Shire of Kojonup

BUSHFIRE RISK MANAGEMENT PLAN

2023-2028

Contents

Document Control

Document name	SoK_BRMP	**Current version**	1.2
Document owner	CEO Shire of Kojonup		
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Document Endorsements

The Shire of Kojonup Council endorses that the Bushfire Risk Management Plan (BRM Plan) has been reviewed and assessed by the Office of Bushfire Risk Management as consistent with the standard for bushfire risk management planning in Western Australia, the Guidelines for Preparing a Bushfire Risk Management Plan. The Shire of Kojonup 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 approval of the BRM Plan by Shire of Kojonup Council satisfies their endorsement obligations under State Hazard Plan Fire.

Local Government	Representative	Signature	Date
Shire of Kojonup Council	Ned Radford		

Version	Date	Author	Section
1.0	01/11/2022	E Peet	Entire
1.1	11/04/2023	E Peet	Entire (after initial review)
1.2	26/07/2023	E Peet	Entire (after LG, DFES, review)

Publication Information

1. Introduction

1.1. Background

Under the State Hazard Plan Fire an integrated Bushfire Risk Management (BRM) Plan is to be developed for local government areas with significant bushfire risk. This BRM Plan has been prepared for the Shire of Kojonup in accordance with the requirements of the Guidelines for Preparing a Bushfire Risk Management Plan (the Guidelines) from the Office of Bushfire Risk Management (OBRM) within the Department of Fire and Emergency Services (DFES). The risk management processes used to develop this BRM Plan are aligned to the key principles of AS/NZ ISO 31000:2009 Risk management – Principles and Guidelines and those described in the National Emergency Risk Assessment Guidelines. This approach is consistent with State Emergency Management (SEM) Policy and SEM Prevention and Mitigation Procedure 1.

This BRM Plan is a strategic document that facilitates a coordinated approach towards the identification, assessment and treatment of assets exposed to bushfire risk. 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 and Treatment Schedule to ensure treatment strategies are collaborative and efficient, regardless of land tenure.

1.2. Aim and Objectives

The aim of a BRM Plan is to effectively manage bushfire risk in order to protect people, assets and other things of local value in Shire of Kojonup. The objectives of this BRM Plan are to:

- guide and coordinate a tenure blind, multi-agency BRM 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 BRM activities;
- integrate BRM into the business processes of local government, land owners and other agencies;
- ensure there is integration between land owners, BRM programs and activities; and
- document processes used to monitor and review the implementation of treatment plans to ensure they are adaptable, and that 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 and Policy

- Aboriginal Cultural Heritage Act 2021
- Aboriginal Cultural Heritage Regulations 2021
- Aboriginal Cultural Heritage Act 2021 Statutory Guidelines
- Aboriginal Heritage Act 1972
- Aboriginal Heritage Regulations 1974
- Biodiversity Conservation Act 2016
- Biodiversity Conservation (Exemptions) Order 2018
- Biodiversity Conservation Regulations 2018
- Building Act 2011
- Bush Fires Act 1954
- Bush Fires Regulations 1954
- Conservation and Land Management Act 1984
- Conservation and Land Management Regulations 2002
- Country Areas Water Supply Act 1947
- Emergency Management Act 2005
- Emergency Management Regulations 2006
- Environmental Protection Act 1986
- Environmental Protection and Biodiversity Conservation Act 1999 (Cth)
- Environmental Protection (Clearing of Native Vegetation) Regulations 2004
- Fire Brigades Act 1942
- Fire and Emergency Service Act 1998
- Fire and Emergency Service Regulations 1998
- Metropolitan Water Supply, Sewerage and Drainage Act 1909
- Planning and Development (Local Planning Scheme) Regulations 2015
- SEM Plan (State Emergency Management Committee (SEMC) 2012)
- SEM Policy (SEMC 2022)
- SEM Procedure (SEMC 2022)
- State Hazard Plan Fire (SEMC 2022)
- State Planning Policy 3.4: Natural Hazards and Disasters (Western Australian Planning Commission (WAPC) 2006)
- State Planning Policy 3.7: Planning in Bushfire Prone Areas (WAPC 2021, as amended)

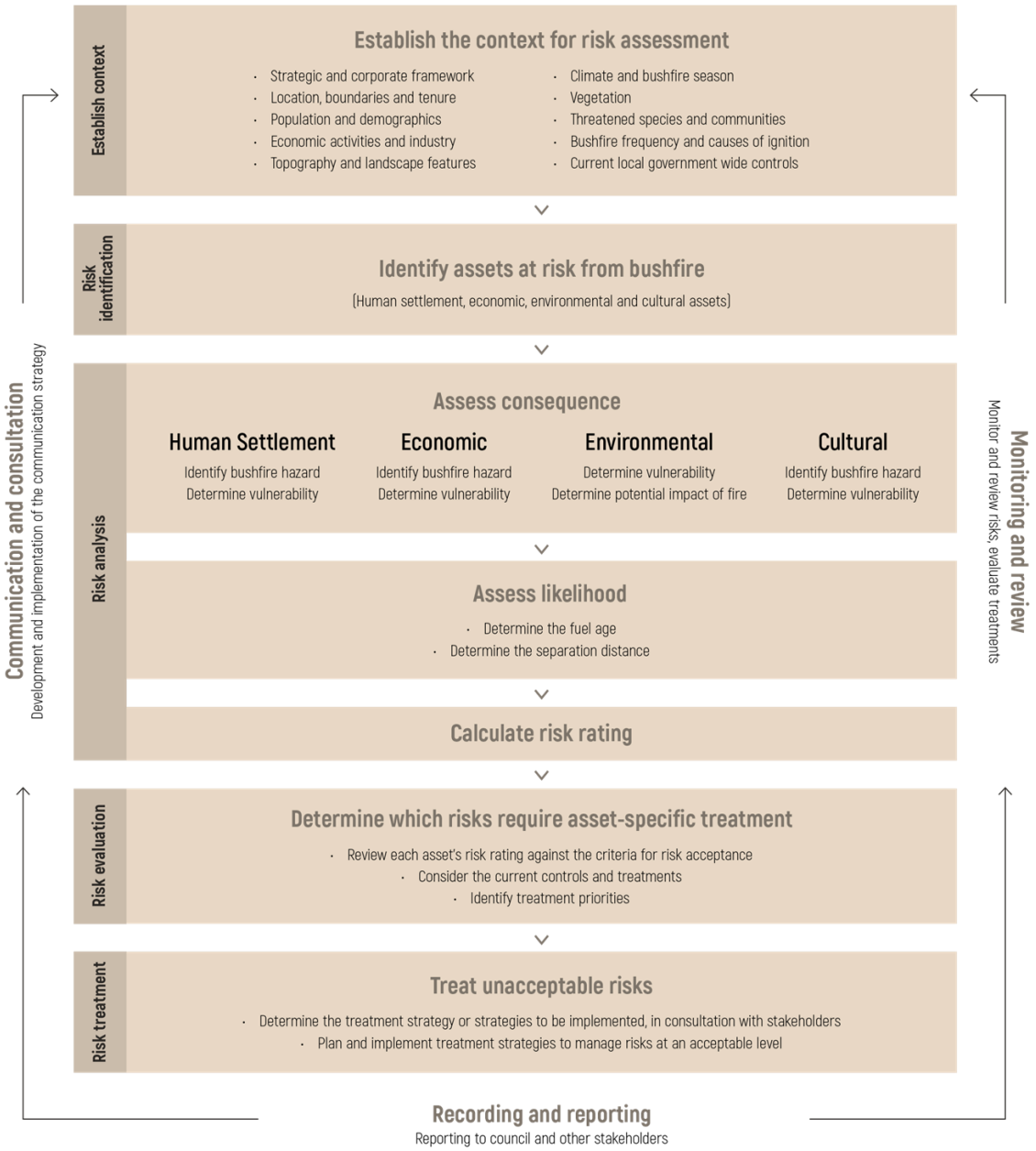
1.3.2 Other Related Documents

- A Capability Roadmap: Enhancing Emergency Management in Australia 2016 (Australasian Fire and Emergency Services Authorities Council 2016)
- A Guide to Constructing and Maintaining Fire-Breaks (DFES 2018)
- AS 3959:2018 Construction of Buildings in Bushfire–Prone Areas (Standards Australia 2018)
- AS/NZ ISO 31000:2009 Risk Management – Principles and Guidelines (Standards Australia 2009)
- Australian Disaster Resilience Handbook 10: National Emergency Risk Assessment Guidelines (Australian Institute for Disaster Resilience 2015)
- A Survey of Roadside Conservation Values in The Shire of Kojonup and Roadside Management Guidelines (Roadside Conservation Committee 2003)
- Bushfire Risk Management Planning Handbook (DFES 2018)
- BFM Strategy information for Shire of Kojonup (Western Power 2023)
- Business Continuity & Disaster Recovery Plan (Shire of Kojonup 2021)
- Code of Practice for Timber Plantations in Western Australia (Forest Products Commission (FPC) 2014)
- Emergency Response Procedures Sub-Plan - Code Yellow – Bushfire, Kojonup Health Service WACHS Great Southern (WACHS Great Southern 2022)
- Fire Management Planning for Urban Bushland (FESA 2000)
- Fire Management Plan for Kojonup Reserve Australian Bush Heritage Fund (Bushfire and Environmental Services 2001)
- Field Guide Fuel Assessment and Fire Behaviour Prediction in Dry Eucalypt Forest (Bushfire CRC 2007)
- Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)
- Guidelines for Preparing a Bushfire Risk Management Plan 2020 (DFES 2020)
- Guidelines for Plantation Fire Protection (DFES 2011)
- Kojonup Reserve Property Plan (Bush Heritage Australia 2011)
- National Disaster Risk Reduction Framework (Department of Home Affairs 2018)
- National Strategy for Disaster Resilience (Attorney-General's Department 2011)
- Natural Resource Management in Western Australia The Salinity Strategy (The Salinity Council 2000)
- Native Vegetation Handbook for the Shire of Kojonup (DPIRD 1994)
- Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Department of Health 2007)
- Powder Keg: Australia Primed to Burn (Climate Council 2023)
- Shire of Kojonup Town Planning Scheme No.3 (Dept. of Planning 2021)
- Western Australian Emergency Risk Management Guide (SEMC 2015)
- Wheatbelt Region parks and reserves management plan 95 (DBCA 2021)

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/NZ ISO 31000:2009 Risk Management – Principles and Guidelines*. This process is outlined in Figure 1.

Figure 1 – An overview of the risk management process[1]



Adapted from: AS 3959:2009, with permission from SAI Global under licence number 1510-c081.

2.1. Roles and Responsibilities

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

Table 1 – Roles and Responsibilities

Stakeholder Name	Roles and Responsibilities
Local Government	• Custodian of the Bushfire Risk Management Plan (BRM Plan) • Coordinate the development and ongoing review of the integrated BRM Plan. • Negotiate a commitment from land owners to treat risks identified in the BRM Plan. • Undertake treatments on lands owned or managed by them. • Submit the draft BRM Plan to DFES's Office of Bushfire Risk Management (OBRM) for review and endorsement. • Submission of the OBRM endorsed BRM Plan to council for their approval and adoption.
Department of Fire and Emergency Services	• Participate in and contribute to the development and implementation of BRM Plans. • Support to local government through expert knowledge and advice in relation to the identification, prevention and treatment of bushfire risk. • Facilitate local government engagement with state and federal government agencies in the local planning process. • Undertake treatments on Unmanaged Reserves and Unallocated Crown Land within gazetted town site boundaries. • In accordance with Memorandums of Understanding and other agreements, implement treatment strategies for other land owners. • Review BRM Plans for consistency with the Guidelines prior to final approval by council. • Administer and coordinate the Mitigation Activity Fund Grants Program.
Department of Biodiversity,	• Participate in and contribute to the development and implementation of BRM Plans.

Stakeholder Name	Roles and Responsibilities
Conservation and Attractions	• Provide advice for the identification of environmental assets that are vulnerable to fire and planning appropriate treatment strategies for their protection. • Undertake treatments on department managed land, and Unmanaged Reserves and Unallocated Crown Land outside gazetted town site boundaries and land in which they have an agreement for.
Forest Products Commission	• Participate in and contribute to the development and implementation of BRM Plans. • Provide information about their assets and current risk treatment programs. • Undertake treatments on lands owned or managed by them.
Department of Planning, Lands and Heritage	• Provide advice for the identification of their assets and infrastructure, specifically Aboriginal and European heritage.
Other State and Federal Government Agencies and Public Utilities	• Provide information about their assets and current risk treatment programs. • Participate in and contribute to the development and implementation of BRM Plans. • Undertake treatments on lands they manage.
Corporations and Private Land Owners	• Provide information about their assets and current risk treatment programs.

2.2. Communication and Consultation

Communication and consultation throughout the risk management process is fundamental to the development, implementation and review of the BRM Plan. To ensure appropriate and effective communication occurred with relevant stakeholders at each stage of the BRM planning process, a *Communication Strategy* was prepared (Appendix A).

3. The Bushfire Risk Management Plan (BRMP)

As a crucial document, the BRMP provides regional and local data obtained during the assessment phase which has been used to determine the risk evaluation and treatments necessary to reduce the bushfire risk. In the development of this plan an emphasis has been placed on the message of 'Shared Responsibility'.

> *Shared responsibility refers to the idea that multiple parties or individuals have a role to play in addressing the bushfire risk. In this approach, each party takes on a portion of the responsibility to address this issue, rather than relying on a single entity or individual.*

In the context of bushfire risk management, shared responsibility involves state and local government agencies, private corporations/businesses, local community groups, residents and rate payers as a collective. Together, the collective work towards Identifying the bushfire hazards, participating in reducing the risk and preparing for emergencies.

The principle of shared responsibility recognises that many challenges are too complex or too significant to be addressed by one entity alone, and that collective effort is needed to achieve sustainable and effective solutions. By working together and sharing responsibility, stakeholders can bring their unique perspectives, resources, and expertise to bear, increasing the chances of success and improving outcomes.

4. Establishing the Context

The context of bushfire in the landscape refers to the various physical, ecological, and social factors that influence the likelihood and impact of bushfires. Understanding the context of bushfire in Shire of Kojonup is an integral component to the foundation of this BRMP. In the sections below a detailed insight of the 'Shire' and its corresponding framework, community, landscape, environment, industry, climate, history, current bushfire strategies and key stakeholders' contribution to mitigation activities.

Section 8 – 'recommendations' provides advice on areas of concern that has been acknowledged within section 4. These areas of concern may not be addressed within BRMS, but would still be seen as a crucial bushfire risk mitigation opportunities.

4.1. Local Government and Community Context

4.1.1 Strategic and Corporate Framework

While the Shire of Kojonup's strategic and corporate framework is an important aspect of its overall planning and governance, consideration towards bushfire risk management and mitigation currently hasn't been covered through the shires framework. Although this doesn't visually show the shire's past and future commitment, behind the scenes, the shire and its dedicated volunteers have always understood the risk of bushfires in the area. Taking any opportunity to help Kojonup's community become resilient towards bushfires.

Shire of Kojonup BRMP Implementation:

This BRMP will provide the Shire, Stakeholders and community with a clear understanding of the bushfire risk within its boundaries, with the aim to enhance community awareness, education and planned treatment activities in their vicinity, thereby aiding in the identification of treatment priorities and facilitating future planning and budgeting. While the focus of bushfire risk management has traditionally been on response and recovery efforts, there has been a shift towards a risk management approach that encompasses prevention and preparedness activities as well. This plan will continue to be reviewed and updated to maintain relevant towards the evolving bushfire risks.

This plan is endorsed by both DFES (OBRM) and the council at Shire of Kojonup, the continuation, implementation, review and amendment of this plan will ultimately come down to the Shire of Kojonup's Chief Executive Officer (CEO) and Regulatory Services. Keeping the data relevant and up to date will be crucial for the shire to maintain a transparent understanding of the ongoing efforts to manage the shire's responsibility towards the bushfire risk.

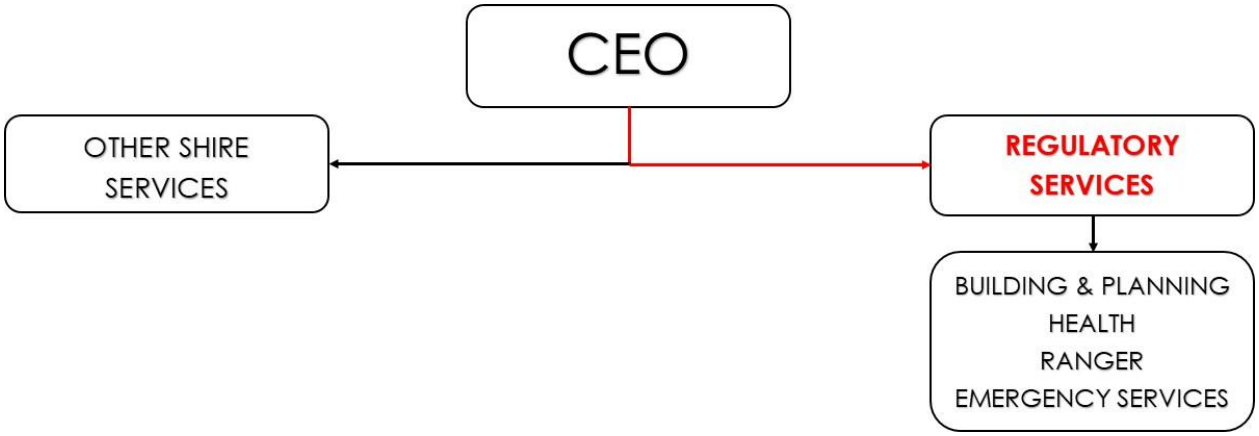


Figure 2 – Shire of Kojonup Hierarchy related to BRMP implementation

4.1.2 Other Supportive Framework

State Government Legislation

- *State Planning Policy 3.7*

  State Planning Policy 3.7 (SPP 3.7) is a policy framework established by the Western Australian State Government to manage bushfire risks in the state. It sets out rules and guidelines for building in areas prone to bushfires, with the aim of minimising risks to people, property, and the environment.

