MORAWA

BREAKING NEW GROUND

Bushfire Risk Management Plan 2023-2028

Office of Bushfire Risk Management – Bushfire Risk Management Plan reviewed 7 February 2023
Shire of Morawa Council BRM Plan endorsement 16 March 2023

Golden Grevillea – Morawa's Floral Emblem

Acknowledgement of Country

The Shire of Morawa acknowledges the traditional custodians, the Yamatji People, and recognises the contribution of Yamatji elders past, present and future, in working together for the future of Morawa.

Contents

Document Control

Document Name	Bushfire Risk Management Plan	Current Version	Final Draft
Document Owner	Shire of Morawa Chief Executive Officer	Issue Date	7 February 2023
Document Location	Shire of Morawa Administration Centre	Next Review Date	7 February 2028

Document Endorsements

The Shire of Morawa 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 Morawa 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 the Shire of Morawa Council satisfies their endorsement obligations under State Hazard Plan – Fire.

Local Government	Representative	Signature	Date
Shire of Morawa	Cr Karen Chappel		16 March 2023

Amendment List

Version	Date	Author	Section
Draft v1.0	February 2022	DW	Initial Draft
Draft v1.1	December 2022	DW	Update sections following QA review
Final Draft	February 2023	DW	Update Section 4.3

Publication Information

Disclaimer

In approving this BRM Plan, the Shire of Morawa Council is acknowledging the assets that have been identified within their local community and the risk ratings and treatment priorities assigned. Approval of the plan is a commitment by the Shire of Morawa to work with land owners and managers to address unacceptable risk within the community. Endorsement of this plan is not an acceptance of responsibility or commitment by the Shire of Morawa to treat risks occurring on land that is not owned or managed by the Shire.

[1] Guidelines for Preparing a Bushfire Risk Management Plan. November 2020

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 Morawa 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/NZS 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 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 the BRM Plan is to effectively manage bushfire risk in order to protect people, assets and other things of local value in the Shire of Morawa. 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 Heritage Act 1972*
- *Aboriginal Cultural Heritage Act 2021*
- *Biodiversity Conservation Act 2016*
- *Building Act 2011*
- *Bush Fires Act 1954*
- *Conservation and Land Management Act 1984*
- *Country Areas Water Supply Act 1947*
- *Emergency Management Act 2005*
- *Environmental Protection Act 1986*
- *Environmental Protection and Biodiversity Conservation Act 1999 (Cth)*
- *Fire Brigades Act 1942*
- *Fire and Emergency Service Act 1998*
- *Metropolitan Water Supply, Sewerage and Drainage Act 1909*
- *National Trust of Australia (WA) Act 1964*
- *Native Title Act 1993*
- *Bush Fires Regulations 1954*
- *Emergency Management Regulations 2006*
- *Planning and Development (Local Planning Scheme) Regulations 2015*
- *SEM Plan (State Emergency Management Committee (SEMC) 2022)*
- *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 2016)*
- *State Planning Policy 3.7: Planning in Bushfire Prone Areas (WAPC 2015, 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 3959-2009 Construction of Buildings in Bushfire-Prone Areas (Standards Australia 2009)

- AS/NZS 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)
- Bushfire Risk Management Planning Handbook (DFES 2018)
- Code of Practice for Timber Plantations in Western Australia (Forest Products Commission (FPC) 2006)
- Guidelines for Preparing a Bushfire Risk Management Plan 2020 (DFES 2020)
- Guidelines for Planning in Bushfire Prone Areas (WAPC 2017)
- Guidelines for Plantation Fire Protection (DFES 2011)
- National Disaster Risk Reduction Framework (Department of Home Affairs 2018)
- National Strategy for Disaster Resilience (Attorney-General's Department 2011)
- Public Service Circular No. 88 use of Herbicides in Water Catchment Areas (Department of Health 2007)
- Western Australian Emergency Risk Management Guide (SEMC 2015)

1.3.3. Shire of Morawa Related Documents

- Annual Firebreak Notice
- Asset Management Policy (ENG03)
- Bushfire Brigade Local Law 2018
- Bushfire Policy (ENG02)
- Community Strategic Plan 2022-2032
- Corporate Business Plan 2019-2023
- Growth and Implementation Plan 2012
- Local Emergency Management Arrangements 2018
- Local Recovery Plan
- Planning Scheme No. 3
- Planning Strategy 2021
- Tourism Plan 2022-2027 (Draft)

2. The Risk Management Process

The risk management processes used to identify and address risk in this BRM Plan are aligned with the international standard for risk management, *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines.* This process is outlined in Figure 1.

