



Shire of Ravensthorpe

Bushfire Risk Management Plan

2017 – 2022

Office of Bushfire Risk Management (OBRM) Bushfire Risk Management (BRM) Plan reviewed April 2017

Local Government Council BRM Plan endorsement - Resolution #69/17 June 2017

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Document Control

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Document Endorsements

Shire of Ravensthorpe Council endorses that the Bushfire Risk Management Plan (BRM Plan) has been reviewed and assessed by the Office of Bushfire Risk Management as compliant with the standard for bushfire risk management planning in Western Australia, the *Guidelines for Preparing a Bushfire Risk Management Plan*. Shire of Ravensthorpe is the owner of this document and has responsibility, as far as is reasonable, to manage the implementation of the BRM Plan and facilitate the implementation of bushfire risk management treatments by risk owners. The endorsement of the BRM Plan by Shire of Ravensthorpe Council satisfies their endorsement obligations under section 2.3.1 of the *State Hazard Plan for Fire (Westplan Fire)*.

Note: In approving the BRM Plan, the local government council is acknowledging the assets that have been identified and the risk ratings and treatment priorities assigned. Approval of the plan is a commitment by local government to work with land owners and managers to address unacceptable risk within their community. It is not the local government committing to a program of treatment works to be implemented by others or an acceptance of responsibility for risk occurring on land that is not owned or managed by the local government¹.

Local Government	Representative	Signature	Date
Shire of Ravensthorpe	Shire of Ravensthorpe CEO – Ian Fitzgerald		

Amendment List

Version	Date	Author	Section
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1. Introduction

1.1 Background

Under the *State Hazard Plan for Fire (Westplan Fire)* an integrated Bushfire Risk Management Plan (BRM Plan) is to be developed for local government areas with significant bushfire risk. This BRM Plan has been prepared for the Shire of Ravensthorpe in accordance with the requirements of *Westplan Fire* and the *Guidelines for Preparing a Bushfire Risk Management Plan (Guidelines)*. The risk management processes used to develop this BRM Plan are aligned to the key principles of *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines (AS/NZS ISO 31000:2009)*, as described in the Second Edition of the *National Emergency Risk Assessment Guidelines (NERAG 2015)*. This approach is consistent with the policies of the State Emergency Management Committee, specifically the *State Emergency Management Policy*.

This BRM Plan is a strategic document that identifies assets at risk from bushfire and their priority for treatment. The Treatment Schedule sets out a broad program of coordinated multi-agency treatments to address risks identified in the BRM Plan. Government agencies and other land managers responsible for implementing treatments participate in developing the BRM Plan to ensure treatment strategies are collaborative and efficient, regardless of land tenure.

1.2 Aim and Objectives

The aim of the BRM Plan is to document a coordinated and efficient approach toward the identification, assessment and treatment of assets exposed to bushfire risk within the Shire of Ravensthorpe.

The objective of the BRM Plan is to effectively manage bushfire risk within the Shire of Ravensthorpe in order to protect people, assets and other things of local value. Specifically, the objectives of this BRM Plan are to:

- Guide and coordinate a tenure blind, multi-agency bushfire risk management program over a five year period;
- Document the process used to identify, analyse and evaluate risk, determine priorities and develop a plan to systematically treat risk;
- Facilitate the effective use of the financial and physical resources available for bushfire risk management activities;
- Integrate bushfire risk management into the business processes of local government, land owners and other agencies;
- Ensure there is integration between land owners and bushfire risk management programs and activities;
- Monitor and review the implementation of treatments to ensure treatment plans are adaptable and risk is managed at an acceptable level.

1.3 Legislation, Policy and Standards

The following legislation, policy and standards were considered to be applicable in the development and implementation of the BRM Plan.

1.3.1 Legislation

- *Bush Fires Act 1954*
- *Emergency Management Act 2005*

- *Fire Brigades Act 1942*
- *Fire and Emergency Service Act 1998*
- *Conservation and Land Management Act 1984*
- *Environmental Protection Act 1986*
- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Wildlife Conservation Act 1950*
- *Aboriginal Heritage Act 1972*
- *Metropolitan Water Supply, Sewerage and Drainage Act 1909*
- *Country Areas Water Supply Act 1947*
- *Building Act 2011*
- *Bush Fires Regulations 1954*
- *Emergency Management Regulations 2006*
- *Planning and Development (Local Planning Scheme) Regulations 2015*
- *National Trust of Australia (WA) Act 1964*
- *Soil and Land Conservation Act 1945*
- *Building Act 2011*

1.3.2 Policies, Guidelines and Standards

- National Emergency Risk Assessment Guidelines (NERAG) (Second Edition 2015)
- State Emergency Management Policy
- State Hazard Plan for Fire (Westplan Fire)
- State Planning Policy 3.7: Planning in Bushfire Prone Areas
- State Planning Policy 3.4: Natural Hazards and Disasters
- Guidelines for Planning in Bushfire Prone Areas (2015)
- Western Australian Emergency Risk Management Guidelines (Emergency Management WA 2005)
- A Guide to the Use of Pesticides in Western Australia (Dept. of Health 2010)
- Guidelines for Plantation Fire Protection (DFES 2011)
- Firebreak Location, Construction and Maintenance Guidelines (DFES)
- Bushfire Risk Management Planning - Guidelines for preparing a Bushfire Risk Management Plan (2015)
- AS/NZS ISO 31000:2009 - Risk management – Principles and guidelines
- AS 3959-2009 Construction of buildings in bushfire-prone areas
- Building Protection Zone Standards (DFES)
- Shire of Ravensthorpe - Local Planning Policy No. 9 – Fire Management Plans
- Shire of Ravensthorpe - Local Planning Policy No. 13 – Farm Forestry
- 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

1.3.3 Other Related Documents

- National Strategy for Disaster Resilience
- National Statement of Capability for Fire and Emergency Services (AFAC 2015)
- Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Dept. of Health 2007)

- Code of Practice for Timber Plantations in Western Australia (Forest Products Commission 2006)
- Bushfire Risk Management Planning Handbook
- Bushfire Risk Management System (BRMS) User Guide Bushfire Risk Management System User Guide (DFES 2015)
- Shire of Ravensthorpe - Strategic Community Plan July 2014-June 2024
- Shire of Ravensthorpe - Corporate Business Plan 2014-2018
- Shire of Ravensthorpe - Local Planning Strategy (2015)
- Shire of Ravensthorpe – Emergency Management Local Recovery Management Plan (2014)
- Shire of Ravensthorpe - Local Emergency Management Arrangements (Dec 2015)
- Shire of Ravensthorpe - Evacuation Plan (2014)
- Shire of Ravensthorpe - Municipal Inventory of Heritage Places
- Shire of Ravensthorpe Fire Break Annual Fire Regulation Notice
- Local Emergency Management Plan for the Provision of Welfare Support - Esperance, Dundas and Ravensthorpe (June 2016) Department of Child Protection
- DER Permit to clear
- State Emergency Management Committee – Great Southern District Risk Assessment Summary Risk Results Report.
- Guidelines for Plantation Fire Protection – Fire and Emergency Services Authority

2. The Risk Management Process

The risk management processes used to identify and address risk in this BRM Plan are aligned with the international standard for risk management, AS/NZS ISO 31000:2009, as described in NERAG (2015). This process is outlined in Figure 1 below.

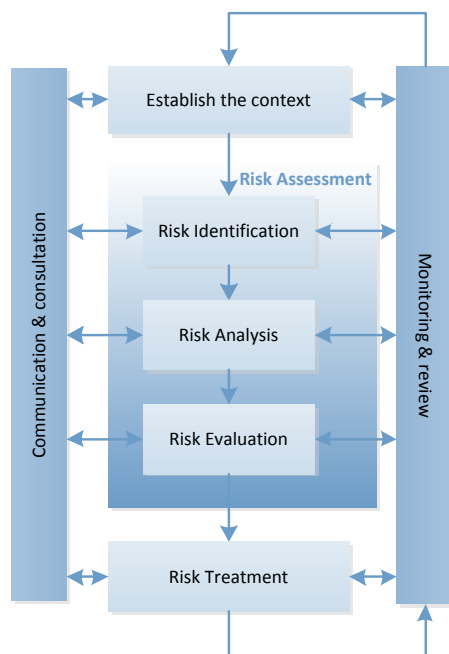


Figure 1 - An overview of the risk management process ²

2.1 Roles and Responsibilities

Table 1 – Roles and Responsibilities

Stakeholder Name	Roles and Responsibilities
Shire of Ravensthorpe	<ul style="list-style-type: none"> As custodian of the BRM Plan, coordination of the development and ongoing review of the integrated BRM Plan. Negotiation of commitment from land owners to treat risks identified in the BRM Plan. As treatment manager, implementation of treatment strategies. As part of the approval process, submission of the draft BRM Plan to the Office of Bushfire Risk Management (OBRM) to review it for consistency with the Guidelines. As part of the approval process, submission of the final BRM Plan to council for their endorsement and adoption.
Department of Fire and Emergency Services (DFES)	<ul style="list-style-type: none"> Participation in and contribution to the development and implementation of BRM Plans, as per their agency responsibilities as the Westplan Fire Hazard Management Agency. Support to local government through expert knowledge and advice in relation to the identification, prevention and treatment of bushfire risk. Facilitation of local government engagement with state and federal government agencies in the local planning process. Undertake treatment strategies, including prescribed burning on behalf of Department of Lands for Unmanaged Reserves and Unallocated

² Source: AS/NZS ISO 31000:2009, Figure 1, reproduced under SAI Global copyright Licence 1411-c083.

Stakeholder Name	Roles and Responsibilities
	<p>Crown Land within gazetted town site boundaries.</p> <ul style="list-style-type: none"> ▪ In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders.
Office of Bushfire Risk Management (OBRM)	<ul style="list-style-type: none"> ▪ Under the OBRM Charter, to ensure bushfire risk is managed in accordance with AS/NZS ISO 31000 and reporting on the state of bushfire risk across Western Australia. ▪ Review BRM Plans for consistency with the Guidelines prior to final endorsement by council.
Department of Parks and Wildlife (P&W)	<ul style="list-style-type: none"> ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ Providing advice for the identification of environmental assets that are vulnerable to fire and planning appropriate treatment strategies for their protection. ▪ As treatment manager, implementation of treatment strategies on department managed land and for Unmanaged Reserves and Unallocated Crown Land outside gazetted town site boundaries. ▪ In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders.
Other State and Federal Government Agencies	<ul style="list-style-type: none"> ▪ Assist the local government by providing information about their assets and current risk treatment programs. ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ As treatment manager, implementation of treatment strategies.
Public Utilities	<ul style="list-style-type: none"> ▪ Assist the local government by providing information about their assets and current risk treatment programs. ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ As treatment manager, implementation of treatment strategies.
Corporations and Private Land Owners	<ul style="list-style-type: none"> ▪ As treatment manager, implementation of treatment strategies.
Others <ul style="list-style-type: none"> • Chief Bushfire Control Officer • Bushfire Advisory Committee • District Operations Advisory Committee • Local Emergency Management Committee • Bushfire Brigades and other Emergency Services 	<ul style="list-style-type: none"> ▪ 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.