  Under SPP 3.7, local governments are responsible for identifying new buildings and developments in bushfire-prone areas through third-party assessments that specify planning and construction standards to reduce the risk of damage or destruction from bushfires. The policy outlines specific requirements for various stages planning proposals, vulnerable or high-risk land uses and unavoidable development.

  To achieve its goal of ensuring safe and sustainable development in bushfire-prone areas, SPP 3.7 provides a framework for decision-makers that requires compliance with specific standards and guidelines, including the Australian Standard AS 3959:2018 Construction of buildings in bushfire-prone areas and Guidelines for Planning in Bushfire Prone Area.

  SPP 3.7 is an essential tool for local governments, practitioners, planners, developers, and the community to ensure that development in bushfire-prone areas is carried out in a responsible and sustainable way. By adhering to its guidelines, the policy aims to minimize the impact of bushfires on people, property, and the environment.

- *Guidelines for planning in Bushfire Prone Areas*

  The Guidelines for Planning in Bushfire Prone Areas is an essential document developed by the Western Australian Department of Planning, Lands and Heritage. It offers comprehensive guidance to local governments, practitioners, planners, and developers on planning for regional, district, local subdivision and development in bushfire-prone areas. The document covers various aspects of decision-making, such as land-use planning, tourism, commercial and residential development.

  The guidelines advocate a risk-based approach and offer guidance on different requirements throughout the planning stages of subdivision or development and incorporating the results into planning and development decisions. It also sets out various considerations for building and development in bushfire prone areas, such as location, sitting and design, access and egress, and access to water.

Overall, the Guidelines for Planning in Bushfire Prone Areas is an indispensable tool for promoting responsible and sustainable development in bushfire-prone areas while safeguarding communities' safety and preserving the environment.

Current Shire of Kojonup Framework

To date the shire has had limited available resources to undertake research, develop policies, procedures, guidelines or other types of bushfire mitigation/management documents. Reliance has been placed on the local volunteers to provide advice and guidance on any arising matters.

A Business Continuity & Disaster Recovery Plan has been developed and helps provide a baseline of assets for the Shire of Kojonup to keep functioning during an unexpected disaster.

Business Continuity & Disaster Recovery Plan

Business Continuity and Disaster Recovery Plan (BCDRP) documents and organises procedures and protocols that the shire follows to ensure it can continue its critical operations during and after a disruptive event or disaster. The goal of the plan is to minimise the impact of a disaster or other event on the organisation's operations, customers, employees, and other stakeholders.

The incident response and business impact analysis outlines the processes and procedures to ensure critical operations continue during and after a disaster or other significant event. It includes the identification of critical business functions, the development of procedures to ensure continuity of those functions, and the designation of personnel responsible for executing the plan.

The plan also outlines the processes and procedures the shire will follow to restore IT infrastructure and applications after a disaster or other significant event. This includes the identification of critical IT systems and applications, the development of backup and recovery procedures, and the designation of personnel responsible for executing the plan.

Although it does not directly involve this BRMP, this plan helps identify the key locations or assets that would require protection for the ability to perform these tasks. Underlining the starting point for asset entry into BRMS.

Future Shire of Kojonup Framework

A holistic approach is being taken by the Shire with regards to future bushfire management planning, taking all factors into consideration when developing policies and strategies. This approach acknowledges that local government is

complex and that decisions made in one area can have ripple effects throughout the organisation.

During the assessment phase for this BRMP, the following corporate framework are under development and to be considered in the near future:

- *Cemetery High Fire Danger Policy*

  Cemetery High Fire Danger Policy is a set of rules and procedures designed to minimise the risk of bushfires in cemeteries during periods of high fire danger. The policy aims to protect cemetery property and reduce the danger to visitors, staff, and surrounding communities.

  The policy includes guidelines for vegetation management, including the removal of dead or dry plants, trees, and other flammable materials. It also requires regular maintenance and inspections of cemetery grounds.

The above policies are just the beginning for the Shire's efforts in addressing the bushfire risk, as well as supporting both this plan and the community's safety.

4.1.3 Location, Boundaries and Tenure

Location and Boundaries

The Shire of Kojonup is a local government area in the Great Southern region of Western Australia. The shire is located approximately 256 kilometers south-east of Perth, the capital city of Western Australia. Kojonup is a town within the shire and is situated on the Albany Highway. The boundaries of the Shire of Kojonup are described as follows:

> *"To the north the Shire of Kojonup is bounded by the Shire of West Arthur and the Shire of Woodanilling. To the east is the Shire of Katanning and the Shire of Broomehill-Tambellup. To the south is the Shire of Cranbrook and to the west is the Shire of Boyup Brook."*

It covers an area of approximately 2,500 square kilometers and includes the town of Kojonup and several smaller communities.

The Shire of Kojonup was first established in 1894 as the Kojonup Road District under the Roads Act of 1871. It was later renamed the Kojonup Shire in 1961 under the Local Government Act of 1960.

There are five gazetted townsites within the Shire of Kojonup, these are:

- Kojonup
- Muradup
- Qualeup

- Boscabel
- Jingalup

Of these Kojonup and Muradup are the only ones that have been substantially established (Kojonup decidedly more-so). The Qualeup, Boscabel and Jingalup townsites have not been developed to any great extent.

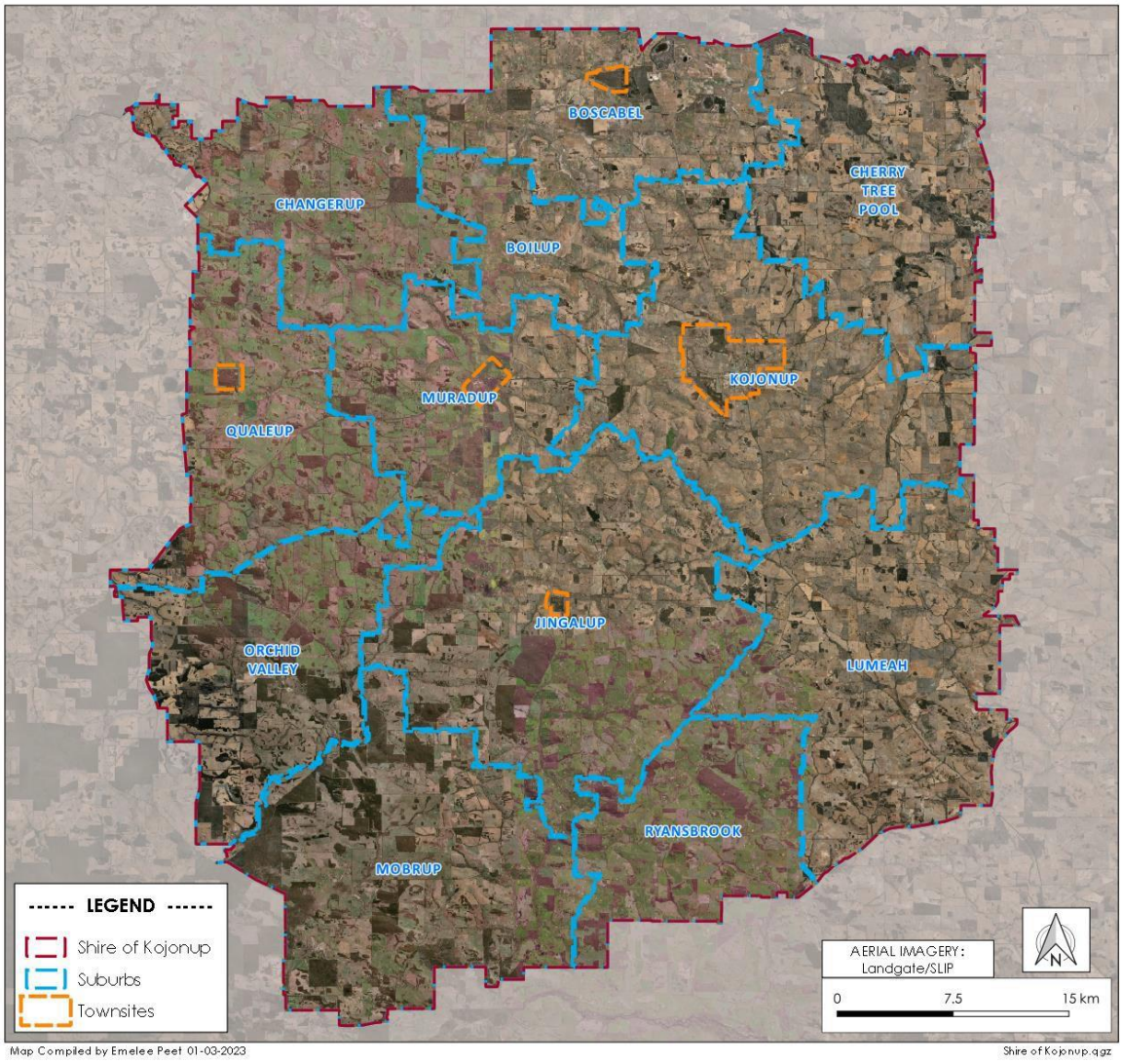


Figure 3 – Shire of Kojonup Map

Tenure

Figure 4 and table 2 (below) provide a breakdown of land proprietors within the Shire of Kojonup, a significant portion (91%) of the total land area has been identified as private/private business owned.

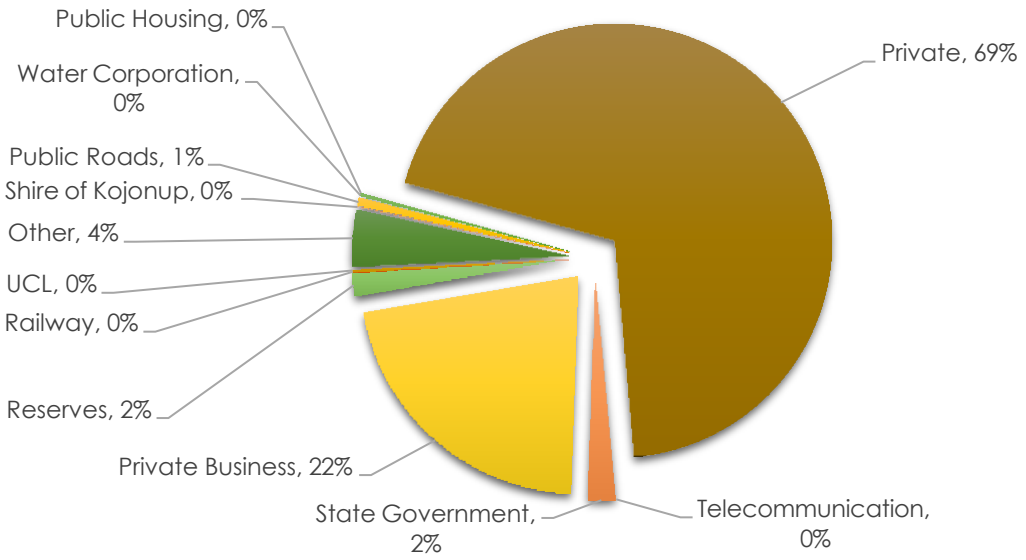


Figure 4 – Shire of Kojonup Land Tenure

In a shire characterised by predominantly private landholders, the risk of bushfires can be elevated due to the decentralised nature of land management practices. The Shire of Kojonup serves as an example, where the primary land uses consist of crop farming, forestry, and sheep husbandry. Given the specific management practices employed for these activities and the timing at which they are conducted, the inherent risk of bushfires remains consistently heightened.

Table 2 – Overview of Land Tenure and Management within the Shire of Kojonup

Land Manager/Agency	Percent of Area
State Government	1.95%
Shire of Kojonup	0.04%
Private	69.28%
Private Business	21.51%
Public Roads	0.61%
Railway	0.04%
Reserves	1.73%
Unallocated Crown Land	0.13%
Public Housing	0.001%
Water Corporation	0.3%
Telecommunication	0.0002%
Other	4.1%
Total	2,423.826 km²

Source: Landgate Land Tenure

On average, 658 hectares (equivalent to 315 football fields) is a typical agricultural property size, where 1000 square meters would be considered as a normal townsite block within the shire. A combination total of 2370.41 hectares represents the aggregate area of Boscabel, Qualeup, Jingalup, Muradup and Kojonup townships, leaving 2,400.12 square kilometers of the shire being managed in a rural setting.

To combat the bushfire risk private land owners contain within their boundaries, the Shire of Kojonup enforce the Firebreak Order as per the Bush Fires Act – section 33 to manage the hazardous fuels. This order is the fundamental document helping mitigate the bushfire hazard on private land.

Further details regarding the Firebreak Order can be found in section 4.2.7 - Current Bushfire Risk Management Activities.

Several government agencies own and manage land within the Shire of Kojonup and unlike private landholders, government land is not bound to a shire's firebreak notice, meaning there is no minimum requirement to uphold with the various agencies. This results in inconsistencies towards the priority of land management, how often the land will be managed and to what extent.

This plan is helping to close that gap, by recognising the key stakeholders, identifying a relevant contact within the organisation's, creating accountability and providing the opportunity to work together in improving the overall risk to the shire and its community.

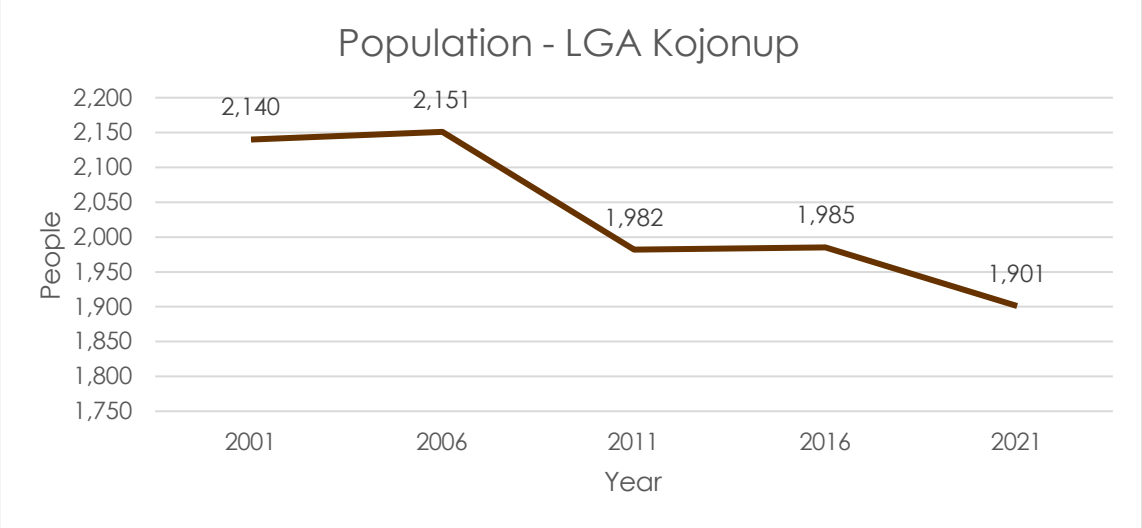
4.1.4 Population and Demographics

The Shire of Kojonup has a predominantly rural population, meaning a significant proportion of its residents live in agricultural areas with the land used for farming purpose. As identified in location and boundaries there are 5 gazetted rural-urban towns, with locality area Kojonup maintaining majority of urban/rural-urban population.

Graph 1 provides a visual understanding towards the decline in population growth since 2006. There are both pros and cons associated with a drop in population numbers in a local government area (LGA) with respect to bushfire risk.

A smaller population has the ability to reduce the risk of bushfire, as fewer people will be living in high-risk areas and fewer assets to protect. In addition, if an evacuation is necessary a smaller population can result in better local knowledge of people's whereabouts, management of the evacuation as there will be fewer people to communicate to, evacuate and/or transport to safety. Moreover, with less structures and homes to protect, firefighters may be able to

focus their efforts more effectively on containing and extinguishing the fire, rather than having to prioritise the protection of homes and structures.