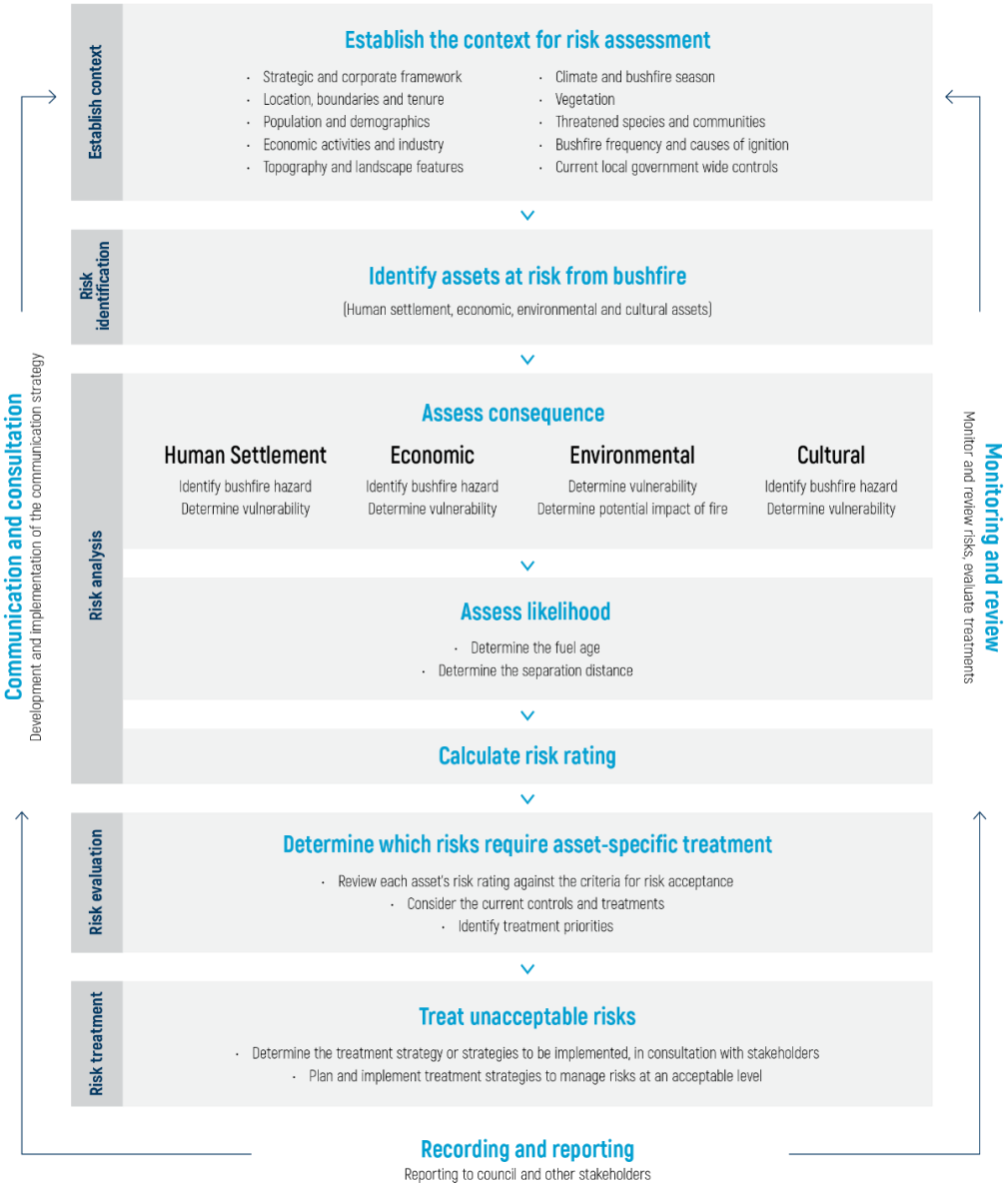


Figure 1 - An overview of the risk management process[2]

[2] 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 landowners 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, Conservation and Attractions	• Participate in and contribute to the development and implementation of BRM Plans • 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

Stakeholder Name	Roles and Responsibilities
	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 1)**.

3. Establishing the Context

3.1. Description of the Local Government and Community Context

The Shire of Morawa has a rich cultural past and the land comprising the area is referred as *Yamatji* country meaning 'man' or 'human being'. Traditionally, within the Yamatji region Aboriginal groups comprised a cultural bloc unified by dialects of common languages and similar patterns of social organisation, as well as ritual, religious and mythological beliefs. Widi Mob as one of these groups lived a nomadic life of following the food cycle and seeking shelter in the natural features of the land and are the recognised group for the land Morawa is now located on. Members of Widi Mob continue to honour their heritage and continue to practice age old traditions and maintenance on country that is now within the Morawa Shire.