Stakeholder Name	Roles and Responsibilities
Volunteers South West Aboriginal Land and Sea Council <ul style="list-style-type: none"> • Community Groups 	

2.2 Communication & Consultation

As indicated in **Figure 1**, communication and consultation throughout the risk management process is fundamental to the preparation of an effective BRM Plan. To ensure appropriate and effective communication occurred with relevant stakeholders in the development of the BRM Plan, a *Communication Strategy* was prepared. The strategy is provided at **Appendix 1**.

3. Establishing the Context

3.1 Description of the Local Government and Community Context

3.1.1 Strategic and Corporate Framework

The Shire of Ravensthorpe strategic and corporate framework is outlined in the *The Shire of Ravensthorpe Strategic Community Plan 2014-20*.

The BRM Plan aims to support the Shire achieve its strategic vision of *growing our community* through the key strategic themes:

- A vibrant, supportive and socially connected community
- A thriving business and industry including tourism
- Adequate services and infrastructure to cater for the regional community
- Civic leadership

The strategic plan for achieving the community's vision is formalised within the Shire of Ravensthorpe's Corporate Business Plan.

The Corporate Business Plan 2014 – 2018, 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, in particular through *Theme 1: A vibrant, supportive and socially connected community*, and the associated Law, Order and Public Safety Program and *Theme 4 – Civic Leadership*, in which the Shire recognises the importance of responsible, accountable, transparent, representative and efficient government.

The Shire of Ravensthorpe recognises the importance of leadership and coordination in emergency management and has an established Local Emergency Management Committee (LEMC) with multi-agency membership. The Committee provides an important multiagency forum for the BRM Plan to consult.

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 natural environment is to be minimised; Harm to cultural environment is to be minimised; 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 Centres, evacuation areas, emergency services facilities and schools must not be compromised; and to ensure minimal disruption to essential services including water, power and communications*³.

The Shire of Ravensthorpe Bushfire Advisory Committee (BFAC) has played an integral role in the development of the BRM Plan, in particular the identification of assets and existing controls, assessment of risk and the development of treatment options.

The LEMC and the BFAC will continue to have involvement in the implementation and review of the BRM Plan as outlined in *Appendix 1 – Communication Strategy*.

³ Shire of Ravensthorpe (2015), Local Emergency Management Arrangements

3.1.2 Location, Boundaries and Tenure

The Shire of Ravensthorpe is in the southern Goldfields-Esperance region of Western Australia (WA), about halfway between the city of Albany and the town of Esperance and about 530km southeast of Perth. The Shire covers an area of 12,872km²⁴.

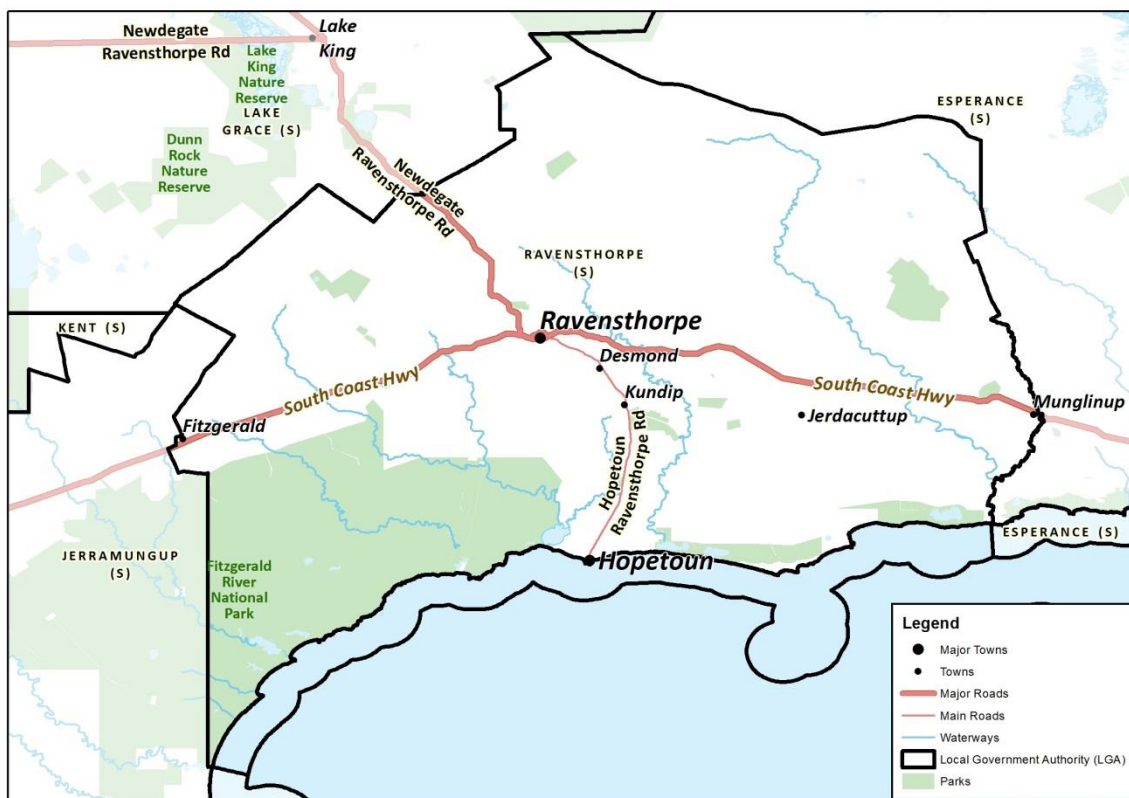


Figure 2 - Shire of Ravensthorpe⁵

The Shire encompasses several national parks, including the Frank Hann National Park in the north and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site, the Fitzgerald River National Park⁶ on the coast.

The Shire of Ravensthorpe adjoins the Shire of Esperance to the east, Shire of Jerramungup to the west and Shire of Lake Grace to the north. The Ravensthorpe town site is located on National Highway One, which links Albany and Esperance.⁷

Approximately two-thirds of the Shire of Ravensthorpe is natural bushland, made up of two national parks, the Ravensthorpe Range, reserves and vacant crown land. The remainder is broad acre farmland.

⁴ Shire of Ravensthorpe (2014), Community Plan 2014-2024

⁵ Source: Department of Fire and Emergency Services

⁶ <http://www.unesco.org> downloaded 28 April 2017

⁷ Shire of Ravensthorpe (2014), Local Planning Strategy

P&W are a major bushfire stakeholder with land management responsibility for approximately 48% of the vegetated land within the Shire of Ravensthorpe. P&W have participated in and contributed to the development of this plan and will continue to be involved in the on-going implementation and review.

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 Mines and Petroleum (DMP) has indicated that the mineral potential is very high for gold, silver and copper.⁸

In 2004 Ravensthorpe Nickel Project (RNP) was operationalised and as a consequence large areas of land surrounding Hopetoun was purchased by developers in anticipation of a 'boom' in housing demand. The mine closed after only a year of production; the closure caused considerable impact on the community. The mine was sold and reopened in 2011 and whilst the population has stabilised the anticipated demand for housing never eventuated. Subsequently large areas of undeveloped land surround the town and with limited development prospect this land carries significant a bushfire risk. Given the low value of the land, the cost of maintaining the firebreaks and undertaking fuel management, risk treatment is not always well received. The Shire with the BFAC is seeking to addresses this risk through amendments to the annual firebreak notice.

The Shire of Ravensthorpe has important Aboriginal heritage. There are many cultural and significant sites in the Wagyl Kaip and Southern Noongar region, many of which are in the Shire of Ravensthorpe. The Wagyl Kaip and Southern Noongar claim for Native Title was made in September 2006. Indigenous Land Use Agreements (ILUA) have commenced operation since, however the Southwest Native Title Settlement will not commence until after registration of the ILUAs by the Native Title Registrar and the resolution of any court proceedings⁹.

In summary the land tenure of the Shire of Ravensthorpe is dominated by large areas of wilderness, 28% Unallocated Crown Land and 20% vested with P&W as either National Park or reserve. The reminder is dominated by broad acre agriculture.

3.1.3 Population and Demographics

The most recent Australian Bureau of Statistics (ABS) data shows the population in the Shire of Ravensthorpe in 2015 as 2,263, of which 1,225 are male and 1,038 are female. The median age is 41.5¹⁰. Indigenous residents account for 2% of the Shires population¹¹. The Shire has a relatively high population of elderly residents in 2011 this was over double the State average in the 75-84 year old bracket, whereas it is lower i.e. less than half the state average for 15-24 year olds.

The rate of volunteerism in 2011 was 27.4% significantly higher than the State average of 17%.¹²

⁸ Shire of Ravensthorpe (2015), Local Planning Strategy retrieved on 4 November 2016 from <http://www.ravensthorpe.wa.gov.au>

⁹ <http://www.noongar.org.au/new-page-17>

¹⁰ <http://stat.abs.gov.au>

¹¹ Shire of Ravensthorpe (2014), Community Plan 2014-2024

¹² Australian Bureau of Statistics downloaded on 2 November 2016 from <http://stat.abs.gov.au>

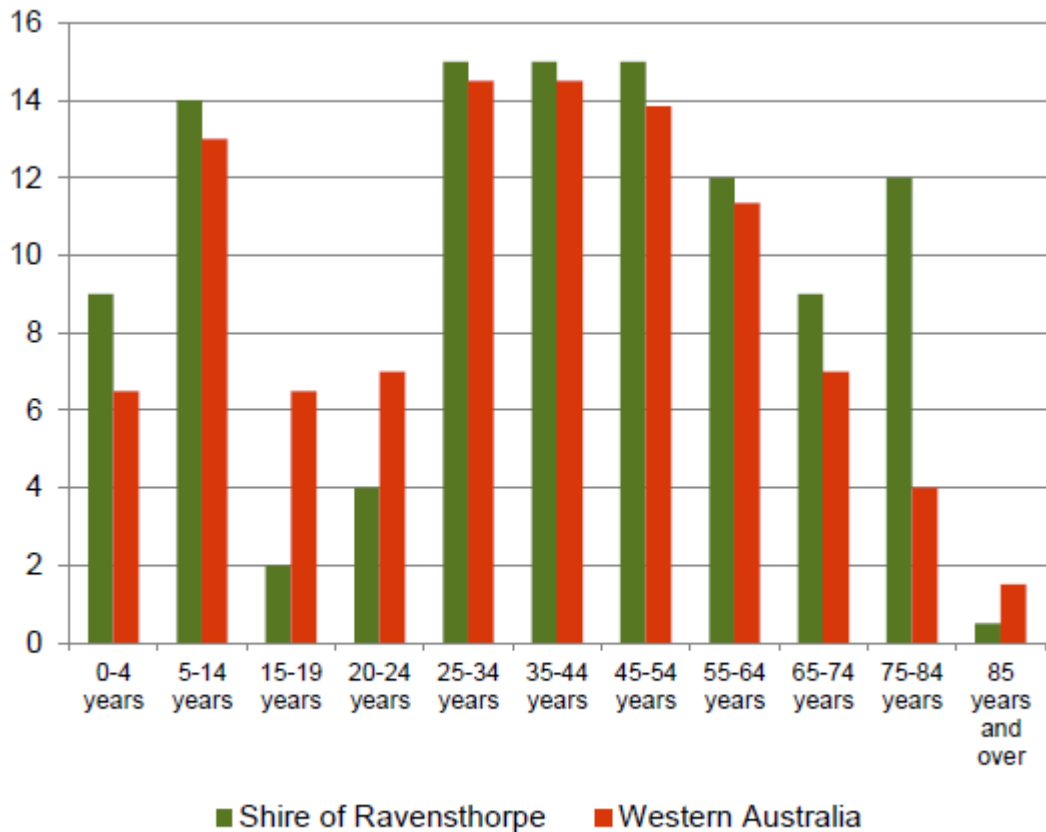


Figure 3 – Population in Ravensthorpe compared with Western Australia¹³

There are 5 gazetted townsites in the Shire. Ravensthorpe and Hopetoun are the two main population bases. Munglinup has a population of approx. 14 people and like Jerdacuttup and Fitzgerald has not substantially developed and are unlikely alter significantly in the future¹⁴.