Graph 1 – Population Growth Pattern LGA Kojonup ABS Census

Alternatively, a drop in population can contribute to a reduction in resources, capacity to manage and respond to bushfires. This could include fewer trained firefighters, fewer resources to support evacuations and recovery efforts and reliance on outsourcing, which can delay the opportunity to control or extinguish the fire. Furthermore, population decline may result in a reduced sense of community resilience, as there may be fewer people available to support each other during times of crisis. This could make it more difficult to coordinate effective responses to bushfires and manage the social and economic impacts of the disaster.

Between the Shire, Local Emergency Management Committee, Bushfire Advisory Committee, BFB's, VFRS and other supportive community groups, the talk of succession planning is always at the forefront of their development and future proofing the community. (4.2.7 Current Bushfire Risk Management Activities, provides further details on LEMC and BFAC committees)

Table 3 below provides comparison data relating to the 2016 and 2021 Census (courtesy of Australian Bureau of Statistics) for the Shire of Kojonup.

Categories	2016	2021	Difference
Population	1,985	1,901	- 4.2%
Median Age	44 years	45 years	+ 2.3%
Over the age of 55	675 (34%)	731 (38.5%)	+ 8%
Under the age of 14	419 (21.1%)	371 (19.5%)	- 12%
Male Gender	50.6%	51.6%	+ 1%

Categories	2016	2021	Difference
Female Gender	49.4%	48.4%	- 1%
Indigenous Status	4.4%	5.2%	+ 0.8%
Born in Australia	76.6%	77.7%	+1.1%
England	3.1%	2.7%	- 0.4%
New Zealand	4.7%	3.7%	- 1%
Primary language: English	77%	86.5%	+ 9.5%
Other	6.6%	5.3%	- 1.3%
Education: Completion of year 10 or beyond	74.1%	77.5%	+ 3.4%
Employed Residents	97.6%	98.5%	+0.9%
Agriculture	45.1%	43.6%	- 1.5%
Health Care	5.9%	6.1%	+ 0.2%
Retail Trade	6.2%	5.2%	- 1%

Table 3 – 2016 and 2021 LGA Kojonup Census

Kojonup's population is also aging, with a median age of 45 years in the 2021 ABS estimate. This suggests that the shire may have a higher proportion of older residents, who may have different social and health needs compared to younger populations.

The current population and demographics for the Shire of Kojonup have very little to overcome in the defense and recovery towards a bushfire, but with the trends of population decline and aging population the future response for the shire can present some challenges if this pattern maintains unchanged.

Farming and Backpackers

As time has gone on, farm consolidation or amalgamation has been occurring. This is a process where farmers purchase or merge with surrounding properties to create larger farms. One of the primary reasons for farm consolidation is economies of scale. By acquiring more land, farmers can spread their fixed costs, such as machinery and infrastructure, over a larger area.

This has resulted in fewer available local labour, requiring us to outsource labour for seasonal work. This introduces backpackers working on farms, which can pose a risk of bushfire in several ways. Below are some potential factors that increase the risk of bushfires:

- *Lack of experience with farming practices:* Many backpackers may not have experience working on farms or in rural areas, and they may not be familiar with the risks associated with farming practices that can start a

fire. For example, using machinery that produces sparks or using tools that can create heat can accidentally start a fire.

- *Lack of knowledge of fire safety:* Backpackers may not be aware of the importance of following fire safety practices, such as not smoking near flammable materials, properly extinguishing campfires, or reporting any signs of a fire immediately.
- *Environmental factors:* Backpackers may not be aware of the environmental factors that increase the risk of bushfires, such as dry weather conditions, high winds, and heatwaves. They may not be aware of how easily a small fire can turn into a large and uncontrollable bushfire.
- *Language and communication barriers:* Backpackers may not have a strong grasp of English, which can make it difficult for them to understand instructions or communicate effectively with other workers or supervisors. This can increase the risk of miscommunication and confusion, which can lead to accidents.
- *Lack of proper training and supervision:* Some employers may not provide adequate training or supervision to backpackers, which can increase the risk of accidents and incidents.
- *Short term plans:* Backpackers are very temporary both in location and the jobs they are undertaking, most employers will be reluctant to invest in providing the correct protective clothing, equipment or training towards protection against bushfire. This onus is placed back onto the shire to provide, creating continuous bushfire brigade membership management, supply of uniforms and training.

4.1.5 Economic Activities and Industry

Agriculture Industry

The Shire of Kojonup relies heavily on agriculture as its primary economic activity, with sheep and crop farming being the mainstay.

Cereal and oilseed crop farming are the primary focus of agriculture in the Shire of Kojonup, with wheat, barley, and canola being the predominant crops grown on large-scale commercial farms.

Forestry Industry

Forestry is also an economic activity in the Shire of Kojonup, with a portion of its land covered in eucalyptus, pine and sandalwood plantations.

Mining Industry

Small-scale mining activities in the area, including gold and mineral exploration.

Tourism, Retail and Services

Kojonup townsite contains emergency/health care facilities/services, assisted living, critical aged care, supermarket, cafes, industrial services and specialty stores.

The Shire of Kojonup is a burgeoning tourist hotspot, boasting an array of natural attractions, including native bushland, historic sites, and scenic drives that appeal to visitors. Between Kojonup, Boscabel, Qualeup, Jingalup, Muradup, Orchid Valley, Mobrup and Changerup localities, heritage and historic buildings contribute to the history of the shire.

Kojonup functions as a pivotal stopover town in the realm of tourism, heavily depending on tourists who pause during their journeys to other destinations. The local shire collaborates both internally and with The Great Southern Treasures to offer and promote attractions and activities in Kojonup and its surrounding areas. This dynamic partnership contributes to the steady growth in the number of tourists who pause to explore the offerings of the Shire of Kojonup.

While these visitors may not stay for extended periods, it's noteworthy that in the event of a disaster, their presence can significantly augment the temporary population of the area.

Economic Activities

Within this plan there is an emphasis on the Agriculture and Forestry activities being a major contributor towards the bushfire risk within the shire, some of these contributing factors can be, modification of the landscape, removal of native vegetation, introduction of annual crops, proliferation of weeds, contribution to the salinity issue and farming practices. It also opens other economic activities to become more vulnerable and at risk.

Due to the heavy reliance on the agricultural industry, managing the bushfire risk is crucial for the local resident's, severe bushfires could devastate the industry

physically and financially by destroying crops, kill livestock, damaging infrastructure, ruining transport corridors, wiping out feed sources and increase the risk of topsoil erosion by wind and rain.

From mid-October to late November, crops gradually start to cure ready for harvest. This results in the crop becoming highly flammable and increasing the fuel load available in the area. Late November to January (start of bushfire season) is a critical period as crops are matured and begin the process of harvesting.

With the use of machinery, hot/dry days and 100% cured crops, the potential outcome can result in a fire. As the crops are planted for maximum yield and the characteristics being grassland, the fire would be expected to spread quickly and cover a vast amount of area in a short period of time. Without the introduction of various mitigation methods, these fires can develop into a highly uncontrollable fire.

The Great Southern Region benefits from the advantages of a well-developed network of sealed roads, which serve as a critical link between Perth and Albany. This comprehensive network accommodates a wide range of vehicles, including bicycles, motorcycles, four-wheelers, and trucks, including double and triple road trains, making it a primary route for diverse modes of transportation.

The town of Kojonup enjoys direct accessibility from both the north and south regions via the Albany Highway. Notably, this road falls under the jurisdiction of Main Roads and serves as a crucial inter-town connector encompassing the Perth Metro area, Bedfordale, Williams, Arthur River, Kojonup, Cranbrook, Mt Barker, and Albany. Its functionality extends to accommodate various purposes, including the transportation of heavy seasonal grain and fertilizer, oversized haulage, commercial goods and services, emergency services access, general commuting, and tourism-related activities.

In addition to ground transportation, the Kojonup Shire maintains a regionally significant airstrip. This airstrip plays a vital role, particularly in the swift transportation of critical care patients and serves as a crucial resource during the fire season for the prompt refilling and refueling of aircraft.

Impact and or destruction to either of these primary resources will have significant consequences for the community. It can lead to isolation, hinder emergency response, disrupt businesses, impact property values, affect healthcare and education. The economic consequences include disruptions in supply chains, reduced tourism, and increased costs. Rebuilding the infrastructure can be costly and time-consuming, and there may also be environmental damage to address.

4.2. Description of the Environment and Bushfire Context

4.2.1 Topography and Landscape Features

Landscape

The behavior of a bushfire is influenced by the physical characteristics of its environment. There are several ways in which the landscape can impact bushfires. Vegetation plays a significant role, as the type, density, and condition of vegetation can affect the speed of a fire's spread. Dry, dense vegetation is highly flammable and can rapidly carry fire, whereas moist, sparse vegetation can slow it down. Additionally, the amount of combustible material in an area, known as fuel load, can affect the heat and intensity of a fire. Human activities such as land use, development, and maintenance can also contribute to bushfires by creating sparks that start fires or by reducing the amount of fuel available. Climate conditions such as temperature, humidity, and wind also play a role in bushfire behavior, with hot and dry conditions increasing the intensity of fires and humid or rainy conditions dampening them. Finally, the shape and features of the land, known as topography, can influence the intensity and direction of fires, acting as barriers or conduits for flames.

The following points are some of the key features of the Shire of Kojonup's landscape environment:

- *Agricultural land:* The majority of the Shire is used for agricultural purposes, with cropping and livestock farming being the primary industries. The region's rolling hills and fertile soils make it well-suited for agriculture.
- *Forests:* The Shire of Kojonup contains fragment areas of jarrah and marri, which are important for recreation, and conservation purposes. These forests also provide habitat for a range of native wildlife species.
- *Woodlands:* There are also areas of woodlands in the Shire of Kojonup, which are home to a variety of plant and animal species. These areas can be vulnerable to bushfires during the summer season.
- *Waterways:* The Shire is home to several rivers and streams, including the Kojonup Brook, which provides important habitat for aquatic species and supports local agriculture.
- *Structures:* Bridges and radio towers are key infrastructure that become a part of the landscape, within the shire there are currently 43 radio towers (additional 2 proposed) and 25 bridges (18 of these are constructed out of timber).

Topography

Topography, or the shape and features of the land, has a significant impact on how a bushfire behaves. Below lists the influences topography can have on bushfires:

- *Slope:* The steepness of the terrain can affect the speed and intensity of a bushfire. On a steep slope, a fire can spread more quickly because the heat rises and creates an updraft that feeds the flames. Additionally, the fuel on the slope can burn more quickly because it is exposed to more heat.
- *Aspect:* The aspect, or direction that the slope faces, can also affect how a fire behaves. South-facing slopes in the Southern Hemisphere, for example, receive less direct sunlight and may have more moisture, which can make the vegetation less flammable. North-facing slopes, on the other hand, may be drier and more prone to fire.
- *Elevation:* As elevation increases, the air becomes thinner and cooler, which can affect the intensity of the fire. Fires can burn more intensely at lower elevations because the air is denser and there is more oxygen available to fuel the flames.
- *Topographic features:* Certain topographic features, such as ridges or valleys, can act as barriers or conduits for a fire. Ridges can block the spread of a fire by creating a natural firebreak, while valleys can funnel the flames and make the fire more intense.
- *Wind:* The shape of the land can also affect wind patterns, which can in turn affect the direction and speed of a fire. A fire, for instance, may burn more intensely in a valley or on a ridge if the wind passes through it.

The topography of the Shire of Kojonup is characterised by gently rolling hills, predominately of agricultural land, with fragments of native forests, and woodlands. The area is part of the larger geographic region known as the Great Southern, which encompasses a wide range of landscapes and topographic features.

Within the Shire of Kojonup, the topography varies somewhat depending on the exact location. The central and eastern parts of the shire are characterised by undulating hills, with elevations ranging from around 150 meters to 300 meters above sea level. The western part of the shire is flatter and lower lying, with elevations closer to sea level.

Salinity

Salinity is a significant environmental problem that affects native vegetation, caused by natural factors or human activities like land clearing, fertiliser use, and irrigation. In the South-West Region of Western Australia, including the Shire of

Kojonup, groundwater salinity levels range from less than 1,000 mg/L to over 10,000 mg/L.

High soil salinity can have both positive and negative effects on bushfires. Although it reduces the flammability of plants due to higher moisture content, it can limit plant growth or degrade the existing vegetation and make it more vulnerable to bushfires. Changes in soil structure and function caused by high salinity levels can also affect the overall ecosystem resilience to bushfires.

4.2.2 Climate and Bushfire Season

Climate

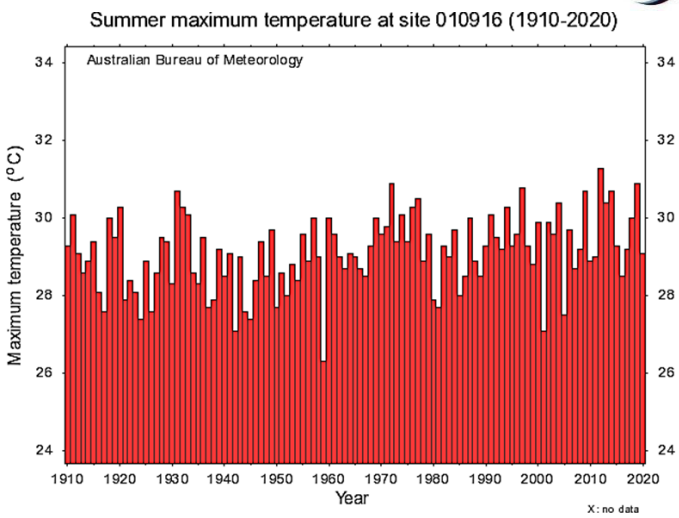
The Shire of Kojonup is located in Western Australia's southwest. The climate in this region is considered to be Mediterranean, with hot, dry summers and mild, wet winters.

January and February can generally be dominated by weekly weather cycles and movements of the west coast trough through the area, this produces a high probability of thunderstorms and lightning. Lightning is a major contributor to Bushfires in the area, as identified within 4.2.6 Bushfire Frequency and Causes of Ignition.

Throughout the entire bushfire season seasonal strong prevailing winds continue to increase the bushfire risk, these can predominately happen in the late afternoon from the south/southwest direction.

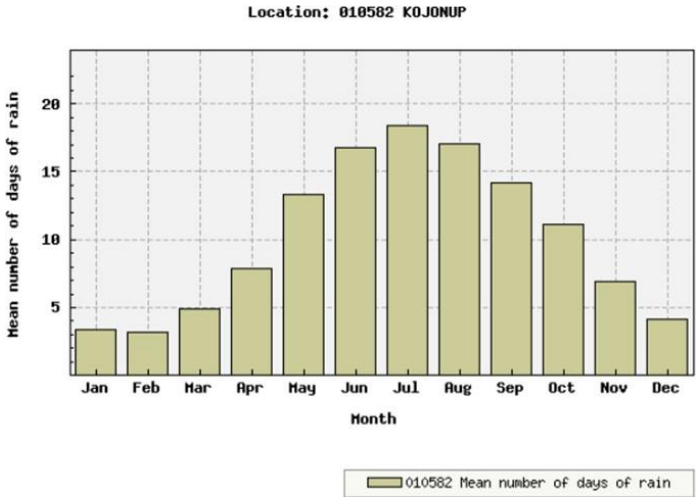
As a guide, here are some key characteristics of the average climate in the Shire of Kojonup:

- *Sunshine:* The region enjoys a relatively high amount of sunshine throughout the year, with an average of around 8 hours of sunshine per day in summer and around 6 hours per day in winter.
- *Temperature:* The average maximum temperature in summer (December-February) is around 29-30°C, (see Graph 2), and the average minimum temperature is around 14°C. In winter (June-August), the average maximum temperature is around 16°C, and the average minimum temperature is around 7°C.



Graph 2 – Kojonup Summer Maximum temperature (1910-2020)

- *Rainfall:* The Shire of Kojonup receives an average of around 550 millimeters of rainfall per year, with the majority of this rainfall occurring in winter. The driest months are typically January and February, while the wettest months are usually July and August (see Graph 3).



Graph 3 – Kojonup Mean Number of Days of Rain

- *Wind:* The Shire of Kojonup can experience strong winds throughout the year, with the highest wind speeds typically occurring in spring and summer. The prevailing winds in this region are usually in the afternoon from the west-southwest direction (see figure 5&6).