In 1894, the Midland Railway linking Perth and Geraldton was completed which brought the first agricultural settlers into the northern wheatbelt districts. Gradually, agricultural settlement spread out and the opening of the Government Railway through Wubin, Perenjori and Morawa in 1913 brought further settlers and development to the area.

In 1912, the townsite of Morawa was formally declared in the Upper Irwin Road Board. In 1916, the Perenjori-Morawa Road Board formed, as sections of the Upper Irwin Road district were excised into more localised divisions. In 1928, the Morawa Road District was formed which became known as the Shire of Morawa in 1961, following the enactment of the Local Government Act.

The Council consists of seven elected members that reflect the scope of the community. The townsite of Morawa is centrally located in the Shire, and offers residents education, medical, sporting and administrative amenities, surrounded by the agricultural and mining industry of the Shire[3].

3.1.1. Strategic and Corporate Framework

The Shire of Morawa's Strategic Community Plan 2022-2032 is a long-term planning document that sets out the community's vision and aspirations for the future, and an overview of the key strategies to be focussed on to achieve these aspirations. It endeavours to be a plan for all and moves away from operational or goal specific to the local government and looks more holistically at what the community aspires to be. The community vision has been revised to emphasise the uniqueness of Morawa and Council.

[3] Shire of Morawa – https://www.morawa.wa.gov.au/shire/overview.aspx

The Shires Vision and Aspirations within the Strategic Community Plan 2022-2032 are shown in Figure 2.

Figure 2 – Shire of Morawa Vision and Aspirations[4]

Bushfire has been identified as one of the Shire's key hazards in their Local Emergency Management Arrangements and through the State Risk Project. In addition, the issue of bushfire hazard mitigation is acknowledged in the Shire of Morawa *Corporate Business Plan 2019-2023* and the *Local Planning Strategy (2018)*.

In the Integrated Planning and Reporting Framework of the Shire, the BRM Plan is considered a purpose-specific strategy to address community concerns around safety, fire and emergency management. The plan and the planning process contribute to achievement and growth in each of the four pillars of the Corporate Business Plan 2019-2023:

- Economic
- Environment
- Social Connection
- Leadership and Governance

The purpose and outcomes of the BRM Plan align with the following objectives and strategies from the Corporate Business Plan as shown in Table 2.

[4] Shire of Morawa Strategic Community Plan – 2022-2032

Table 2 – Linkages of the Strategic and Corporate Framework to Bushfire Risk Planning[5]

Strategic Plan Element	Link to BRM Planning
Objective 1 – A diverse, resilient and innovative economy Outcome 1.7 – Well maintained local roads and ancillary infrastructure • Strategy 1.7.4 – Control roadside vegetation	• Reduce fuel loads on road reserves by using a variety of hazard reduction methods
Objective 2 – Protect and enhance the natural environment Outcome 2.2 – Enhance and promote rehabilitation of our native vegetation • Strategy 2.2.2 – Rehabilitate, protect and conserve Shire controlled land, with greater emphasis on controlling Declared Pest Plants • Strategy 2.2.3 – Support and promote environmental management practices	• Environmental considerations and protection of TEC's when mitigation strategies are developed and works undertaken to reduce fuel loads in natural areas, parks and reserves • Weed management supports fire objectives through removal of fine fuels • Mitigation works undertaken reduce likelihood of increased weed species
Objective 3 – A community that is friendly, healthy and inclusive Outcome 3.1 – Services and facilities that meet the needs of the community • Strategy 3.1.2 – Advocate and support the maintenance of adequate police and emergency services Outcome 3.3 – Retain a safe environment • Strategy 3.3.1 – Continue to support visiting Ranger Services	• Volunteer brigades are engaged and valued in the planning and undertaking of mitigation works in their brigade areas using local knowledge and experience • BRM Planning and implementation is integral to the management of bushfire risk. The BRM Plan will be linked with existing structures such as the Local Emergency Management Committee (LEMC), Bush Fire Advisory Committee (BFAC) and Ranger Services • Firebreak inspection program undertaken by Ranger Services and identifying high bushfire risk areas

[5] Shire of Morawa Corporate Business Plan 2019-2023

Strategic Plan Element	Link to BRM Planning
Objective 4 – A connected community with strong leadership Outcome 4.1 – A well informed, connected and engaged community that actively participates • Strategy 4.1.1 – Develop a communication strategy	• Engaging the community in a wide range of ways is critical to ensuring the success of BRM Planning. • The communication of bushfire risk, property preparation and other elements of emergency management utilising social media platforms will be a feature of the Shire's community engagement activities

The *Local Planning Strategy* incorporates a vision, aspirational goals and objectives principles, and a series of precinct plans to address the key opportunities, issues and challenges within the Shire. The BRM Plan will strengthen the Shire's capacity to achieve the following strategy objectives:

- C4 – Provision of sufficient land to accommodate required range of emergency services;
- E5 – Maximise retention and rehabilitation of native vegetation within Morawa and support the retention of natural landform;
- E8 - Seek to minimise the potential impact of bushfire on property and infrastructure; and
- G1 - Maximise community involvement in planning strategy and policy formation.

