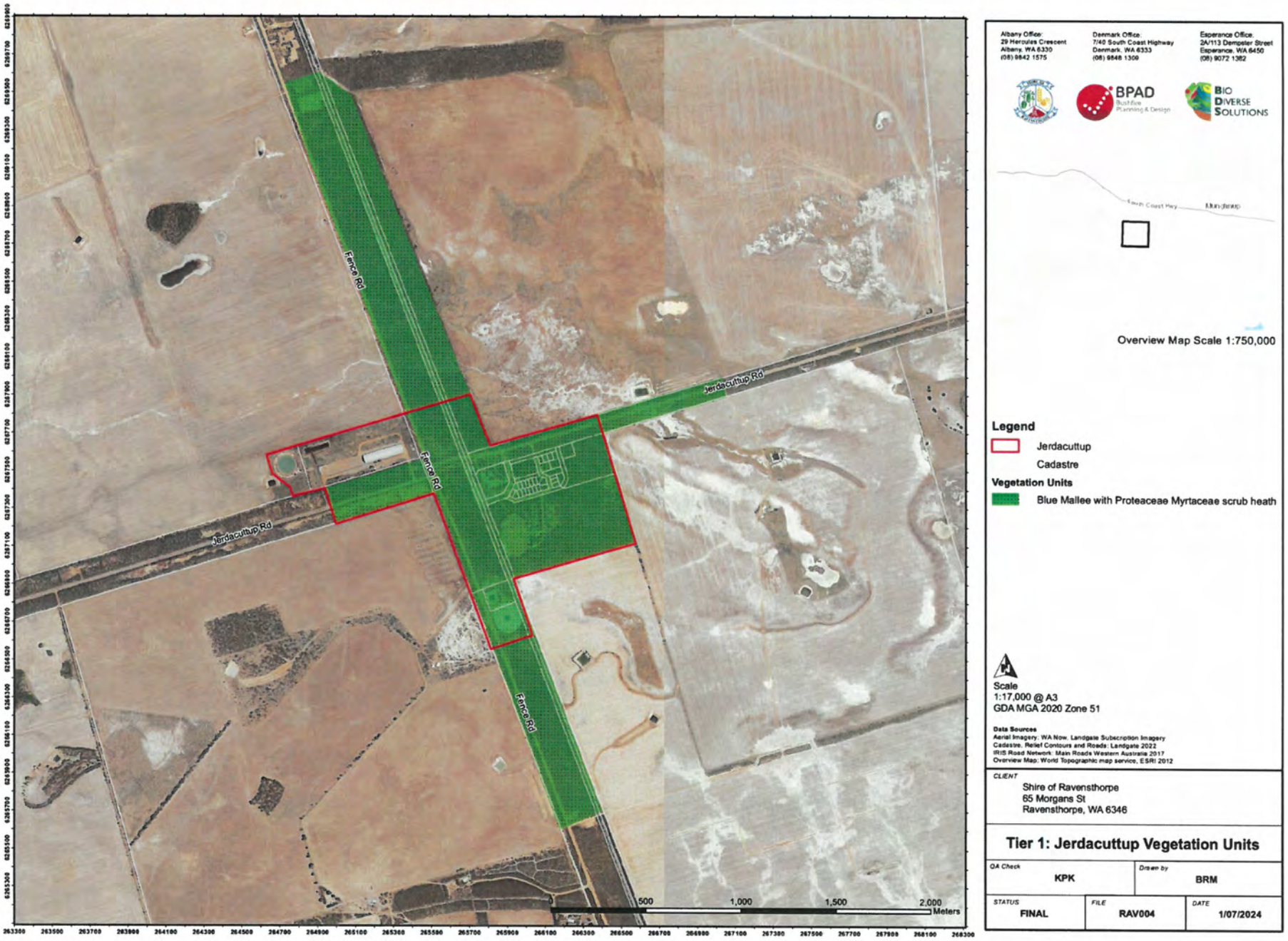
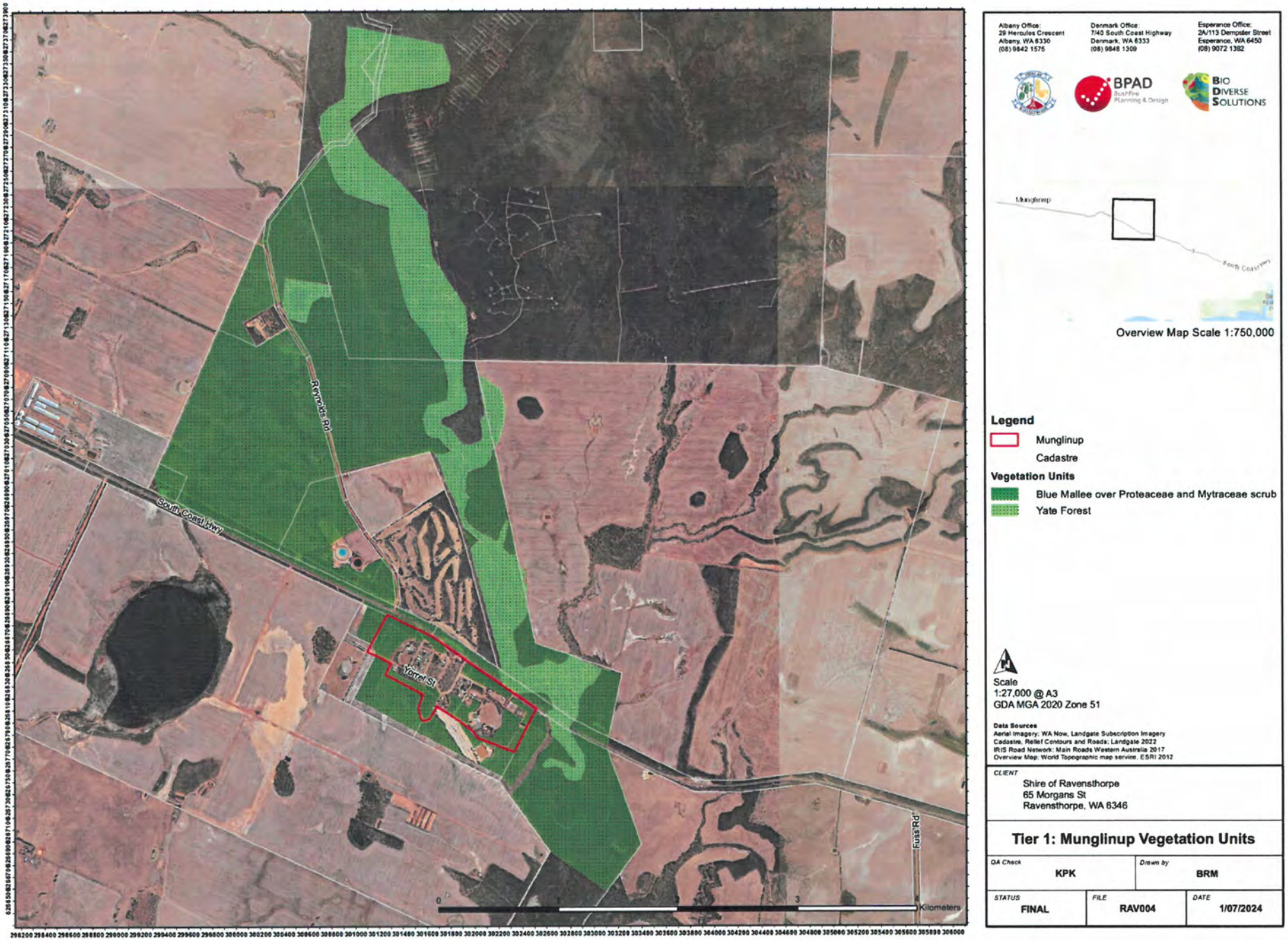


Figure 20: Jerdacuttup Vegetation Units



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BPAD Bushfire Planning & Design

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:750,000

Legend

- Munglinup
- Cadastre

Vegetation Units

- Blue Mallee over Proteaceae and Mytraceae scrub
- Yate Forest

Scale
1:27,000 @ A3
GDA MGA 2020 Zone 51

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2022
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Ravensthorpe
65 Morgans St
Ravensthorpe, WA 6346

Tier 1: Munglinup Vegetation Units

QA Check	Drawn by	
KPK	BRM	
STATUS: FINAL	FILE: RAV004	DATE: 1/07/2024

Figure 21: Munglinup Vegetation Units

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BPAD Bushfire Planning & Design

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:750,000

Legend

- Fitzgerald
- Cadastre

Vegetation Units

- Blue Mallee over Proteaceae and Myrtaceae scrub
- Variety of Planted non local species of trees

Scale
1:14,000 @ A3
GDA MGA 2020 Zone 51

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2022
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

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Tier 1: Fitzgerald Vegetation Units