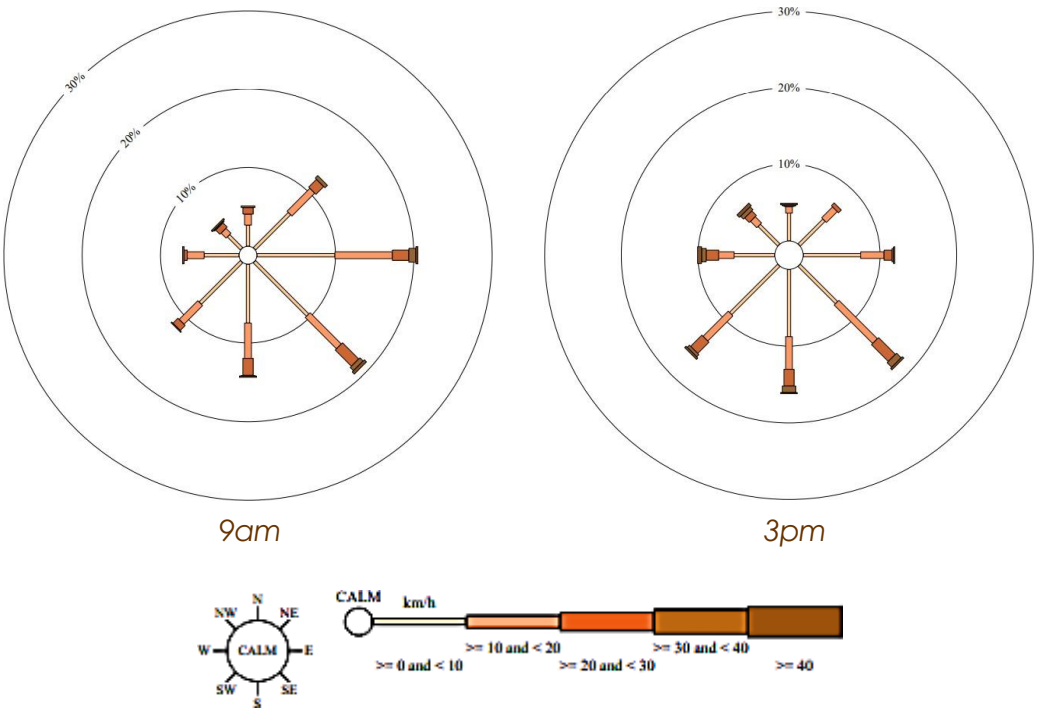


Figure 5 – Kojonup Wind speed vs direction plot

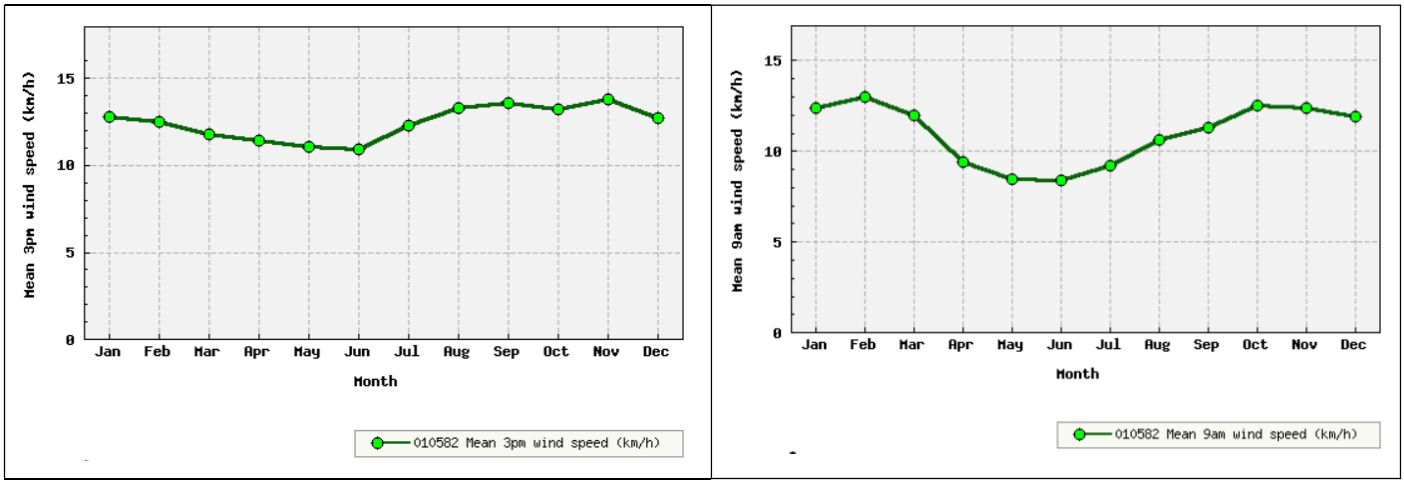


Figure 6 – Kojonup wind speed means (09:00 & 15:00)

Bushfire Season

The bushfire season in the Shire of Kojonup typically occurs during the summer months, from December to February. This is because the climate in this region is characterised by hot and dry conditions during the summer season, which can create a higher risk of bushfires.

The highest level of fire danger typically occurs during the period from late spring through early autumn, as the fuels on the ground have had time to dry out following the winter rains. During this time, the intensification of heat troughs in proximity to the Pilbara region, combined with the influx of hot air masses from the interior, creates hazardous fire weather conditions.

During this time, the Shire of Kojonup and other authorities in the area monitor weather and fire conditions closely and issue warnings or alerts as necessary. Residents in the area are encouraged to take precautions, such as ensuring that their properties are bushfire-safe and have a bushfire survival plan in place.

Most farmers are constantly improving their fire risk mitigation systems as new techniques and equipment become available. Reliable communications continue to be essential to maintain fast response and suppression times.

4.2.3 Native Vegetation

76% of Kojonup's native vegetation has been removed for farmland/agricultural use. It is known that in many areas of Australia, including Western Australia, there has been significant loss of native vegetation due to land clearance for agriculture, urban development, and other human activities.

Botanic Province

Botanical provinces refers to geographical regions characterised by a distinct and unique combination of plant species, vegetation types, and ecological conditions. These provinces are based on the natural distribution of plant species and reflect the influence of various factors such as climate, topography, geology, and soils.

In Australia, the concept of botanical provinces has been used extensively to map and classify the country's plant species and vegetation types. The shire of Kojonup is situated in the South-West Province.

Bioregion (Jarrah Forest)

The South-West Province has been divided into bioregions to better define the native vegetation. The shire is situated within the 'Jarrah Forest' bioregion, which is characterised by extensive areas of jarrah forests dominated by tall, straight-trunked trees with rough, grey-brown, stringy/fibrous bark. Other tree species, such as marri, wandoo, and sheoak, are also found in this region. The understory vegetation mainly consists of shrubs, grasses, and herbs and is predominantly located towards Jingalup, Mobrup, and Orchid Valley way.

The Jarrah Forest is one of Australia's 36 biogeographic regions, covering an area of about 44,500 square kilometers in southwestern Western Australia. It is renowned for its high levels of plant species diversity and endemism. A bioregion is a geographic area defined by its distinct ecological characteristics, including climate, geology, topography, vegetation, and wildlife. Bioregions are typically defined by natural boundaries, such as mountains, rivers, or coastlines, and may encompass a range of different ecosystems, including forests, grasslands, wetlands, deserts, and marine environments.

Vegetation Systems

The following vegetation system definitions (Native Vegetation Handbook for the Shire of Kojonup) provide a better understanding of the different formation of native vegetation found in the Shire of Kojonup. Figure 6 visually shows the boundaries of the vegetation systems.

Jingalup Vegetation System:

Well defined mosaic of jarrah, marri and wandoo woodlands on ironstone gravels, woodlands of marri and wandoo on the slopes. Brown mallet often associates with jarrah on breakaways, while flooded gum occurs along minor creeks. Woodlands of marri and wandoo dominate, scattered small jam and sheoak with some bull banksia and Christmas trees. In the soulth-west of the system, wandoo woodland appears in the valleys and on the lower slopes. In some of the damper areas, flat-topped yate woodlands occurs, while along water courses flooded gum low woodland is common. Jarrah open forest is generally confined to lateritic hill tops and merges with wandoo woodland on the upper slopes.

Beaufort Vegetation System:

Sandy deposits occur along sections of Carrolup River, and carry a variety of plant communities. The principle elements of this vegetation system landscape are woodland of wandoo on laterite residuals, woodlands of York gum and wandoo on undulating country and woodland of York gum and flat-topped yate on sand patches. Often there is a mosaic of different combinations of Eucalyptus spp. Woodland on a variety of landscapes.

Bridgetown Vegetation System:

Similar to the jarrah-marri forest of the Darling Scarp, although the system does not contain any part. Marri-wandoo woodlands occur towards its eastern boundary, along the river-banks flooded gums form fringing forest and paperbark forms a dense understory at the water's edge of more permanent rivers.

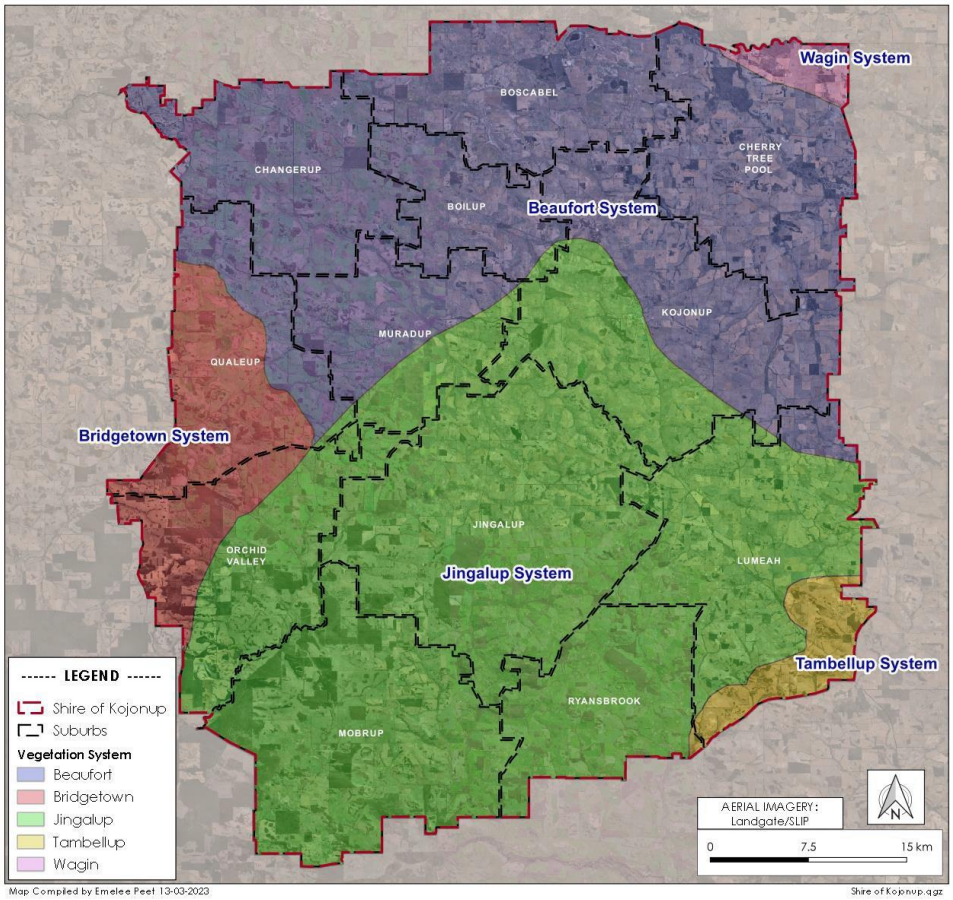


Figure 6 – Shire of Kojonup Vegetation Systems

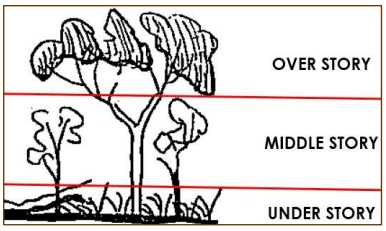
Native Vegetation Distribution

Due to the extensive land clearing for agriculture purposes, the native vegetation within the shire of Kojonup is very fragmented and disconnected. Although this is not an encouraging environment for native flora and fauna, it can be considered as an opportunistic situation. The breaks in dense/heavy fuels can provide additional options towards fire response tactics, while also being considered as a reduction in overall bushfire risk.

Although the opportunity for fire response tactics could be a positive, introduction of the agricultural environment surrounding the vegetated areas has created a negative impact on the ecological and survival of native vegetation in the area. Plant species used for agricultural purposes have created evolving issues to these areas, highlighting some of these issues, non-native plants invading the vegetated areas, out competing native species, changing nutrient and soil structure making it undesirable for natives, fast recovery or regeneration stimulation after fires. This has also contributed to changes in vegetation structure

and heavier fuel loads, a more in-depth explanation can be found in 4.2.4 introduced vegetation.

Vegetation Structure



Throughout the shire, majority of the remnant native vegetation represents a woodland structure, consisting of an under and over story. Native grasses, sedges, vines, low lying shrubs, logs/sticks/branches and leaf litter define the understory disposition. Sparse and open tree canopy maintaining partially filtered sunlight would emphasize the characteristics of woodland. r story.

Figure 8 creates a visual aid towards the native vegetation structure located around the shire.

Figure 7 – Shire of Kojonup Native Vegetation Areas

Significant Native Vegetation Areas within Shire of Kojonup

Qualeup Townsite

Muradup townsite

Significant Native Vegetation Areas within Shire of Kojonup

Changerup Hall

Boscabel Townsite

Farrar Reserve

Jingalup Townsite

Myrtle Benn - Kojonup

Showgrounds - Kojonup

Redundant Rail line (East) - Kojonup

Redundant Rail line (West) - Kojonup

Blocks of sheoak or banksia/acacia shrubs can be found in Patches throughout the woodland areas, these types of plants create a middle story within the vegetation changing the structure to a forest classification. Below Figure 7 highlights the pocket of forest vegetation within 'Myrtle Benn Reserve'.

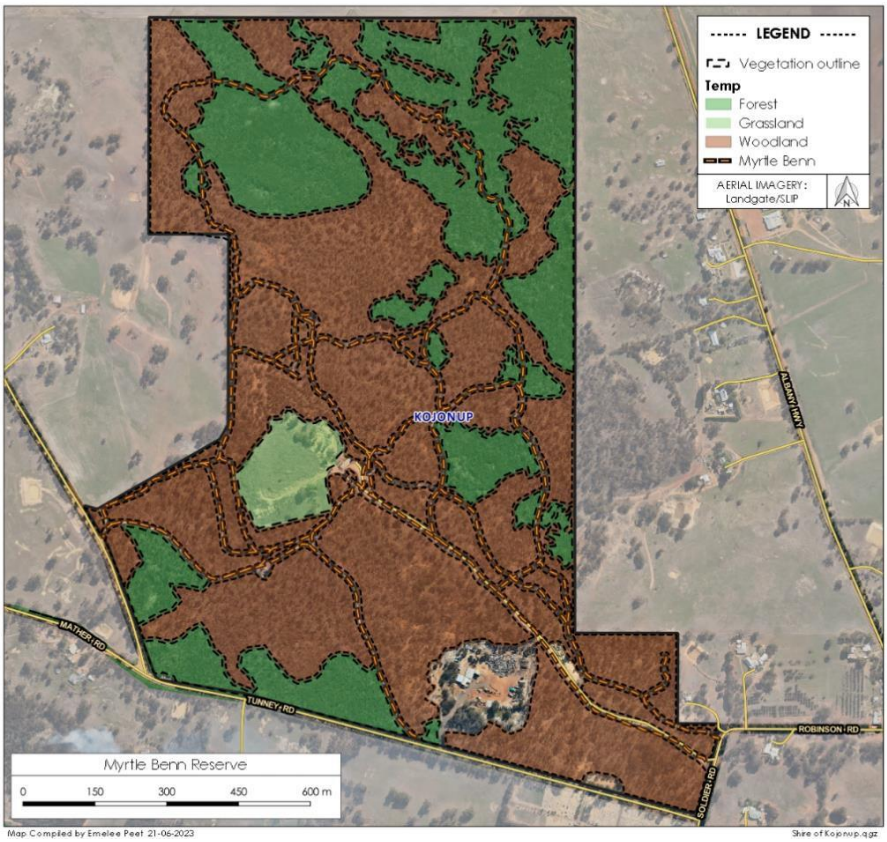


Figure 8 – Myrtle Benn Vegetation Areas

Forest vegetation structure contains an under, middle and over story, the middle story addition creates an additional layer of fuel. This allows for fire to climb from the ground to the top of the trees (Natural ladder fuel) which can evolve into a canopy fire. Canopy fires are challenging to control and extinguish, they pose significant risks to the detriment of vegetation survival, fire crew's safety and bushfire response planning. As identified earlier in distribution, the fragmented vegetation helps reduce the opportunity for continuation of a canopy fire due to the distance between vegetated areas.

Species

Although a lot of indigenous plants have adapted to fire for regeneration and management, oversight of the vulnerability or introduction of the incorrect fire regime may have a devastating effect on the vegetation, to its ecosystem or the survival of that species. Below lists a few endemic native plants found in the Shire of Kojonup with susceptibility to fire:

Wandoo Eucalyptus:

Medium to large size tree with a smooth trunk, mottled bark and long, narrow foliage. Regeneration process for wandoo trees involves seeding into an ash bed. Seeds that land on stony ground, leaf litter, or lightly burned areas are usually not able to germinate. Although mature wandoo trees are very resilient to mild or moderate intensity fire, they will be killed stone-dead by a high-intensity fire.