The BRM Plan is a hazard specific plan with a primary objective to reduce unacceptable bushfire risks and facilitate the safe and perpetual development of the Shire into the future. The BRM Plan identifies assets within the Shire exposed to significant bushfire risk and aims to reduce the potential impacts from bushfire across all land tenures within the Shire. This will be facilitated using prudent planning and coordinated land treatment strategies. The application of treatment strategies will be across community assets that are exposed to bushfire risk. The treatments when implemented, will reduce the potential loss and damage resulting from bushfires and help protect human life and local assets within the Shire.

The Shire of Morawa recognises the importance of leadership and coordination in emergency management, as demonstrated through their Local Emergency Management Arrangements (LEMA), which highlights the multi-agency approach to emergency management across the Shire. The committee provides an important forum for the BRM Plan to consult and support the development of the BRM Plan as a tenure blind, strategic document.

The Shire's LEMC and BFAC are identified as key stakeholders in the development, implementation and review of the BRM Plan. Their input and advice is highly valuable to the bushfire risk management process and will provide an important forum for consultation, joint-agency partnerships and the resolution of local issues.

The BRM Plan will assist by improving community awareness of bushfire risk and treatment activities planned in their area. Identification of treatment priorities will assist with forward planning and budgeting for treatment activities. Bushfire risk management has primarily been focussed on the response and recovery from bushfires however, there has been a gradual change in recent years to a risk management approach that also includes bushfire prevention and preparedness activities.

The prevention and preparedness treatment strategies currently employed to reduce the bushfire risk within the Shire include:

- reducing fuel loads through annual works programs
- proactively addressing risk identified on Shire managed land; and
- controlled burns on Shire managed reserves where appropriate.

These treatment strategies are managed within their budgetary and human resource constraints.

The following challenges are identified for the Shire, of which have the potential to impact the objectives of this BRM Plan. Consequently, special consideration should be given to these matters during the life of this plan:

- changes to agricultural practices that result in increased bushfire risk or ignitions;
- ageing population and its impact on volunteerism, service delivery, community preparedness and emergency planning for vulnerable / special risk groups and facilities within the community; and
- attraction and retention of residents and its impact on succession planning within the emergency services volunteer brigades.

Ultimately, the Shire's Chief Executive Officer (CEO) is responsible for the BRM Plan process, sustainability and continuity, noting that the CEO can delegate all or some of these responsibilities. There are multiple stakeholders involved in the effective implementation of the BRM Plan. The Shire's responsibility is to address the risk within its scope and facilitate the management of bushfire risk in the wider community in accordance with the *Bush Fires Act 1954* and relevant local laws and may involve officers across the Shire's departments, as outlined in Figure 3.

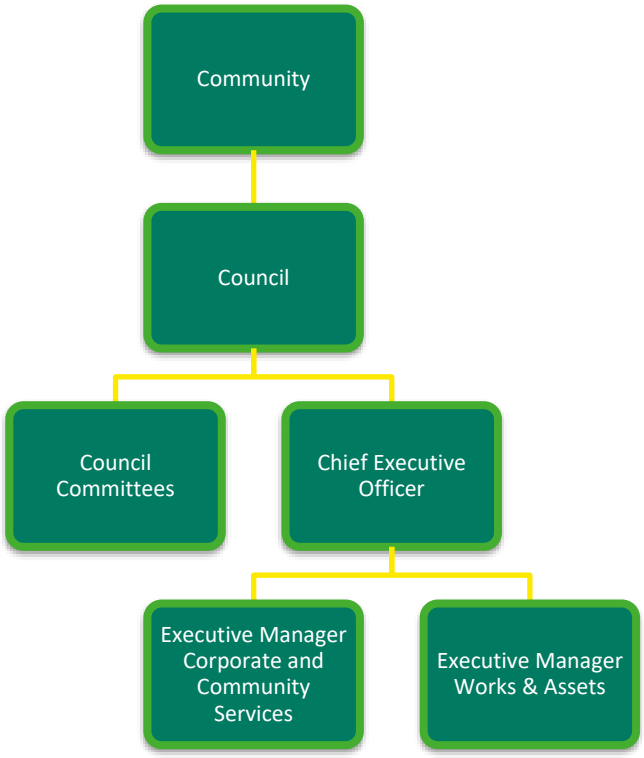


Figure 3 – Shire of Morawa organisational structure

The Shire has access to the services of a Community Emergency Services Manager (CESM). This position is shared across neighbouring local governments being the Shires of Murchison, Perenjori and Yalgoo and is supported by the DFES, managed by a Memorandum of Understanding.