There are currently two mines operating in the area, a Ravensthorpe Nickel Project (RNP) and Ravensthorpe Lithium Project (RLP). There is a proposal for a third mine to open in the near future. The Shire of Ravensthorpe has a long history of mining and with this the population has fluctuated with the cyclical nature of mining. As a result of the closure of the RNP in 2007 it's estimated that there was a surplus of between 94-101 residential dwellings in Ravensthorpe and 399-407 in Hopetoun.

While it is not always possible to avoid changes in the population due to mining, more sustainable economic development is being pursued to avoid large fluctuations such as the previous mine closure caused. The RNP originally employed approximately 1300 people whereas now it is closer to 300.

The Ravensthorpe town is the administrative centre of the Shire and is home to the Council Chambers, the regional offices for various other State Government agencies, the public regional High School and the regional Health Campus. It provides a range of retail and commercial services to

¹³ Source: Department of Fire and Emergency Services courtesy: John Tonkin

¹⁴ Shire of Ravensthorpe (2014), Local Planning Strategy

meet the needs of the wider agricultural region. In the 2011 census the resident population was 391¹⁵.

Hopetoun is located on the Southern Ocean, approximately 190km west of Esperance by road and 50km south of Ravensthorpe by road. It acts as a local service centre which is home to retirees, mine employees from both the Nickel and Lithium mines, absentee land owners (holiday homes), local farmers, fishermen and people who provide other services in the town. There are areas zoned for rural living purposes to the north, east and west of the town which provides an alternative housing choice. The population of the town at the 2011 Census was 1398 persons.

Hopetoun is essentially divided into two precincts; the original town and the recently completed Mary Ann Waters Estate. The newer residential area of Mary Ann Waters Estate was developed to accommodate growth resulting from the construction and operation of the RNP. Large numbers of houses in this area remain vacant.

The more recent housing has a higher level of construction. Seaview Estate also developed by the Nickel Project had strict environmental constraints. Pre-fabricated housing was craned on to site to reduce the impact of development on the existing vegetation. The proximity of the vegetation to the housing within this particular estate exposes residents to a higher level of bushfire risk than the other newer housing. The estate is now under the management of the Nickel Mine and requires a specific fire management plan.

The original town site largely consists of holiday homes and residential dwellings for retirees and the local workforce. Construction standards in the older area are ad-hoc which may expose the housing to a greater level of risk from bushfire. Further to this many are owned by farmers or absentee landowners, which mean they are vacant for a large part of the year.

Hopetoun does not contain any higher order services however provides commercial and retail services to meet the everyday needs of the local residents. There is a local primary school in the town that caters for students from pre-primary to year six.¹⁶

Munglinup is a small service centre located at the eastern extent of the Shire along the South Coast Highway, approximately 85km east of Ravensthorpe by road and 100km west of Esperance. The region was first opened up for farming in the late 1950s and by the early 1960s the community asked for a town-site between Esperance and Ravensthorpe to be considered. The town-site was surveyed in 1961 and gazetted in 1962¹⁷. The town-site has a very small population of approximately 14 people according to the 2006 Census¹⁸. The town consists of a commercial area which provides a few essential services, a small residential population, a primary school, some light industrial and recreation areas (including an oval, golf course and tennis courts). The town exists primarily to serve the surrounding agricultural population. Within Munglinup there are a total of 73 lots zoned 'Residential' with only 19 of these lots currently developed. A large proportion, (58%) of the 'Residential' zoned lots within the town site remains as Unallocated Crown Land.

¹⁵ Shire of Ravensthorpe (2014), Local Planning Strategy

¹⁶ Shire of Ravensthorpe (2015), Local Planning Strategy, retrieved 13 October 2016 from <http://www.ravensthorpe.wa.gov.au>

¹⁷ Shire of Ravensthorpe (2015), Local Planning Strategy, retrieved 13 October 2016 from, <http://www.ravensthorpe.wa.gov.au>

¹⁸ Shire of Ravensthorpe (2015), Local Planning Strategy, retrieved 13 October 2016 from <http://www.ravensthorpe.wa.gov.au>

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 and the warmer summer weather and the bushfire season. The population increases in late December January to 5,000 people¹⁹. The LEMC recognises this in its Local Emergency Management Arrangements in particular that through traffic can increase markedly along with an increase in campers in the coastal heath. 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 Fitzgerald River National Park, Starvation Bay, Masons Bay, Munglinup Beach and the general coastal areas²⁰.

The Local Emergency Management Arrangements (LEMA) recognises that the agricultural based residents leave the area for the holiday period following the completion of harvest. This means less farm fire units are available, less volunteer fire-fighters are available along with a further reduced population in the remote areas of the Shire to report ignitions.

The Shire of Ravensthorpe has experienced many large bushfires, while the majority have been in the more remote areas of wilderness several have threatened the townships. The most recent in November 2016 threatened Hopetoun from the north-east. The fire was contained but prediction models showed the fire had the potential to threaten the town. In 2003 the Lake Tay Fire travelled over 100km and threatened the town of Ravensthorpe.

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.

It is understood many of the longer term residents, especially retirees from the agriculture community who are aware of the risk of bushfire based on their experience of living in the area. The 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 conditions²¹.

Both of the mine communities would benefit from community engagement around the bushfire risks and opportunities are available to collaborate with the Mine Companies. The BRM Plan and LEMC consider the tourist population presents a special risk. Special consideration also needs to be given to educating and engaging the tourist population as identified with the LEMA. The BRM Plan also recognises the risk to the remote camping areas, they have been assessed as a 'human settlement' asset and assessed and treated as such.

The elderly residential population is largely made up of retirees from the surrounding agricultural area and have a high level of awareness and knowledge of the bushfire risk. This knowledge is of value to the local community and should be harnessed in any engagement strategies. Despite this the elderly population, due to issues of mobility and self-reliance, are at risk to risk from bushfire. The high numbers of elderly residents can create pressure on the emergency and support services,

¹⁹ Evolve Solutions (2010) Tourism Strategy for the Shire of Ravensthorpe retrieved 13 October 2016 from <http://www.ravensthorpe.wa.gov.au/centre>

²⁰ Shire of Ravensthorpe – Local Emergency Management Arrangements

²¹ 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. (February 2013).

particularly if required to conduct an evacuation. Strategies to address will include community engagement but also require collaboration and planning with the associated support services.

3.1.4 Economic Activities and Industry

At present, the three main economic drivers within the Shire are agricultural, mining and tourism industries. In addition to these key industries, the economic growth and development of the Shire and each of the settlements is dependent on adequate land availability and the provision of services and infrastructure. The LEMC 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 LEMC by introducing controls and treatments that reduces the risk of bushfire to the economy.

The recent flood events in February 2017 have highlighted the risk to the economy from natural disaster. The main transport route was cut until temporary diversions were put in place this impacted the mining and transport industries. The damage to the internal road network was extensive and this affected the movement of people, predominantly those located on farms. Access to the National Park has been cut for several months and this is understood to have affected tourism to the area. 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 a major regional transport corridor.

Small local governments such as the Shire of Ravensthorpe are sensitive to any disruption to industry.

Agricultural production remains the key economic activity underpinning the local economy. The latest available ABS data (2011) indicates that the gross value of agricultural production was approximately \$107 million²². Major crops include wheat, barley and canola. Livestock enterprises include cattle and sheep i.e. wool and meat. A majority of the land directly surrounding Ravensthorpe is used for agriculture. Agriculture is of vital importance to the local economy as production remains stable.

The Shire has controls in place pursuant to the *Bush Fires Regulations 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 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 burning canola windrows.

The State Government has indicated that areas of the Shire have 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.

Mining Operations provides employment for approximately 520 people and continued sustainability for the Shire of Ravensthorpe.

²² Australian Bureau of Statistics (2011)

Tourism continues to be important component of economic activity in the Shire and is likely to grow in the future, particularly with improved facilities and better access to the National Park. 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 within the parks and reserves, including the Fitzgerald River National Park, are a popular holiday location. According to *The Shire of Ravensthorpe Tourism Strategy (2010)*, an estimated average 30,000 people visit the area annually²³.

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 unacceptable²⁴. The BRM Plan recognises that any mitigation strategies must be developed with respect to the biodiversity values of the area. The BRM Plan references the publication '*Identification and Conservation of Fire Sensitive Ecosystems and Species of the South Coast Natural Resource Management Region*' published by *South Coast Natural Resource Management* with the Department of Parks and Wildlife.

The Shire considers there is potential for commercial agroforestry and timber plantations however this is limited due to species suitability to the soil type and rainfall. The limited farm forestry plantations that occur in the Shire are managed by the Forests Products Commission (FPC). The FPC is joint author of the industry standard *Code of Practice for Timber Plantations in Western Australia. Section 4.7.6* of the Code outlines Fire Prevention and Suppression Guidelines which underpins the *Shires Local Planning Policy No. 13 – Farm Forestry 2015*. The Code also references *Guidelines for Plantation Fire Protection* (DFES).

Another emerging industry is carbon plantations to create carbon offsets through the establishment and management of plantations dedicated to that purpose. The carbon plantations are not subject to harvesting and may be left in place for 70 years. Development approval for 'plantations', regardless of type, is through the *Shire of Ravensthorpe Local Planning Policy No. 13 – Farm Forestry 2015*. A fire management plan is required for each plantation as part of this approval process. On-going inspections are conducted annually by the Shire.

3.2 Description of the Environment and Bushfire Context

3.2.1 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 bush land, 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 Fitzgerald River National Park. Approximately 190,000ha of the Park sits within the Shire of Ravensthorpe. The remaining 140,000ha forms the eastern part of the Shire of Jerramungup. The Fitzgerald River National Park, 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.

²³ Evolve Solutions (2010), *The Shire of Ravensthorpe Tourism Strategy*

²⁴ Shire of Ravensthorpe (2015) – Local Emergency Management Arrangements

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 few river corridors. The western area of the Shire is primarily made up of UCL and the Fitzgerald River National Park which is characterised by significant ranges on the coast and a number of river catchments with valleys and break always. The rugged topography of both areas poses significant limitations to vehicle access.

There are a number of 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 area was subject to extensive flooding in February 2017.

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

The expansive areas of vegetation within the Shire presents 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 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 both for both environmental factors and safety to emergency responders.

In 2003 a bushfire referred to as the Lake Tay fire burnt an area in excess of 300,000 ha. The Lake Tay fire demonstrated the potential for 'remote' fires, 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 Corridor²⁵.

This particular fire led to a decision by P&W to increase response capability and to 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.

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 regime²⁶.

²⁵ 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.

²⁶ 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.