Banksia Species:

Banksias can come in many forms, from low lying shrub to 25m plus sized tree. Distinguished by strong gnarly trunks and long, tough leaves with coarse teeth, while some species may have finer or needle-like foliage. Most have long-lasting, flowers densely arranged in cylindrical or globular spikes, over time transforming into woody cones that bear fruit. While the plant itself is very susceptible to fire, the seeds trapped inside the fruit require heat from fire to open the fruit and the nutrients from ash to help germinate. It has also been suggested the smoke from fire is also an additional promoter for the seeds to germinate.

It is highly critical to the shire to correctly manage the remaining native vegetation, during the planning stages of any future mitigation works consideration towards the native species and its vulnerability will be assessed for the appropriate course of action.

Mitigation works:

Planned burns or mechanical works are a common bushfire mitigation technique used to reduce fuel loads and decrease the severity of potential fires. However, if not properly managed, mitigation works can have unintended negative consequences, such as introducing weed infestations and increasing fuel loads.

During a planned burn, the intense heat can stimulate dormant weed seeds in the soil to germinate and grow rapidly. This can lead to the establishment of new weed populations and outcompete native vegetation, increasing the overall fuel load in the area.

Meanwhile mechanical works can introduce weeds due to lacking machinery cleanliness. Weeds can easily become lodged in various parts of machinery, such as tyres, undercarriages, or equipment surfaces, and can be inadvertently transported to new areas. This can happen both in a reactive approach whilst controlling a bushfire and during mitigation programs.

When machinery is not adequately cleaned any weed seeds or plant parts present on the equipment can be dislodged and left behind in the next location where the machinery is used. This can lead to the introduction and establishment

of new weed species or the spread of existing weeds in previously weed-free areas.

Weeds compete with the native vegetation for resources like sunlight, water, and nutrients, reducing the vegetation quality. Not only does that create additional long term and tedious methods of control, it also is an environmental concern.

Spotting / Ember Attack

Spotting or Ember Attack refers to the phenomenon of embers or burning debris being carried by the wind and landing on nearby structures, vegetation, or other combustible materials, thereby starting new fires.
During a bushfire, strong winds can cause burning debris to be lifted into the air, carried for long distances, and deposited elsewhere. This can result in spot fires igniting well ahead of the main fire front, making the fire much harder to control and extinguish.

Ember attacks are a significant threat during bushfires, as they can easily spread flames to other areas, including buildings and homes. Embers can be carried up to several kilometers ahead of the main fire front and can ignite fires in areas that may not have otherwise been directly threatened by the bushfire.

4.2.4 Introduced Vegetation

Agriculture

As highlighted earlier, 76% of the shire has been cleared for agriculture use. This signifies the importance of understanding and managing introduced vegetation's (crops, plantations, orchids and weeds) towards the risk of bushfire. Defined below are characteristics and key considerations regarding agriculture land use:

Crop characteristics:

Cereal, leguminous and oil seeds are crops that are commonly grown for agricultural purposes. The bushfire risk associated with these crops can vary depending on a variety of factors, including the type of crop, the climate, and the farming practices used.

The exact fuel load of a particular crop will depend on a variety of factors, including the specific variety of crop, the growing conditions, and the farming practices used.

Additional to the natural composition of a crop, other important concerns arise from the practices undertaken for curing or harvesting a crop.

Weeds:

Weeds are a potential source of fuel for bushfires. This is because many species of weeds are highly flammable and can easily ignite, spreading fire rapidly. In addition, weeds tend to grow in areas that are not well-maintained, such as roadsides, vacant lots, and other areas that are difficult to access or manage. This makes them particularly dangerous, as they can provide a ready source of fuel for a bushfire to spread quickly and with intensity.

Weeds also tend to outcompete native vegetation, leading to a change in the landscape that can increase the risk of bushfires. For example, invasive weeds can quickly take over an area, crowding out native plants that are less flammable and less likely to contribute to the spread of bushfire. This can lead

to a buildup of dry, flammable material, such as dead leaves and branches, which can easily ignite and contribute to the spread of a bushfire.

Some weeds can also be stimulated by fire, causing further issues with control.

In addition to their flammability, some species of weeds can also produce volatile oils that can ignite easily, adding to the risk of bushfires. These oils can be released into the air during hot, dry weather, increasing the likelihood of a bushfire starting or spreading.

4.2.4 Threatened Species and Communities

Threatened Ecological Communities

An Ecological Community is a term used to define naturally occurring biological groupings that inhabit specific types of habitats. These groupings, known as Threatened Ecological Communities (TECs), are assessed and categorized based on the level of threat they face. These categories include "Presumed Totally Destroyed," "Critically Endangered," "Endangered," and "Vulnerable." Some TECs receive legal protection under the Environmental Protection and Biodiversity Conservation Act of 1999 (Cth), including the nationally recognized TEC known as "Eucalypt Woodlands of the Western Australian Wheatbelt," which is situated within the boundaries of the Shire.

Eucalypt woodlands represent an iconic element of the wheatbelt landscape, comprising 62 distinct vegetation communities, each characterized by varying species compositions and structural features. The dominant canopy trees are eucalypts with single trunks (not mallees), while the understorey exhibits a diverse range, from open grassy areas to shrubby patches. This ecological community serves as crucial habitat for numerous plant and animal species that depend on Eucalypt woodlands for shelter and sustenance. Moreover, these woodlands provide essential ecosystem services, including the regulation of local water tables and salinity levels.

For your reference, Table 4 presents a comprehensive list of Threatened Ecological Communities (TECs) situated within the Shire.

Scientific Name	Common Name	Conservation Status
Alluvial soils of the upper Blackwood River	Blackwood Alluvial Flats	P2
Yate dominated alluvial claypans of the Jingalup Soil System	Yate dominated claypans	P2 CE
Claypans with mid dense shrublands of Melaleuca lateritia over herbs	Claypans with shrubs over herbs	P1 CE
Eucalypt woodlands of the Western Australian Wheatbelt	Wheatbelt Woodlands	P3 CE

Table 4 – Kojonup's Threatened Ecological Communities

Another significant aspect to be taken into account regarding both bushfire protection and response strategies involves the potential dissemination of weeds or diseases. Fungal-borne diseases have the capacity to propagate via soil transportation facilitated by vehicles, animals, water, and foot traffic. It is imperative to incorporate this risk into the planning of prevention and response strategies and to actively mitigate it whenever feasible.

Threatened flora

Threatened flora encompass plant species that have undergone assessments identifying them as being in danger of extinction. In the context of Western Australia, these species are referred to as "Declared Rare Flora" (DRF), denoting their status as plants requiring specific protection due to their susceptibility to extinction, rarity, or the need for specialized safeguarding measures.

Within the jurisdiction of the Shire, several priority plant species have been documented, including nine species classified as DRF. These specific DRF species are meticulously cataloged in Table 5 for reference.

Species	Common Name	Conservation Status
Adenanthos pungens subsp. effusus	Sprawling Spiky Adenanthos	T CR
Banksia oligantha	Wagin Banksia	T EN
Caladenia dorrienii	Cossack Spider-orchid	T EN
Conostylis drummondii	Drummond's Conostylis	T EN
Conostylis setigera subsp. dasys	Boscabel Conostylis	T CR
Eleocharis keigheryi	Keighery's Eleocharis	T VU
Gastrolobium lehmannii	Cranbrook Pea	T VU
Hemigenia ramosissima	Branched Hemigenia	T CR
Verticordia fimbrilepis subsp. fimbrilepis	Shy Featherflower	T VU

Table 5 – Kojonup's Threatened Flora

Threatened fauna

The Biodiversity Conservation Act of 2016 provides a precise definition for "threatened fauna," characterising it as fauna that is either rare or faces the imminent risk of extinction. These species are designated as "threatened" following comprehensive surveys that confirm their rarity, perilous status, or the necessity of special protective measures.

Additionally, the Biodiversity Conservation Act of 2016 extends protection to various other categories of fauna. This includes migratory birds safeguarded under international agreements, species presumed to be extinct, and other

fauna with specific protective designations. A comprehensive list of both threatened and specially protected fauna within the jurisdiction of the Shire can be found in Table 6.

Scientific Name	Common Name	Conservation Status
Bettongia penicillata ogilbyi	woylie, brush-tailed bettong	T CR
Botaurus poiciloptilus	Australasian Bittern	T EN
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	T VU
Calyptorhynchus baudinii	Baudin's cockatoo	T EN
Calyptorhynchus latirostris	Carnaby's cockatoo	T EN
Calyptorhynchus sp.	white-tailed black cockatoo	T EN
Dasyurus geoffroii	chuditch, western quoll	T VU
Leipoa ocellata	malleefowl	T VU
Macrotis lagotis	bilby, dalgyte, ninu	T VU
Myrmecobius fasciatus	numbat, walpurti	T EN
Pseudocheirus occidentalis	Western ringtail possum, ngwayir	T CR

Table 6 – Kojonup's Threatened Fauna

Frequently burned areas may not be suitable habitats for certain plant and animal species. While managing bushfire risk is a crucial component of conserving these species, it is imperative to carefully consider the potential consequences of these management practices to avoid adverse outcomes.

Due to the sensitive nature of information concerning protected flora and fauna, we have exercised discretion in the amount of recorded data. Therefore, it is essential to consult subject matter experts to verify the location of environmental assets within the jurisdiction of the Shire and assess the potential impacts of both mitigation and response strategies.

Flora and fauna hold particular significance for the Shire as they are not only acknowledged as valuable environmental assets but also influence the range of treatment options available for identified risks related to other assets. The selection of treatments must diligently weigh the implications for environmental and heritage considerations.

Inadequate treatment selection could result in detrimental consequences, including harm to environmentally sensitive areas, loss of biodiversity, destruction of habitats, and damage to natural, historical, and indigenous values. Therefore, all treatments must undergo assessment in accordance with the requirements outlined for the specific flora and fauna identified above. Furthermore, it is essential to ensure that appropriate authorities are consulted before the commencement of any mitigation work.

The Shire will, whenever feasible, remind landowners and managers of their obligation to obtain the necessary clearances and approvals before

undertaking vegetation-based treatments. This includes areas designated as Environmentally Sensitive Areas, habitats for Threatened Fauna, and locations housing Declared Rare Flora, as well as other designated TECs.

4.2.6 Bushfire Frequency and Causes of Ignition

Human activity, like machinery operations, arson, unattended campfires, and in some instances negligence with equipment that can spark, is the primary cause of bushfires.

Additionally, natural causes such as lightning strikes can also initiate bushfires, particularly in areas with dry and hot conditions that increase the risk of ignition. In many cases, a combination of factors can contribute to the start and spread of bushfires, making it important to be vigilant and proactive in reducing the risk of bushfires.

Utilising Table 4, it highlights Machinery, Lightning and Escaped Burns being the most common cause within the shire.

From November to mid-January many farms are harvesting fully cured crops, this time of the year is highlighted in section 3.2.2 Climate and Bushfire Season as hot and dry. Combine this with the multitude of machines used (refer to machinery caused fires) to assist in harvest, it isn't hard to understand how a fire could start. Although mid-February to March is not considered the peak of bushfire season, it still maintains favorable conditions for a bushfire. During this time farms will undertake preparation for seeding, this is performed with the use of machinery.

Further information on Lightning and Power Pole caused fires have been explained in extra depth under the appropriate heading below.

Given the highly fragmented and disconnected native vegetation within the landscape, characterized by predominantly crop or grazing land, there are no established natural vegetation corridors that can be identified as significant contributors to the bushfire risk.

The term "broadacre" best encapsulates the prevailing landscape characteristics within the Shire of Kojonup. Although it may not be considered a traditional pathway, the extensive expanse of grassland vegetation within this region yields a substantial accumulation of fine fuels. This accumulation, in turn, facilitates the rapid escalation of a small bushfire into a significant area when accompanied by the predictable presence of strong prevailing winds throughout the bushfire season.

A major factor in this situation is summer lightning strikes, which are unpredictable. Firefighters in the community stay on high alert when lightning is forecasted to reduce escalation risks.

Table 8 and 9 show the recorded incidents for the shire.

Table 7 – Department of Fire and Emergency Services Incident attendance Record:

Dates: 01/07/2012 to 30/06/2022

No. of Incidents Attended

This report shows the number of Incidents attended in any capacity.
It does not count multiple turnouts to the same Incident.
Note: Bushfire (lge) is a fire greater than 1 hectare

Brigade Name	2012/2013				2013/2014				2014/2015				2015/2016				2016/2017				2017/2018				2018/2019				2019/2020				2020/2021				2021/2022				TOTAL BRIGADE COMBINED
	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	Fire - Bushfire (lge)	Fire - Bushfire (sml)	Fire - Other	TOTAL	
BOILUP BFB	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	1	1	**2**	0	1	0	**1**	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**4**
BOSCABEL BFB	1	0	1	**2**	0	0	1	**1**	2	1	0	**3**	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**	0	1	0	**1**	**9**
CHANGERUP BFB	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	1	1	0	**2**	0	0	0	**0**	1	1	0	**2**	**5**
CHERRY TREE POOL BFB	0	1	0	**1**	1	1	0	**2**	1	2	1	**4**	1	1	0	**2**	1	2	0	**3**	1	0	0	**1**	3	0	0	**3**	0	0	0	**0**	0	0	0	**0**	0	2	0	**2**	**18**
JINGALUP BFB	1	0	0	**1**	1	3	0	**4**	1	0	0	**1**	0	0	1	**1**	3	0	0	**3**	2	1	1	**4**	0	0	0	**0**	0	2	0	**2**	2	0	0	**2**	1	6	1	**8**	**26**
KOJONUP BFB	6	1	1	**8**	3	6	0	**9**	5	8	0	**13**	3	9	1	**13**	4	5	1	**10**	8	11	1	**20**	10	8	1	**19**	4	4	0	**8**	4	2	0	**6**	2	5	0	**7**	**113**
LUMEAH BFB	0	2	0	**2**	0	1	1	**2**	0	1	0	**1**	0	2	0	**2**	0	1	0	**1**	1	3	0	**4**	3	1	0	**4**	1	2	1	**4**	1	0	0	**1**	0	0	0	**0**	**21**
MOBRUP BFB	1	1	0	**2**	0	2	0	**2**	1	1	0	**2**	0	2	0	**2**	2	0	0	**2**	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**	0	1	0	**1**	0	1	0	**1**	**13**
MURADUP BFB	6	5	0	**11**	3	8	1	**12**	4	7	1	**12**	3	9	1	**13**	5	7	0	**12**	5	6	0	**11**	8	7	0	**15**	4	6	0	**10**	5	4	1	**10**	3	8	4	**15**	**121**
ORCHID VALLEY BFB	0	0	0	**0**	1	0	1	**2**	0	1	0	**1**	0	0	0	**0**	1	0	0	**1**	1	0	0	**1**	0	0	0	**0**	0	0	0	**0**	0	2	0	**2**	0	1	1	**2**	**9**
QUALEUP BFB	1	2	0	**3**	0	1	0	**1**	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	3	0	0	**3**	0	0	0	**0**	1	0	0	**1**	0	2	0	**2**	**11**
RYANS BROOK BFB	2	0	0	**2**	0	0	0	**0**	0	1	0	**1**	0	0	1	**1**	2	1	0	**3**	1	0	0	**1**	1	0	0	**1**	0	0	0	**0**	0	0	0	**0**	0	1	0	**1**	**10**

TOTAL YEAR COMBINED	2012/13	**32**	2013/14	**35**	2014/15	**38**	2015/16	**38**	2016/17	**36**	2017/18	**44**	2018/19	**46**	2019/20	**27**	2020/21	**23**	2021/22	**41**

Table 8 – Shire of Kojonup type of incident attendance Record:

Incident Cause Report

Date range: 2003 to 2022

YEAR / CAUSE	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	TOTAL CAUSE COMBINED
Machinery	0	0	0	NR	0	NR	2	4	1	2	4	0	2	0	2	0	4	NR	NR	0	**21**
Lightning	1	0	1	NR	0	NR	0	11	2	22	5	7	6	3	0	0	3	NR	NR	0	**61**
Escape Burn	0	1	0	NR	0	NR	1	3	1	2	0	1	1	0	2	1	6	NR	NR	0	**19**
Re-Ignition	0	0	0	NR	0	NR	0	0	0	0	0	0	0	1	0	0	1	NR	NR	0	**2**
Vehicle	0	0	0	NR	0	NR	0	1	0	2	1	0	1	3	0	1	1	NR	NR	0	**10**
Illegal Burn	0	0	0	NR	0	NR	0	0	1	1	1	0	0	0	0	2	0	NR	NR	0	**5**
Electrical Power Pole	1	0	0	NR	2	NR	0	5	0	1	3	1	1	0	0	1	0	NR	NR	1	**16**
Electrical	0	0	0	NR	0	NR	1	0	0	0	1	1	0	0	0	0	0	NR	NR	0	**3**
Spontaneous Combustion	0	0	0	NR	0	NR	0	1	1	0	0	0	0	0	0	0	0	NR	NR	0	**2**
Protective Burn	0	0	0	NR	0	NR	0	0	1	0	0	0	0	0	0	0	0	NR	NR	0	**1**
Structural	0	0	0	NR	0	NR	0	0	0	0	0	0	1	0	0	0	0	NR	NR	0	**1**
Angle Grinder	0	0	0	NR	0	NR	1	0	0	0	0	0	0	0	0	0	0	NR	NR	0	**1**
Suspicious	0	0	0	NR	0	NR	0	1	0	0	0	0	0	0	0	0	3	NR	NR	0	**4**
Unknown	0	0	0	NR	0	NR	1	1	1	1	1	6	5	0	10	4	2	NR	NR	0	**32**
TOTAL YEAR COMBINED	**2**	**1**	**1**		**2**		**6**	**27**	**8**	**31**	**16**	**16**	**17**	**7**	**14**	**9**	**20**			**1**	

Machinery caused fires:

Farm machinery has been identified as one of the highest contributors to bushfires within the shire of Kojonup, unfortunately the cause isn't simple. Common causes like, machinery coming into contact with dry vegetation or crops during harvest or buildup of plant debris on the equipment are avoidable but only require minimal negligence or complacency before a fire can develop.