The CESM position will have a supporting role throughout the implementation, monitoring and review phases of this BRM Plan, particularly in relation to the Shire's mitigation program. This position has strong support from the emergency services volunteers, including advice from the Chief Bushfire Control Officer, BFAC and LEMC when determining bushfire risk, treatment strategies and priorities.

However, given the changing priorities, funding limitations and political landscape, the current arrangements supporting the CESM position may be subject to change in the future. Should this position not continue, the CESM responsibilities will be allocated to another officer within the Shire that is tasked with responsibilities for emergency management, noting however, that the capability of the Shire will be reduced overall, as there would no longer be a dedicated resource available to support these functions.

3.1.2. Location, Boundaries and Tenure

Morawa is an Aboriginal name, first shown on maps of the area for a rock hole in 1920. It is possibly derived from "Morowa" or Morowar", the Dalgite, a small marsupial which burrows into the earth. A Dalgite is a type of bilby. Another possible meaning is "the place where men are made". This is probably a reference to initiation ceremonies conducted in the area by the Aboriginal inhabitants.

The Shire of Morawa is approximately 396 km north of Perth and located within the North Midlands sub-region, which forms part of the broader Mid-West Region. The region covers approximately 478,000 km^2 and accounts for almost one fifth of the State's land mass. The Mid-West economy is one of WA's most diverse and is built around mining, agriculture, fishing and tourism. Covering a total area of approximately 3,528 km^2, the Shire includes the township of Morawa and the rural localities of Canna, Gutha, Koolanooka, Merkanooka and Pintharuka. These rural localities were historically established to service the rural hinterland and some of these contain receival bins for CBH.

The Shire is bordered by the City of Greater Geraldton to the north, the Shires of Mingenew and Three Springs to the west, the Shire of Perenjori to the south and the Shire of Yalgoo to the east. Morawa is a sub-regional centre which is intended to provide services to those living in surrounding settlements within the Mid-West region. Figure 4 shows the location of Morawa within the wider context of the region and Western Australia.

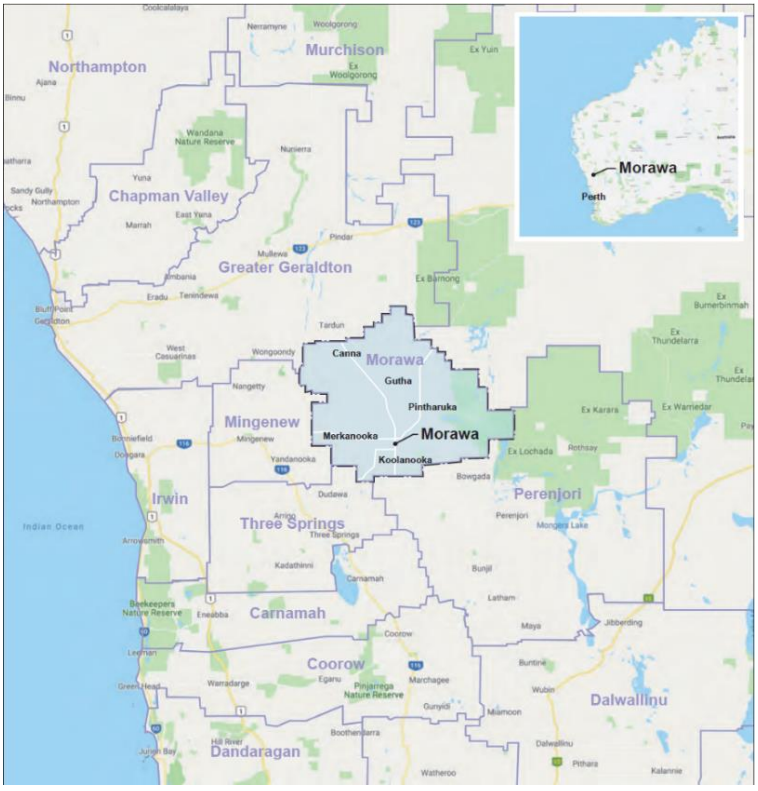


Figure 4 – The Shire of Morawa's location in broader context

Morawa has a rich blend of historic and modern attractions scattered throughout the town against the backdrop of a spectacular wildflower season display. The town services the surrounding farms with a grain receival facility, railway line and small shopping facilities. The town has grown to include a primary school, district high school, agricultural college, medical centre, district hospital and Shire administration centre.