The SEMC State Capability Framework recognises the importance of the topography and landscape features in section '4.2 *The ecosystem is effectively managed to preserve natural barriers that aid community protection and biosecurity barriers*²⁷. This is an important consideration in the Shire of Ravensthorpe as the landscape character is vast 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 option.

The spread of 'Dieback' (*Phytophthora cinnamomi* and other related pathogens) is an important factor when determining bushfire risk management and suppression strategies as the biodiversity and social values of the region, in particular the FRNP, are threatened by *Phytophthora* dieback. The soil-borne pathogen infests native plant communities causing death of susceptible species²⁸. 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 management purposes. The cells are defined by cleared access trails. The cells still represent vast areas of natural vegetation.

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 wildfires 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 opportunity to implement direct-attack strategies (building a fireline 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. In the event of a fire the vegetation cell is 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 are able to access such large areas of fuel with limited suppression have a better opportunity to develop into bigger fires that generate their own energy and pose the greatest risk to the community.

Strategic breaks are used throughout the landscape to break the vast areas of vegetation into cells within which responders can apply dry suppression techniques to assist in the containment or 'pulling up' of the fire. Typically numerous strategic breaks are installed around towns to enable responders several opportunities to 'pull the fire up'. On the western edge of Hopetoun the last of these strategic breaks is referred to as the 'last stand'.

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

²⁷ Office of Emergency Management – State Capability Framework retrieved 4 October 2016 from <https://www.oem.wa.gov.au/emergency-management/portal/capability>

²⁸ 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.



Figure 4 – Dry Suppression during a Mallee fire in Ravensthorpe²⁹

3.2.2 Climate and Bushfire Season

The climate of the Great Southern region is typically Mediterranean, with warm to hot dry summers and mild, wet winters. The majority of rainfall occurs between May and September, with heaviest falls during the winter months from June to August.

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 10 degrees in August to 26 degrees in February.

Summers are very dry, with December to February receiving a monthly average of less than 25mm 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 bush fire, therefore a high degree of caution is required by residents and visitors.

The early to mid- summer is generally dominated by weekly weather cycles and movements of the west coast trough through the area producing thunder storm 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. The Great Southern 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.

²⁹ Source: Department of Fire and Emergency Services courtesy: John Tonkin

Prevailing winds are from the north-west and south-east which can prove challenging during suppression because they generally strong, hot and dry (refer Figure 6 below). The NW 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. As a consequence the area experiences a fire danger rating (FDR) of 'Very High' or above for approximately 28 days between Jan-March³⁰.

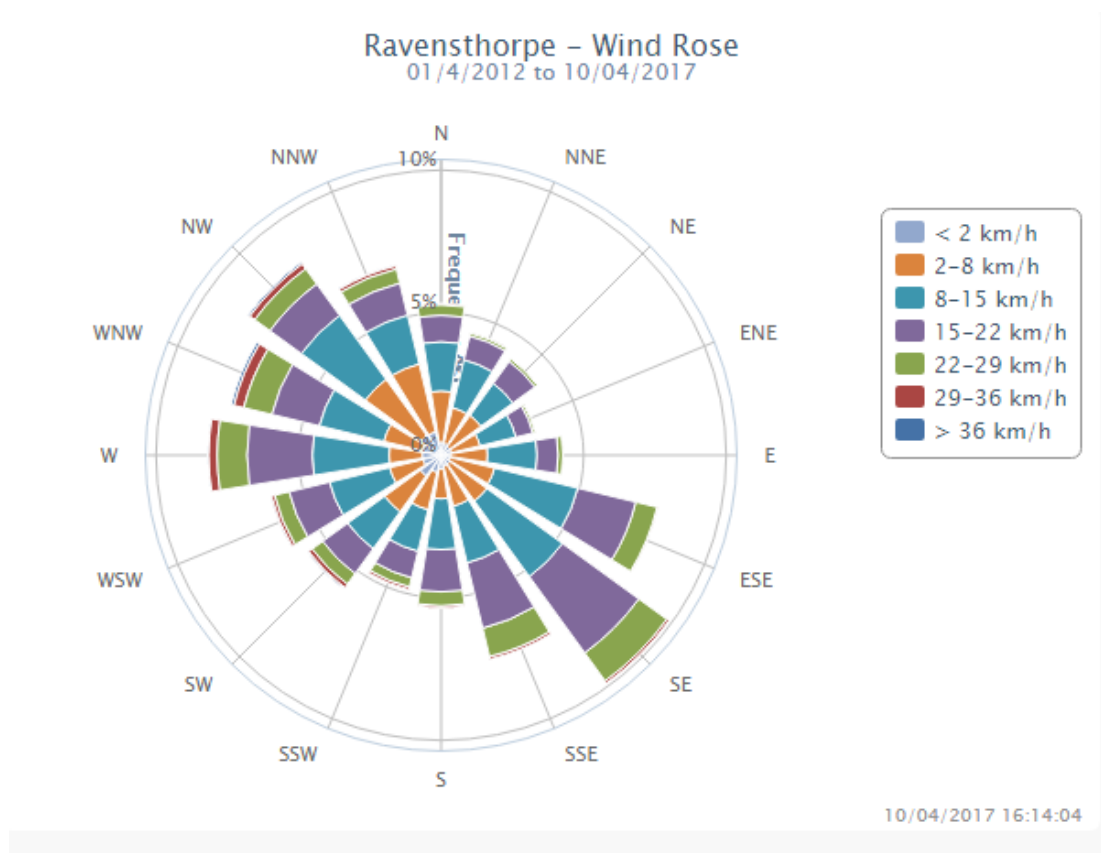


Figure 5 – Wind Rose ³¹

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

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.

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 with lower humidity and strong winds will produce strong fire behaviour. The Shire of Ravensthorpe has 'Restricted Burning' conditions for the remainder 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 October.

³⁰ http://www.bom.gov.au/climate/averages/tables/cw_010633_All.shtml sourced on 28 April 2017.

³¹ Department of Agriculture and Food, Ravensthorpe Windrose, retrieved 10 April 2017 from <https://www.agric.wa.gov.au/climate-land-water/climate-weather>

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 1 February: Prohibited Burning
- 1 February – 31 October: Restricted Burning (permits required)
- Burning is prohibited on ALL Public Holidays and on Sundays, except between 30 April and 19 September

The climate has an effect on 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 reducing the impact of fire intensity on susceptible species. Burning is however used extensively as a treatment method, it is used in balance with mechanical treatments such as parkland clearing, mulching and scrub rolling. It is important that treatment strategies are 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.

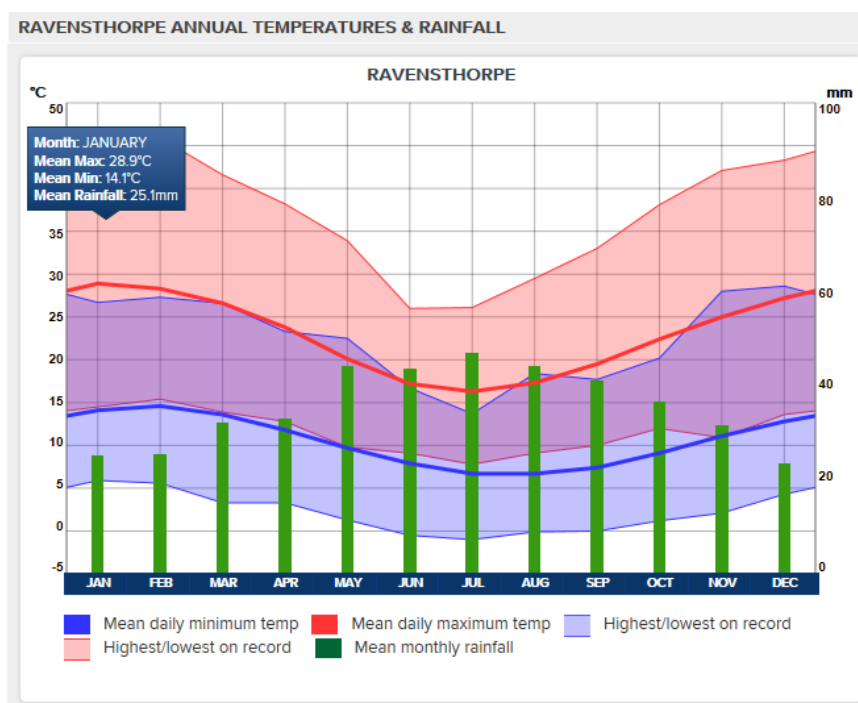


Figure 6 – Ravensthorpe Climate ³²

3.2.3 Vegetation

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.

³² Weather Zone, Ravensthorpe Climate, retrieved 13 October 2016 from <http://www.weatherzone.com.au/climate/station.jsp?lt=site&lc=10633>

The BRMP risk assessment process currently applies a default fuel load for the vegetation types found locally, which is equivalent to a 20 year fuel age. In cases where the fuel age is significantly lower, then the assessment may over-estimate the actual risk found on the ground. Where this is the case, treatments will be scheduled for implementation according to the actual fuel state.

While fuel load is a significant factor in fire behaviour, the BRMP process looks at a number of 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 change³³.

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 region is sparsely populated; the only towns of note are Bremer Bay, Ravensthorpe, Hopetoun and Esperance³⁴.

The main vegetation formation of the Esperance Plains region is mallee-heath; this 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 only woodland communities are some *Eucalyptus loxophleba* (York Gum) and *E. occidentalis* (Flat-topped Yate) woodland in low-lying areas³⁵.

As of 2007, the Esperance Plains is known to contain 3506 indigenous vascular plant species, and a further 294 naturalised alien species. The endangered flora of the Esperance Plains region consists of 72 species, with a further 433 species having been declared Priority Flora under the Department of Environment and Conservation's Declared Rare and Priority Flora List³⁶.

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.³⁷

³³ 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.

³⁴ Esperance Plains retrieved 10 October 2017 from https://en.wikipedia.org/wiki/Esperance_Plains

³⁵ Esperance Plains retrieved 10 October 2017 from https://en.wikipedia.org/wiki/Esperance_Plains

³⁶ Esperance Plains retrieved 10 October 2017 from https://en.wikipedia.org/wiki/Esperance_Plains

³⁷ 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. (February 2013).

Some of the flora and ecological communities have adapted to fire while others are fire sensitive. It is important to note that those that have developed adaptations 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 structurally³⁸. 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 used as a treatment strategy in these pockets.

The Fitzgerald River National Park dominates the eastern part of the Shire. The FRNP is the core area of the Fitzgerald Biosphere which is a part-tenured management concept recognised by the UNESCO *Man and the 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 communities³⁹. 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 and *Phytophthora* presents significant challenges when managing the significant biodiversity of the region.

According to the Threatened Species and Ecological Communities Regional Strategic Management Plan (Management Plan)⁴⁰, there are 57 threatened fauna 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 plan recognises 8 significant impacts on threatened species in the area. One of which is inappropriate fire regime. No fire regime is 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.

³⁸ 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.

³⁹ Markey, A, Kern, S Gibson N. (2012), *Floristic communities of the Ravensthorpe Range, Western Australia* Conservation Science W. Australia 8 (2): pp187-239 (2012).

⁴⁰ Department of Parks and Wildlife, South Coast NRM (2009), *Threatened Species and Ecological Communities Regional Strategic Management Plan (June 2009)* retrieved 4 November 2016 from http://www.southcoastnrm.com.au/images/user-images/documents/Threatened_Species_and_Ecological_Communities_Regional_Strategic_Management_Plan_Jun_2009.pdf

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 not known.