There are several causes of fire within the equipment itself as listed below:

- Electrical issues: One of the most common causes is an electrical issue. Faulty wiring, frayed wires, or a short circuit can all lead to an electrical spark that can start a fire.
- Fluid leaks: Fluid leaks, such as oil or fuel leaks, can ignite when they come into contact with a hot surface in the engine compartment.
- Overheating: If the engine is running too hot, it can cause a fire. This can happen if the cooling system is not functioning properly, if the radiator is blocked, or if the fan is not working.
- Improper maintenance: Failure to properly maintain a vehicle can increase the risk of a header fire. This includes not replacing worn-out or damaged parts, using the wrong type of fluids, or not changing the oil regularly.
- Collision: If machinery comes into contact with power lines, stationary items, rocks. It can result in a spark that can ignite nearby materials like crops or vegetation.

Besides these main causes, there may be other factors that also play a role. Table 4 highlights the Shire of Kojonup recording a minimum of 21 machinery caused fires between 2003 – 2022.

Crop/Stubble/Agricultural Burning

Crop burning, also known as agricultural or stubble burning, involves intentionally setting fire to crop residues or leftover agricultural vegetation on farmland. Some reasoning's for undertaking this practice are removing crop residues, controlling weeds, preventing diseases, and preparing fields for the next planting season.

The practice of burning leftover crop residues, carries significant bushfire risks. The dry and flammable nature of stubble can cause fires to spread quickly, posing a danger to surrounding areas, including vegetation and properties. Smoke from stubble burning can also affect air quality and harm the health of nearby communities.

These practices are undertaken during permit season when the risk is more manageable, but this also relies upon the landowners to understand the responsibility they uphold for the surrounding residents. During the period of 2003 to 2022, 19 bushfires evolved from escaped burn.

Lightning caused fires:

Lightning strikes can cause bushfires when the heat generated by the electrical discharge ignites dry vegetation or other flammable materials on the ground. This is especially common in areas where there is a lot of dry vegetation, like grasslands or forests, and during hot and dry weather conditions when the risk of fires is high.

In the Great Southern region of Western Australia, lightning strikes are a common cause of bushfires. This is because the region is characterised by a Mediterranean climate with long, dry summers, which creates conditions that are conducive to the spread of fires. The region is also home to large areas of crop land and other types of vegetation, which can provide a significant fuel source for fires.

Refer to table 4, the Shire of Kojonup between the years 2003 – 2022 recorded a minimum 61 time for lightning caused fires.

Electrical Pole caused fires:

Pole top fires can occur in electrical power transmission and distribution systems, and they often happen due to a combination of environmental and equipment-related factors.

One of the most common causes of pole top fires is the buildup of contaminants like dirt, dust, and salt on the insulators or other electrical components on the pole top. These contaminants combined with moisture can create a conductive path that allows electricity to arc across the insulator or jump to the pole, leading to a spark or flame that can ignite nearby materials.

This can cause a spark or electrical arc to occur, which can ignite nearby materials like dry vegetation or flammable objects.

Referring to table 4, throughout the Shire of Kojonup between the years 2003 – 2022 it was recorded a minimum 16 time for electrical pole caused fires. Although the natural environment has a large influence on electrical pole fires, section 3.2.7 Key Stakeholders Mitigation Activities outlines Western Powers contribution to long term assistance in mitigating the risk of bushfires from public electrical poles.

History of Bushfires in the Shire of Kojonup

Two sizeable bushfires have occurred within the boundaries of Kojonup Shire, below outlines the incidents:

Jan 2013:

Cause: lightning strike Vegetation: blue gum plantation
Locality: Mobrup Area: 3000ha burnt
Response: 150 fire units, four water bombers, air intel helicopter, five loaders & one dozer

Narrative: This fire was contained on the day a took firefighters several days to fully extinguish, due to the lightning strike within a plantation, it wasn't acknowledgeable until the fire developed. Further escalation resulted in the fire escaping to nearby pasture allowing accelerated fire growth.

Jan 2019:

Cause: Escaped burn Vegetation: Pasture
Locality: Ryansbrook Area: 2500ha burnt
Response: 150 fire units
Narrative: over the course of 10 days, around 250 firefighters attended this incident. Starting from a winter burnt smoldering log heap, high winds of 70km per hour created the opportunity for the fire to escape into surrounding pasture.

The above incidents contribute to the historic understanding of bushfires locally to the shire, fires history can play a pivotal role in informing the decision-making process by identifying regions with a higher likelihood of fire initiation and the underlying causes, thereby facilitating the development and implementation of suitable treatment strategies.

3.2.7 Additionally Identified issues

The cause of a bushfire can be easy to recognise and record, but it requires several influences to create a cause. Explained below are prevailing issues that contribute to the ignition or continuation of a fire.

Spontaneous Combustion

Spontaneous combustion can occur on a farm when organic materials, such as hay, straw, manure, and other plant or animal-based products, undergo a process of self-heating and ignite without an external source of ignition. This can happen when organic materials are stored in large quantities and are not properly managed or maintained.

The most common causes of spontaneous combustion on a farm include:

Moisture: When organic materials such as hay or straw are baled or stacked while still wet, they can begin to decompose and generate heat. If the moisture level is high, this can lead to spontaneous combustion.

Lack of ventilation: If organic materials are stored in a tightly packed or poorly ventilated area, the heat generated during the decomposition process can build up and cause spontaneous combustion.

Overheating: When organic materials such as manure or compost are piled too high, they can become compacted, which restricts air flow and causes the materials to overheat.

Bulk storage facilities

Bulk storage can have a significant impact on the behaviour and intensity of a bushfire. Bulk storage refers to the accumulation of combustible materials such as firewood, lumber, chemicals, and other flammable materials in a particular area.

During a bushfire, these materials can serve as additional fuel sources, increasing the intensity and spread of the fire. The more fuel available, the hotter and more intense the fire can become. This can cause the fire to spread more quickly and unpredictably, making it harder for firefighters to control and contain.

Bulk storage can also create obstacles and hazards for firefighters, making it difficult for them to move around and access critical areas of the fire. The stored materials may also release toxic fumes or hazardous chemicals when burned, which can pose a health risk to both firefighters and nearby residents.

Consequential fires:

Bushfires can spread into built-up areas, fire will impact homes and their surrounding elements (including fences, gardens, cars, and stored materials). This burning of surrounding elements is known as a secondary, or consequential fire. These consequential fires present additional impacts to the house, generating radiant heat, and spreading their own embers, flames, and toxic smoke.

4.2.8 Current Bushfire Risk Management Activities

Map of Bushfire Prone Areas

The intent of the WA Government's Bushfire Prone Planning Policy is to implement effective risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure. The *State Planning Policy 3.7 – Planning for Bushfire Prone Areas* ensures bushfire risk is given due consideration in all future planning and development decisions. This policy does not apply retrospectively, however the BRM Plan can help address this risk for existing development and establishing an effective treatment plan to manage

the broader landscape and any unacceptable community risks. The Shire of Kojonup Bushfire Prone Area is shown in Figure 10.

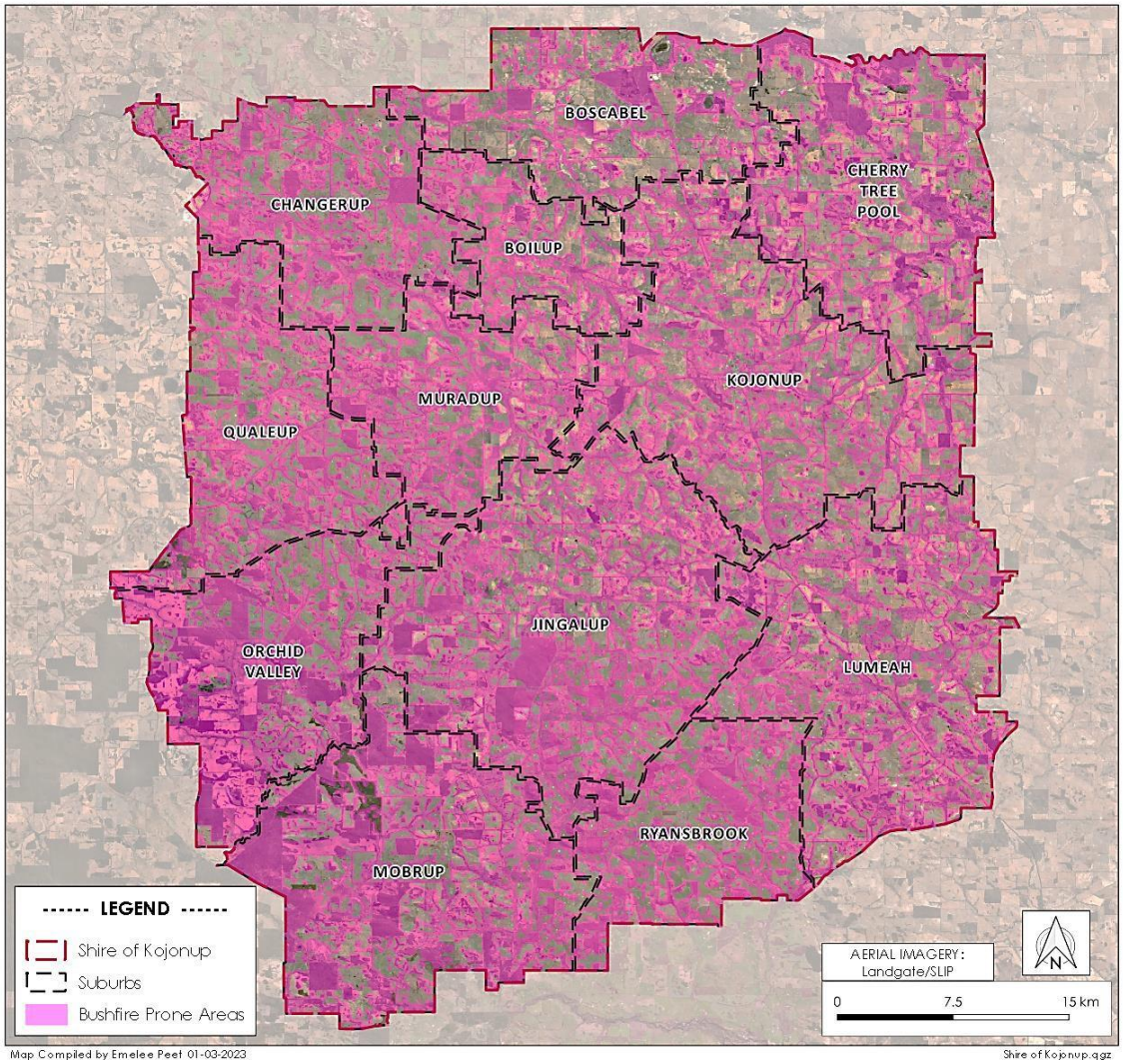


Figure 9 – Shire of Kojonup Bushfire Prone Areas Map

Volunteer Emergency Management

Bushfire Advisory Committee:

The Bushfire Advisory Committee is a group of local representatives who provide advice and recommendations to government bodies, emergency services, and the public on bushfire prevention, preparedness, and response. The committee's primary objective is to reduce the risk of bushfires and minimize their impact on communities and the environment.

They achieve this by developing and implementing bushfire management plans and strategies, advising on fire prevention measures such as hazard reduction burning, fuel management, and building codes, and providing information and education to the public on bushfire safety and preparedness.

The committee also assesses the risk of bushfires and develops response plans in the event of an emergency. They conduct research and analysis to better understand bushfire behavior and improve fire management practices.

Local Emergency Management Committee:

The purpose of a local emergency management committee is to coordinate emergency preparedness, response, and recovery efforts within a specific geographic area. This committee typically includes representatives from a variety of organizations, such as emergency services, public health agencies, local government, and community groups. By working together, the committee aims to identify and mitigate potential risks and hazards, develop emergency plans, and ensure that resources are available to respond quickly and effectively in the event of an emergency. Additionally, the committee may engage in community outreach and education efforts to help residents prepare for emergencies and to build resilience in the face of disasters.

Bushfire Brigades:

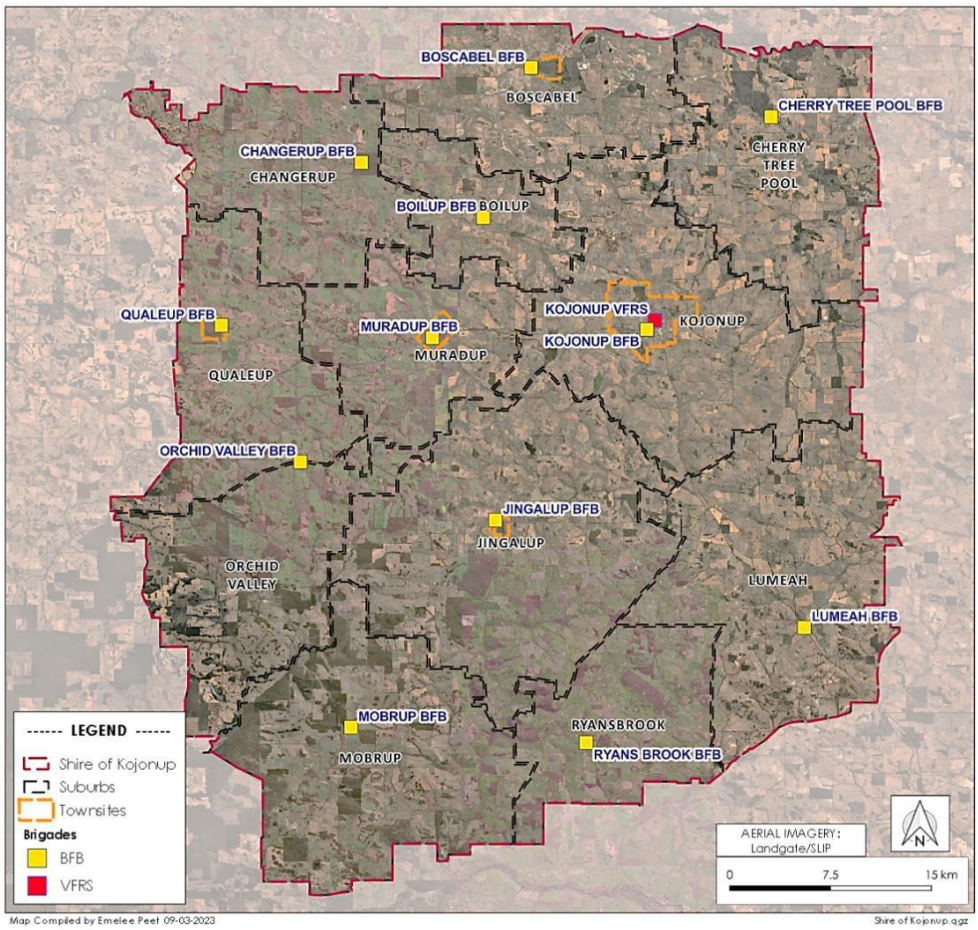


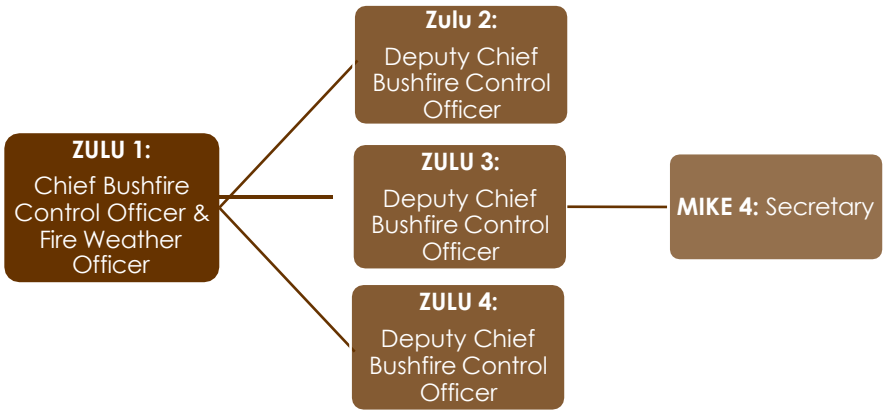
Figure 10 – Shire of Kojonup Brigade locations Map

There are 12 x Bush Fire Brigades (BFB) within the Shire. The Kojonup Shire has 493 registered volunteer BFB members with an average age of 40. The Shire appliances are as below:

- Kojonup BFB - 2.4 Broad acre appliance
- Muradup BFB - 4.4 Broad acre appliance

There are also over one hundred of privately owned farm appliances within the Shire that provide the response.