Morawa also boasts the Church of the Holy Cross designed by the famous architect-priest Monsignor John Hawes. A variety of sporting facilities including an 18 hole golf course, speedway, community gymnasium, an Olympic sized swimming pool, a recreational centre with indoor and outdoor basketball courts, squash courts and tennis courts.

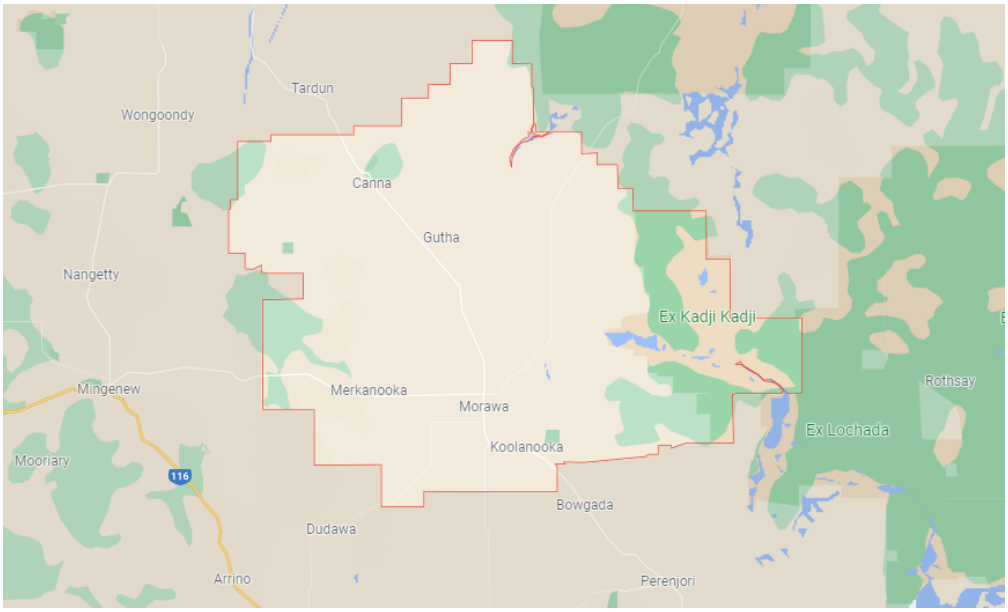


Figure 5 - Shire of Morawa boundary and localities

The Shire is located in the northern portion of the Avon Wheatbelt region and a significant portion of its land is used for agricultural activities. This requires a significant management resource during fire season to mitigate the escape of crop burning. This can be a challenge as many of the local volunteers are also farmers who are harvesting during this time. The high proportion of agricultural activities mean that there are large areas of continuous farming land that can carry large fires. Much of this land is mixed agriculture with patches of native vegetation.

Beyond the farming belt to the east of the Shire, much of the land is made up of pastoral leases, Unallocated Crown Land (UCL) or areas of conservation. The Department of Biodiversity, Conservation and Attractions (DBCA) is responsible for the management of natural reserves, National Parks and State Forests.

There are 13 areas of conservation tenure/proposed tenure within the Shire with the existing reserves managed by DBCA. The area of former Kadji Kadji Station is now UCL and managed under a Memorandum of Understanding between DBCA and Department of Planning, Lands and Heritage (DPLH). These are listed in Table 3.

Table 3 – DBCA managed conservation tenure within the Shire of Morawa[6]

Reserve Number	Reserve Tenure	Reserve Name
R 36334	Nature Reserve	Pintharuka Nature Reserve
R13032	Nature Reserve	Pintharuka Well Nature Reserve
R 16070	Nature Reserve	Koolanooka Dam Nature Reserve
R 40161	Nature Reserve	Bowgada Nature Reserve
R 29289	Nature Reserve	Canna Nature Reserve
R 11776	Nature Reserve	Unnamed Reserve
R 16329	Nature Reserve	Koolanooka Nature Reserve
R12958	Nature Reserve	Mount Nunn Nature Reserve
R 783	Nature Reserve	Unnamed Reserve
R 20644	Nature Reserve	Doutha Soak Nature Reserve
-	UCL – former leasehold proposed for conservation. Dual tenure with TR 1/10 and 2/10h	Ex Kadji Kadji
TR 1/10	Timber Reserve	Unnamed Reserve
TR 2/10	Timber Reserve	Unnamed Reserve

The Shire is the land and treatment manager for those reserves under its care, control and management, which is a combination of private freehold and Crown land. There are 60 reserves vested in the Shire of Morawa which are made up of remnant vegetation, community orientated services such as drainage, emergency services sites, public open spaces and recreational purposes.