QA Check	Drawn by		
KPK	BRM		
STATUS	FILE	DATE	
FINAL	RAV004	1/07/2024	

Figure 22: Fitzgerald Vegetation Units

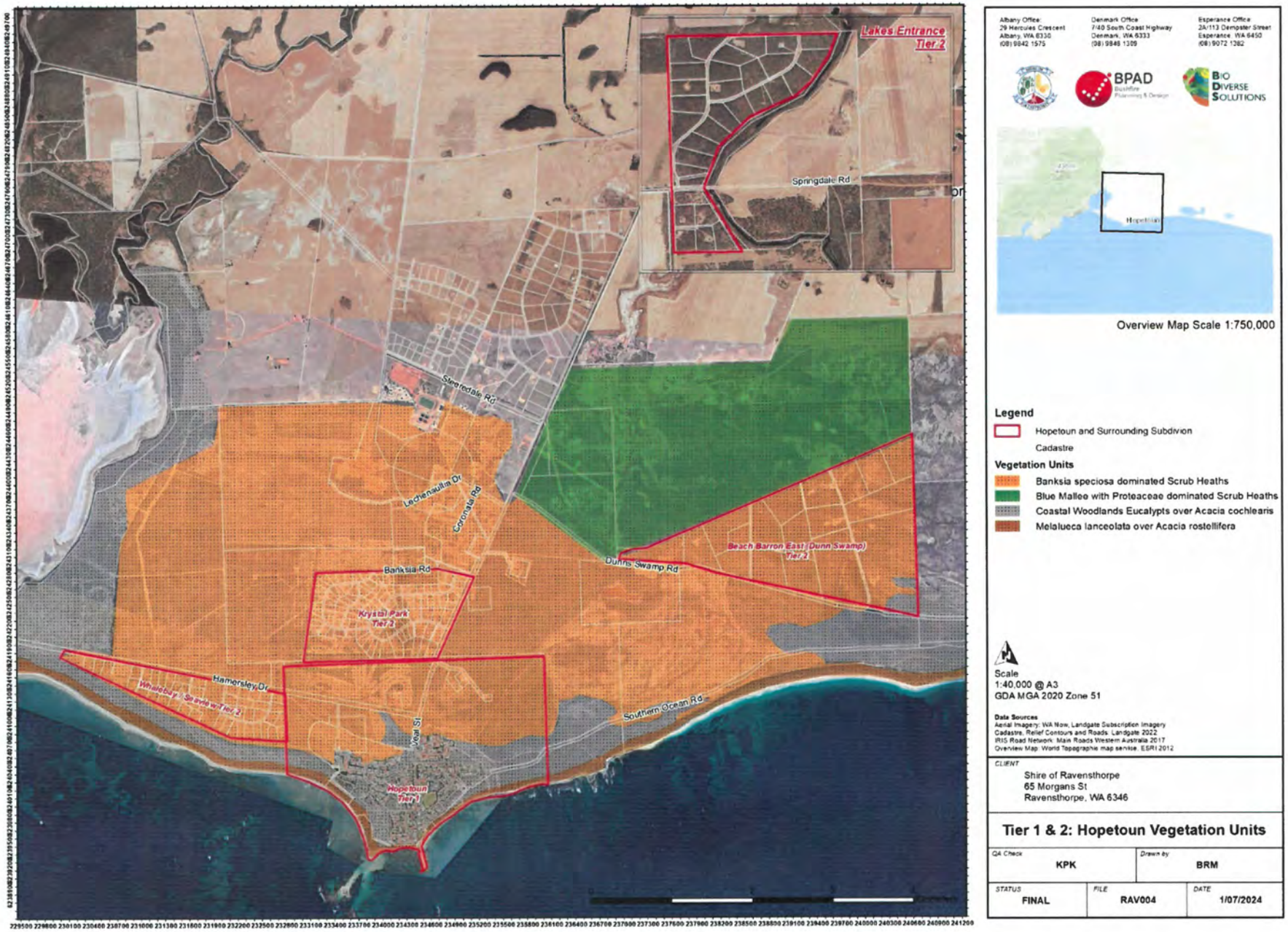


Figure 23: Hopetoun and Surrounding Subdivisions Vegetation Units

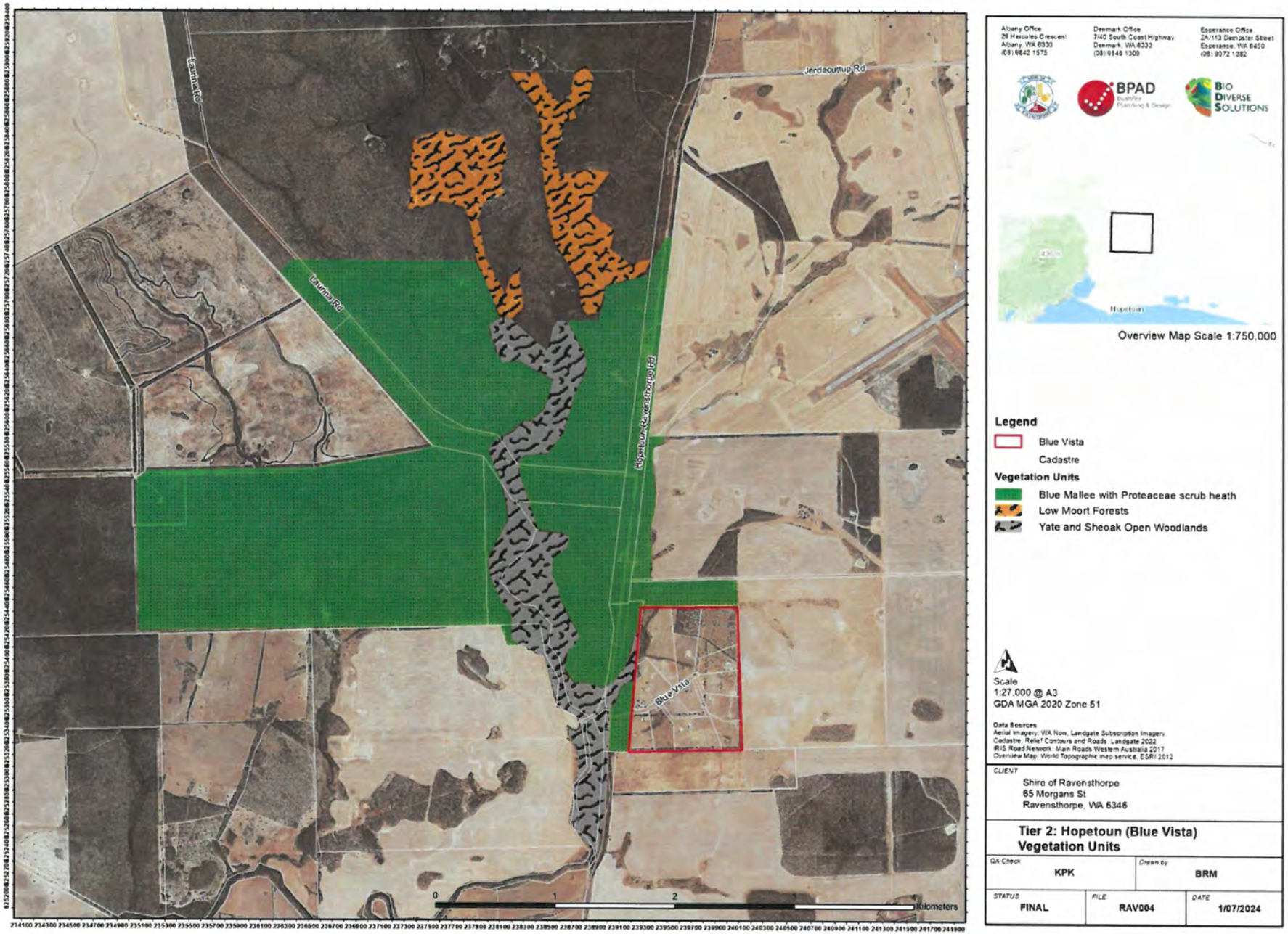
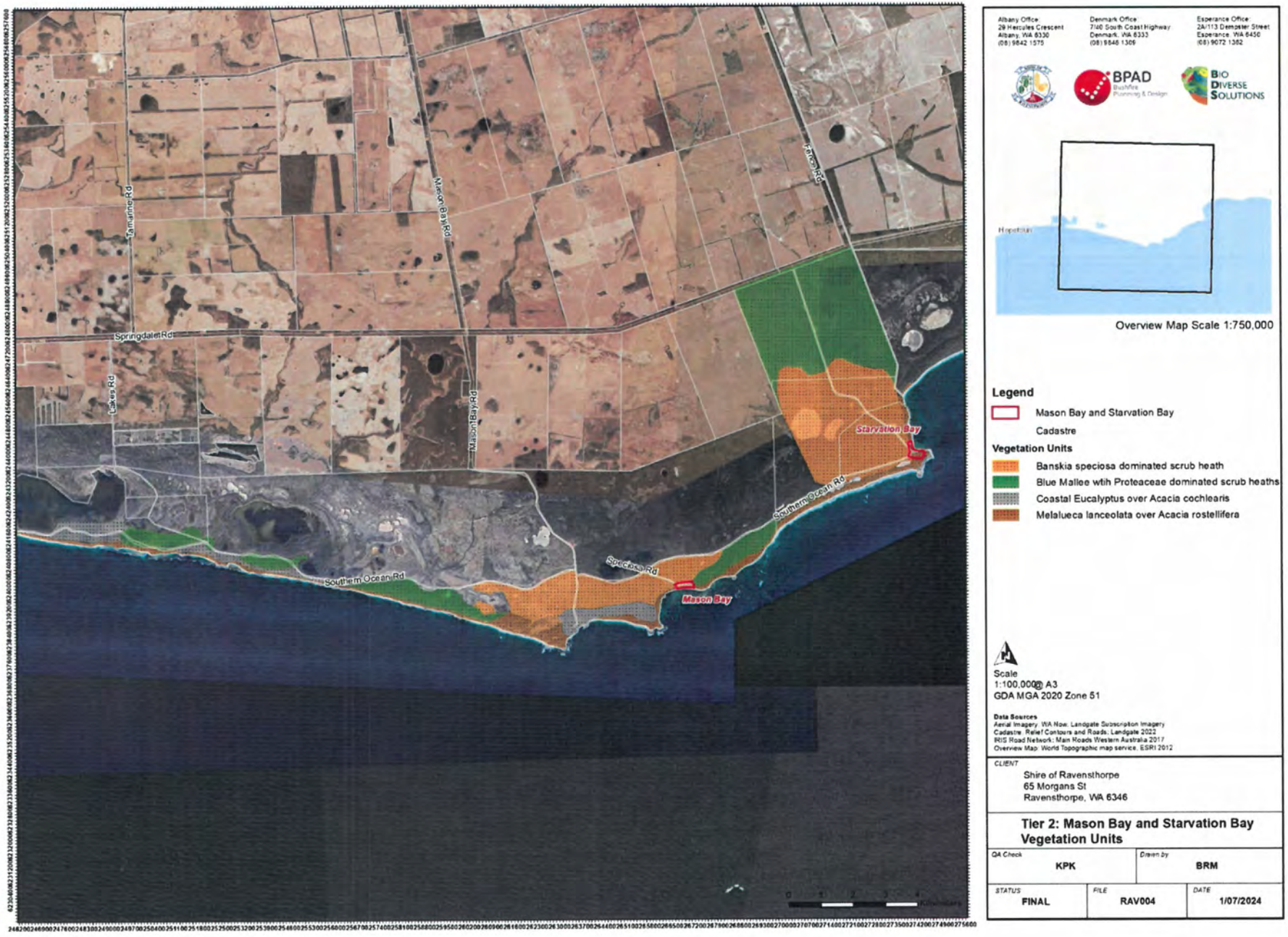


Figure 24: Hopetoun (Blue Vista) Vegetation Units



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BPAD Bushfire Planning & Design

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:750,000

Legend

- Mason Bay and Starvation Bay
- Cadastre

Vegetation Units

- Banskia speciosa dominated scrub heath
- Blue Mallee wtih Proteaceae dominated scrub heaths
- Coastal Eucalyptus over Acacia cochlearis
- Melalueca lanceolata over Acacia rostellifera

Scale
1:100,000 @ A3
GDA MGA 2020 Zone 51

Data Sources
Aerial Imagery: WA Now: Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2022
RIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Ravensthorpe
65 Morgans St
Ravensthorpe, WA 6346

Tier 2: Mason Bay and Starvation Bay Vegetation Units

QA Check	Drawn by	
KPK	BRM	
STATUS	FILE	DATE
FINAL	RAV004	1/07/2024

Figure 25: Mason Bay and Starvation Bay Vegetation Units

3.12 Historical bushfire occurrence

Bushfires occur frequently in this area with a large proportion of the native vegetation available to burn most times of the year. Crops, pasture, and introduced grasses are also available to burn for a large part of the year. The main causes of bushfires are lightning strikes as demonstrated in Table 5 below, and some accidental ignition from farming.

Table 5: DFES Bushfires Summary of Ignition Report [71]

Bushfires Summary of Ignition Report											
	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	**Total**
Total Number of Bushfires:	**16**	**6**	**20**	**16**	**19**	**15**	**16**	**16**	**17**	**16**	**157**
Reported Cause											
Burn off fires	1	1	3	4	4	1	0	2	0	1	17
Campfires/bonfires/outdoor cooking	0	0	1	0	0	0	0	0	0	1	2
Cigarette	0	0	0	1	0	1	0	0	0	0	2
Electrical distribution (excl. power lines)	1	0	0	1	0	0	0	0	1	0	3
Equipment - Mechanical or electrical fault	0	0	0	0	0	2	0	0	0	0	2
Improper Fuelling/Cleaning/Storage/Use of material ignited	0	0	0	0	1	0	1	0	0	0	2
Indoor Appliances - cause unknown	0	1	0	0	0	0	0	0	0	0	1
Other open flames or fire	1	0	0	0	0	0	0	0	0	0	1
Power lines	1	0	1	1	0	0	0	0	2	2	7
Reignition of previous fire	0	1	0	0	0	1	0	0	2	1	5
Suspicious/Deliberate	2	0	1	0	1	2	0	1	0	0	7

[71] DFES (2024) Bushfires Summary of Ignition Report. Generated by Operational Information Systems Branch 14 May 2024

Undetermined	1	0	0	1	0	0	0	0	0	0	2
Unreported	0	0	1	1	1	1	3	5	4	6	22
Vehicles (incl. Farming Equipment/Activities)	2	1	2	6	7	0	2	1	4	1	26
Weather Conditions - Lightning	7	1	11	0	5	7	10	7	4	4	56
Weather Conditions (High winds, natural combustion etc. Excludes Lightning)	0	1	0	0	0	0	0	0	0	0	1
Yard maintenance, hand held equipment	0	0	0	1	0	0	0	0	0	0	1

During a five year period between 2019 and 2023, 80 fires were recorded of which 32 were caused by lightning. The lightning is driven by west coast trough movements that occur normally between October and March, the higher risk period for bushfires. Half the remaining fires were accidental ignition by farming, caused by harvesting cereal crops, which also occurs in the higher risk period for bushfires, or were unreported fires. The ignitions listed in Table 6 above are those reported to the Chief Bushfire Control Officer (CBFCO). Often in remote regions not all ignitions are recorded.

While the majority have been in the more remote areas of wilderness, several have threatened the townships. Bushfires in Lake Tay in 2003 and 2023/2024 threatened Ravensthorpe and forced the mine and South Coast Highway to close. Two weeks later another fire started in the FRNP which had the potential to threaten the Hopetoun townsite, where a Large Air Tanker (LAT) crashed, with the pilots fortunately walking away. A blaze in February 2024 saw the district high school in Ravensthorpe closed for two days. With the majority of fires caused by lightning strike and in combination with long unburnt bush surrounding the towns, the fires have the ability to come closer to the townsites.

3.13 Current bushfire risk management controls

Local government-wide controls are activities that reduce the overall bushfire risk within the Shire of Ravensthorpe. These types of treatments are not linked to specific assets and are applied across all or part of the local government as part of normal business or due to legislative requirements. The following controls are currently in place across the Shire of Ravensthorpe:

- *Bush Fires Act 1954* Section 33 notices, including applicable fuel management requirements, firebreak standards, and annual enforcement programs
- Shire of Ravensthorpe Prohibited Burn Times, Restricted Burn Times, Total Fire Bans, and Harvest & Vehicle Movement Bans
- Declaration and management of Prohibited Burn Times, Restricted Burn Times, and Total Fire Bans for the local government
- Public education campaigns and the use of P&W and DFES state-wide programs, tailored to suit local needs
- State-wide arson prevention programs developed in conjunction with WA Police and DFES
- State planning framework and local planning schemes, implementation of appropriate land subdivision and building standards in line with DFES, Department of Planning, Lands and Heritage and Building Commission policies and standards
- Monitoring performance against the BRM Plan and reporting annually to the local government council and OBRM
- Department of Parks and Wildlife Master Burn Plan Programme
- Shire of Ravensthorpe LO1 –Bushfire Control –Camping and Cooking Fires
- Shire of Ravensthorpe LO2 –Bush Fire Advisory Committee
- Shire of Ravensthorpe LO3 –Bush Fire Control –Burning Restrictions
- Shire of Ravensthorpe LPP 9 – Farm Forestry
- Australian Standard AS 3959 – 2018 Construction of buildings in bushfire prone areas
- SPP 3.7 Planning in Bushfire Prone Areas (SPP 3.7) (WAPC 2015)
- Guidelines for Planning in Bushfire Prone Areas version 1.4 (the Guidelines) (DPLH & WAPC 2021)

A shire work plan has been developed and is attached at Appendix E. The plan details work to be undertaken as a part of normal business, to improve current controls or to implement new controls to better manage bushfire risk across the local government.

The Australian Fire Danger Rating System (AFDRS) describes the potential danger should a bushfire start, to allow action to protect lives and assets from the current bushfire risk. There are 4 levels ranging from Moderate to Catastrophic[72]. It is primarily intended for community messaging. The categories are controlled by tables that define Fire Behaviour Index thresholds. The thresholds represent changes in the underlying fire behaviour that have consequences for

[72] DFES (2022) AFDRS Fire Danager Rating and Bushfire Warnings
https://publications.dfes.wa.gov.au/publications/afdrs-fire-danger-ratings-and-bushfire-warnings

operational decision making, including Fire behaviour and fire weather, implications for prescribed burning, fire suppression and containment, and the potential for impact on life, property, and infrastructure[73]. A Total Fire Ban (TFB) is called when weather is extreme or firefighting resources are stretched, while a Harvest & Vehicle Movement Ban is triggered when the Fire Weather Officer/Chief Bushfire Control Officer deems it appropriate, or when the FBI reaches 40 on Total Fire Ban days[74].

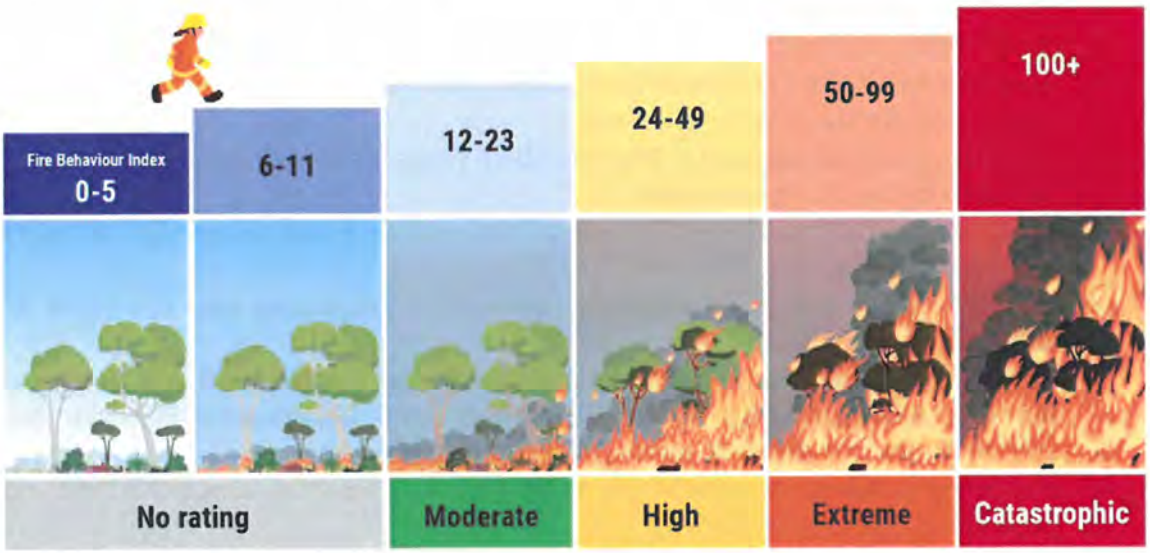

Figure 266: DFES Understanding the Fire Behaviour Index[75]

There are three warning levels for bushfires. The first is, **Advice**, where a fire has started but there is no threat the resident should remain up to date on the current fire. The second is **Watch and Act** where the bushfire can be a threat to lives and homes residents should be ready to leave or be ready to defend. The third and final is the **Emergency Warning**, there is an immediate threat to lives and homes. With this warning it can be too late to leave and residents will need to take shelter until the fire front passes.

3.14 Fire Restrictions

The Shire uses Section 33 notices to address the fire risk on private property through its Fire Control and Firebreak Notice. Land in certain zones with a land area of 4000m^2 or less is required to reduce fuel and parkland clear vegetation. Land over 4000m^2 should establish and maintain an APZ around a habitable building, a 3m wide bare earth firebreak around external boundaries, fuel tanks, sheds, gas cylinders, and 6m of a haystack. The remainder of the land should have

[73] DFES (2022) AFDRS Understanding the Fire Behaviour Index
https://publications.dfes.wa.gov.au/publications/afdrs-fire-behaviour-index
[74] Shire of Ravensthorpe (2022) Appendix E Agenda Report by Steve Peterson
https://www.ravensthorpe.wa.gov.au/council-meetings/ordinary-council-meeting/20-december-2022-ordinary-council-meeting/504/documents/agenda-december-2022-attachments-combined.pdf
[75] DFES (2022) AFDRS Understanding the Fire Behaviour Index
https://publications.dfes.wa.gov.au/publications/afdrs-fire-behaviour-index

grass less than 100mm high and implement parkland clearing of vegetation. Cleared vacant land must be maintained in that cleared state[76].

Rural zones should have a 3m wide bare earth firebreak inside all external boundaries. Rural land small holdings <200ha not managed as a single farming entity must have a 3m wide fire break inside external boundaries and driveways cleared to 4m wide, primarily for appliance access. Properties must have a clear 3m wide bare earth firebreak around fuel storage, sheds, gas cylinders, and within 6m of haystacks, and establish and maintain an Asset Protection Zone (APZ) around a habitable building.
Rural Residential land requires a 3m wide bare earth firebreak inside all external boundaries and implementation of parkland clearing of vegetation. A clear 3m wide bare earth firebreak around fuel storage, sheds, gas cylinders, and within 6m of haystacks is required, as well as, establishing and maintaining a 1m wide low fuel zone around power infrastructure, along with a 4m wide driveway and APZ around habitable buildings. Plantations are required to maintain a 15m wide bare earth fire break inside the boundaries and have an approved BMP. The Guidelines for Plantation Fire Protection should be followed.

It is noted however that the requirements contained within the Fire Control and Firebreak Notice (and noted above) are reviewed on an annual basis by the Shire of Ravensthorpe Bush Fire Advisory Committee (BFAC) and are subject to change based on the risk assessment by the Shires Fire Control Officers.

Total fire bans are declared when extreme weather conditions or firefighting resources are stretched, DFES will declare a TFB after consulting with local governments. A TFB prohibits the lighting of fires in the open air and other activities that may start a fire, this includes welding, grinding, and campfires[77].

The Local Government can issue Harvest & Vehicle Movement Bans (HVMB) under the *Bush Fire Act 1954*. The Chief Bushfire Control officer will decide if the conditions may result in a bushfire with the use of engines, vehicles, or machinery. A HVMB can be imposed for any length of time but is generally imposed for several hours during summer harvesting weather and/or an entire day should the forecast and actual weather conditions warrant such a nomination.

3.15 Community Messaging

In 2015 the Western Australia Government released a suite of reforms in response to the Keelty Report 2011 that apply across the state and elevate bushfire issues to the highest level of planning policy.