Below outlines the entire shire wide structure, call signs and figure 6 shows brigade location.



(Shire of Kojonup: overarching Bushfire Brigade management structure)

Boilup BFB	Boscabel BFB	Changerup BFB	Cherry Tree Pool BFB	Jingalup BFB	Kojonup BFB
• **BRAVO 1 -** *Fire Control Officer* • **BRAVO 2 -** *Lieutenant*	• **BOSCABEL 1 -** *Fire Control Officer* • **BOSCABEL 2 -** *Lieutenant* • **BOSCABEL 3 -** *Lieutenant* • **BOSCABEL 4 -** *Lieutenant*	• **CHARLIE 1 -** *Fire Control Officer* • **CHARLIE 2 -** *Lieutenant* • **CHARLIE 3 -** *Lieutenant*	• **CTP 1 -** *Fire Control Officer* • **CTP 2 -** *Lieutenant* • **CTP 3 -** *Lieutenant* • **CTP 4 -** *Lieutenant*	• **JINGALUP 1 -** *Fire Control Officer* • **JINGALUP 2 -** *Lieutenant* • **JINGALUP 3 -** *Lieutenant*	• **KEELO 1 -** *Fire Control Officer* • **KEELO 2 -** *Lieutenant* • **KEELO 3 -** *Lieutenant* • **TANGO 1 -** *Shire Vehicle operator*

Lumia BFB	Mobrup BFB	Muradup BFB	Orchid Valley BFB	Qualeup BFB	Ryans Brook BFB
• **LEEMA 1 -** *Fire Control Officer* • **LEEMA 2 -** *Lieutenant* • **LEEMA 3 -** *Lieutenant*	• **MOBRUP 1 -** *Fire Control Officer* • **MOBRUP 2 -** *Lieutenant* • **MOBRUP 3 -** *Lieutenant*	• **MIKE 1 -** *Fire Control Officer* • **MIKE 2 -** *Lieutenant* • **MURADUP 4.4 -** *Shire Vehicle Operator*	• **OV 1 -** *Fire Control Officer* • **OV 2 -** *Lieutenant* • **OV 3 -** *Lieutenant*	• **QUALEUP 1 -** *Fire Control Officer* • **QUALEUP 2 -** *Lieutenant* • **QUALEUP 3 -** *Lieutenant* • **QUALEUP 4 -** *Lieutenant*	• **ROMEO 1 -** *Fire Control Officer* • **ROMEO 2 -** *Lieutenant* • **ROMEO 3 -** *Lieutenant*

(Shire of Kojonup: Bushfire Brigades, including internal management structure)

DFES Brigade:

Located in the Kojonup townsite, the Kojonup Volunteer Fire and Rescue brigade are first response for structural fires and road crash rescue within the townsite, also providing backup for asset protection from a bushfire if required within the townsite.

Burning Restrictions

Burning restrictions within the Shire of Kojonup's are as follows:

- *Restricted Burning Times –1st of October to 30th*
- *Prohibited Burning Times - 1st November to 28th 14th February*

When required, Harvest and Vehicle Movement Bans are issued by the Shire and reviewed according to fuel loading at risk at the time.

Total Fire Bans are declared by DFES.

Shire of Kojonup Historic Total Fire Ban Days												
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	0	2	1	12	2	1	0	9	4	3	3	1

Table 9 – Shire of Kojonup TFB History

Fire Break Notice

A fire break notice/order is a legal requirement (Bush Fires Act 1954, Section 33) that is issued by the Local Government, to landowners or property managers to create and maintain a fire break (and/or other bushfire risk reducing requirements) on their property.

A fire break is an area or strip of land that is free from flammable materials, such as grass, leaves, twigs, or other debris, which can fuel a bushfire. The fire break is typically created by clearing or reducing vegetation, and may be plowed, sprayed, or mowed to prevent the spread of fire.

A fire break notice/order sets out the requirements for creating and maintaining a fire break, including the width and extent of the fire break, the specific methods to be used to create it, and the timeframe for creating it. Failure to comply with a fire break notice/order can result in penalties, fines, or other enforcement action.

The aim of a fire break notice/order is to reduce the risk of bushfires by creating a buffer zone that can slow down or stop the spread of fire, access for vehicles and provide a safer area for firefighters to work from. By reducing the amount of fuel available to a bushfire, a fire break can help to limit the damage and potential danger of a fire, and protect people, property, and natural resources.

The shire has divided up the land use into 3 categories, these are, 'Urban', 'Rural', and 'Plantation Land'. Within the categories, strict guidelines have been outlined for compliance with the order.

Urban land is described as land within a gazetted townsite, with compliance period being 2nd of November until 31st of May. Rural Land is described as land outside of a gazetted townsite and compliance with the order is from the 14th of December to the 31st of May. The guidelines for plantation land are based on an area exceeding three hectares planted for commercial purposes, this area doesn't define the compliance period.

The fire break notice/order is the single key function for the shire to manage private land and the fuel loads within its boundaries. The order is issued yearly with the shire consistently reviewing the contents and updates when required.

Other Current Local Government Wide Controls

Local Government Wide Controls are activities that reduce the overall bushfire risk within the Shire of Kojonup. These types of activities 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.

Further information about the Local Government Wide Controls and how they will support the treatment of bushfire risk can be found in section 7.1 Local Government Wide Controls.

Key Stakeholders Mitigation Activities

During the assessment phase, consultation with the below key stakeholders initiated to identify an appropriate point of contact and to accentuate what policies, guidelines, practices and/or contribution they are implementing towards bushfire risk mitigate within the Shire of Kojonup.

Australian Bush Heritage Fund

Australian Bushfire Heritage Fund own and manage Kojonup Reserve located in Cherry Tree Pool (Mission Road, 388.03 ha), with the primary focus on conservation of native flora and fauna. While they are still in the process of updating their Reserve management plan and fire management plan, the fund has recently installed a 10,000L water take dedicated for firefighting purposes.

This reserve has had little amount of fire since the 1960's, with only 3 records (small fire through the central western boundary1960, north-east section in 1962 and a prescribed burn roughly 2ha with DBCA in 2017). The fund does not have any self-funded response vehicles and would require the local brigade response to help extinguish a bushfire.

Department Biodiversity, Conservation and Attractions

DBCA plays a crucial role in bushfire mitigation through various actions. These include managing fire in compliance with relevant laws and guidelines, maintaining the capability for prescribed burning and bushfire mitigation, keeping records and mapping systems, preparing and reviewing regional fire plans, conducting prescribed burning and fuel management, integrating fire management with other conservation efforts, establishing fire breaks and access tracks, collaborating with stakeholders for cooperative fire management, incorporating traditional knowledge where possible, and providing fire management training to staff and operators.

Their objectives are to minimise the risk of losing threatened species, critical habitat, and important natural and cultural values from inappropriate fire regimes. While conducting bushfire mitigation and suppression, our priority is to protect human life and property first, and then focus on preserving the natural environment and cultural heritage.

bushfire mitigation strategies used by the department include early suppression of bushfires (excluding high-value assets), fire management measures for protecting biodiversity assets, ensuring the safety of threatened species, limited construction and maintenance of internal fire access tracks, assessing the need for perimeter access tracks, avoiding vegetation modification unless there is a significant risk, and establishing temporary fire control lines when necessary.

Within the Shire of Kojonup, the organisation has management orders over 20 reserves. Located within Jingalup are two reserves considered for fuel management intervention (Jingalup & Jingalup South Nature Reserves), these reserves are currently in line for a prescribed burn to be undertaken within 2023/2024.

The department has also worked with the Australian Bush Heritage Fund, undertaking burns within the Kojonup reserve. The last prescribed burn within the Kojonup reserve undertaken by DBCA was June 2017.

Main Roads Western Australia (MRWA)

Main Roads actively works to fulfill its responsibilities related to bushfire risk management and mitigation. This includes discharging its duty of care to ensure appropriate measures are in place to minimize bushfire risks. Main Roads contributes to the development and implementation of Bushfire Risk Management Plans prepared by Local Governments. By actively participating in the planning process, Main Roads ensures that its assets and infrastructure are considered in the overall bushfire risk management strategy.

To effectively manage bushfire risks, Main Roads assesses the potential impact of bushfires on its assets. This includes identifying vulnerable areas and evaluating the risk posed to infrastructure, such as roads, bridges, and other facilities. By conducting thorough risk assessments, Main Roads can implement appropriate measures to mitigate and manage the potential impacts of bushfires on its assets. This may involve incorporating design features that enhance fire resistance, implementing targeted maintenance practices, or coordinating with relevant stakeholders to develop emergency response plans.

By discharging its duty of care, contributing to Bushfire Risk Management Plans, and assessing and managing risks to its assets, Main Roads takes proactive steps to minimise the impact of bushfires on its operations, safeguarding infrastructure, and ensuring the safety of road users and the wider community.

For the purpose of bushfire risk management Main Roads' critical assets have been identified as the following assets which fall within bushfire prone areas:

- 24-hour rest bays,
- Timber and timber hybrid traffic and pedestrian bridges, and
- Regional offices and operationally important facilities in depots.

In the Great Southern Region, bridge structures undergo herbicide spraying and brush cutting as needed. Vegetation within a cleared area around bridges, extending 10 meters on each side of the structure and 5 meters beyond the barrier railing, is treated once a year.

Additionally, a select number of bridge structures receive vegetation clearing for Bridge Fire Mitigation. This involves removing all vegetation, including mature trees, within a cleared area around bridges. The cleared area extends 10 meters on each side of the structure, 5 meters beyond the barrier railing, and 6 meters above the deck to ensure a clear work environment and fire suppression.

Open areas within the road reserve, including shoulders, drains, and gravel pits, undergo Fire Hazard Reduction slashing of grasses. Approximately 200 hectares are slashed per calendar year.

Parking bays, managed by Main Roads, have scheduled grass and weed control activities twice per calendar year.

Public Transport Authority

The Public Transport Authority (PTA) takes responsibility for minimising bushfire risk on PTA Land and collaborates with local governments and fire authorities in managing this risk. This includes ensuring safety along passenger and freight rail lines, stations, depots, and other facilities. The PTA conducts fuel reduction

activities, maintains firebreaks, and implements procedures to minimise bushfire risk from maintenance activities. They also respond to fire protection notices, support emergency response measures, and liaise with fire authorities and local governments for effective bushfire mitigation strategies. As a consultative party, the PTA contributes to the preparation of Bushfire Risk Management Plans by local governments and fire authorities.

The PTA is dedicated to minimising bushfire risks on its land by:

- Contributing to bushfire risk assessments and implementing appropriate mitigation measures.
- Implementing fuel reduction strategies while considering conservation, infrastructure, and cultural values.
- Collaborating with local governments and land managers to develop long-term bushfire mitigation plans.
- Taking proactive measures for bushfire preparedness, including controlled access, safe operating procedures, and asset protection zones.
- Contributing to bushfire hazard reduction through donations, funding fuel reduction activities, and supporting rail safety access.
- Collaborating with stakeholders to protect areas of high conservation value and Aboriginal sites.

The PTA have a redundant railway spanning west to east from Qualeup, through Muradup & Kojonup continuing further east past the shires border. Four sections of the rail reserve are managed by CBH and the Shire of Kojonup, with future planning to develop a heritage rail trail east of Kojonup Townsite. At this present time no mitigation works have been undertaken within the rail reserve, but PTA have advised they will be working alongside the shire in reducing the bushfire risk within the Kojonup community.

St Bernard's Catholic Primary School (SBCPS)

As SBCPS is governed by Catholic Education Western Australia (CEWA) it is ineligible for assistance by the state government to assess the Bushfire risk of the school grounds (The Principals Guide to Bushfire). But CEWA have identified this issue and have implemented third party services to have all their schools that are located within a high bushfire risk environment, to undertake assessments of these properties and provide a similar plan as the state government schools.

"The Principal's Guide to Bushfire" is a resource provided by the Department of Education that aims to help school principals and leaders manage the risk of bushfires in their schools and communities. The guide covers a range of topics

related to bushfire management, including understanding the bushfire risk, preparing for bushfires, responding to bushfires, and recovering from bushfires.

The guide provides information on different types of bushfires, how they start, and what factors contribute to their spread. It also explains how schools can assess the bushfire risk in their area and take steps to prepare for a bushfire, such as developing a bushfire plan, conducting regular drills, and identifying safe evacuation routes.

In the event of a bushfire, the guide provides guidance on what to do during a bushfire, including how to activate the bushfire plan, communicate with staff, students, and parents, and evacuate safely. The guide also covers the recovery process after a bushfire, including managing the physical and emotional needs of the school community, accessing government support, and rebuilding the school and community. (CEWA have followed the same principles, aligning with their own structure and hierarchy)

By SBCPS having a Bushfire plan in place, they are already aware of their own contribution to the bushfire risk and have processes in place towards mitigation.

Western Power

Western Power Corporation is an electricity company that operates in Western Australia and is responsible for maintaining and operating the state's electricity network. The corporation's approach to mitigating bushfire risk includes:

Regular maintenance and inspections of its infrastructure: Western Power conducts regular maintenance and inspections of its infrastructure, including power lines, poles, and transformers, to identify potential hazards and repair or replace equipment as necessary (March to August yearly).

Vegetation management: The Corporation implements vegetation management practices to reduce the risk of vegetation coming into contact with power lines and causing bushfires (vested in either crown land or their control). This includes tree trimming, vegetation removal, and the use of herbicides.

Collaboration with emergency services: The Corporation works closely with emergency services to coordinate bushfire response efforts and support firefighting operations.

Community education and awareness: Western Power provides education and awareness campaigns to the community to encourage them to take steps to reduce bushfire risks and to report any potential hazards they observe near the electricity network.

5. Asset Identification and Risk Assessment

5.1. Planning Areas

The Shire of Kojonup was considered as a single planning area for risk assessment purposes. The assessments were prioritised and conducted in a phased approach, focusing initially on the townsites of Kojonup, Muradup, Jingalup, Qualeup, and Boscabel. Once the assessment of these townsites was completed, the risk assessments expanded outward to cover the remaining regions within the Shire. This approach ensured that the assessment process was carried out systematically, addressing the higher population and infrastructure areas first before extending to the wider shire.

5.2. Asset Identification

Asset identification and risk assessment has been conducted at the local level using the methodology described in the Guidelines using BRMS. Identified assets are categorised into the following categories and subcategories provided in Table 11.

Table 10 – Asset Categories and Subcategories

Asset Category	Asset Subcategories
Human Settlement	**Residential areas** Residential areas, including dwellings in rural areas and the rural-urban interface. **Places of temporary occupation** Commercial and industrial areas, mining sites or camps and other locations where people may work or gather. **Special risk and critical facilities** Locations and facilities where occupants may be especially vulnerable to bushfire for one or more of the following reasons: • Occupants may have limited knowledge about the impact of bushfires; • Occupants may have a reduced capacity to evaluate risk and respond adequately to bushfire event; • Occupants may be more vulnerable to stress and anxiety arising from a bushfire event or the effects of smoke; • There may be significant communication barriers with occupants; • Relocation and/or management of occupants may present unique challenges or difficulties, such as transportation, or providing alternative accommodation, healthcare or food supplies; or • Facilities that are critical to the community during a bushfire emergency.

Asset Category	Asset Subcategories
Economic	**Agricultural** Areas under production, such as pasture, livestock, crops, viticulture, horticulture and associated infrastructure. **Commercial and industrial** Major industry, waste treatment plants, mines (economic interest), mills, processing and manufacturing facilities and cottage industry. **Critical infrastructure** Power lines and substations, water pumping stations, tanks/bores and pipelines, gas pipelines, telecommunications infrastructure, railways, bridges, port facilities and waste water treatments plants. **Tourist and recreational** Tourist attractions, day-use areas and recreational sites that generate significant tourism and/or employment within the local area. These assets are different to tourist accommodation described as a Human Settlement Asset (see above). **Commercial forests and plantations** Plantations and production native forests. **Drinking water catchments** Land and infrastructure associated with drinking water catchments.
Environmental	**Protected** Flora, fauna and ecological communities that are listed as a: • Critically Endangered, Endangered or Vulnerable species under the Environmental Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act 1999) (including associated critical habitat); • Critically Endangered, Endangered or Vulnerable species under the Biodiversity Conservation Act 2016; • Critically Endangered, Endangered or Vulnerable ecological community under the EPBC Act 1999 (Cth); • Critically Endangered, Endangered or Vulnerable Threatened Ecological Community (TEC) endorsed by the Minister for Environment (WA); • Fauna protected under international conventions; and • Ramsar wetlands of international importance. **Priority** Flora, fauna and ecological communities that are a: • Priority species listed on the Priority Flora or Priority Fauna Lists held by DBCA (Priority 1-5). • Priority Ecological Community (PEC) (Priority 1-5); and • Wetlands of national or state importance.