[6] Shire of Morawa Local Planning Strategy 2021

These reserves total 1775 ha vested with the Shire of Morawa which places considerable pressure on local government and its rate payers to adequately maintain bushfire strategic mitigation strategies without additional resources, both financially and capability based.

With just under 75%, private land is the largest land tenure comprising of a number of individual land owners and stakeholders involved in land and fire management. This means that there is a range of people and land managers to engage with and can present a challenge to the Shire to ensure that communications regarding bushfire risk management are timely, effective and targeted. An overview of the land tenure and management within the Shire is shown in Table 4.

Table 4 – Overview of Land Tenure and Management within the BRM Plan Area[7]

Land Manager/Agency	Percentage of Local Government Area
Local Government	9.9%
Private Land	74.3%
Department of Biodiversity, Conservation and Attractions	1.5%
Unallocated Crown Land/Unmanaged Reserves	8.7%
Other*	5.6%
Total	100%

* Tenure is made up of other State Govt land, DPLH and Utilities and excludes roads and railways

The Shire includes 195 km of sealed roads, 850 km of unsealed roads and is responsible for the maintenance and management of minor roads throughout, including unsealed roads and accessways. Main arterial roads and routes are managed by Main Roads.

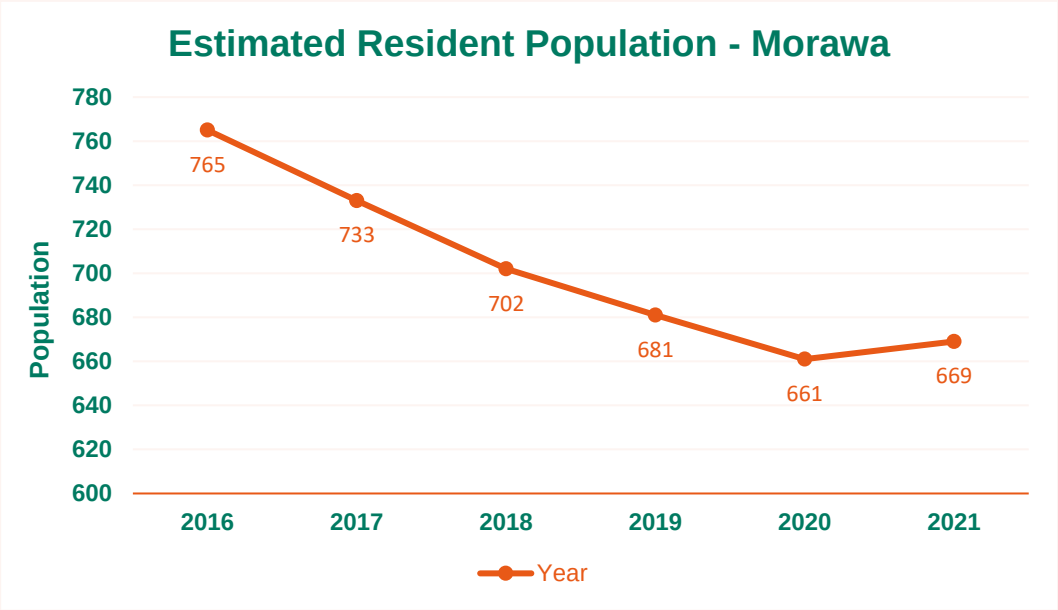
The *Native Title Act 1993* recognises the traditional rights and interests to land and waters of Aboriginal and Torres Strait Islander people. Native title may exist on UCL, reserve land or water bodies that are not privately owned. There is one registered native title claim for the Shire of Morawa area, being a claim for the Amangu people (WAD6002/04).

[7] Landgate tenure data

3.1.3. Population and Demographics

The most comprehensive population count available in Australia is derived from the Population and Household Census conducted every 5 years by the Australian Bureau of Statistics (ABS). This population figure includes overseas visitors but excludes Australians overseas. However, the Census count is not the official population of an area. To provide a more accurate population figure the ABS also produces "Estimated Resident Population" (ERP) numbers.

The ERP data for Morawa as of June 2021 is 669 persons. Since 2016, there has been a steady decline of population as shown in Graph 1 below. The ERP also showed that the gender diversity is a near even split with 51.8% of males and 48% of females. Approximately 10.7% of the Shire are identifying as being of Aboriginal or Torres Strait Island people.