The Department of Fire and Emergency Services (DFES), the WA Building Commission, and Western Australian Planning Commission (WAPC) collectively released:

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[76] SoR (2024) Fire Control Notice and Firebreak Notice
https://www.ravensthorpe.wa.gov.au/Profiles/ravensthorpe/Assets/ClientData/RA_Firebreak_notice_2023-2024.pdf
[77] SoR Fire Control Notice and Fire Break Notice 2022/2023
https://www.ravensthorpe.wa.gov.au/Profiles/ravensthorpe/assets/moduledata/publicnotices/0c04d419-90bb-4872-a4c1-40cbe754122c/1.4/111-a-SoR-Fire-Break-Notice-2022-2023.pdf

- State Planning Policy 3.7 'Planning in Bushfire Prone Areas'
- Amendments to Planning Regulations
- Amendments to Building Regulations
- An order by the Fire & Emergency Services Commissioner designating bushfire prone areas
- Published the Map of Bushfire Prone areas
- Published the Guidelines for Planning in Bushfire Prone Areas[78]

These controls play a part in making sure assets are protected from the vegetation that will cause the more severe bushfires and ensuring buildings are built to provide a higher level of protection than in the past. To gain development approval, the map of bushfire prone areas produced by the Office of Bushfire Risk Management (OBRM) should be consulted. If the property is within a bushfire prone area, they will require a Bushfire Attack Level (BAL) assessment. The Shire of Ravensthorpe and Hopetoun town sites have a BAL Contour Plan that applies a BAL rating to the whole town site which can be used. Otherwise, properties located outside of the town sites will need to have a site-specific Bushfire Attack Level (BAL) assessment prepared by an accredited person.

The BAL Assessment informs the design response to the bushfire threat for the area, the building will need to be constructed per AS 3959 Construction of Buildings in Bushfire Prone Areas. The development will be assessed for access, turnaround areas for emergency service vehicles, water for firefighting, and an Asset Protection Zone (APZ). An APZ is an area of low fuel immediately around the building, depending on the BAL rating the size of the APZ area will vary.

The following map shows the locations of volunteer fire brigades and other bushfire response resources in the Shire of Ravensthorpe. There are 8 Bush Fire Brigades (BFB) located in the Shire of Ravensthorpe; Cocanarup, North Ravensthorpe, Hopetoun Rural, East Ravensthorpe, Jedacuttup, Munglinup, West River and Mt Short BFBs. The Shire also has the Ravensthorpe and Hopetoun Volunteer Fire and Rescue Service (VFES), the Ravensthorpe Volunteer Fire and Rescue Service (VFRS) and Ravensthorpe SES. The BFBs have over 300 members in total, with approximately 120 trained to be on a fire ground. Numbers are primarily made up of farmers and their communities. However, there are only 5 appliances in the Shire at this stage and only 3 brigades have sheds. This means that without the use of farm vehicles, response can be limited. It is important that the community is made aware of these limitations and the importance of bushfire risk management planning.

[78] SOR (2024) Planning in a Bushfire Prone area https://www.ravensthorpe.wa.gov.au/work/building-planning/planning-in-bushfire-prone-areas.aspx

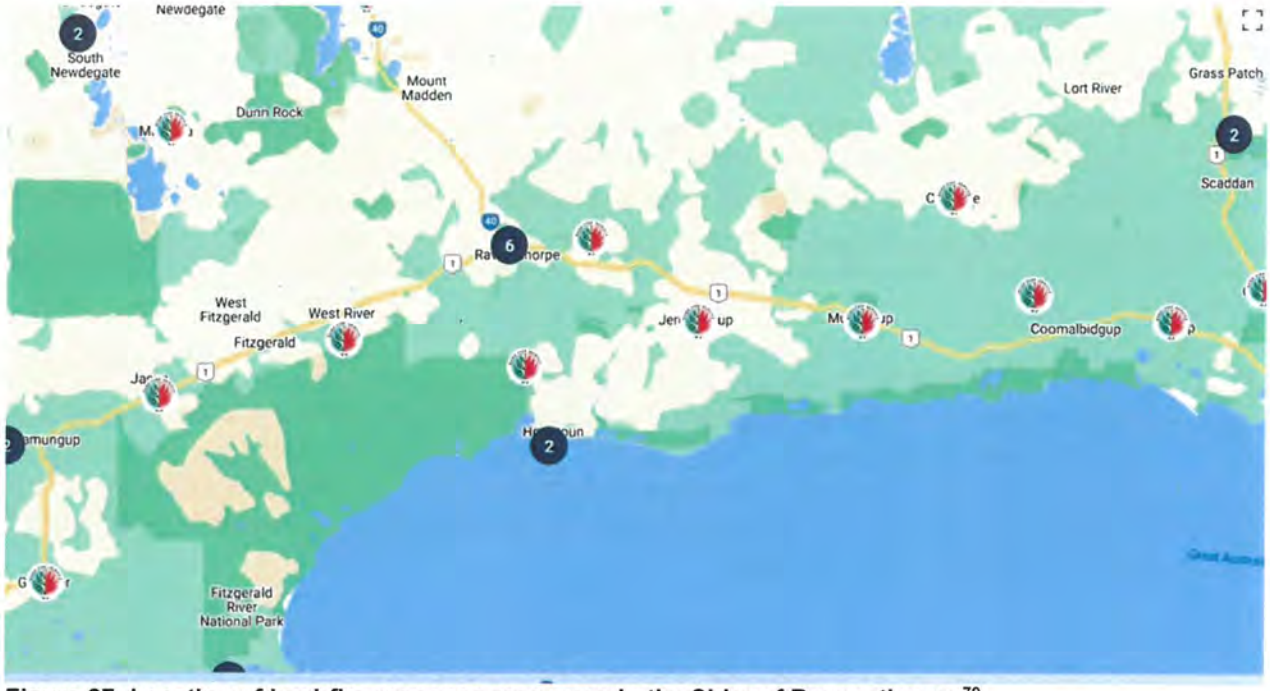

Figure 27: Location of bushfire response resources in the Shire of Ravensthorpe [79]

A number of farmers have bushfire experience and firefighting units that provide extra resources but as stated before, some do leave town after harvest in the peak fire season. The mining companies in the Shire also have their own fire units as part of the planning conditions, these units can be called upon if required during an incident with the Shire having a Memorandum of Understanding with the FQM mine. However reliance on these units cannot be guaranteed given the operational needs of the mines and also both mines now advised they will be put into care and maintenance.

Parks and Wildlife Service at DBCA is responsible for managing fire in forests, parks, nature reserves, and other lands, they have a shared responsibility for fire protection along with local government, Forest Products Commission, plantation owners, mining companies, and private landowners.

The Shire of Ravensthorpe is working with many other land managers to develop fuel management programs to reduce the risk to the town. Works are coordinated with state agencies such as MRWA and WaterCorp. The South East Fire Working Group (SEFWG) is an initiative of the Shire of Ravensthorpe, Shire of Esperance, Shire of Jerramungup, DFES, DBCA and now traditional owner or custodian groups, to better identify, plan and coordinate works within funding and capacity limitations.

DFES has several programs and information resources to help the community prepare for bushfires, what to do during the fire, and how to transition to recovery. DFES encourages the use

[79] DFES Volunteer Service locations n.d. https://dfes.vol.org.au/services-map

of the My Bushfire plan so households are aware of the triggers to leave. They have information on warnings, alerts, preparation, pets, vegetation, and Asset Protection Zones.

The Shire of Ravensthorpe also runs a community website and Facebook updates for bushfires, internal communications for Councilors and staff, uses LED signage in Hopetoun, liaise with DFES, has a community SMS service, and uses variable message boards to increase community awareness. The use of emergencywa.com and the ABC are also vital for community messaging recommended through the shire messaging that emergencywa.com be the priority information source.

It is notable that the Shire was also the first Shire (along with the Shire of Jerramungup) to be provided with a Bushfire Risk Mitigation Coordinator (BRMC). The Shire of Ravensthorpe also has a Community Emergency Services Manager (CESM), part of whose role is to get messaging and information, and assistance out to the broader community. The CESM role provides a conduit with DFES and allows for a coordinated community messaging approach with the substantial backing of DFES provided resources.

The Shires BRM Plan allows the Shire to access funding through the Mitigation Activity Fund, which is managed by DFES in conjunction with the Shire's BRMC. A list of Local Government Wide Controls for reducing bushfire risk in the Shire of Ravensthorpe is provided in Appendix B.

Chapter 4 Asset identification and risk assessment

Assets at risk from bushfire in Shire of Ravensthorpe are recorded in the Asset Risk Register in the BRMS. Assets are divided into four categories: human settlement, economic, climate, and cultural. Each asset has been assigned a bushfire risk rating between low and extreme based on the risk assessment methodology described in the Guidelines and Handbook.

4.1 Local government asset risk profile

A summary of the risks assessed in Shire of Ravensthorpe is shown in Table 6. This table shows the proportion of assets at risk from bushfire in each risk category at the time the BRM Plan was endorsed. This table was correct at the time of publication but may become outdated as risks are treated or additional risks are identified and assessed. A report may be generated from the BRMS to provide the most current risk profile.

Table 6: Shire of Ravensthorpe's Asset Risk Summary

Asset Category	Risk Rating					
		Low	Medium	High	Very High	Extreme
	Human Settlement	*25.75%*	*18.79%*	*17.4%*	*12.06%*	*25.98%*
	Economic	*20.92%*	*28.72%*	*24.46%*	*17%*	*8.86%*
	Environmental	*0*	*33.33%*	*0*	*66.67%*	*0*
	Cultural	*0*	*0*	*20%*	*40%*	*40%*

Chapter 5 Risk evaluation

5.1. Risk acceptance criteria

The acceptable level of risk for each asset category is shown in Table 7. A risk that is assessed as exceeding these limits will be considered for treatment.

Table 7: Risk acceptance criteria for bushfire risk in Shire of Ravensthorpe

	Asset category			
	Human settlement	**Economic**	**Environmental**	**Cultural**
Acceptable risk level	HIGH and above – refer table 6	HIGH and above – refer table 6	HIGH and above – refer table 6	HIGH and above – refer table 6
	Loss of life unacceptable, loss of property to be minimised, Access to the hospital must not be compromised, Control centers, evacuation centers, emergency services facilities, and schools must not be compromised, minimal disruption to essential services including water, power, and communications.	Economic loss to be minimised for the business community.	Harm to the natural environment to be minimised, irreparable and damage to the bio-diversity is unacceptable.	Harm to the cultural environment to be minimised.

Risks below the acceptable level do not require treatment during the life of this BRM Plan. They will be managed by routine Local Government Wide Controls and monitored to detect any increase in their risk rating.

5.2. Treatment priorities

The treatment priority for each asset is automatically assigned by BRMS, based on the asset's risk rating. Table 8 shows how consequence and likelihood combine to give the risk rating and subsequent treatment priority for an asset. The treatment priority assigned in BRMS will help inform decision making for risk acceptability and development of the Treatment Strategy and schedule.

Table 8: Treatment priorities

Likelihood	Consequence				
		Minor	**Moderate**	**Major**	**Catastrophic**
	Almost Certain	3D (High)	2C (Very High)	1C (Extreme)	1A (Extreme)
	Likely	4C (Medium)	3A (High)	2A (Very High)	1B (Extreme)
	Possible	5A (Low)	4A (Medium)	3B (High)	2B (Very High)
	Unlikely	5C (Low)	5B (Low)	4B (Medium)	3C (High)

Chapter 6 Risk treatment

The purpose of risk treatment is to reduce the potential impact of bushfire on the community, economy and environment. This is achieved by implementing treatments that modify the characteristics of the hazard, the community or the environment to make bushfires less likely or less harmful.

6.1. Treatment Strategy

The Treatment Strategy describes the overall approach to managing bushfire risk in the medium to long term in the Shire of Ravensthorpe. The strategy is shaped by factors such as the distribution of risk in the landscape, the community's values and objectives, stakeholders' mitigation programs and constraints on treatment options. The Treatment strategy helps guide the development of integrated annual treatment schedules. Treatment types include:

- **Fuel management** - reduces or modifies the bushfire fuel through mechanical, chemical, and prescribed burning methods;
- **Ignition management** - aims to reduce potential human and infrastructure sources of ignition in the landscape;
- **Preparedness** - aim to improve access and water supply arrangements to assist firefighting operations;
- **Planning** - focus on developing plans to improve the ability of firefighters and the community to respond to bushfire; and
- **Community Engagement** - seek to build relationships, raise awareness and change the behaviour of people exposed to bushfire risk.
- **Other** - Local government-wide controls, such as community education campaigns and planning policies, will be used to manage the risk. Asset-specific treatment is not required or not possible in these circumstances.

The Shires treatment strategy is to determine the appropriate type and frequency of treatment/s based on the terrain, vegetation, adjacent agricultural type (if applicable), and risk rating. Priority is given to extreme-risk areas that have potential to impact human settlement assets including shire owned/managed nature reserves and road reserves. It is accepted that seasonal shifts and weather may dictate if treatments can occur as planned. Where treatments cannot take place due to circumstances beyond the treatment managers control, alternative treatments will be identified according to risk rating. This may be within the human settlement category or selected from across all asset categories following consultation with relevant stakeholders.

Treatments are selected to support environmental considerations including threatened species and communities and to minimise negative effects such as erosion across the undulating terrain or the potential spread of Dieback. Some treatments must be planned to suit conditions at certain times of the year, such as planned burns to be scheduled to support the native vegetation and avoid unnecessary loss of the threatened species and communities. Consultation with the stakeholders will support the selection of appropriate treatments where required.

Where situations arise for combined treatments with adjacent landowners, these will be prioritised to maximise the opportunity for greater strategic risk reduction and cost savings.

The Shire works with both DFES and DBCA to coordinate priority treatments within the Shire. An initiative of stakeholders, the Shire, and it neighbours Esperance and Jerramungup, along with DFES and DBCA formed the South East Working Fire Group. This was the first of its kind in the region and has assisted all parties to come together to discuss and coordinate priority works, seasonal weather trends, risk and responsibility, and updates with respect of pre and post season findings and/or initiatives.

The community values the natural landscape in which they live and they have highlighted their support for bushfire mitigation across the shire through the 2024 community survey. To facilitate every opportunity to carry out treatments and reduce the overall bushfire risk, the Shire will continue to request funding support through government and non-government grants.

Due to the large percentage of private property in the Shire, non-physical approaches are incorporated to address bushfire risk. This includes a varied community engagement program that promotes resilience and preparedness and compliments the physical on-ground treatments.

6.2. Treatment Schedule

The Treatment Schedule is a list of bushfire risk treatments recorded in the BRMS. It is developed through the outcome of the risk assessment process and Treatment Strategy and in consultation with stakeholders.

A treatment schedule for the Shire of Ravensthorpe covering the 2024/2027 period has been entered into BRMS, as this aligns with current funding allocations and milestones. This is a live document and will be regularly updated throughout the life of the BRM Plan.

Land managers and owners are responsible for implementing agreed treatments on their land. This includes any costs associated with the treatment and obtaining the relevant approvals, permits, or licences to undertake an activity. Where agreed, another agency may manage a treatment on behalf of a land manager.

The treatments for each asset are assessed alongside the risk rating from BRMS and a summary of the treatments for each area against the vegetation units is shown in Table 9.

Proposed mitigation works currently funded or planned for in the 2024 – 2027 period are at Appendix F.

Table 9: Summary of asset treatments and vegetation units

Tier	Treatment Locality	Vegetation units mapped (ha)	a.) Area ha of burn treatment	% of vegetation units (a)	b.) Area ha of mechanical mitigation	% of vegetation units (b)	% of total remnant vegetation In LG
Tier 1 Areas	Ravensthorpe	2,558	1976	77	44	1.72	0.23
	Hopetoun & Laurina Road (Blue Vista)	6,215	1763	28.36	82	1.31	0.21
	Munglinup	906	605	66	38	4.19	0.07
	Jerdacuttup	185	137	74	7	74	0.15
	Fitzgerald	643	540	83.98	8	1.24	0.06
Tier 2 Areas	Ravensthorpe Coast – Mason Bay and Starvation Bay	4,662	3347	71.79	0	0	0.38

Chapter 7 Monitoring and review

Monitoring and review processes are in place to ensure that the BRM Plan remains current and considers the best available information.

7.1. Monitoring and review

Shire of Ravensthorpe will monitor the BRM Plan and BRMS data to identify any need for change. The Plan and BRMS data will be reviewed at least every two years to ensure they continue to reflect the local context, assets at risk, level of risk and treatment priorities.