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 habitat for breeding but younger vegetation for feeding⁴¹.

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.

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 an endangered ecological community of national environmental significance as listed under the *Environmental Protection and Biodiversity Act 1999*. The Kwongkan ecological community is important because a large portion has already been lost and remaining areas are vulnerable to the impacts of threats such as dieback due to *Phytophthora cinnamomi*, changing fire regimes, land clearing, invasive species, and climate change. The Kwongkan community occurs in patches throughout the Shire refer *Appendix 4 – Map of Kwongkan Threatened Ecological Community*.

Any vegetation management treatments proposed by the BRM Plan, including prescribed burning but particular mechanical clearing will need to carefully consider the impact on the vegetation from an ecological perspective. This is also a legislative requirement as per the requirement of the Commonwealth Department of Environmental Regulation. Any fuel reduction treatments will require a thorough assessment of the vegetation and approval to be sought for 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.

The BRM Plan has established a working relationship with P&W Regional office and the FRNP Fire Working Group, both have been directly involved 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 in their respective partners such as the South Coast Natural Resource Management.

3.2.4 Bushfire Frequency and Causes of Ignition

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 at Item 8.0 in the Table below, and some accidental ignition from industry.

⁴¹ 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.

Number of Reported Landscape Fires

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Fire - Landscape	6	7	8	14	4	10	10	12	15	19	105
Total	6	7	8	14	4	10	10	12	15	19	105

Number of Landscape Fires, breakdown by Ignition Factor.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
0. Undetermined or Not Reported	2	4	3	5	1	1	0	1	0	4	21
2.0 Suspicious	0	0	0	0	0	0	1	1	1	0	3
3.1 Abandoned, discarded materials	0	0	0	0	0	0	0	0	0	1	1
3.3 Inadequate control of open fire	0	0	0	1	1	2	2	1	4	2	13
3.4 Cutting/Welding	0	0	0	0	1	0	0	0	0	0	1
4.0 Misuse of Material Ignited - Other	1	0	0	0	0	0	0	0	0	0	1
5.0 Mechanical or Electrical failure - Other	0	0	0	1	0	0	0	1	0	0	2
5.1 Part failure, leak, break	0	0	1	0	0	0	0	1	0	1	3
5.3 Electrical or Ground Fault	0	0	0	0	0	1	1	0	1	0	3
5.4 Failure due to lack of Maintenance	0	0	0	0	0	1	0	0	0	0	1
6.0 Design construction or other Installation de	0	0	0	0	0	0	1	0	0	0	1
7.0 Operational Deficiency - Other	0	0	0	0	0	0	0	0	1	3	4
7.3 Operator Failure to Clean	0	0	0	0	0	0	0	1	0	0	1
8.0 Weather Conditions	2	2	4	5	0	5	5	5	7	5	40
9.0 Other Ignition Factor	0	1	0	0	0	0	0	0	1	0	2
9.2 Other - Rekindle from Previous Incident	0	0	0	0	0	0	0	1	0	1	2
9.2 Other - Vehicle	1	0	0	2	1	0	0	0	0	2	6
Total	6	7	8	14	4	10	10	12	15	19	105

Figure 7 – All Landscape Fires & Ignition Factors at Ravensthorpe 01/01/2007 to 31/12/2016⁴²

During a five year period between 30 June 1997 and 30 June 2002, 194 fires were recorded of which 79 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.

A large percentage of the accidental ignition by industry is caused by harvesting cereal crops, which also occurs in the higher risk period for bushfires.

The ignitions listed in Figure 7 above are those reported to the Chief Bushfire Control Officer (CBFCO). Often in remote regions not all ignitions are recorded.

⁴² Department of Fire and Emergency Services, generated by *Operational Information Systems Branch* 21 April 2017

Bushfire risk increases during the crop harvesting period generally from mid to late October through to late December 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 spread⁴³.

The local agricultural industry has a strong focus on cereal cropping which peaks in late October through to late December with the curing of crops and harvesting. Following this the majority of farmers take their annual leave. Typically the agricultural community take time away from the farm to holiday in a coastal location. The consequence of this is significantly less resources available for observing and reporting bushfires over the vast and sparsely populated landscape and reduced response and suppression capability. Response capability relies on both farm fire appliances and volunteers to resource appliances. This coincides with the peak tourist season in the coastal locations.

The following image shows the scar from a bushfire that occurred to the north east of Hopetoun on the 15 November 2016. The fire was caused by the reignition of a wood pile that had been burnt several months earlier. The forecast fire weather for the day was somewhat unseasonal and out of character from the weather in the weeks preceding. At 1500hrs the Fire Danger Rating was rated - *Extreme*, the temperature was 39 degrees, with a relative humidity of 6% and wind speed of 35km/h gusting up to 60km/h. It was fortunate that fixed wing water bombers had been located in Esperance on a trial basis. The containment of the fire is largely attributed to the involvement of the water bombers. The fire was contained within the agricultural land which was predominantly unharvested cereal crop with patches of remnant vegetation.

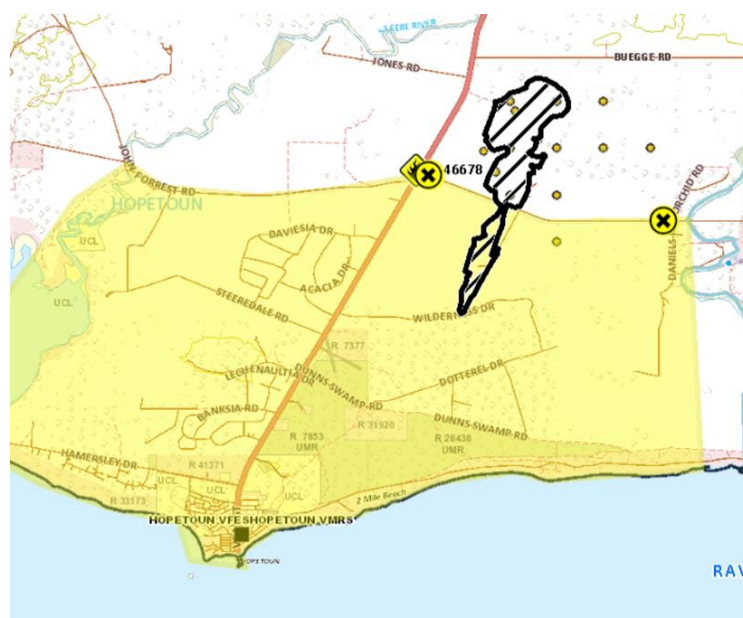


Figure 8 – Fire Scar Hopetoun Fire⁴⁴

The potential threat to the town is demonstrated in the image below which was generated from a *Firewatch Aurora* model using the forecast weather and fuel types. The various shapes show the

⁴³ Department of Fire and Emergency Services (2014), Homeowner Bushfire Survival Manual, pp. 37

⁴⁴ Department of Fire and Emergency Services – Hopetoun Fire Scar, Tuesday 15 November 2016

extent of the predicted fire at 3 hour intervals. If the fire entered the remnant vegetation and wetlands to the Northeast of town site it would be very difficult to have undertaken fire management activities due to access issues. Had this happen the fire would have posed a very serious threat to the town.

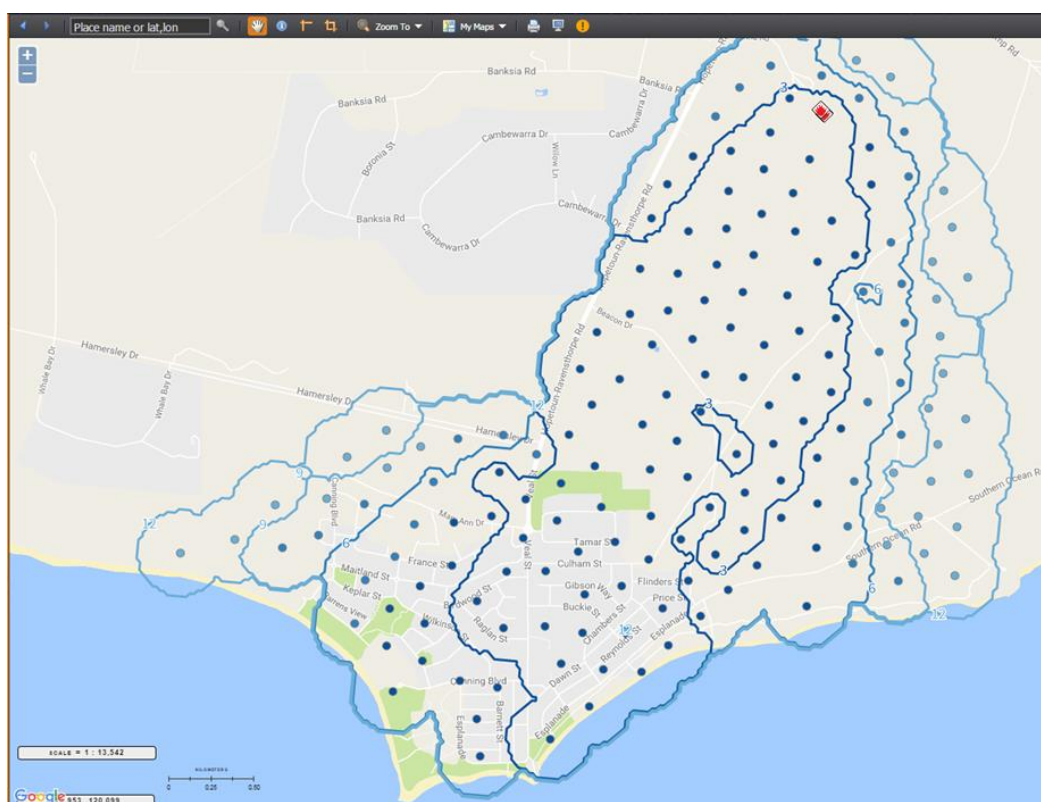


Figure 9 – Firewatch Aurora Model Hopetoun 3 hour interval ⁴⁵

The following anecdotal bushfire data has been provided by the Chief Bushfire Control Officer, Rodney Daw AFSM for the Shire of Ravensthorpe:

Table 2 –Shire of Ravensthorpe Anecdotal Fire History

Year	Bushfire description	Approx. area
1957	R to H into the area over the Barrens – SW lit up east flank and came back to No. 1 Highway 25km east of Ravensthorpe. Several farms burnt out.	
1979	Coujonup (8 days) Cost unknown. Damage to Rabbit Proof Fence and private property adjacent.	150,000ha
1984	Fitzgerald River National Park	150,000ha
1987	Kundip 1 farm lost, 1 farmer didn't return to farming, 70 men.	130,000ha
1989	Fitzgerald River National Park - Fould's Fields, 8 farms. Cost unknown est. above \$1 million	250,000ha
1990	Geordies Woodenup ran for 8 days	20,000ha
1991	Scadding Munglinup	8,000ha
1991	Oldfield	Unknown
1997	Jerdacuttup, \$410,750 2 houses and sheds, 2,000 sheep, damage to fences pasture and stock	8,000ha

⁴⁵ Landgate Firewatch (2017), Department of Fire and Emergency Services generated Model of Hopetoun Fire 15 November 2016

1997	Jerdacuttup Estuary	1,500 – 3,000ha
1996	Fitzgerald River National Park - Hills Short Rd	Unknown
1997	Fitzgerald River National Park - 30km long some damage to WR farms	35-40,000ha
1998	Middle Iron Cap	24,500ha
2000	Ravensthorpe Ranges – came to the town boundary	5,000ha
2003	Lake Tay - largest fire in the Southwest of WA at the time	304,000ha
2001	Lake Shaster	40,000ha
2001	Swallow Rock	9,000ha
2001	Lake Tay	Unknown
2005	12 mile Intense fire that got into the paper swamps	Unknown
2003	Cheadenup Nature Reserve	5,000ha
2006	Cocanarup	35,000ha

4. Asset Identification and Risk Assessment

4.1 Planning Areas

The Shire of Ravensthorpe has been divided into four planning areas, Fitzgerald, Ravensthorpe, Munglinup and Hopetoun. Attached at **Appendix 2** is a map showing the boundaries of the planning areas identified within the Shire of Ravensthorpe.