Asset Category	Asset Subcategories
	Locally important Species, populations, ecological communities or habitats that the local community or independent scientific experts consider important for the area and for which there is some scientific evidence that protection would be beneficial. Wetlands of local importance. Sites being used for scientific research.
Cultural	**Aboriginal heritage** Places of indigenous significance identified by the DPLH or the local community. **European heritage** Non-Indigenous 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 local community as being significant to local heritage. **Other** Other assets of cultural value to the local community, for example community halls, churches, clubs and recreation facilities.

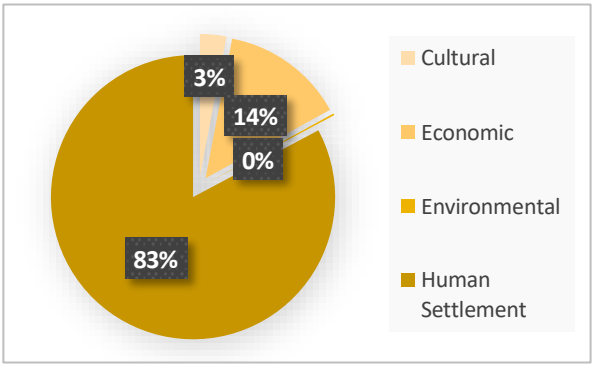
5.3. Assessment of Bushfire Risk

The *Asset Risk Register* will be maintained in BRMS, this information is not included in the plan because the data is constantly evolving requiring real-time updates and adjustments based on changing circumstances and new information.

The percentage of assets within the local government in each asset category at the time of BRM Plan endorsement is shown in Table 12.

Table 11 – Asset Category Proportions

Asset category	Proportion of identified assets
Human Settlement	82.8%
Economic	14%
Environmental	0.2%
Cultural	3%



5.3.1 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.

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

- Consequence Rating – Human Settlement, Economic and Cultural Assets

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

- 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.

5.3.2 Likelihood Assessment

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

5.3.3 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.

5.3.4 Local Government Asset Risk Summary

A risk profile for the local government is provided in Table 13. This table shows the proportion of assets at risk from bushfire in each risk category at the time the BRM Plan was endorsed.

Table 12 – Local Government Asset Risk Summary

Asset Category	Risk Rating					
		Low	Medium	High	Very High	Extreme
	Human Settlement	1%	8%	15%	34%	26%
	Economic	0%	1%	1%	3%	8%
	Environmental	0%	0%	0%	0%	0%
	Cultural	0%	0%	1%	0%	2%

6. Risk Evaluation

6.1. Evaluating Bushfire Risk

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

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

6.2. 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 landowner, 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 13 – Criteria for Acceptance of Risk and Course of Action

Risk Rating	Criteria for Acceptance of Risk	Course of Action
Extreme	For optimal management of the situation, it is essential to have exceptional controls in place. In order to address the matter urgently, prompt treatment action is necessary.	Simply relying on routine controls is insufficient for effectively managing the risk. In the initial two years of the BRM Plan, it is crucial to take specific actions whenever there is adequate resourcing and funding available. The following approach will be taken for treatments: • Prioritisation will be given to treatments that provide the greatest benefits to multiple assets and critical infrastructure. • Treatments that benefit vulnerable communities will be given higher priority. • Partnerships with other agencies will be identified for strategic mitigation. • Effective communication with asset owners in this category will be a priority, focusing on enhancing their understanding of the risks associated with these assets (refer to the Communications plan). After the completion of the undertaken works, a review will be conducted for both the assets and the treatments. The frequency of reassessment for each treatment will be determined on a case-by-case basis, taking into consideration the specific circumstances.
Very High	To ensure an acceptable level of risk management, it is imperative to have robust controls in place. In order to address the situation effectively, treatment action is necessary.	Routine controls are insufficient for effective management of the risk. In the initial three years of the BRM Plan, it is crucial to take specific actions whenever there is adequate resourcing and funding available. The following approach will be taken for treatments: • Prioritisation will be given to treatments that provide the greatest benefits to multiple assets and critical infrastructure. • Treatments that benefit vulnerable communities will be given higher priority. • Partnerships with other agencies will be identified for strategic mitigation. • Effective communication with asset owners, focusing on enhancing their understanding of the risks associated with these assets (refer to the Communications plan). After the completion of the undertaken works, a review will be conducted for both the assets and the treatments. The frequency of reassessment for each treatment will be determined on a case-by-case basis, taking into consideration the specific circumstances.

High	To ensure an acceptable level of risk management, it is imperative to have robust controls in place. In order to address the situation effectively, treatment action is necessary.	Routine controls are insufficient for effective management of the risk. In the initial three years of the BRM Plan, it is crucial to take specific actions whenever there is adequate resourcing and funding available. Treatments will be approached by: • Emphasis will be given to treatments that yield the highest benefits for multiple assets and critical infrastructure. • In cases where assets are located adjacent to Extreme or Very High assets, treatments may be extended to include them, considering the potential strategic advantages. • Communication with stakeholders, as outlined in the Communications Plan, will be actively pursued. After the completion of the undertaken works, a review will be conducted for both the assets and the treatments. The frequency of reassessment for each treatment will be determined on a case-by-case basis, taking into consideration the specific circumstances.
Medium	Immediate treatment action is not necessary. Regularly monitoring is important to maintain the associated risks.	No specific action is needed in this scenario. The risk will be effectively managed through routine controls, which will be continuously monitored as necessary. To ensure ongoing effectiveness, risk assessments will be reviewed at least once during the lifespan of the BRM Plan.
Low	Immediate treatment action is not necessary. Regularly monitoring is important to maintain the associated risks.	No specific actions are necessary in this case. The risk will be managed using routine controls and will be monitored as needed.

6.3. Treatment Priorities

The treatment priority for each asset has been automatically assigned by BRMS and recorded in the *Treatment Schedule*, based on the asset's risk rating. Table 15 shows how consequence and likelihood combine to give the risk rating and subsequent treatment priority for an asset.

Table 14 – Treatment Priorities

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

7. 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.

7.1. Local Government Wide Controls

Local government wide controls are activities that are non-asset specific, rather they reduce the overall bushfire risk within the local government. The below list outlines the controls actively being implemented by the shire:

- Bush Fires Act 1954, Section 33 notices, including applicable fuel management requirements, firebreak standards and annual enforcement programs;
- Declaration and management of Limited Burning Times for the local government area;

- Declaration and management of HVMBs for the local government area;
- TFBs declared and managed by 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;
- State-wide arson prevention programs developed in conjunction with WA Police and DFES;
- Monitoring performance against the BRM Plan and reporting annually to the local government Council and OBRM;
- Quarterly BFAC meetings to review current practices and contemporary bushfire management concepts; and
- Quarterly LEMC meetings.

7.2. 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 five asset specific treatment strategies:

- Fuel management

  Treatment reduces or modifies the bushfire fuel through manual, chemical and planned 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.

7.3. Development of the Treatment Schedule

The treatment schedule is a list of bushfire risk treatments recorded within BRMS. The Shire of Kojonup will be focusing on developing a program of works that covers activities to be undertaken within the first year after the approval of the BRM Plan. The treatment schedule will evolve and develop throughout the life of the BRM Plan.

The treatment schedule was developed in broad consultation with landowners and other stakeholders including DFES and DBCA.

Landowners 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 landowner to ensure treatments detailed in this BRM Plan's *Treatment Schedule* are completed.

8. Recommendations

The recommendations in table 15 list alternative options that can contribute to mitigating and managing bushfire risks. These recommendations have been identified as alternatives to what BRMS and associated programs provide, utilising these recommendations can present proactive measures to reduce the potential impact of bushfires on lives, property, and the environment.

Each recommendation within this section represents a key element of the overall risk management strategy, addressing specific areas of concern and outlining practical steps to be taken. These recommendations are tailored to the unique characteristics of the region, considering factors such as vegetation types, weather patterns, population density, and existing infrastructure.

These recommendations provide guidance on preventive measures, such as fuel reduction activities and infrastructure modifications, as well as emergency response procedures, community education, and interagency coordination.

The implementation of these recommendations requires a collaborative effort, involving various stakeholders, including government agencies, emergency services, local communities, and landowners.

Table 15 – Table of Recommendations for the Shire of Kojonup

Subject	Recommendation
Habitable Buildings with build date pre-2015	Shire of Kojonup is a generational town which means many habitable buildings were built before bushfire prone areas, policies and guidelines. Providing advice/education around voluntary upgrades, repairs or additions to buildings for better protection for bushfire. Examples: gutter guard to reduce fine fuels close to the roof space, closing gaps around the exterior of the house, inspecting exposed timber beams for weathering, evaporative air-conditioning upgrades, solar panel maintenance, fly screen material and other external plastic facades.
Asbestos buildings	As highlighted above, many properties within the shire may contain or be built out of Asbestos, providing education around asbestos building and what it can mean during and after a fire.
Identifying fire period/seasons	Some bushfires have been caused due to lack of advertisement surrounding prohibited/permit times of the year, utilising the main roads around the shire with signage to identify if permits are required or prohibited would help reduce the risk of accidental fires.
Fire danger ratings	As highlighted above, during permit season and the newly introduced system "AFDRS", Signage to display current information of the fire danger rating is, can also help reduce accidental fires on bad weather days.
Fire break notice	The fire break notice is a universal requirement for all shires/city's, yearly monitoring of the terminology used within a notice from surrounding shires and city's (and updating as needed). Would be highly recommended for ease when considering transitioning new or temporary residents.
Fire break notice	Expressed profusely throughout this BRMP, a vast majority of the land is used for agricultural purposes. Consider an addition to the firebreak order for management of crop fuel loads during harvest, crops located on the border of a farm to cut the crop lower to 100mm, at a width of 15m from the fence. This will help reduce the risk of fires escaping properties during harvest and the bushfire season.
Local community group	Consider supporting development of a Friends of environmental group for Myrtle Benn/Showgrounds to help manage and maintain these significant vegetated areas located close to dense population. (weeding, surveillance of illegal activity, maintenance of basic assets e.g. fencing)
Management plans	Consider collaborating with the land managers of Myrtle Benn/Showgrounds to develop an urban bushland management plan

9. 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*.

9.1. Review

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

- Changes to organisational responsibilities or legislation;
- Changes to the bushfire risk profile of the local government; or
- Following a major fire event.

9.2. 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 as described in Table 14 – Criteria for Acceptance of Risk and Course of Action. New assets will be added to the Asset Risk Register when they are identified.

9.3. Reporting

The Shire of Kojonup will be requested to contribute information relating to their fuel management activities to assist in the annual OBRM *Fuel Management Activity Report*.

The CEO or an authorised shire employee will provide annual progress reports on the mitigation works and management of bushfire risk through the BRM Plan to the Council sub-committees, including the BFAC (Bushfire Advisory Committee), LEMC (Local Emergency Management Committee), and other relevant working groups. However, additional reporting may be conducted more frequently as required based on the specific needs and circumstances.

10. 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 (BRMS) used to record the details of assets identified in the Bushfire Risk Management Plan (BRM Plan).
Asset Risk Register	A report produced within the BRMS that details the consequence, likelihood, risk rating and treatment priority for each asset identified in the BRM Plan.
Bushfire	Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective.
Bushfire Hazard	The hazard posed by the classified vegetation, based on the vegetation category, slope and separation distance.
Bushfire Risk Management Plan	A development related document that sets out short, medium and long term bushfire risk management strategies for the life of a development.
Bushfire Risk	The chance of a bushfire igniting, spreading and causing damage to the community or the assets they value.
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 Risk	The chance of a bushfire igniting, spreading and causing damage to the community or the assets they value.
Consequence	The outcome or impact of a bushfire event.

Draft Bushfire Risk Management Plan	The finalised draft BRM Plan is submitted to the Office of Bushfire Risk Management (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 approval.
Geographic Information System (GIS)	A data base technology, linking any aspect of land-related information to its precise geographic location.
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, it is the potential of a bushfire igniting, spreading and impacting on an asset.
Locality	The officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns).
Map	The mapping component of the BRMS. Assets, treatments and other associated information is spatially identified, displayed and recorded within the Map.
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.
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.
Risk Identification	The process of recognising, identifying and describing risks.
Risk Register	A component within the BRMS used to record, review and monitor assessments and treatments associated with assets recorded in the B 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.
Rural Urban Interface	The line or area where structures and other human development adjoin or overlap with undeveloped bushland.
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 planned 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 BRM Plan, including coordinating or undertaking work, monitoring, reviewing and reporting.
Treatment Planning Stage	The status or stage of a treatment as it progresses from proposal to implementation.
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 BRMS that details the treatment priority of each asset identified in the BRM 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 planned burn.
Vulnerability	The susceptibility of an asset to the impacts of bushfire.

11. Common Abbreviations

AFAC	Australasian Fire and Emergency Services Authorities Council
BFAC	Bush Fire Advisory Committee
BRM	Bushfire Risk Management
BRM Branch	Bushfire Risk Management Branch (DFES)
BRM Plan	Bushfire Risk Management Plan
BRMS	Bushfire Risk Management System
DBCA	Department of Biodiversity, Conservation and Attractions
DDA	Due Diligence Assessment
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
EPBC Act	Environmental Protection and Biodiversity Conservation Act
FPC	Forest Products Commission
GIS	Geographical Information System
LEMC	Local Emergency Management Committee
OBRM	Office of Bushfire Risk Management (DFES)
PEC	Priority Ecological Community
SEMC	State Emergency Management Committee
TEC	Threatened Ecological Community
UCL	Unallocated Crown Land
UMR	Unmanaged Reserve
WA	Western Australia
WAPC	Western Australian Planning Commission

12. Appendices

Appendix A Shire Wide Collaborative Approach Mitigation Controls

Appendix B Communication Strategy

Appendix A

Bushfire Risk Management Planning – Shire Wide Collaborative Approach Mitigation Controls

	Control	Action or activity description	Lead agency	Other stakeholder(s)	Notes and comments
1	Firebreak Notice (Bush Fires Act 1954)	Annual LG Firebreak Notice	Shire of Kojonup	Landowners Land Managers Shire of Kojonup Ranger	Published Annually. Inspect local properties. 'Fire Access Track' has the same meaning as 'Fire Break', in the Bush Fires Act 1954.
2	Prohibited, Restricted Burning Times and Total Fire Bans. Bush Fire Control (Bush Fires Act 1954)				
3	Total Fire Ban Declaration	Restriction of activities that may cause or contribute to the spread of a bushfire	DFES	Shire of Kojonup Western Power Water Corporation Local Residents	A Total Fire Ban (TFB) is declared because of extreme weather conditions or when current operational commitments have reduced statewide resources / capabilities. A TFB is declared by DFES following consultation with the LG.
4	Harvest and Vehicle Movement Bans	Restricting the movement of vehicles during harvesting in the Bushfire Season.	Shire of Kojonup	Shire of Kojonup Western Power Local Residents	A Harvest and Vehicle Movement Ban may be imposed for any length of time but is generally imposed for the 'heat of the day' periods and may be extended or revoked by the local government should weather conditions change.
5	Townsite UCL/UMR land management	Preparedness, mitigation work conducted on lands owned by Department of Planning, Lands and Heritage (DPLH) and managed by DFES.	DFES	Bushfire Brigades DPLH	Annual funding is allocated to UCL/UMR land within gazetted boundary with priorities identified in consultation with stakeholders and managed through DFES.
6	Rural UCL/UMR land management	DBCA's indicative burn program, conduct mulching and other mechanical treatments to reduce fuel load or provide fire access.	DBCA		Plans can be accessed via the DBCA website.
7	Shire land management	Shire program to maintain access tracks, reduce fuel load and remove hazards as required.	Shire of Kojonup	Kojonup Bushfire Brigades	Fuel reduction program on all SoK reserves. This includes access track installation and maintenance, weed reduction (slashing, spraying), vegetation thinning and removal and prescribed burning.

	Control	Action or activity description	Lead agency	Other stakeholder(s)	Notes and comments
8	State planning framework and local planning schemes	Implementation and compliance with SPP3.7 and the Bushfire Protection Criteria of the Guidelines for Planning in Bushfire Prone Areas where required	Shire of Kojonup DPLH	WAPC Landowners	State planning framework and local planning schemes, implementation of appropriate subdivision and building standards in line with DFES, WAPC and Building Commission policies, guidelines and standards
9	State-wide arson prevention programs	Police infringement and reward schemes to prevent arson. various awareness campaigns and information packages	DFES WAPOL	Shire of Kojonup General Public	Participation as required. The Shire participates in campaigns for arson prevention. The LG assists in the promotion of Arson prevention campaigns
10	Public School Bushfire Management	A plan designed to assist staff to prepare for a total fire ban, catastrophic fire danger rating, or a bushfire.	Dept of Education	DFES Shire of Kojonup	This plan was developed in accordance with the Emergency and Critical Incident Management Policy

Appendix B