7.2. Reporting

The Shire of Ravensthorpe CEO or their delegate will provide to OBRM the outcomes of 2 yearly reviews of the BRM Plan. This is required to maintain OBRM endorsement of the Plan.

The Shire of Ravensthorpe will contribute information about their BRM Program to the annual OBRM Fuel Management Activity Report.

Glossary

Asset	Something of value that may be adversely impacted by bushfire. This may include residential houses, infrastructure, commercial, agriculture, industry, environmental, cultural, and heritage sites.
Asset category	There are four categories that classify the type of asset – Human Settlement, Economic, Environmental and Cultural.
Asset Owner	The owner, occupier or custodian of the asset itself. Note: this may differ from the owner of the land the asset is located on, for example, a communication tower located on leased land or private property.
Asset Register	A component within the Bushfire Risk Management System is used to record the details of assets identified in the Bushfire Risk Management Plan.
Asset risk register	A component within the Bushfire Risk Management System (BRMS) used to record the consequence, likelihood, risk rating and treatment priority for each asset identified in the BRM Plan.
Bushfire	Unplanned vegetation fire. A generic term that includes grass fires, forest fires, and scrub fires both with and without a suppression objective.
Bushfire Management Plan	A document that sets out short, medium, and long term bushfire risk management strategies for the life of a development.
Bushfire risk management	A systematic process to coordinate, direct, and control activities relating to bushfire risk to limit the adverse effects of bushfire on the community.
Bushfire Threat	The threat posed by the hazardous vegetation is based on the vegetation category, slope, and separation distance.
Bushfire risk	The chance of a bushfire igniting, spreading, and causing damage to the community or the assets they value.
Consequence	The outcome or impact of a bushfire event.
Draft Bushfire Risk Management Plan	The finalised draft Bushfire Risk Management Plan (BRM Plan) is submitted to the OBRM for review. Once the OBRM review is complete, the BRM Plan is called the 'Final BRM Plan' and can be progressed to the local government council for endorsement.
Emergency Risk Management Plan	A document (developed under *State Emergency Management Policy 2.9*) that describes how an organisation(s) intends to undertake the activities of emergency risk management based on minimising risk.

	These plans help inform the ongoing development of Local Emergency Management Arrangements (LEMA) and Westplans.
Forest Mulch	Forestry mulching is a land clearing method that uses a single machine to cut, grind, and clear vegetation.
Geographic Information System (GIS)	A database technology, linking any aspect of land-related information to its precise geographic location.
Geographic Information System (GIS) Map	The mapping component of the Bushfire Risk Management System. Assets, treatments, and other associated information is spatially identified, displayed, and recorded within the GIS Map.
Land Owner	The owner of the land, as listed on the Certificate of Title; or leaser under a registered lease agreement; or other entity that has a vested responsibility to manage the land.
Likelihood	The chance of something occurring. In this instance, the chance of a bushfire igniting, spreading, and reaching the asset.
Locality	The officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns).
Parkland Clearing	Parkland clearing is the removal of most or all understorey vegetation and grasses while retaining an overstorey canopy of trees and selected shrubs.
Planning Area	A geographic area determined by the local government which is used to provide a suitable scale for risk assessment and stakeholder engagement.
Priority	See Treatment Priority.
Recovery Cost	The capacity of an asset to recover from the impacts of a bushfire.
Responsible Person	The person is responsible for planning, coordinating, implementing, evaluating, and reporting on risk treatment.
Risk acceptance	The informed decision to accept a risk is based on the knowledge gained during the risk assessment process.
Risk analysis	The application of consequence and likelihood to an event in order to determine the level of risk.
Risk assessment	The systematic process of identifying, analysing, and evaluating risk.
Risk evaluation	The process of comparing the outcomes of risk analysis to the risk criteria to determine whether a risk is acceptable or tolerable.

Risk identification	The process of recognising, identifying, and describing risks.
Risk Manager	The organisation or individual responsible for managing a risk identified in the Bushfire Risk Management Plan; including review, monitoring, and reporting.
Risk Register	A component within the Bushfire Risk Management System used to record, review and monitor risk assessments and treatments associated with assets recorded in the Bushfire Risk Management Plan.
Risk treatment	A process to select and implement appropriate measures undertaken to modify risk.
Rural	Any area where in residences and other developments are scattered and intermingled with forest, range, or farmland and native vegetation or cultivated crops.
Rural Urban Interface (RUI)	The line or area where structures and other human development adjoin or overlap with undeveloped bushland.
Slope	The angle of the ground's surface is measured from the horizontal.
Tenure Blind	An approach where multiple land parcels are considered as a whole, regardless of individual ownership or management arrangements.
Treatment	An activity undertaken to modify risk, for example, a prescribed burn.
Treatment Objective	The specific aim to be achieved or action to be undertaken, in order to complete the treatment. Treatment objectives should be specific and measurable.
Treatment Manager	The organisation, or individual, is responsible for all aspects of a treatment listed in the Treatment Schedule of the Bushfire Risk Management Plan, including coordinating or undertaking work, monitoring, reviewing, and reporting.
Treatment Priority	The order, importance, or urgency for allocation of funding, resources, and opportunity to treatments associated with a particular asset. The treatment priority is based on an asset's risk rating.
Treatment Schedule	A report produced within the Bushfire Risk Management System details the treatment priority of each asset identified in the Bushfire Risk Management Plan and the treatments scheduled.
Treatment Strategy	The broad approach that will be used to modify risk, for example fuel management.

Treatment Type	The specific treatment activity that will be implemented to modify risk, for example a prescribed burn.
Vulnerability	The susceptibility of an asset to the impacts of bushfire.

Common abbreviations

ABS	Australian Bureau of Statistics
ACH	Aboriginal Cultural Heritage
AFAC	Australasian Fire and Emergency Services Authorities Council
AFDRS	Australian Fire Danger Rating System
AFG	Australian Forest Growers
AO	Area Officer
APZ	Asset Protection Zone
AS	Australian Standard
BFAC	Bush Fire Advisory Committee
BFB	Bushfire Brigade
BoM	Bureau of Meteorology
BRM	Bushfire Risk Management
BRM Branch	Bushfire Risk Management Branch (DFES)
BRMO	Bushfire Risk Management Officer
BRM Plan	Bushfire Risk Management Plan
BRMS	Bushfire Risk Management System
BRPC	Bushfire Risk Planning Coordinator
CBFCO	Chief Bushfire Control Officer
CESM	Community Emergency Services Manager
DBCA	Department of Biodiversity, Conservation and Attractions
DEMC	District Emergency Management Committee
DoE	Department of Education
DFES	Department of Fire and Emergency Services
DMIRS	Department of Energy, Mines, Industry Regulation and Safety

DO	District Officer
DPLH	Department of Planning, Lands and Heritage
ESP01	Esperance Plains bioregion and Fitzgerald
FBI	Fire Behaviour Index
FCN	Fire Control Notice
FDR	Fire Danger Rating
FIFWA	Forest Industries Federation WA
FPC	Forest Products Commission
FQM	First Quantum Minerals
FRNP	Fitzgerald River National Park
GIS	Geographic Information System
HP	Horizon Power
HSZ	Hazard Separation Zone
HV	High Voltage
HVMB	Harvest & Vehicle Movement Ban
ILUA	Indigenous Land Use Agreements
ISO	International Organization for Standardization
LEMA	Local Emergency Management Arrangements
LEMC	Local Emergency Management Committee
LG	Local Government
LGA	Local Government Areas
LPP	Local Planning Policy
MOU	Memorandum of Understanding
MRWA	Main Roads Western Australia

MWPC	Mechanical Works Parkland Clearing
OBRM	Office of Bushfire Risk Management (DFES)
OIC VES	Officer in Charge Volunteer Emergency Service
P&W	Parks and Wildlife (Department of)
PB	Prescribed Burn
SAP	Standard Administrative Procedure
SEMC	State Emergency Management Committee
SES	State Emergency Service
SoJ	Shire of Jerramungup
SoR	Shire of Ravensthorpe
TM	Townsite Maintenance
UCL	Unallocated Crown Land
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WA	Western Australia
WALGA	Western Australian Local Government Association
WAPC	Western Australian Planning Commission
VFRS	Volunteer Fire & Rescue Service

Appendices

Appendix A	Threatened Species List
Appendix B	Local Government Wide Controls
Appendix C	Communication Plan
Appendix D	Protected matters
Appendix E	Multi-agency work plan
Appendix F	Shire of Ravensthorpe Work Program Maps

Appendix A –State and Commonwealth Threatened Fauna[80] [81]

Threatened Fauna	Status	WA	Commonwealth
Curlew Sandpiper	Critically Endangered	Yes	Yes
Tristan Albatross	Critically Endangered	Yes	Yes
Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit	Critically Endangered	Yes	Yes
Eastern Curlew, Far Eastern Curlew	Critically Endangered	Yes	Yes
Western Ground Parrot	Critically Endangered	Yes	Yes
Tristan Albatross	Critically Endangered	Yes	Yes
Carnaby's Black- Cockatoo	Endangered	Yes	Yes
Dibbler	Endangered	Yes	Yes
Indian Yellow-nosed Albatross	Endangered	Yes	Yes
Red Tailed Phascogale	Endangered	Yes	Yes
Australasian Bittern	Endangered	Yes	Yes
Red Knot, Knot	Endangered	Yes	Yes
Western Bristlebird	Endangered	Yes	Yes
Northern Royal Albatross	Endangered	Yes	Yes
Sooty Albatross	Endangered	Yes	Yes
Numbat	Endangered	Yes	Yes
Black-browed Albatross	Endangered	Yes	Yes
Chuditch	Vulnerable	Yes	Yes
Malleefowl	Vulnerable	Yes	Yes
Numbat	Vulnerable	Yes	Yes
Heath Mouse	Vulnerable	Yes	Yes
Cape Barren Goose (south-western), Recherche Cape Barren Goose	Vulnerable	Yes	Yes
Greater Sand Plover, Large Sand Plover	Vulnerable	Yes	Yes
Southern Royal Albatross	Vulnerable	Yes	Yes
Wandering Albatross	Vulnerable	Yes	Yes
Shy Albatross	Vulnerable	Yes	Yes
Campbell Albatross, Campbell Black browed Albatross	Vulnerable	Yes	Yes
White-capped Albatross	Vulnerable	Yes	Yes
Grey Falcon	Vulnerable	Yes	Yes
Australian Fairy Tern	Vulnerable	Yes	Yes
Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor	Vulnerable	Yes	Yes
Southern Royal Albatross	Vulnerable	Yes	Yes
White-capped Albatross	Vulnerable	Yes	Yes

[80] Department of Environment and Conservation (2012) Fitzgerald Biosphere Recovery Plan: A Landscape Approach to Threatened Species and Ecological Communities Recovery and Biodiversity Conservation https://www.dcceew.gov.au/sites/default/files/documents/fitzgerald-biosphere-recovery-plan.pdf

[81] Department of Climate Change, Energy, the Environment and Water (2024) EPBC Act Protected Matters Report https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool

Flesh-footed Shearwater	Vulnerable	Yes	
Bridled Tern			Yes
Noisy Scrub Bird			
Western whipbird (western mallee)			

State and Commonwealth threatened Flora[82] [83]

Threatened flora	Status	WA	Commonwealth
Kundip Wattle	Critically Endangered	Yes	Yes
Cactus Dryandra	Critically Endangered	Yes	Yes
Lake King Eremophila	Critically Endangered	Yes	Yes
Whorled Eremophila	Critically Endangered	Yes	Yes
Bandalup Buttercup	Critically Endangered	Yes	Yes
Kunzea similis subsp. Similis	Critically Endangered	Yes	Yes
South Coast Underground Orchid	Critically Endangered	Yes	Yes
Oval Leaved Adenanthos	Endangered	Yes	Yes
Small Two-Coloured Kangaroo Paw	Endangered	Yes	Yes
Bremer Boronia	Endangered	Yes	Yes
Dwarf Spider Orchid	Endangered	Yes	Yes
Sedge Conostylis	Endangered	Yes	Yes
Mauve Coopernookia	Endangered	Yes	Yes
Long sepalled Daviesia	Endangered	Yes	Yes
Paddle leaved Daviesia	Endangered	Yes	Yes
Crowned Mallee	Endangered	Yes	Yes
Burdett Gum	Endangered	Yes	Yes
Fan Leaved Grevillea	Endangered	Yes	Yes
Hairy fruited Marianthus	Endangered	Yes	Yes
Barrens Wedding bush	Endangered	Yes	Yes
Mt Barren Featherflower	Endangered	Yes	Yes
False Plumed-Banksia	Endangered	Yes	Yes
Hoffman's Spider-orchid	Endangered	Yes	Yes
Stilted Tinsel Lily	Endangered	Yes	Yes
Tall Donkey Orchid	Endangered	Yes	Yes
Remote Thorny Lignum	Endangered	Yes	Yes
Little Pine Verticordia, Pine-like Featherflower	Endangered	Yes	Yes
Fitzgerald Woollybush	Vulnerable	Yes	Yes
Ironcaps Banksia	Vulnerable	Yes	Yes
Fitzgerald Eremophila	Vulnerable	Yes	Yes
Lake Varley Grevillea	Vulnerable	Yes	Yes

[82] Department of Environment and Conservation (2012) Fitzgerald Biosphere Recovery Plan: A Landscape Approach to Threatened Species and Ecological Communities Recovery and Biodiversity Conservation https://www.dcceew.gov.au/sites/default/files/documents/fitzgerald-biosphere-recovery-plan.pdf

[83] Department of Climate Change, Energy, the Environment and Water (2024) EPBC Act Protected Matters Report https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool

Spiny Peppercress	Vulnerable	Yes	Yes
Jerramungup Myoporum	Vulnerable	Yes	Yes
Yellow Mountain Trigger plant	Vulnerable	Yes	Yes
Sandplain Sun orchid	Vulnerable	Yes	Yes
Crowded Featherflower	Vulnerable	Yes	Yes
Coast Featherflower	Vulnerable	Yes	Yes
Woolly Wattle	Vulnerable	Yes	Yes
Kunzea ericifolia subsp. subulata	Vulnerable	Yes	Yes
Saltmat	Vulnerable	Yes	Yes
Verticordia crebra	Vulnerable	Yes	Yes
Granite Featherflower	Vulnerable	Yes	Yes
Hopetoun Beard Orchid	Critical	Yes	
Kunzea similis subsp. mediterranea	Endangered	Yes	
Beyeria cockertonii	Vulnerable	Yes	
Red Flowered Moort	Vulnerable	Yes	
Eucalyptus purpurata	Vulnerable	Yes	
Bungalbin Tetratheca	Vulnerable		Yes

Appendix B - Local Government Wide Controls

Control		Action or activity description	Lead agency	Other stakeholder(s)	Notes and comments
Ref #	What is the control in place?	What is the name of the specific action or activity?	Who is the agency responsible for the implementation of the control?	Are there any other key stakeholders who contribute to the success of the control?	Provide a brief description of the action or activity, such as community education campaigns, including its contribution to bushfire risk management in the local government, target areas, key timeframes, and any work being undertaken to improve the control.
01	Risk Analysis	BRMP extreme risks priority for treatment	LG/DFES	All	Treatments planned for all extreme risks and including in BRMP Treatment Schedule
02	Risk Analysis	Maintain and refine BRMP	All	All	Currently Planning treatments for all very high risks
03	Shire of Ravensthorpe local fire break and hazard reduction laws *Bushfires Act 1954 s(33)*	Annual Fire Break Notice published and issued	LG		Published annually

04		Review of Annual Fire Break Notice	LG	Review to improve the adequacy of control.
05		Annual inspection target to be reviewed	LG	Level of non-compliance to inform the BRMP context and vulnerability assessment (human settlement assets).
06	Shire of Ravensthorpe Prohibited Burn Times, Restricted Burn Times, Total Fire Bans, and Harvest & Vehicle Movement Bans	Prohibited and Restricted burn periods are published in the annual firebreak notice. All bans will be communicated via Shires SMS system, Harvest Ban Hotline or ABC local Radio (558AM) at 10.05am, 11.05am, 12.35pm and 2.05pm daily	LG/DFES	Prohibited and Restricted burning periods may be varied due to seasonal changes. Any changes are to be published in the local newspaper and Shire's website.
07	*Bush Fires Act 1954 S(38)*	A person shall not operate a harvest machine or header in any crop during the prohibited burning period or restricted burn times with a fire extinguisher.	LG	Harvest period occurs during peak bushfire risk.
08	Shire of Ravensthorpe LPP No. 9 - Fire	Council will determine, in consultation with the Department of Fire and Emergency Services,	LG	

	Management Plans	when a Fire Management Plan is required to be prepared following the requirements of Planning for Bush Fire Protection.			
09	Shire of Ravensthorpe LPP No. 13 – Farm Forestry	To facilitate the establishment, management, and harvesting of plantations consistent with the Code of Practice for Timber Plantations in Western Australia. A fire management plan should be available for each plantation.			
10	Code of Practice for Timber Plantations in Western Australia	The size of plantation compartments & firebreak specifications should comply with the Bush Fires Act (1954), the Guidelines for Plantation Fire Protection (FESA), and local government firebreak notices. Softwood plantations should be pruned, Grazing should be considered, and	FIFWA FPC	Forest Industry	The purpose of this Code is to provide goals and guidelines to plantation managers so that plantation operations in Western Australia is conducted in a manner that is in accordance with accepted principles for good plantation management. *4.7.6 Fire Prevention and Suppression* of the Code outlines Fire Prevention and Suppression Guidelines[84].