4.1.1 Priorities for Asset Identification and Assessment

The *Planning Area Assessment Tool* was applied to each planning area to determine the priorities for asset identification and assessment. Using the tool, each planning area was rated against six risk factors, with the highest scoring planning area being the first priority for asset identification and risk assessment.

Assets were identified and assessed in each planning area, based on the results of the planning area assessment outlined in the following table.

Table 3 – Planning Area Assessment Summary

Risk Factor	Hopetoun	Ravensthorpe	Munglinup	Fitzgerald
1. % of LG Population in Planning Area	Approximately 63% 160	Approximately 20% 40	Approximately 9% 20	Approximately 8% 20
2. Fuel Structures	Coastal Heath, Shrublands and Mallee 80	Shrublands, Mallee and woodland 80	Shrublands, Mallee and woodland 80	Shrublands, Mallee and woodland 60
3. Assets	The township of Hopetoun 60	The township of Ravensthorpe 100	The township of Munglinup 100	Fitzgerald 100
4. Rural Urban Interface	A large amount of RUI 80	A limited amount of RUI 40	A very limited amount of RUI 20	Nil 20
5. Suppression response times	Limited 80	Limited 80	Limited 80	Good response to rural fires 40
6. Suppression strategies	Varied 60	Varied 60	Varied 60	Varied 60
TOTAL	520	520	360	300
PRIORITY	1	2	3	4

4.2 Asset Identification

Asset identification and risk assessment has been conducted at the local level using the methodology described in the Guidelines. Identified assets have been mapped, recorded and assessed in the Bushfire Risk Management System (BRMS). Identified assets are categorised into the following subcategories:

Table 4 – Asset Categories and Subcategories

Asset Category	Asset Subcategories
Human Settlement	<ul style="list-style-type: none"> • Residential areas Rural urban interface areas and rural properties. • Places of temporary occupation Commercial, mining and industrial areas located away from towns and population centres (that is, not adjoining residential areas). • Special risk and critical facilities Hospitals, nursing homes, schools and childcare facilities, tourist accommodation and facilities, prison and detention centres, government administration centres and depots, incident control centres, designated evacuation centres, police, fire and emergency services.
Economic	<ul style="list-style-type: none"> • Agricultural Pasture, grazing, livestock, crops, viticulture, horticulture and other farming infrastructure. • Commercial and industrial Major industry, waste treatment plants, mines, mills and processing and manufacturing facilities and cottage industry. • Critical infrastructure Power lines and substations, water and gas pipelines, telecommunications infrastructure, railways, bridges, port facilities and waste water treatments plants. • Tourist and recreational Tourist attractions and recreational sites that generate significant tourism and/or employment within the local area. • Commercial forests and plantations • Drinking water catchments
Environmental	<ul style="list-style-type: none"> • Protected Rare and threatened flora and fauna, ecological communities and wetlands. • Priority Fire sensitive species and ecological communities. • Locally important Nature conservation and research sites, habitats, species and communities, areas of visual amenity.
Cultural	<ul style="list-style-type: none"> • Aboriginal heritage Places of indigenous significance. • Recognised heritage Assets afforded legislative protection through identification by the National Trust, State Heritage List or Local Planning Scheme Heritage List. • Local heritage Assets identified in a Municipal Heritage Inventory or by the community. • Other Other assets of cultural value, for example community centres and recreation facilities.

4.3 Assessment of Bushfire Risk

Risk assessments have been undertaken for each asset or group of assets identified using the methodology described in the Guidelines.

The percentage of assets within the local government in each asset category at the time of BRM Plan endorsement is shown in the following table.

Table 5 – Asset Category Proportion

Asset category	Proportion of identified assets
Human Settlement	84%
Economic	14%
Environmental	1%
Cultural	1%

4.3.1 Likelihood Assessment

Likelihood is described as the chance of a bushfire igniting, spreading and reaching an asset. The approach used to determine the likelihood rating is **the same for each asset category**: Human Settlement, Economic, Environmental and Cultural.

There are four possible likelihood ratings: almost certain, likely, possible, and unlikely.

Table 6 – Likelihood Ratings

Likelihood Rating	Description
Almost Certain (Sure to Happen)	<ul style="list-style-type: none"> Is expected to occur in most circumstances; High level of recorded incidents and/or strong anecdotal evidence; and/or Strong likelihood the event will recur; and/or Great opportunity, reason or means to occur; May occur more than once in 5 years.
Likely (Probable)	<ul style="list-style-type: none"> Regular recorded incidents and strong anecdotal evidence; and /or Considerable opportunity, reason or means to occur; May occur at least once in 5 years.
Possible (feasible but < probable)	<ul style="list-style-type: none"> Should occur at some stage; and/or Few, infrequent, random recorded incidents or little anecdotal evidence; and/or Some opportunity, reason or means to occur.
Unlikely (Improbable, not likely)	<ul style="list-style-type: none"> Would only occur under exceptional circumstances.

4.3.2 Consequence Assessment

Consequence is described as the outcome or impact of a bushfire event. The approach used to determine the consequence rating is **different for each asset category**: Human Settlement, Economic, Environmental and Cultural.

There are four possible consequence ratings: minor, moderate, major and catastrophic.

Table 7 – Consequence Ratings

Consequence Rating	Descriptions
Minor	<ul style="list-style-type: none"> • No fatalities. • Near misses or minor injuries with first aid treatment possibly required. • No persons are displaced. • Little or no personal support (physical, mental, emotional) required. • Inconsequential or no damage to an asset, with little or no specific recovery efforts required beyond the immediate clean-up. • Inconsequential or no disruption to community. • Inconsequential short-term failure of infrastructure or service delivery. (Repairs occur within 1 week, service outages last less than 24 hours.) • Inconsequential or no financial loss. Government sector losses managed within standard financial provisions. Inconsequential business disruptions.
Moderate	<ul style="list-style-type: none"> • Isolated cases of serious injuries, but no fatalities. Some hospitalisation required, managed within normal operating capacity of health services. • Isolated cases of displaced persons who return within 24 hours. • Personal support satisfied through local arrangements. • Localised damage to assets that is rectified by routine arrangements. • Community functioning as normal with some inconvenience. • Isolated cases of short to mid-term failure of infrastructure and disruption to service delivery. (Repairs occur within 1 week to 2 months, service outages last less than 1 week.) • Local economy impacted with additional financial support required to recover. Government sector losses require activation of reserves to cover loss. Disruptions to businesses lead to isolated cases of loss of employment or business failure. • Isolated cases of damage to environmental or cultural assets, one-off recovery efforts required, but with no long term effects to asset.
Major	<ul style="list-style-type: none"> • Isolated cases of fatalities. • Multiple cases of serious injuries. Significant hospitalisation required, leading to health services being overstretched. • Large number of persons displaced (more than 24 hours duration). • Significant resources required for personal support. • Significant damage to assets, with ongoing recovery efforts and external resources required. • Community only partially functioning. Widespread inconvenience, with some services unavailable. • Mid to long-term failure of significant infrastructure and service delivery affecting large parts of the community. Initial external support required. (Repairs occur within 2 to 6 months, service outages last less than a month.) • Local or regional economy impacted for a significant period of time with significant financial assistance required. Significant disruptions across

Consequence Rating	Descriptions
	<p>industry sectors leading to multiple business failures or loss of employment.</p> <ul style="list-style-type: none"> • Significant damage to environmental or cultural assets that require major rehabilitation or recovery efforts. • Localised extinction of native species. This may range from loss of a single population to loss of all of the species within the BRM Plan area (for a species which occupies a greater range than just the BRM Plan area).
Catastrophic	<ul style="list-style-type: none"> • Multiple cases of fatalities. • Extensive number of severe injuries. • Extended and large number requiring hospitalisation, leading to health services being unable to cope. • Extensive displacement of persons for extended duration. • Extensive resources required for personal support. • Extensive damage to assets that will require significant ongoing recovery efforts and extensive external resources. • Community unable to function without significant support. • Long-term failure of significant infrastructure and service delivery affecting all parts of the community. Ongoing external support required. (Repairs will take longer than 6 months, service outages last more than 1 month.) • Regional or State economy impacted for an extended period of time with significant financial assistance required. Significant disruptions across industry sectors leading to widespread business failures or loss of employment. • Permanent damage to environmental or cultural assets. • Extinction of a native species in nature. This category is most relevant to species that are restricted to the BRM Plan area, or also occur in adjoining areas and are likely to be impacted upon by the same fire event. 'In nature' means wild specimens and does not include flora or fauna bred or kept in captivity.

The methodology used to determine the consequence rating for each asset category is based on the following:

- **Consequence Rating - Human Settlement Assets**

The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the threat posed by the hazard vegetation and the vulnerability of the asset.

- **Consequence Rating - Economic Assets**

The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the level of economic impact and the recovery costs.

- **Consequence Rating - Environmental Assets**

The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the vulnerability of the asset and the potential impact of a bushfire or fire regime.

• **Consequence Rating - Cultural Assets**

The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the threat posed by the hazard vegetation and the vulnerability of the asset.

4.3.3 Assessment of Environmental Assets

Using available biological information and fire history data, environmental assets with a known minimum fire threshold were assessed to determine if they were at risk from bushfire, within the five year life of the BRM Plan. Environmental assets that would not be adversely impacted by bushfire within the five year period have not been included and assessed in the BRM Plan. The negative impact of a fire on these assets (within the period of this BRM Plan) was determined to be minimal, and may even be of benefit to the asset and surrounding habitat.

4.3.4 Local Government Asset Risk Summary

A risk profile for the local government is provided in the summary table below. This table shows the proportion of assets at risk from bushfire in each risk category at the time the BRM Plan was endorsed.

Table 8 – Local Government Asset Risk Summary

Risk Rating	Low	Medium	High	Very High	Extreme
Asset Category					
Human Settlement	0	0.5%	37%	19%	27%
Economic	0	0.4%	11%	0.4%	2%
Environmental	0	0	0	1%	0
Cultural	0	0	0.7%	0.6%	0.4%

5. Risk Evaluation

5.1 Evaluating Bushfire risk

The risk rating for each asset has been assessed against the likelihood and consequence descriptions to ensure:

- The rating for each asset reflects the relative seriousness of the bushfire risk to the asset;
- Likelihood and consequence ratings assigned to each asset are appropriate; and
- Local issues have been considered.