[84] *Code of Practice for Timber Plantations in Western Australia.* Forest Industries Federation (WA) 2nd Edition 2014

		Prescribed burning should be considered at regular intervals in native forests adjacent to plantations Shire declared *Bushfire Prone*.		
11	*State Planning Policy 3.7 – Planning in Bushfire Prone Areas*	- Conducting hazard mapping throughout the Shire to formally recognise bush fire prone areas in the Shire; - Scheme Amendment to require all housing in recognised bushfire prone areas to comply with AS3959.	LG	WAPC DFES

Appendix C – Communication Plan

This Communication Plan supports the development, implementation and review of the Shire of Ravensthorpe Bushfire Risk Management (BRM) Plan. It should document the:

- Communication objectives.
- Roles and responsibilities.
- Key stakeholders engaged in the development of the BRM Plan and Treatment Schedule.
- The implementation and review of the BRM Plan including: target audiences and key messages at each project stage; communication risks and strategies for their management; and communication monitoring and evaluation procedures.

Communication objectives

The communication objectives for the development, implementation, and review of the BRM Plan for the Shire of Ravensthorpe are as follows:

The communication objectives for the development, implementation, and review of the BRM Plan for the Shire of Ravensthorpe are as follows:

1. Key stakeholders understand the purpose of the BRM Plan and their role in the bushfire risk management planning process.
2. Stakeholders who are essential to the bushfire risk management planning process, or can supply required information, are identified and engaged in a timely and effective manner.
3. Relevant stakeholders are involved in decisions regarding risk acceptability and treatment.
4. Key stakeholders engage in the review of the BRM Plan as per the schedule in place for the local government area.
5. The community and other stakeholders engage with the bushfire risk management planning process and as a result are better informed about bushfire risk and understand their responsibilities to address bushfire risk on their land.
6. Strengthen Shire of Ravensthorpe Strategic Community Plan Objectives: 1.3 Community Engagement & 3.6 Conservation and protection of natural resources.

Roles and responsibilities

Shire of Ravensthorpe is responsible for the development, implementation and review of the Communication Plan. Key stakeholders support the local government by participating the Communication Plan as appropriate. An overview of communication roles and responsibilities follows:

- CEO *Shire of Ravensthorpe* is responsible for requesting OBRM endorse the BRM Plan.
- CEO, Manager Corporate & Community Services and Community Emergency Services Manager, *Shire of Ravensthorpe* is responsible for communication of the BRM Plan to the community.

- Bushfire Risk Management Planning Coordinator, *Shire of Ravensthorpe* is responsible for communication between the local government and the Department of Fire and Emergency Services.

Key Stakeholders for Communication

The following table identifies key stakeholders in the BRM planning process, its implementation, and review. These are stakeholders that are identified as having a significant role or interest in the planning process or are likely to be significantly impacted by the outcomes.

Stakeholder	Role or interest	Level of impact of outcomes	Level of engagement
Who is the stakeholder? Consider government agencies, interest groups, and service providers.	What is their role or interest that makes them a stakeholder? Consider if they are an asset owner, landowner or manager, treatment manager, or interested party.	Consider how the implementation of the BRM Plan will impact each stakeholder and then assign them a rating of High, Medium, or Low.	What level of engagement is necessary for the stakeholder? Inform, consult, involve, collaborate, or empower?
Government Agencies	Land Managers/Asset Owners Identify assets at risk. Identify risk and responsibility for it.	High	Inform, involve, and consult
Interest groups	Understanding BRMP & interface with respective special interests Represent community interests & values Source of local knowledge Identify assets & values	Medium	Inform, consult, empower
Service Providers	Critical infrastructure assets/risk/ Identify assets at risk Treatment Strategies	High	Inform, consult, collaborate
Landowners/Residents	Human settlement at risk Represent community interests & values Source of risk Community Education	Medium	Inform, consult, empower
Business Owners	Land/managers/asset owners Identify assets Negotiate/Treat risks	Medium	Inform, consult, empower

Communications log

This Communications log captures the communications with key internal and external stakeholders that occurred during the review of the BRM Plan. Record any significant conversations, community engagement events, emails, meetings, presentations, workshops, and other communication initiatives.

Timing of communication	Stakeholders	Purpose	Summary	Communication method	Lesson Identified	Follow up
Review of the BRM Plan (if relevant)						
When did this communication occur?	Who was the stakeholder or target audience?	What was the purpose of the communication?	What topics were discussed?	What communication method did you use?	Were there any issues or lessons identified?	Was there any follow up required?
	Biodiverse Solutions	Engagement as an external consultant	Review of BRM Plan for Ravensthorpe as required.	Email, face to face		
27/ 06/2024	Biodiverse Solutions	BRM Plan meeting	Meeting to review and develop BRM Plan	Face to face meeting		
02/07/2024	Community	Formulation of CSCC	Members	Public Notices, emails		
15/07/2024	DPLH Karl Hanson	Aboriginal Heritage and Engagement	Aboriginal Heritage sites	Face to face	Aboriginal Heritage issue	Yes
30/7/2024	Community	CSCC Kick off meeting	Design of report, Information, and maps	Meeting		Stakeholders are to be sent report and maps
30/7/2024	DFES	CSCC Kick off meeting	Design of report, Information, and maps	Meeting		Stakeholders are to be sent report and maps
23/7/2024	Wagyl Kaip Southern Noongar Aboriginal Corporation	CSCC Kick off meeting	Input into the report, Limited available time	Email		
30/7/2024	Councillors	CSCC Kick off meeting	Design of report, Information, and maps	Meeting		Stakeholders are to be sent report and maps
30/7/2024	Ravensthorpe Wildflower Show	CSCC Kick off meeting	Design of report, Information, and maps	Meeting		Stakeholders are to be sent report and maps

30/7/2024	DBCA	Request for CSCC participation	Design of report, Information, and maps	Meeting	Stakeholders are to be sent report and maps
	DFES	Tenure information request UCL/UMR		BDS contact	
	DFES	BRMS asset review		DBS and BRMC – phone and BRMS	
	Community and Stakeholder Consultative Committee (CSCC)	Kick off meeting		Face to face meeting	
	Community	FCN issued via rates notice and website/FB		post	
	CSCC	Distribution of minutes, draft maps, and PP slides		Email	
19/08/2024	DBCA	Advice, feedback and post meeting submission of information	CSCC Submission	Email	
20/8/2024	DFES – community engagement officer	Community engagement opportunities pre-fire season		Emails and phone	
21/8/2024	OWG	Advise that the draft would be distributed for review and also issued at the BFAC		meeting	
4/9/2024	WKSN Aboriginal Corporation	Face-to-face meeting to discuss proposed works		Face to face	

04/09/2024	Local Emergency Management Committee	Draft for review		Meeting and email		
05/09/2024	Community and Stakeholder Consultative Committee	Draft for Review		Email		
05/09/2024	Office of Bushfire Risk Management	Draft for Review	Requested changes and assessment criteria review	Email		Yes
12/09/2024	RWS and CCA joint submission	Submission	Submission noting not agreeable to the consultation process	Email	Have not understood per the initial meeting the inherent risks to the Shire	
16/09/2024	DBCA	Submission	Detailed response to draft plan re DBCA areas of interest	Email	Good level of detail	
16/09/2024	Bushfire Advisory Committee	Draft for Review	Amended Draft	Email		

Communication Plan

This Communication Plan outlines the key communication initiatives that will be undertaken during the implementation of the BRM Plan.

Timing of communication	Stakeholders	Communication Objective(s)	Communication Method	Key Message or Purpose	Responsibility	Identified Risks to Communication	Strategy to Manage Risks	Monitoring and Evaluation Method
Development of the BRM Plan								
Life of the plan	Shire of Ravensthorpe, CEO & Executive, CESM	All (1-6)	Regular emails, telephone calls, meetings (quarterly), Representation at bushfire stakeholder workshops	Inform & Empower, strategic oversight, review, and input, existing controls, identify assets, treatments	BRPC or Planner	Time constraints, stakeholder capacity (small executive), competing issues/projects	Forward planning, achievable timeframes, strategic consultation	Feedback, 'buy-in', outcomes met, response times.
Life of the plan	BFAC	All (1-6)	Presentation at each BFAC meeting. On-going consultation through CBFCO	Inform & Empower, strategic oversight, review, and input, existing controls, identify assets, treatments	BRPC, BRMO	Time constraints, stakeholder capacity (volunteers) competing issues/projects	Forward planning, achievable timeframes, strategic consultation	Feedback, 'buy-in', outcomes met, response times.

Life of the plan	LEMC	All (1-6)	Presentation at each LEMC meeting.	Understanding the BRMP process supports for project, inc. identified assets, treatments esp. priority.	BRPC, BRMO	Attendance of members at the scheduled meeting, Time constraints, and lack of buy-in.	Set clear objectives, and prepare succinct clear presentations .	Feedbac k, sign off on strategic mileston es.
Strategic milestone i.e. last quarter 2016	DEMC	1 & 2	One of presentation, as need arising issues. Follow-up with individual stakeholders as required	Understanding the BRMP process, strategic support within respective agencies	BRMO	Attendance of members at the scheduled meeting i.e. absence of key stakeholders Time constraints	Schedule up with key agencies Set clear objectives, prepare succinct clear presentation s, and provide opportunities for follow-up	Feedback, questions, responses to follow-up meetings

Life of the plan	DFES, Regional Superintendent, DO, AO, CESM	All (1-6)	Inform, consult, and collaborate, Quarterly meetings with the Superintendent, emails & telephone calls, Representation at bushfire stakeholder workshops	Understanding the BRMP process, and engagement in the process i.e. identify assets, risk assessment & treatment. Accept responsibilities.	BRMO	Staff turnover, Travel distances, Limited buy-in to the project, Treatments not negotiated.	Adapt communication to staffing, document communication outcomes, and foster ownership/ empowerment in the process.	Timely constructive feedback, support for/level of participation in the process, and negotiate treatments.
Life of the plan	Bushfire Stakeholders, CBFCO, BFB Captains, OIC VES, VFRS Captains	All (1-6)	Inform, consult, and collaborate, Presentations at brigade meetings Representation at bushfire stakeholder workshops i.e. OIC/Captain	Understanding the BRMP process, and engagement in the process i.e. identifying assets, risk assessment & treatment.	BRPC & BRMO	Time constraints Availability of Volunteers Limited buy-in	Planning for scheduled meetings Effective communication i.e. clear objectives, appropriate level of information, ensure feedback	Feedback, 'buy-in'

Life of the plan	Department of Parks and Wildlife	All (1-6)	Inform, consult, and collaborate, Regular emails, telephone calls, meetings, Representation at bushfire stakeholder workshops	Understanding the BRMP process, engagement in the process i.e. existing controls identify assets, risk assessment & negotiate treatments.	BRPC & BRMO & AO/DO Superintendent as required	Time constraints Limited buy-in to the project. Treatments not negotiated.	Establish strategic buy-in, agree to appropriate line communication	Timely constructive feedback, support for/level of participation in the process, and negotiated treatments.
At strategic milestones	Govt/Critical Infrastructure Service Providers	All (1-6)	Inform, consult, and collaborate via regular emails, telephone calls, and meetings, to identify assets, assess risk negotiate treatments	Understanding the BRMP process, engagement in the process i.e. existing controls identify assets, risk assessment & negotiate treatments.	BRPC & BRMO	Time constraints Limited buy-in to the project. Treatments not negotiated.	Establish strategic buy-in, agree to appropriate line communication	Timely constructive feedback, support for/level of participation in the process, and negotiated treatments.

At strategic project milestones during development	Business/Industry	As relevant (1-6)	Inform, consult, and collaborate via regular emails, telephone calls, and meetings, to identify assets, assess risk negotiate treatments	Understanding the BRMP process, engagement in the process i.e. existing controls identify assets, risk assessment & negotiate treatments.	BRPC & BRMO	Time constraints Limited buy-in to the project, Treatments not negotiated.	Establish strategic buy-in, agree to appropriate line communication	Timely constructive feedback, support for/level of participation in the process, and negotiated treatments.
At strategic project milestones during development	Community Interest Groups	1,3, 2 & 6	Inform, consult, and collaborate, Regular emails, telephone calls, and meetings, to identify assets, assess risk negotiate treatments	Understanding BRMP process, engagement in process i.e. expert knowledge, community values	BRPC & LG Exec as required BRMO & DO/AO as required	Time constraints Limited buy-in to the project, Treatments not negotiated.	Establish strategic buy-in, agree to appropriate line communication	Timely constructive feedback, support for/level of participation in the process, and negotiated treatments.

At strategic project milestones during development	Community /Residents at risk	1,2 & 6	Inform, consult, empower. Letters, social media internet updates, presentations.	Understanding the BRMP process, understand adjacent risk and acceptability of treatments, and responsibility for own risks.	BRPC & BRMO	Time constraints Limited buy-in to the project	Appropriate communication methods, opportunities for two-way communication, and feedback.	Constructive feedback, support for/level of participation in the project.

Implementation of the BRM Plan								
Life of the plan	Shire of Ravensthorpe, CEO & Executive, CESM	All (1-6)	Emails, telephone calls, meetings (quarterly),	Report on progress, monitor & review against milestones/funding, bushfires, annual works plans of respective stakeholders	BRPC & BRMO, Planner, Manager Corporate Services	Time constraints, stakeholder capacity (small executive), competing issues/projects	Forward planning, achievable timeframes, strategic consultation	Feedback, 'buy-in', outcomes met, response times.
Life of Plan	Bushfire Stakeholder Group – CESM, DFES AO/DO, P&W, CBFCO/OIC/Captain	All (1-6)	Email updates Annual Management	Report on progress, monitor & review against milestones/funding, bushfires, annual works plans of respective stakeholders	BRPC & BRMO, Planner, Manager Corporate Services	LG capacity in the absence of BRMO & BRPC	Forward planning, achievable timeframes, strategic consultation	Feedback, 'buy-in', outcomes met, response times.
Life of Plan	Essential Service Providers Working Group	All (1-6)	Email updates Annual Management	Report on progress, monitor & review against milestones/funding, bushfires, annual works plans of respective stakeholders	BRPC & BRMO, Planner, Manager Corporate Services	LG capacity in the absence of BRMO & BRPC	Forward planning, achievable timeframes, strategic consultation	Feedback, 'buy-in', outcomes met, response times.

Review of the BRM Plan								
Yearly	Shire of Ravensthorpe, CEO & Executive, CESM	All (1-6)	Email Annual Meeting	Review monitoring reporting against milestones/funding, bushfires, and annual works plans of respective stakeholders	BRPC & BRMO or, Planner	LG capacity in the absence of BRMO & BRPC	Forward planning, achievable timeframes, strategic consultation	On-going support and positive feedback from the Council
Yearly	LEMC	All (1-6)	Annual Meeting	Review monitoring reporting against milestones/funding, bushfires, and annual works plans of respective stakeholders	BRPC & BRMO or planner	LG capacity in the absence of BRMO & BRPC	Forward planning, achievable timeframes, strategic consultation	On-going support and positive feedback from the Council
Yearly	Bushfire Stakeholders & key service providers i.e. Western Power, Watercorp etc.	All (1-6)		Review monitoring reporting against milestones/funding, bushfires, and annual works plans of respective stakeholders	BRPC & BRMO or Planner	LG capacity in the absence of BRMO & BRPC	Forward planning, achievable timeframes, strategic consultation	On-going support and positive feedback from the Council
3 yearly	OBRM, DFES, Shire of Ravensthorpe	All (1-6)		Compliance to plan and acceptance of risk	BRPC & BRMO or Planner	LG capacity in the absence of BRMO & BRPC	Forward planning, achievable timeframes, strategic consultation	On-going support and positive feedback from Council

Appendix D – Protected Matter Search

Department of Climate Change, Energy, the Environment and Water

Protected Matters Search Tool

Report Generated - 1:41PM - 03 May 2024

Matters of National Environment Significance	Count
World Heritage Properties	0
National Heritage Places	1
Wetlands of International Importance (Ramsar Wetlands)	0
Great Barrier Reef Marine Park	0
Commonwealth Marine Area	1
Listed Threatened Ecological Communities	3
Listed Threatened Species	88
Listed Migratory Species	45

Other Matters Protected by the EPBC Act	Count
Commonwealth Lands	5
Commonwealth Heritage Places	0
Listed Marine Species	71
Whales and Other Cetaceans	14
Critical Habitats	0
Commonwealth Reserves Terrestrial	0
Australian Marine Parks	3
Habitat Critical to the Survival of Marine Turtles	0

Extra Information	Count
State and Territory Reserves	27
Regional Forest Agreements	0
Nationally Important Wetlands	2
EPBC Act Referrals	16
Key Ecological Features	0
Biologically Important Areas	12
Bioregional Assessments	0
Geological and Bioregional Assessments	0

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected and is accurate at the time of generation. Please see the caveat for interpretation of information provided here. Consider carefully the age of information for decision making.

Report Metadata Caveat

National Heritage Places [Resource Information]

Place ID	Place Name	State	Heritage Class	Legal Status	Website
105974	Fitzgerald River National Park	WA	Natural	Listed place	Australian Heritage Database

Listed Threatened Ecological Communities [Resource Information]

				Presence	
Community ID	Community Name	Threatened Category	Website	Rank	Text
128	Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Species Profile and Threat Database (SPRAT)	Likely	Community likely to occur within the area
118	Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Species Profile and Threat Database (SPRAT)	Likely	Community likely to occur within the area
126	Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	Species Profile and Threat Database (SPRAT)	Likely	Community likely to occur within the area

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	Website
69402	*Thunnus maccoyii*	Southern Bluefin Tuna	Fish	Known	Species or species habitat known to occur within the area	Conservation Dependent					Species Profile and Threat Database (SPRAT)
68453	*Galeorhinus galeus*	School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	Shark	May	Species or species habitat may occur within the area	Conservation Dependent					Species Profile and Threat Database (SPRAT)
87538	*Duma horrida subsp. abdita*	Remote Thorny Lignum	Plant	May	Species or species habitat may occur within the area	Critically Endangered					Species Profile and Threat Database (SPRAT)
82758	*Banksia anatona*	Cactus Dryandra	Plant	May	Species or species habitat may occur within the area	Critically Endangered					Species Profile and Threat Database (SPRAT)
89267	*Hibbertia abyssus*	Bandalup Buttercup	Plant	Known	Species or species habitat known to occur within the area	Critically Endangered					Species Profile and Threat Database (SPRAT)
856	*Calidris ferruginea*	Curlew Sandpiper	Bird	Known	Species or species habitat known to occur within the area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		Specis Profile and Threat Database (SPRAT)
84650	*Pezoporus flaviventris*	Western Ground Parrot, Kyloring	Bird	May	Species or species habitat may occur within the area	Critically Endangered					Species Profile and Threat Database (SPRAT)

89853	*Rhizanthella johnstonii*	SouthCoast Underground Orchid	Plant	Known	Species or species habitat known to occur within the area	Critically Endangered				Species Profile and Threat Database (SPRAT)
84068	*Kunzea similis subsp. similis*	null	Plant	Known	Species or species habitat known to occur within the area	Critically Endangered				Species Profile and Threat Database (SPRAT)
847	*Numenius madagascariensis*	Eastern Curlew, Far Eastern Curlew	Bird	Likely	Species or species habitat likely to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed	Species Profile and Threat Database (SPRAT)
21218	*Coopernookia georgei*	Mauve Coopernookia	Plant	Likely	Species or species habitat likely to occur within area	Endangered				Species Profile and Threat Database (SPRAT)
7032	*Eremophila verticillata*	Whorled Eremophila	Plant	Likely	Species or species habitat likely to occur within area	Endangered				Species Profile and Threat Database (SPRAT)
832	*Tringa nebularia*	Common Greenshank, Greenshank	Bird	Likely	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area	Species Profile and Threat Database (SPRAT)
1060	*Macronectes giganteus*	Southern Giant-Petrel, Southern Giant Petrel	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
66471	*Diomedea dabbenena*	Tristan Albatross	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
82760	*Banksia pseudoplumosa*	False Plumed-Banksia	Plant	Likely	Species or species habitat likely to occur within area	Endangered				Species Profile and Threat Database (SPRAT)

86432	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit	Bird	May	Species or species habitat may occur within the area	Endangered					Species Profile and Threat Database (SPRAT)
21161	*Roycea pycnophylloides*	Saltmat	Plant	Likely	Species or species habitat likely to occur within the area	Endangered					Species Profile and Threat Database (SPRAT)
313	*Parantechinus apicalis*	Dibbler	Mammal	Known	Species or species habitat known to occur within the area	Endangered					Species Profile and Threat Database (SPRAT)
55823	*Verticordia staminosa var. cylindracea*	Granite Featherflower	Plant	May	Species or species habitat may occur within the area	Endangered					Species Profile and Threat Database (SPRAT)
22	*Neophoca cinerea*	Australian Sea-lion, Australian Sea Lion	Mammal	Known	Breeding is known to occur within the area	Endangered			Listed		Species Profile and Threat Database (SPRAT)
40	*Eubalaena australis*	Southern Right Whale	Mammal	Known	Breeding is known to occur within the area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
55798	*Verticordia pityrhops*	Little Pine Verticordia, Pine-like Featherflower	Plant	Likely	Species or species habitat likely to occur within the area	Endangered					Species Profile and Threat Database (SPRAT)
56785	*Daviesia megacalyx*	Long-sepalled Daviesia	Plant	Known	Species or species habitat known to occur within the area	Endangered					Species Profile and Threat Database (SPRAT)

55575	*Acacia lanuginophylla*	Woolly Wattle	Plant	May	Species or species habitat may occur within area	Endangered					Species Profile and Threat Database (SPRAT)
77	*Pseudomys shortridgei*	Heath Mouse, Dayang, Heath Rat	Mammal	Known	Species or species habitat known to occur within area	Endangered					Species Profile and Threat Database (SPRAT)
1001	*Botaurus poiciloptilus*	Australasian Bittern	Bird	Likely	Species or species habitat likely to occur within area	Endangered					Species Profile and Threat Database (SPRAT)
21241	*Anigozanthos bicolor subsp. minor*	Little Kangaroo Paw, Two-coloured Kangaroo Paw, Small Two-colour Kangaroo Paw	Plant	Known	Species or species habitat known to occur within area	Endangered					Species Profile and Threat Database (SPRAT)
5538	*Boronia clavata*	Bremer Boronia	Plant	Likely	Species or species habitat likely to occur within area	Endangered					Species Profile and Threat Database (SPRAT)
64659	*Acacia rhamphophylla*	Kundip Wattle	Plant	Known	Species or species habitat known to occur within area	Endangered					Species Profile and Threat Database (SPRAT)
4631	*Grevillea involucrata*	Lake Varley Grevillea	Plant	May	Species or species habitat may occur within area	Endangered					Species Profile and Threat Database (SPRAT)
36	*Balaenoptera musculus*	Blue Whale	Mammal	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
1768	*Dermochelys coriacea*	Leatherback Turtle, Leathery Turtle, Luth	Reptile	Likely	Breeding likely to occur within area	Endangered	Migratory	Migratory Marine Species	Listed		Species Profile and Threat Database (SPRAT)
515	*Dasyornis longirostris*	Western Bristlebird	Bird	Known	Species or species habitat known to occur within area	Endangered					Species Profile and Threat Database (SPRAT)

64456	*Diomedea sanfordi*	Northern Royal Albatross	Bird	May	Species or species habitat may occur within the area	Endangered	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
17311	*Daviesia obovata*	Paddle-leaf Daviesia	Plant	Known	Species or species habitat known to occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
9254	*Conostylis lepidospermoides*	Sedge Conostylis	Plant	Known	Species or species habitat known to occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
294	*Myrmecobius fasciatus*	Numbat	Mammal	Known	Translocated population known to occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
1763	*Caretta caretta*	Loggerhead Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within the area	Endangered	Migratory	Migratory Marine Species	Listed	Species Profile and Threat Database (SPRAT)
5772	*Grevillea infundibularis*	Fan-leaf Grevillea	Plant	Known	Species or species habitat known to occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
13505	*Eucalyptus burdettiana*	Burdett Gum	Plant	Known	Species or species habitat known to occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
21253	*Adenanthos dobagii*	Fitzgerald Woollybush	Plant	Likely	Species or species habitat likely to occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
19931	*Ricinocarpos trichophorus*	Barrens Wedding Bush	Plant	Known	Species or species	Endangered				Species Profile and

					habitat known to occur within the area					Threat Database (SPRAT)
56719	*Caladenia hoffmanii*	Hoffman's Spider-orchid	Plant	May	Species or species habitat may occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
89224	*Thalassarche cauta*	Shy Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within the area	Endangered	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
56702	*Eremophila subteretifolia*	Lake King Eremophila	Plant	Known	Species or species habitat known to occur within the area	Endangered				Species Profile and Threat Database (SPRAT)
87737	*Zanda latirostris*	Carnaby's Black Cockatoo, Short-billed Black-cockatoo	Bird	Known	Breeding is known to occur within the area	Endangered (listed as Calyptorhynchus latirostris)				Species Profile and Threat Database (SPRAT)
2308	*Eucalyptus coronata*	Crowned Mallee	Plant	Likely	Species or species habitat likely to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
1061	*Macronectes halli*	Northern Giant Petrel	Bird	Likely	Foraging, feeding or related behaviour likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
929	*Falco hypoleucos*	Grey Falcon	Bird	Likely	Species or species habitat likely to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
10518	*Banksia sphaerocarpa var. dolichostyla*	Ironcaps Banksia, Ironcap Banksia	Plant	May	Species or species habitat may	Vulnerable				Species Profile and Threat

					occur within the area					
4570	*Adenanthos ellipticus*	Oval-leaf Adenanthos	Plant	Known	Species or species habitat known to occur within the area	Vulnerable				Database (SPRAT) Species Profile and Threat Database (SPRAT)
64470	*Carcharodon carcharias*	White Shark, Great White Shark	Shark	Known	Foraging, feeding or related behaviour known to occur within the area	Vulnerable	Migratory	Migratory Marine Species		Species Profile and Threat Database (SPRAT)
66472	*Thalassarche melanophris*	Black-browed Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
4908	*Thelymitra psammophila*	Sandplain Sun-orchid	Plant	Likely	Species or species habitat likely to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
316	*Phascogale calura*	Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor	Mammal	Known	Species or species habitat known to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
89147	*Kunzea ericifolia subsp. subulata*	null	Plant	Likely	Species or species habitat likely to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)

64569	*Eremophila denticulata subsp. denticulata*	Fitzgerald Eremophila	Plant	Known	Species or species habitat known to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
934	*Leipoa ocellata*	Malleefowl	Bird	Known	Species or species habitat known to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
1075	*Phoebetria fusca*	Sooty Albatross	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
877	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Bird	Likely	Species or species habitat likely to occur within the area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	Species Profile and Threat Database (SPRAT)
874	*Calidris acuminata*	Sharp-tailed Sandpiper	Bird	Known	Species or species habitat known to occur within the area	Vulnerable	Migratory	Migratory Wetlands Species	Listed	Species Profile and Threat Database (SPRAT)
529	*Aphelocephala leucopsis*	Southern Whiteface	Bird	May	Species or species habitat may occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
82018	*Calectasia pignattiana*	Stilted Tinsel Lily	Plant	May	Species or species habitat may occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
855	*Calidris canutus*	Red Knot, Knot	Bird	Known	Species or species habitat known to occur within the area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area	Species Profile and Threat Database (SPRAT)
1036	*Pterodroma mollis*	Soft-plumaged Petrel	Bird	May	Species or species habitat may occur within the area	Vulnerable			Listed	Species Profile and Threat Database (SPRAT)

82950	*Sternula nereis nereis*	Australian Fairy Tern	Bird	Known	Foraging, feeding or related behaviour known to occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)
64462	*Thalassarche steadi*	White-capped Albatross	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
64464	*Thalassarche carteri*	Indian Yellow-nosed Albatross	Bird	Likely	Species or species habitat likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
330	*Dasyurus geoffroii*	Chuditch, Western Quoll	Mammal	Known	Species or species habitat known to occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)
4666	*Stylidium galioides*	Yellow Mountain Trigger plant	Plant	Known	Species or species habitat known to occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)
68752	*Carcharias taurus (west coast population)*	Grey Nurse Shark (West Coast population)	Shark	Likely	Species or species habitat likely to occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)
1059	*Halobaena caerulea*	Blue Petrel	Bird	May	Species or species habitat may occur within the area	Vulnerable			Listed		Species Profile and Threat Database (SPRAT)
37	*Balaenoptera physalus*	Fin Whale	Mammal	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
55678	*Verticordia crebra*	null	Plant	Likely	Species or species habitat likely to occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)

25978	*Cereopsis novaehollandiae grisea*	Cape Barren Goose (south-western), Recherche Cape Barren Goose	Bird	Known	Species or species habitat known to occur within the area	Vulnerable			Listed - overfly the marine area		Species Profile and Threat Database (SPRAT)
64458	*Diomedea antipodensis*	Antipodean Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
64459	*Thalassarche impavida*	Campbell Albatross, Campbell Black-browed Albatross	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
8204	*Verticordia helichrysantha*	Coast Featherflower	Plant	Likely	Species or species habitat likely to occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)
64445	*Pachyptila turtur subantarctica*	Fairy Prion (southern)	Bird	May	Species or species habitat may occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)
1765	*Chelonia mydas*	Green Turtle	Reptile	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species	Listed		Species Profile and Threat Database (SPRAT)
2915	*Tetratheca aphylla*	Bungalbin Tetratheca	Plant	May	Species or species habitat may occur within the area	Vulnerable					Species Profile and Threat Database (SPRAT)
34	*Balaenoptera borealis*	Sei Whale	Mammal	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)

4365	*Diuris drummondii*	Tall Donkey Orchid	Plant	Known	Species or species habitat known to occur within the area	Vulnerable				Species Profile and Threat Database (SPRAT)
89221	*Diomedea epomophora*	Southern Royal Albatross	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
89223	*Diomedea exulans*	Wandering Albatross	Bird	Likely	Foraging, feeding or related behaviour, likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed	Species Profile and Threat Database (SPRAT)
82651	*Ardenna grisea*	Sooty Shearwater	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as Puffinus griseus)	Species Profile and Threat Database (SPRAT)
66680	*Rhincodon typus*	Whale Shark	Shark	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species		Species Profile and Threat Database (SPRAT)

Listed Migratory Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Presence Rank	Presence Text	Threatened Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	Website
59309	*Actitis hypoleucos*	Common Sandpiper	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed		Species Profile and Threat Database (SPRAT)
832	*Tringa nebularia*	Common Greenshank, Greenshank	Bird	Likely	Species or species habitat likely to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		Species Profile and Threat Database (SPRAT)
1061	*Macronectes halli*	Northern Giant Petrel	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
1060	*Macronectes giganteus*	Southern Giant-Petrel, Southern Giant Petrel	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
66471	*Diomedea dabbenena*	Tristan Albatross	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
64470	*Carcharodon carcharias*	White Shark, Great White Shark	Shark	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species			Species Profile and Threat Database (SPRAT)
66472	*Thalassarche melanophris*	Black-browed Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
678	*Apus pacificus*	Fork-tailed Swift	Bird	Likely	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed - overfly marine area		Species Profile and Threat Database (SPRAT)
1075	*Phoebetria fusca*	Sooty Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)