5.2 Treatment Priorities

The treatment priority for each asset has been automatically assigned by BRMS, based on the asset’s risk rating. Table 10 shows how likelihood and consequence combine to give the risk rating and subsequent treatment priority for an asset.

Table 9 – Treatment Priorities

Consequence Likelihood	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)

5.3 Risk Acceptability

Risks below a certain level were not considered to require specific treatment during the life of this BRM Plan. They will be managed by routine local government wide controls and monitored for any significant change in risk.

In most circumstances risk acceptability and treatment will be determined by the land owner, in collaboration with local government and fire agencies. However, as a general rule, the following courses of action have been adopted for each risk rating.

Table 10 – Criteria for Acceptance of Risk and Course of Action

Risk Rating	Criteria for Acceptance of Risk	Course of Action
Extreme (Priorities 1A, 1B, 1C)	<i>Only acceptable with excellent controls. Urgent treatment plans to be explored and implemented where possible, managed by the highest level of Authority.</i>	<i>Routine controls are not enough to adequately manage the risk. Immediate attention required as a priority. Specific action is required in first year of BRM Plan with an annual review prior to each bushfire season.</i>
Very High (Priorities 2A, 2B, 2C)	<i>Only acceptable with excellent controls. Treatment action is required. Senior Shire Officers and Council notified.</i>	<i>Routine controls are not enough to adequately manage the risk. Specific action will be required during the period covered by the BRM Plan. Specific action is required in the first year of BRM Plan with biennial monitoring.</i>
High (Priorities 3A, 3B, 3C, 3D)	<i>Only acceptable with adequate controls, managed by senior management/executive.</i>	<i>Specific action may be required. Risk may be managed with routine controls and/or specific procedures and is subject to biennial monitoring.</i>

<p>Medium (Priorities 4A, 4B, 4C)</p>	<p><i>Acceptable with adequate controls. Treatment action is not required but risk must be monitored regularly.</i></p>	<p><i>Specific action may not be required. Risk may be managed with routine controls and is subject to biennial monitoring.</i></p>
<p>Low (Priorities 5A, 5B, 5C)</p>	<p><i>Acceptable with adequate controls. Treatment action is not required but risk must be monitored.</i></p>	<p><i>Need for specific action is unlikely. Risk will be managed with routine controls and monitored as required.</i></p>

6. Risk Treatment

The purpose of risk treatment is to reduce the likelihood of a bushfire occurring and/or the potential impact of a 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.

There are many strategies available to treat bushfire risk. The treatment strategy (or combination of treatment strategies) selected will depend on the level of risk and the type of asset being treated. Not all treatment strategies will be suitable in every circumstance.

6.1 Local Government-Wide 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 and Building Commission policies and standards; and
- 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 LPP No. 13 – Farm Forestry
- Shire of Ravensthorpe LPP No. 9 – Fire Management Plans

A multi-agency work plan has been developed and is attached at **Appendix 3**. 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.

6.2 Asset-Specific Treatment Strategies

Asset-specific treatments are implemented to protect an individual asset or group of assets, identified and assessed in the BRM Plan as being at risk from bushfire. There are six asset specific treatment strategies:

- **Fuel management** - Treatment reduces or modifies the bushfire fuel through manual, chemical and prescribed burning methods;
- **Ignition management** - Treatment aims to reduce potential human and infrastructure sources of ignition in the landscape;

- **Preparedness** - Treatments aim to improve access and water supply arrangements to assist firefighting operations;
- **Planning** - Treatments focus on developing plans to improve the ability of firefighters and the community to respond to bushfire; and
- **Community Engagement** - Treatments 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.

6.3 Determining the Treatment Schedule

Efforts will be made to finalise the Treatment Schedule within six months of this BRM Plan being endorsed by council. The Treatment Schedule will be developed in broad consultation with land owners and other stakeholders.

Land owners are ultimately responsible for treatments implemented on their own 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 owner. However, the onus is still on the land owner to ensure treatments detailed in this BRM Plan are completed.

6.4 Privacy Issues and Release of Information

Information captured through the Bushfire Risk Management System (BRMS) includes data considered 'personal' in nature including the names and addresses of landholders. There is therefore the potential for the data collected through the BRMS to be used for purposes other than bushfire risk mitigation (i.e. Insurance companies using this information to set insurance premiums). It has been determined, in consultation with the Shire of Ravensthorpe that BRMS reports produced for the public domain are not to include information considered personal in nature. The land 'owner' data field, which reflects the category of landowner only, is the preferred field to be used when reports are required for the public domain. The Chief Executive Officer or the Manager Corporate & Community Services are to be consulted prior to any Bushfire Risk Management data being released to the public domain.

The Shire of Ravensthorpe, as a matter of course, will provide reports to stakeholders that detail the assets and treatments that the stakeholders (landowners) have responsibility for in order to actively encourage and support the implementation, monitoring and review of agreed actions.

7. Monitoring and Review

Monitoring and review processes are in place to ensure that the BRM Plan remains current and valid. These processes are detailed below to ensure outcomes are achieved in accordance with the *Communication Strategy* and *Treatment Schedule*.

7.1 Review

A comprehensive review of this BRM Plan will be undertaken at least once every five years, from the date of council endorsement. Significant circumstances that may warrant an earlier review of the BRM Plan include:

- Changes to the BRM Plan area, organisational responsibilities or legislation;
- Changes to the bushfire risk profile of the area; or
- Following a major fire event.

7.2 Monitoring

BRMS will be used to monitor the risk ratings for each asset identified in the BRM Plan and record the treatments implemented. Risk ratings are reviewed on a regular basis. New assets will be added to the *Asset Risk Register* when they are identified.

7.3 Reporting

The Shire of Ravensthorpe will submit an annual report to OBRM each year summarising progress made towards implementation of the BRM Plan. New assets will be added to the *Asset Risk Register* when they are identified.

The Shire of Ravensthorpe has determined that:

- Assets rated 'Extreme' will be re-evaluated annually, prior to the bushfire season
- Assets rated 'Very High' will be re-evaluated every second year (as a minimum)

The review process will be managed by the Bushfire Risk Planning Coordinator (BRPC) however if the BRPC project role ceases, the CEO will delegate responsibility.

8. Glossary

Asset	A term used to describe anything 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 used to record the details of assets identified in the Bushfire Risk Management Plan.
Asset Risk Register	A report produced within the Bushfire Risk Management System that details the consequence, likelihood, risk rating and treatment priority for each asset identified in the Bushfire Risk Management Plan.
Bushfire	Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective. ⁴⁶
Bushfire Management Plan	A document that sets out short, medium and long term bushfire risk management strategies for the life of a development. ⁴⁷
Bushfire risk management	A systematic process to coordinate, direct and control activities relating to bushfire risk with the aim of limiting the adverse effects of bushfire on the community.
Bushfire Threat	The threat posed by the hazard vegetation, based on the vegetation category, slope and separation distance.
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 local government council for endorsement.
Emergency Risk Management Plan	A document (developed under <i>State Emergency Management Policy 2.9</i>) that describes how an organisation(s) intends to undertake the activities of

⁴⁶ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne.

⁴⁷ Western Australian Planning Commission 2015, *State Planning Policy 3.7: Planning in Bushfire Prone Areas*, WAPC, Perth.

emergency risk management based on minimising risk. These plans help inform the ongoing development of Local Emergency Management Arrangements (LEMA) and Westplans.

Geographic Information System (GIS)	A data base technology, linking any aspect of land-related information to its precise geographic location. ⁴⁸
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).
Planning Area	A geographic area determine 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 responsible for planning, coordinating, implementing, evaluating and reporting on a risk treatment.
Risk acceptance	The informed decision to accept a risk, 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 in order to determine whether a risk is acceptable or tolerable.

⁴⁸ Landgate 2015, *Glossary of terms*, Landgate, Perth

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 farm land and native vegetation or cultivated crops. ⁴⁹
Rural Urban Interface (RUI)	The line or area where structures and other human development adjoin or overlap with undeveloped bushland. ⁵⁰
Slope	The angle of the ground's surface measured from the horizontal.
Tenure Blind	An approach where multiple land parcels are consider 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, 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 that details

⁴⁹ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne

⁵⁰ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne

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.

9. Common Abbreviations

APZ	Asset Protection Zone
BRMP	Bushfire Risk Management Planning
BRMS	Bushfire Risk Management System
CALD	Culturally and Linguistically Diverse
DEMC	District Emergency Management Committee
DFES	Department of Fire and Emergency Services
ERMP	Emergency Risk Management Plan
FFDI	Forest Fire Danger Index
FMP	Fire Management Plan
GFDI	Grassland Fire Danger Index
GIS	Geographic Information System
HSZ	Hazard Separation Zone
JAFFA	Juvenile and Family Fire Awareness
LEMA	Local Emergency Management Arrangements
LEMC	Local Emergency Management Committee
LG	Local Government
LMZ	Land Management Zone
OBRM	Office of Bushfire Risk Management
P&W	Parks and Wildlife (Department of)
SEMC	State Emergency Management Committee
SLIP	Shared Land Information Platform
WAPC	Western Australian Planning Commission

Appendices

- 1 Communication Strategy**
- 2 Planning Area Map**
- 3 Local Government-Wide Controls, Multi-Agency Treatment Work Plan**
- 4 Map of Kwongan Threatened Ecological Community**



Shire of Ravensthorpe

Bushfire Risk Management Planning Communication Strategy

Document Control

Document Name	Bushfire Risk Management Plan Communications Strategy	Current Version	1.0
Document Owner	Shire of Ravensthorpe CEO	Issue Date	
Document Location	Synergy Central Records – Bushfire Risk Management Planning	Next Review Date	

Related Documents

Title	Version	Date
<i>Shire of Ravensthorpe</i> Bushfire Risk Management Plan	1.0	

Amendment List

1 INTRODUCTION

A Bushfire Risk Management Plan (BRM Plan) is a strategic document that outlines the approach to the identification, assessment and treatment of assets exposed to bushfire risk within the Shire of Ravensthorpe. This Communication Strategy accompanies the BRM Plan for the Shire of Ravensthorpe. It documents the communication objectives for the BRM Plan, roles and responsibilities for communication, key stakeholders, target audiences and key messages at each project stage, communication risks and strategies for their management, and communication monitoring and evaluation procedures.

2 COMMUNICATIONS OVERVIEW

Communication Objectives

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 own land.
6. Strengthen *Shire of Ravensthorpe Strategic Community Plan* Objectives: 1.3 Community Engagement & 3.6 Conservation and protection of natural resources.

Communication Roles and Responsibilities

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

- CEO, Shire of Ravensthorpe responsible for endorsement of the BRM Plan Communications Strategy.
- CEO, Manager Corporate & Community Services and Community Emergency Services Manager, Shire of Ravensthorpe, are responsible for external communication with the local government area.

- Bushfire Risk Management Planning Coordinator, Shire of Ravensthorpe responsible for operational-level communication between the Shire and the Department of Fire and Emergency Services.