82845	*Onychoprion anaethetus*	Bridled Tern	Bird	Likely	Foraging, feeding or related behaviour likely to occur within the area		Migratory	Migratory Marine Birds	Listed (as Sterna anaethetus)		Species Profile and Threat Database (SPRAT)
40	*Eubalaena australis*	Southern Right Whale	Mammal	Known	Breeding is known to occur within the area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
952	*Pandion haliaetus*	Osprey	Bird	Known	Breeding is known to occur within the area		Migratory	Migratory Wetlands Species	Listed		Species Profile and Threat Database (SPRAT)
43	*Lagenorhynchus obscurus*	Dusky Dolphin	Mammal	May	Species or species habitat may occur within the area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
877	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Bird	Likely	Species or species habitat likely to occur within the area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		Species Profile and Threat Database (SPRAT)
874	*Calidris acuminata*	Sharp-tailed Sandpiper	Bird	Known	Species or species habitat known to occur within the area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		Species Profile and Threat Database (SPRAT)
46	*Orcinus orca*	Killer Whale, Orca	Mammal	May	Species or species habitat may occur within the area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
856	*Calidris ferruginea*	Curlew Sandpiper	Bird	Known	Species or species habitat known to occur within the area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly the marine area		Species Profile and Threat Database (SPRAT)
855	*Calidris canutus*	Red Knot, Knot	Bird	Known	Species or species habitat known to occur within the area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly the marine area		Species Profile and Threat Database (SPRAT)
82404	*Ardenna carneipes*	Flesh-footed Shearwater, Fleshy-footed Shearwater	Bird	Likely	Foraging, feeding or related behaviour likely to occur within the area		Migratory	Migratory Marine Birds	Listed (as Puffinus carneipes)		Species Profile and Threat Database (SPRAT)
858	*Calidris melanotos*	Pectoral Sandpiper	Bird	May	Species or species habitat may occur within the area		Migratory	Migratory Wetlands Species	Listed - overfly the marine area		Species Profile and Threat Database (SPRAT)
64462	*Thalassarche steadi*	White-capped Albatross	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)

64464	*Thalassarche carteri*	Indian Yellow-nosed Albatross	Bird	Likely	Species or species habitat likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
83288	*Lamna nasus*	Porbeagle, Mackerel Shark	Shark	Likely	Species or species habitat likely to occur within the area		Migratory	Migratory Marine Species			Species Profile and Threat Database (SPRAT)
35	*Balaenoptera edeni*	Bryde's Whale	Mammal	May	Species or species habitat may occur within the area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
808	*Hydroprogne caspia*	Caspian Tern	Bird	Known	Foraging, feeding or related behaviour known to occur within the area		Migratory	Migratory Marine Birds	Listed (as Sterna caspia)		Species Profile and Threat Database (SPRAT)
36	*Balaenoptera musculus*	Blue Whale	Mammal	May	Species or species habitat may occur within the area	Endangered	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
37	*Balaenoptera physalus*	Fin Whale	Mammal	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
1768	*Dermochelys coriacea*	Leatherback Turtle, Leathery Turtle, Luth	Reptile	Likely	Breeding is likely to occur within the area	Endangered	Migratory	Migratory Marine Species	Listed		Species Profile and Threat Database (SPRAT)
64458	*Diomedea antipodensis*	Antipodean Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
64459	*Thalassarche impavida*	Campbell Albatross, Campbell Black-browed Albatross	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
642	*Motacilla cinerea*	Grey Wagtail	Bird	May	Species or species habitat may occur within the area		Migratory	Migratory Terrestrial Species	Listed - overfly the marine area		Species Profile and Threat Database (SPRAT)
64456	*Diomedea sanfordi*	Northern Royal Albatross	Bird	May	Species or species habitat may occur within the area	Endangered	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)

39	*Caperea marginata*	Pygmy Right Whale	Mammal	May	Species or species habitat may occur within the area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
38	*Megaptera novaeangliae*	Humpback Whale	Mammal	Likely	Species or species habitat likely to occur within the area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
1763	*Caretta caretta*	Loggerhead Turtle	Reptile	Known	Foraging, feeding, or related behaviour known to occur within the area	Endangered	Migratory	Migratory Marine Species	Listed		Species Profile and Threat Database (SPRAT)
1765	*Chelonia mydas*	Green Turtle	Reptile	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species	Listed		Species Profile and Threat Database (SPRAT)
34	*Balaenoptera borealis*	Sei Whale	Mammal	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
860	*Calidris ruficollis*	Red-necked Stint	Bird	Known	Species or species habitat known to occur within the area		Migratory	Migratory Wetlands Species	Listed - overfly the marine area		Species Profile and Threat Database (SPRAT)
89221	*Diomedea epomophora*	Southern Royal Albatross	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
89223	*Diomedea exulans*	Wandering Albatross	Bird	Likely	Foraging, feeding, or related behaviour likely to occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
82651	*Ardenna grisea*	Sooty Shearwater	Bird	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as Puffinus griseus)		Species Profile and Threat Database (SPRAT)
89224	*Thalassarche cauta*	Shy Albatross	Bird	Likely	Foraging, feeding, or related behaviour likely to occur within the area	Endangered	Migratory	Migratory Marine Birds	Listed		Species Profile and Threat Database (SPRAT)
844	*Limosa lapponica*	Bar-tailed Godwit	Bird	May	Species or species habitat		Migratory	Migratory Wetlands Species	Listed		Species Profile and Threat Database (SPRAT)

					may occur within the area					
847	*Numenius madagascariensis*	Eastern Curlew, Far Eastern Curlew	Bird	Likely	Species or species habitat likely to occur within the area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed	Species Profile and Threat Database (SPRAT)
66680	*Rhincodon typus*	Whale Shark	Shark	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species		Species Profile and Threat Database (SPRAT)

Whales and Other Cetaceans [Resource Information]

				Presence							
Species ID	**Scientific Name**	**Common Name**	**Class**	**Rank**	**Text**	**Threatened Category**	**Migratory Status**	**Migratory Category**	**Marine Status**	**Cetacean Status**	**Website**
40	*Eubalaena australis*	Southern Right Whale	Mammal	Known	Breeding known to occur within the area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
43	*Lagenorhynchus obscurus*	Dusky Dolphin	Mammal	May	Species or species habitat may occur within the area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
46	*Orcinus orca*	Killer Whale, Orca	Mammal	May	Species or species habitat may occur within the area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
60	*Delphinus delphis*	Common Dolphin, Short-beaked Common Dolphin	Mammal	May	Species or species habitat may occur within the area					Cetacean	Species Profile and Threat Database (SPRAT)
64	*Grampus griseus*	Risso's Dolphin, Grampus	Mammal	May	Species or species habitat may occur within the area					Cetacean	Species Profile and Threat Database (SPRAT)
68417	*Tursiops truncatus s. str.*	Bottlenose Dolphin	Mammal	May	Species or species habitat may occur within the area					Cetacean	Species Profile and Threat Database (SPRAT)
35	*Balaenoptera edeni*	Bryde's Whale	Mammal	May	Species or species habitat may occur within area		Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
36	*Balaenoptera musculus*	Blue Whale	Mammal	May	Species or species habitat may occur within the area	Endangered	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)
37	*Balaenoptera physalus*	Fin Whale	Mammal	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	Species Profile and Threat Database (SPRAT)

68418	*Tursiops aduncus*	Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Mammal	Likely	Species or species habitat likely to occur within the area				Cetacean	Species Profile and Threat Database (SPRAT)
39	*Caperea marginata*	Pygmy Right Whale	Mammal	May	Species or species habitat may occur within the area		Migratory	Migratory Marine Species	Cetacean	Species Profile and Threat Database (SPRAT)
38	*Megaptera novaeangliae*	Humpback Whale	Mammal	Likely	Species or species habitat likely to occur within the area		Migratory	Migratory Marine Species	Cetacean	Species Profile and Threat Database (SPRAT)
34	*Balaenoptera borealis*	Sei Whale	Mammal	May	Species or species habitat may occur within the area	Vulnerable	Migratory	Migratory Marine Species	Cetacean	Species Profile and Threat Database (SPRAT)
33	*Balaenoptera acutorostrata*	Minke Whale	Mammal	May	Species or species habitat may occur within the area				Cetacean	Species Profile and Threat Database (SPRAT)

Australian Marine Parks [Resource Information]

Zone ID	Park Name	Zone & IUCN Categories	Network
swbrespm03	Bremer	Special Purpose Zone (Mining Exclusion) (IUCN VI)	South-west
swbrenpz01	Bremer	National Park Zone (IUCN II)	South-west
swswcspz14	South-west Corner	Special Purpose Zone (IUCN VI)	South-west

State and Territory Reserves

[Resource Information]

Protected Area ID	Protected Area Name	Reserve Type	State	Jurisdiction	Environment
CWTH_N7120	Aerodrome Road	NRS Addition - Gazettal in Progress	WA	State	Terrestrial
WA_27023	Frank Hann	National Park	WA	State	Terrestrial
WA_31737	Fitzgerald River	National Park	WA	State	Terrestrial
WA_26662	Unnamed WA26662	Nature Reserve	WA	State	Terrestrial
WA_40156	Jerdacuttup Lakes	Nature Reserve	WA	State	Terrestrial
WA_32339	Lake Shaster	Nature Reserve	WA	State	Terrestrial
WA_31424	Unnamed WA31424	Nature Reserve	WA	State	Terrestrial
WA_31425	Koornong	Nature Reserve	WA	State	Terrestrial
NTWA_0034	NTWA Bushland covenant (0034)	Conservation Covenant	WA	Private	Terrestrial
NTWA_0047	NTWA Bushland covenant (0047)	Conservation Covenant	WA	Private	Terrestrial
NTWA_0015A	NTWA Bushland covenant (0015A)	Conservation Covenant	WA	Private	Terrestrial
NTWA_0035	NTWA Bushland covenant (0035)	Conservation Covenant	WA	Private	Terrestrial
WA_49742	Unnamed WA49742	Conservation Park	WA	State	Terrestrial
WA_43060	Unnamed WA43060	Nature Reserve	WA	State	Terrestrial
WA_36445	Dunn Rock	Nature Reserve	WA	State	Terrestrial
NTWA_0053	NTWA Bushland covenant (0053)	Conservation Covenant	WA	Private	Terrestrial
NTWA_0019	NTWA Bushland covenant (0019)	Conservation Covenant	WA	Private	Terrestrial
NTWA_0043	NTWA Bushland covenant (0043)	Conservation Covenant	WA	Private	Terrestrial
WA_31881	Long Creek	Nature Reserve	WA	State	Terrestrial
WA_31755	East Naernup	Nature Reserve	WA	State	Terrestrial
WA_29184	Hayes	Nature Reserve	WA	State	Terrestrial

WA_31128	Kundip	Nature Reserve	WA	State	Terrestrial
CWTH_N7084	Ravensthorpe Range	NRS Addition - Gazettal in Progress	WA	State	Terrestrial
WA_27525	Overshot Hill	Nature Reserve	WA	State	Terrestrial
WA_31754	Cheadanup	Nature Reserve	WA	State	Terrestrial
WA_27177	Unnamed WA27177	Nature Reserve	WA	State	Terrestrial
NTWA_0015B	NTWA Bushland covenant (0015B)	Conservation Covenant	WA	Private	Terrestrial

Nationally Important Wetlands [Resource Information]

Reference Code	Wetland Name	State	Website
WA025	Fitzgerald Inlet System	WA	Australian Wetlands Database
WA024	Culham Inlet System	WA	Australian Wetlands Database

EPBC Act Referrals [Resource Information]

Reference Number	Title of referral	Jurisdiction	Industry Type	Stage	Stage Description	Referral Outcome	Website
2020/8745	Ravensthorpe Gold Project	WA	Mining	Completed	Withdrawn	Controlled Action	EPBC Referral List
2023/09463	Ravensthorpe Lithium Project, Ravensthorpe, Western Australia	WA	Exploration (mineral, oil, and gas - non-marine)	Completed	Withdrawn		EPBC Referral List
2017/8127	INDIGO Central Submarine Telecommunications Cable	NSW	Telecommunications	Completed	Referral Decision Made	Not Controlled Action	EPBC Referral List
2016/7722	Extension of State Barrier Fence, WA	WA	Agriculture and Forestry	Completed	Referral Decision Made	Not Controlled Action	EPBC Referral List

2009/4958	Road upgrades and walk trail development	WA	Tourism and Recreation	Post-Approval	Referral Decision Made	Not Controlled Action (Particular Manner)	EPBC Referral List
2010/5684	Extraction of road building materials	WA	Transport - Land	Post-Approval	Approval Decision Made	Controlled Action	EPBC Referral List
2001/172	Ravensthorpe Nickel Project	WA	Mining	Post-Approval	Approval Decision Made	Controlled Action	EPBC Referral List
2017/7996	INDIGO Marine Cable Route Survey (INDIGO)	CM	Telecommunications	Post-Approval	Referral Decision Made	Not Controlled Action (Particular Manner)	EPBC Referral List
2016/7756	Expansion of Ravensthorpe Nickel Operations and changes to associated infrastructure, Ravensthorpe,	WA	Mining	Assessment Approach	Assessment Method Determined	Controlled Action	EPBC Referral List
2013/7082	Ravensthorpe Heavy Haulage Route Project, WA	WA	Transport - Land	Completed	Referral Decision Made	Not Controlled Action	EPBC Referral List
2003/1203	Construction and operation of a single wind turbine near Hopetoun WA	WA	Energy Generation and Supply (renewable)	Completed	Referral Decision Made	Not Controlled Action	EPBC Referral List
2021/8920	Middlemount Coal Mine - Southern Open Cut Extension Project, QLD	QLD	Mining	Assessment Approach	Assessment Method Determined	Controlled Action	EPBC Referral List
2015/7522	Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	NSW	Natural Resources Management	Completed	Referral Decision Made	Not Controlled Action	EPBC Referral List

2018/8334	Munglinup Graphite Project, 85km east of Ravensthorpe, WA	WA	Mining	Assessment Approach	Assessment Method Determined	Controlled Action	EPBC Referral List
2005/2000	Phillips River Gold Project	WA	Mining	Completed	Referral Decision Made	Not Controlled Action	EPBC Referral List
2011/6173	Phillips River Project	WA	Mining	Completed	Withdrawn	Referral Decision	EPBC Referral List

Biologically Important Areas

[Resource Information]

Species ID	Scientific Name	Common Name	Species Group	Behaviour	Presence	Website
82404	Ardenna carneipes	Flesh-footed Shearwater	Seabirds	Foraging (in high numbers)	Known to occur	Species Profile and Threat Database (SPRAT)
82652	Ardenna tenuirostris	Short-tailed Shearwater	Seabirds	Foraging (in high numbers)	Known to occur	Species Profile and Threat Database (SPRAT)
1085	Eudyptula minor	Little Penguin	Seabirds	Foraging (provisioning young)	Known to occur	Species Profile and Threat Database (SPRAT)
808	Hydroprogne caspia	Caspian Tern	Seabirds	Foraging (provisioning young)	Known to occur	Species Profile and Threat Database (SPRAT)
811	Larus pacificus	Pacific Gull	Seabirds	Foraging (in high numbers)	Known to occur	Species Profile and Threat Database (SPRAT)
82845	Onychoprion anaethetus	Bridled Tern	Seabirds	Foraging (in high numbers)	Known to occur	Species Profile and Threat

59660	Phalacrocorax fuscescens	Black-faced Cormorant	Seabirds	Foraging	Known to occur	Database (SPRAT) Species Profile and Threat Database (SPRAT)
59363	Puffinus assimilis tunneyi	Little Shearwater	Seabirds	Foraging (in high numbers)	Known to occur	Species Profile and Threat Database (SPRAT)
82949	Sternula nereis	Fairy Tern	Seabirds	Foraging (in high numbers)	Known to occur	Species Profile and Threat Database (SPRAT)
22	Neophoca cinerea	Australian Sea Lion	Seals	Foraging (male and female)	Known to occur	Species Profile and Threat Database (SPRAT)
64470	Carcharodon carcharias	White Shark	Sharks	Foraging	Known to occur	Species Profile and Threat Database (SPRAT)
38	Megaptera novaeangliae	Humpback Whale	Whales	Migration (north)	Known to occur	Species Profile and Threat Database (SPRAT)

Appendix E - Multi-agency work plan

Control	ID	Action/Activity Description	Lead Agency	Partners	Application		Status	Implementation Notes
					Targeted	Period		
Risk Analysis	01	BRMP extreme risks priority for treatment	LG/DFES	All	Yes	1	Ongoing	Treatments planned for all extreme risks and included in BRMP Treatment
	02	Maintain and refine BRMP	All	All	Yes	All	Ongoing	Currently Planning treatments for all very high risks
Shire of Ravensthorpe local fire break and hazard reduction laws *Bushfires Act 1954 s(33)*	03	Annual Fire Break Notice published and issued	LG		No			Published annually
	04	Review of Annual Fire Break Notice	LG		No	All	Ongoing	Review to improve the adequacy of control. Due 2016.
	05	Annual inspection target to be reviewed	LG		No	2	Review	Level of non-compliance to inform the BRMP context and vulnerability assessment (human settlement assets).
Shire of Ravensthorpe Prohibited Burn Times, Restricted Burn Times, Total Fire Bans, and Harvest & Vehicle Movement Bans	06	Prohibited and Restricted burn periods are published in the annual firebreak notice. All bans will be communicated via Shires SMS system, Harvest Ban Hotline, or ABC local Radio (558AM) at 10.05am, 11.05am, 12.35pm and 2.05pm daily	LG/DFES		No	All	Ongoing	Prohibited and Restricted burning periods may be varied due to seasonal changes. Any changes are to be published in the local newspaper and on Shire's website.