Key Stakeholders for Communication

The following table identifies key stakeholders in bushfire risk management planning. 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
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 interest & 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 interest & 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 Plan

Timing of Communication	Stakeholder (s)	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 meetings. 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 meetings	Understanding BRMP process, supports for project, inc. identified assets, treatments esp. priority.	BRPC, BRMO	Attendance of members at the scheduled meeting, Time constraints, lack of buy-in	Set clear objectives, prepare succinct clear presentations,	Feedback, sign off on strategic milestones.
Strategic	DEMC	1 & 2	One of	Understanding	BRMO	Attendance of	Schedule follow-	Feedback,

milestone i.e. last quarter 2016			presentation, as need arising issues. Follow-up individual stakeholders as required	BRMP process, strategic support within respective agencies		members at the scheduled meeting i.e. absence of key stakeholders Time constraints	up with key agencies Set clear objectives, prepare succinct clear presentations, provide opportunities for follow-up	questions, response to follow-up meetings
Life of the plan	DFES, Regional Superintendent, DO, AO, CESM	All (1-6)	Inform, consult and collaborate, Quarterly meetings with Superintendent, emails & telephone calls, Representation at bushfire stakeholder workshops	Understanding BRMP process, engagement in process i.e. identify assets, risk assessment & treatment. Accept responsibilities.	BRMO	Staff turn-over, Travel distances, Limited buy-in to project, Treatments not negotiated.	Adapt communication to staffing, document communication outcomes, foster ownership/ empowerment in process.	Timely constructive feedback, support for/level of participation in process, negotiated 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 ie. CBFCO or	Understanding BRMP process, engagement in 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'

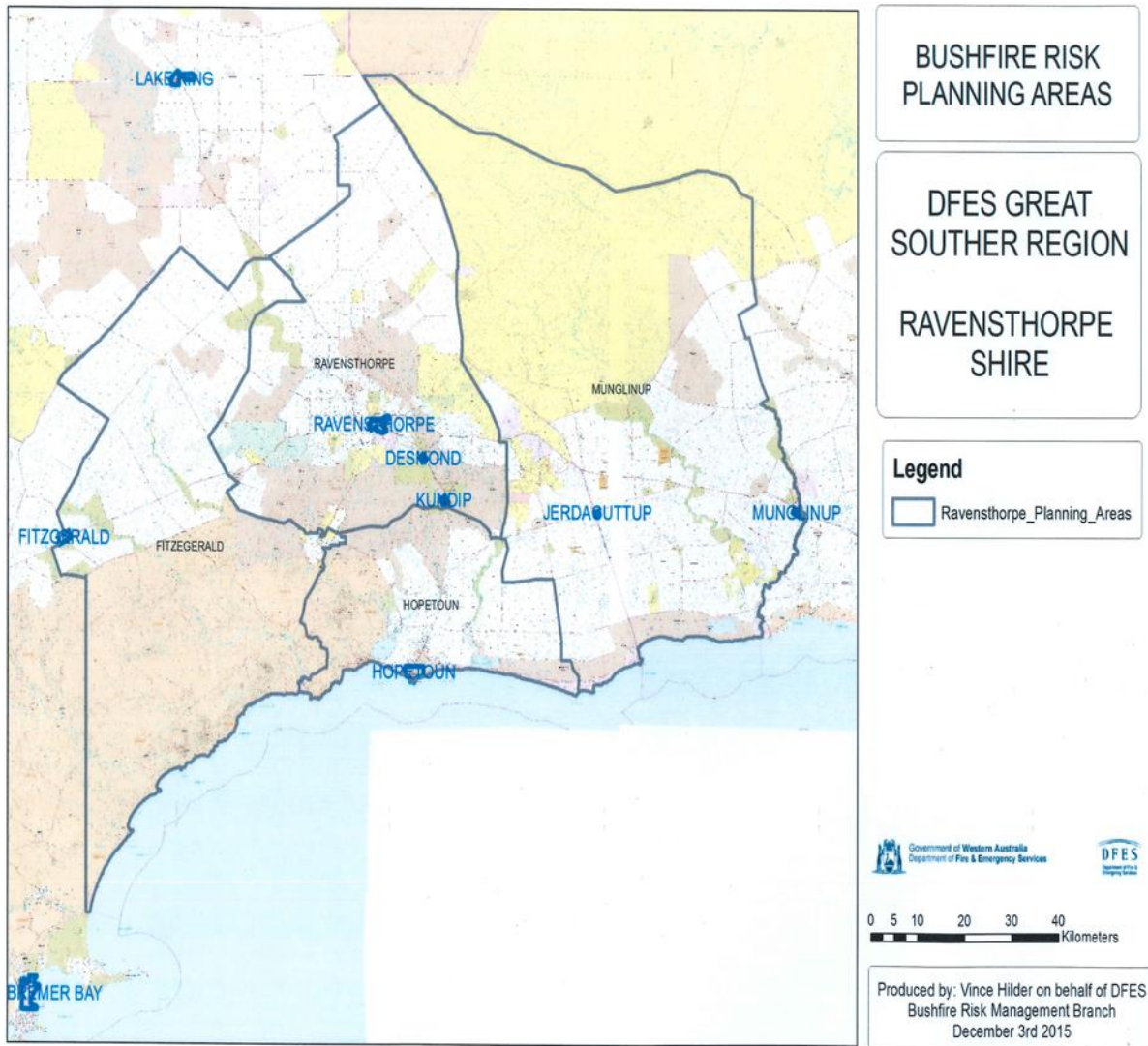
			OIC/Captain				incorporated	
Life of the plan	Department of Parks and Wildlife	All (1-6)	Inform, consult and collaborate, Regular emails, telephone calls, meetings, Representation at bushfire stakeholder workshops	Understanding BRMP process, engagement in process i.e. existing controls identify assets, risk assessment & negotiate treatments.	BRPC & BRMO & AO/DO Superintendent as required	Time constraints Limited buy-in to project, Treatments not negotiated.	Establish strategic buy-in, agree to appropriate line communication	Timely constructive feedback, support for/level of participation in process, negotiated treatments.
At strategic milestones	Govt/Critical infrastructure Service Providers	All (1-6)	Inform, consult and collaborate, Regular emails, telephone calls, meetings, to identify assets, assess risk negotiate treatments	Understanding BRMP process, engagement in process i.e. existing controls identify assets, risk assessment & negotiate treatments..	BRPC & BRMO	Time constraints Limited buy-in to project, Treatments not negotiated.	Establish strategic buy-in, agree to appropriate line communication	Timely constructive feedback, support for/level of participation in process, negotiated treatments.
At strategic project milestones during development i.e. 01/02/2016 – 30/06/17	Business/Industry	As relevant (1-6)	Inform, consult, and collaborate, Regular emails, telephone calls, meetings, to identify assets, assess risk negotiate treatments	Understanding BRMP process, engagement in process i.e. existing controls identify assets, risk assessment & negotiate treatments.	BRPC & BRMO	Time constraints Limited buy-in to project, Treatments not negotiated.	Establish strategic buy-in, agree to appropriate line communication	Timely constructive feedback, support for/level of participation in process, negotiated treatments.
At strategic project milestones	Community Interest Groups	1,3, 2 & 6	Inform, consult, and collaborate, Regular emails,	Understanding BRMP process, engagement in	BRPC & LG Exec as required BRMO & DO/AO	Time constraints Limited buy-in to project,	Establish strategic buy-in, agree to	Timely constructive feedback,

during development i.e. 01/02/2016 – 30/06/17			telephone calls, meetings, to identify assets, assess risk negotiate treatments	process i.e. expert knowledge, community values	as required	Treatments not negotiated.	appropriate line communication	support for/level of participation in process, negotiated treatments.
At strategic project milestones during development i.e. 01/02/2016 – 30/06/17	Community/Residents at risk	1,2 & 6	Inform, consult, empower. Letters, social media internet updates, presentations.	Understanding BRMP process, understand adjacent risk and acceptability of treatments, responsibility for own risks.	BRPC & BRMO	Time constraints Limited buy-in to project	Appropriate communication methods, opportunities for two-way communication, feedback.	Constructive feedback, support for/level of participation in 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 Mtg	Report on progress, monitor & review against milestones/funding, bushfires, annual works plans of respective stakeholders	BRPC & BRMO , Planner, Manager Corporate Services	LG capacity in absence of BRMO & BRPC	Forward planning, achievable timeframes, strategic consultation	Feedback, 'buy-in', outcomes met, response times.
Life of Plan	Essential Service Providers Working	All (1-6)	Email updates Annual Mtg	Report on progress, monitor & review	BRPC & BRMO , Planner,	LG capacity in absence of	Forward planning,	Feedback, 'buy-in',

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

							timeframes, strategic consultation	feedback from Council
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APPENDIX 2 – Planning Areas



APPENDIX 3 – Local Government-Wide Controls, Multi-Agency Treatment 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 including in BRMP Treatment Schedule
	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 <i>Bushfires Act 1954 S(33)</i>	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 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 to seasonal changes. Any changes to be published in local newspaper and Shire's website.
<i>Bush Fires Act 1954 S(38)</i>	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, 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. <i>4.7.6 Fire Prevention and Suppression</i> of the Code outlines Fire Prevention and Suppression Guidelines ⁵¹ .
State Planning Policy 3.7 – Planning in	11	Shire declared <i>Bushfire Prone</i> . - Conducting hazard mapping throughout the Shire in order to	LG	WAPC DFES	Yes	All	Ongoing	

⁵¹ Code of Practice for Timber Plantations in Western Australia, Forest Industries Federation (WA) 2nd Edition 2014

<i>Bushfire Prone Areas</i>		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;						
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CRITICAL INFRASTRUCTURE								
Control	ID	Action/Activity Description	Lead Agency	Partners	Application		Status	Implementation Notes
WaterCorp Bushfire Mitigation Program	12	2 sites in Ravensthorpe 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	5 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 on	14	Watercorp has an agreement with P&W for undertaking mitigation and land management activities on	Watercorp P&W		Yes		Ongoing	

Water Reserves		their estate.						
MRWA State-wide bridge prioritisation	15	MRWA undertook and state-wide risk prioritisation project to identify key bridge assets at risk.	MRWA		No			Three bridges identified as 'High' risk: West River, Jerdacuttup River, Munglinup River on Sth 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 <i>Perth Hills Bushfire Inquiry 2011</i> .
MRWA Great Southern Region – Annual Bridge assessment & maintenance works plan	17	Annual field assessment of individual bridges undertaken at 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 Note: 2016-17 due to the delayed winter & extended growing season, HP had to complete an additional round of Pole Base Clearing. There are also instructions FI 2.4 & FI 6.19
Horizon Power - vegetation management, annual vegetation inspection &	18	Annual field assessment for vegetation management and pole base clearance.	Horizon Power	Contract or: 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

corrective cut/action.								(FI 8.5) for chosen HV poles. Both of these are completed on a minimum 12 month cycle Note: 2016-17 due to the delayed winter & extended growing season, HP had to complete an additional round of Pole Base Clearing. 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. 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 <i>Emergency and Critical Incident Management Plan</i> . A checklist to help you to 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.

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 National Park (1999-2001)	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 facilitate 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 that is currently still relatively free of <i>Phytophthora cinnamomi</i> infestations. <i>Phytophthora cinnamomi</i> 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 .

⁵² Fitzgerald River National Park Coastal Walk Trails; Dieback Plan, Department of Parks and Wildlife 2013

Indicative Annual Prescribed Burn Program - 2016/17 South Coast Region, Albany District	24	P&W prepare 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 DoL 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 DoL.	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 DoL and managed by P&W through MoU	26	Risk management activities such as fuel reduction are undertaken by DFES on UMR and UCL . Funding is provided by DoL.	P&W	Brigades			Annual	

APPENDIX 4 – Map of Kwongkan Shrublands