Bush Fires Act 1954 s(38)	07	A person shall not operate a harvest machine or header in any crop during the prohibited burning period or restricted burn times with a fire extinguisher.	LG		No	All	Ongoing	Harvest period occurs during peak bushfire risk.
Shire of Ravensthorpe LPP No. 9 - Fire Management Plans	08	Council will determine, in consultation with the Department of Fire and Emergency Services, when a Fire Management Plan is required to be prepared in accordance with the requirements of Planning for Bush Fire Protection.	LG	DFES	Yes			
Shire of Ravensthorpe LPP No. 13 – Farm Forestry	09	To facilitate the establishment, management, and harvesting of plantations consistent with the Code of Practice for Timber Plantations in Western Australia.	LG	Yes	Yes	All	Ongoing	

Code of Practice for Timber Plantations in Western Australia	10	A fire management plan should be available for each plantation. The size of plantation compartments & firebreak specifications should comply with the Bush Fires Act (1954), the Guidelines for Plantation Fire Protection (FESA), and local government firebreak notices. Softwood plantations should be pruned, Grazing should be considered, and Prescribed burning should be considered at a regular interval in native forests adjacent to plantations.	FIFWA FPC	Forest Industry	No	All	Ongoing	The purpose of this Code is to provide goals and guidelines to plantation managers so that plantation operations in Western Australia are conducted in a manner that is in accordance with accepted principles for good plantation management. 4.7.6 Fire Prevention and Suppression of the Code outlines Fire Prevention and Suppression Guidelines51.
State Planning Policy 3.7 – Planning in Bushfire Prone Areas	11	Shire declared Bushfire Prone. - Conducting hazard mapping throughout the Shire in order to formally recognise bush fire prone areas in the Shire; - Scheme Amendment to require all housing in a recognised bush fire prone areas to comply with AS3959;	LG	WAPC DFES	Yes	All	Ongoing	

CRITICAL INFRASTRUCTURE								
Control	**ID**	**Action/Activity Description**	**Lead Agency**	**Partners**	**Application**		**Status**	**Implementation Notes**
WaterCorp Bushfire Mitigation Program	12	2 sites in Ravensthorpe were identified within 149 program sites statewide. Preliminary risk ranking of Very High and High respectively. Extreme project sites are being addressed first. 124_GSR_Hopetoun Road_Ravensthorpe_LWA	Watercorp (State)	DFES	Yes	All	Ongoing	3 year Bushfire Risk Mitigation Program focused on reducing bushfire risk to offsite assets from fuel loads on its tenure. Watercorp owns or manages over 31,000 parcels of land across WA. This tenure has been spatially risk assessed at a pre-qualification level to identify the High, Very High, and Extreme risk parcels that form the priority sites funded by this program.
WaterCorp Asset Management	13	Great Southern Region Annual Works Plan. Watercorp assets are managed/maintained at the regional level. Each asset has an asset no. and a management plan referred to as an SAP.	Watercorp (Great Southern)		No	All	Ongoing	The SAPs only address very basic maintenance (inc. firebreaks as per Firebreak notice but not fuel load management etc., however, any treatments from BRMS would be put through the SAP in order to raise a works order.
Watercorp fuel load management of Water Reserves	14	Watercorp undertakes mitigation and land management activities on their estate.	Watercorp		Yes		Ongoing	
MRWA State-wide bridge prioritisation	15	MRWA undertook and state-wide risk priorisation project to identify key bridge assets at risk.	MRWA		No			Three bridges identified as 'High' risk: West River, Jerdacuttup River, Munglinup River on South Coast Hwy. 2 'Moderate' Phillips River Oldfield River.

MRWA – Vegetation clearance envelope for bridges.	16	Applied to annual works plans on MRWA bridges	MRWA		Yes			The clearance envelope was developed and adopted in response to the Perth Hills Bushfire Inquiry 2011.
MRWA Great Southern Region – Annual Bridge assessment & maintenance works plan	17	Annual field assessment of individual bridges undertaken to assess vegetation envelope maintained. Subsequent works program to ensure the stringent clearance envelopes are maintained.	MRWA		Yes		Annual	HP vegetation management manual details annual vegetation inspection & corrective cut/action requirements. HP field instruction manual details pole base clearing requirements (FI 8.5) for chosen HV poles. Both of these are completed on a minimum 12 month cycle. There are also instructions FI 2.4 & FI 6.19
Horizon Power - vegetation management, annual vegetation inspection & corrective cut/action.	18	Annual field assessment for vegetation management and pole base clearance.	Horizon Power	Contractor: Eastern Trees			Annual - Ongoing	HP vegetation management manual details annual vegetation inspection & corrective cut/action requirements. HP field instruction manual details pole base clearing requirements (FI 8.5) for chosen HV poles. Both of these are completed on a minimum 12 month cycle There are also instructions FI 2.4 & FI 6.19

DFES – Bushfire Risk Mitigation Schools	19	All schools within areas declared bushfire prone are individually assessed. The risk treatment plan is developed and signed off and DoE appoints contractors to undertake agreed work.	Department of Education DFES		Yes			Schools are rated Zone 1 or 2. Need to have a BAL of 12 or BAL 19 is accepted with building modification.
School Principals Guide - Department of Education	20	All schools should include their plan for dealing with bushfire as a part of their Emergency and Critical Incident Management Plan. A checklist to help you prepare your school for a possible bushfire starts on page 6 and you need to include the Asset Protection Zone (refer to page 8) in your assessment.	Department of Education	DFES	Yes		Annual Review	Zone 1 schools require standalone bushfire plans.
South East Fire Working Group								

ENVIRONMENTAL								
Control	**ID**	**Action/Activity Description**	**Lead Agency**	**Partners**	**Application**		**Status**	**Implementation Notes**
					Targeted	Period		
Fire Management Strategy for the Wilderness Zones of the Fitzgerald River	21	Provides strategic objectives for the management of fire and biodiversity in the park. Sits behind the annual works developed by the Fire Working Group.						While some of the strategies are outdated the overall intent and objectives are still applied by P&W. The FRNP Advisory Committee and the Fire Working Group still function.
Fitzgerald River National Park Fire Working Group	22	P&W facilitates stakeholder working group: season debrief, plan burns and mitigation works	P&W	DFES SoJ SoR CBFCO's				Annual meeting. Agreed mitigation works are documented. Important for town protection as the FRNP abuts three main town sites. Large areas of UCL also surround the towns.
Fitzgerald River National Park Management Plan	23	The management plan outlines strategies for the management of the NP including bushfire risk and importantly dieback management.						FRNP is the largest conservation reserve in southwest Western Australia is currently still relatively free of *Phytophthora cinnamomi* infestations. *Phytophthora cinnamomi* is one of the most significant threats to the biodiversity of the park and therefore preventing its introduction and further spread is one of the primary objectives for P&W in managing the park (CALM 1991)[52].

Indicative Annual Prescribed Burn Program - South Coast Region, Albany District	24	P&W prepared an indicative burn plan for the South Coast Region Albany.	P&W					The plans can be accessed via their website, by sharing shape files (GIS), and are communicated at Local BFAC, ROAC, and other various meetings.
Preparedness, Mitigation, and Response for land within gazetted town boundaries owned by DPLH and managed by DFES through MoU	25	Risk management activities such as fuel reduction are undertaken by DFES on UMR and UCL. Funding is provided by DPLH.	DFES LG	Brigades		Yes	Annual	DFES is responsible for identifying risk.
Preparedness, Mitigation, and Response for Lands Managed by P&W and for Lands owned by DPLH and managed by P&W through MoU	26	Risk management activities such as fuel reduction are undertaken by DBCA on UMR and UCL. Funding is provided by DPLH.	P&W	Brigades			Annual	

Appendix F – Shire of Ravensthorpe Work Program Maps

Albany Office:
29 Hercules Crescent
Albany, WA 6330
(08) 9842 1575

Denmark Office:
7/40 South Coast Highway
Denmark, WA 6333
(08) 9848 1309

Esperance Office:
2A/113 Dempster Street
Esperance, WA 6450
(08) 9072 1382

BPAD Bushfire Planning & Design

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:1,000,000

Legend

Subdivision and Recreation Site (Tier 2)

Cadastre

Coastal Reserve Burn Plan (Year to Burn)

Hazard Reduction Burn

Scale
1:127,000 @ A3
GDA MGA 2020 Zone 51

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2022
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Ravensthorpe
65 Morgans St
Ravensthorpe, WA 6346

Coastal Reserve Burn Plan (Year to Burn)

QA Check	Drawn by
KPK	BRM

STATUS	FILE	DATE
DRAFT	RAV004	3/10/2024

Albany Office:
29 Hercules Crescent
Albany, WA 6330
(08) 9842 1575

Denmark Office:
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Denmark, WA 6333
(08) 9848 1309

Esperance Office:
2A/113 Dempster Street
Esperance, WA 6450
(08) 9072 1382

BPAD Bushfire Planning & Design

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:750,000

Legend

- Hopetoun (Tier 1) and Surrounding Subdivison (Tier 2)
- Cadastre
- Strategic Low-Fuel Zones (SLFZ)
- 2022 Whale Bay Bushfire Incident

Hopetoun Burn Plan (Year to Burn)

- Hazard Reduction Burn
- Parkland Clean Up

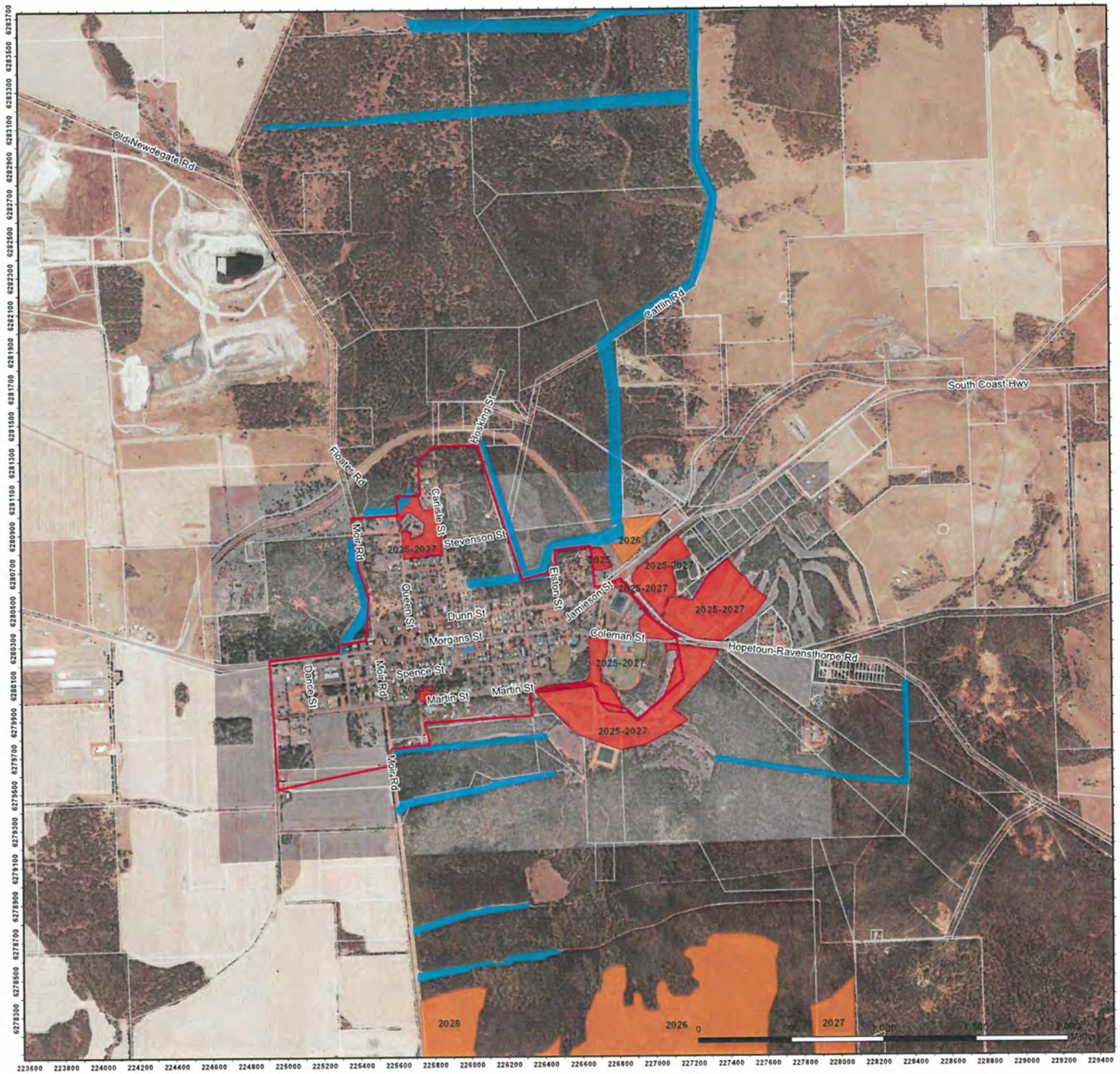
Scale
1:32,000 @ A3
GDA MGA 2020 Zone 51

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2022
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Ravensthorpe
65 Morgans St
Ravensthorpe, WA 6346

Hopetoun Burn Plan (Year to Burn)

QA Check	Drawn by	
KPK	BRM	
STATUS: DRAFT	FILE: RAV004	DATE: 3/10/2024



Albany Office:
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(08) 9848 1309

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Esperance, WA 6450
(08) 9072 1382

BPAD Bushfire Planning & Design

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:750,000

Legend

- Ravensthorpe (Tier 1)
- Cadastre
- Strategic Low-Fuel Zones

Ravensthorpe Burn Plan (Year to Burn)

- Hazard Reduction Burn
- Hazard Reduction Burn (Burning of Windrows)
- Parkland Clean Up

Scale
1:20,000 @ A3
GDA MGA 2020 Zone 51

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2022
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Ravensthorpe
65 Morgans St
Ravensthorpe, WA 6346

Ravensthorpe Burn Plan (Year to Burn)

QA Check	Drawn by	
KPK	BRM	
STATUS: DRAFT	FILE: RAV004	DATE: 3/10/2024

Albany Office:
29 Hercules Crescent
Albany, WA 6330
(08) 9842 1575

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(08) 9848 1309

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2A/113 Dempster Street
Esperance, WA 6450
(08) 9072 1382

BPAD Bushfire Planning & Design

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:750,000

Legend

- Hopetoun Rural (Blue Vista)
- Cadastre
- Strategic Low-Fuel Zones (SLFZ)

Southern Ravensthorpe Range Burn Plan (Year to Burn)

- Hazard Reduction Burn

Scale
1:62,000 @ A3
GDA MGA 2020 Zone 51

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2022
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Ravensthorpe
65 Morgans St
Ravensthorpe, WA 6346

Southern Ravensthorpe Range Burn Plan (Year to Burn)

QA Check	Drawn by	
KPK	BRM	
STATUS	FILE	DATE
DRAFT	RAV004	3/10/2024

Appendix G – Review Checklist

Appendix G – Annual review checklist

Correspondence

☐	*Cover letter from local government Chief Executive Officer or delegate to Director OBRM with this form completed and attached.*

Bushfire Risk Management Plan

Chapter 1	☐	BRM Plan objectives remain relevant.
Chapter 3	☐	Content of the context statement reflects current factors affecting bushfire hazard and bushfire risk to the community, economy and environment.
Chapter 4-7	☐	Figures and tables have been updated to reflect current data in Bushfire Risk Management System (BRMS).
Chapter 6	☐	Treatment Strategy remains reflective of community values and strategic priorities.
Appendix B	☐	Local government wide controls includes current treatment programs in local government area.
Appendix C	☐	Communication Plan has been updated to include planned stakeholder engagement and communication activities for the next planning period.

Bushfire Risk Management System

☐	*All assets identified in the Local Government area have been mapped and risk assessed in BRMS.*
☐	*All assets have had a risk reassessment completed in the last 2 years.*
☐	*The treatment schedule includes planned treatments for at least the next 12 months.*