Graph 1 – Shire of Morawa Population Growth 2016-2021[8]

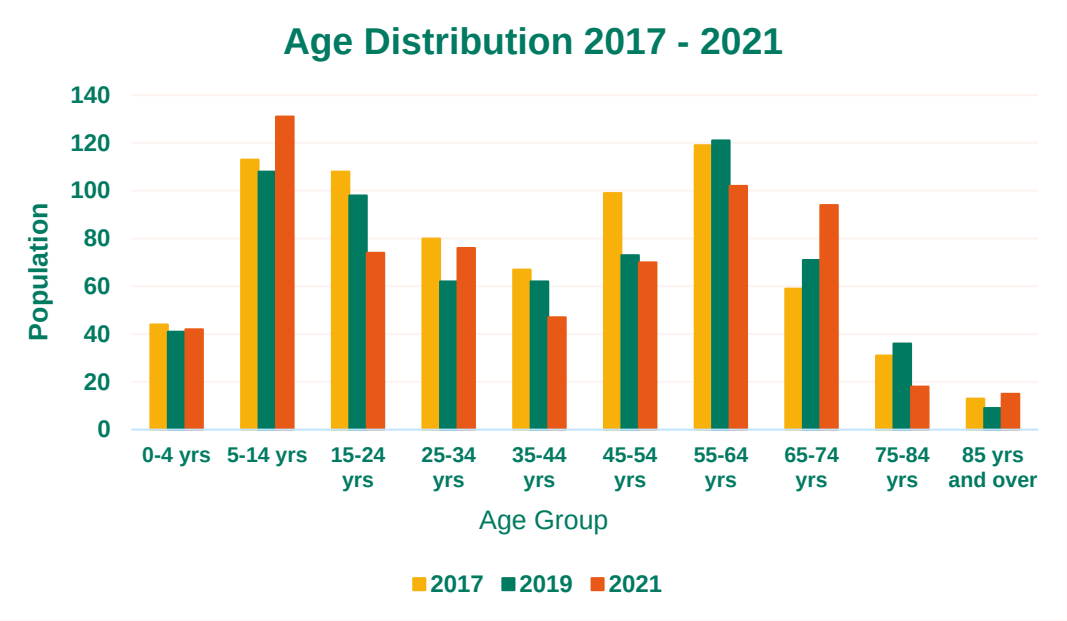
The median age of Morawa's population is 39.2 years, which is older than the median age for Western Australia (38 years). The working age population (15 to 64 years) in 2021 was 55.2% with a steady decrease since 2016. The largest age cohort in the Shire however is the 5-14 years which could account for the primary and secondary schooling facilities located in Morawa. There is also a higher presence of young people aged 15-24 years, which can, in part, be attributed to residential/boarding students at the Morawa Agricultural College and mining operations at Karara.

[8] Australian Bureau of Statistics – Regional Summary - Morawa

In contrast, the second largest cohort is the 55-64 years which shows signs of an ageing population as forecasted by WA Tomorrow comparing 2016 actuals with 2031 projections. They estimate that the number of residents below the age of 64 years will shift from approximately 91% in 2016 to 78% in 2031 with the number of residents 65 years and above will shift from 9% in 2016 to 23% in 2031. This provides a steady base to draw on for bushfire response at present, and strongly suggests an ageing volunteer base could be a challenge for the Shire in the coming years.

Some thought could be given to developing effective strategies to engage younger people in volunteering, to maintain the volunteer numbers required to manage bushfire response and transfer the knowledge currently held by older and/or experienced volunteers, considering population forecasts. A large proportion of volunteers are farm-based which lends itself to a greater capacity to respond quickly to bushfire events with farm-based equipment and local brigades. This does however, present potential issues with turn out times, isolation during bushfire events and fire response as a competing priority with seeding, harvesting and stock husbandry responsibilities.

The Shire experiences a reduction in residents generally between Christmas and early February, as locals' holiday during the school holiday period. This can reduce the capability of the local brigade to respond to incidents. The age breakdown for residents in the Shire of Morawa is shown in Graph 2.



Graph 2 – Shire of Morawa Age Distribution

In terms of population distribution, significantly more of the Shire's residents (approx. 70%) live in Morawa town, than in the surrounding localities. Residences outside of town tend to be surrounded by broadacre farming lots, with notable distance between residents and significant seasonal fuel loads.

This could present a challenge during response to a bushfire incident, which may be initially managed by the availability of farm fire-fighting equipment. The distance between localities and the differing nature of land use and tenure presents challenges for the local government in disseminating consistent bushfire preparedness information, adherence to the Fire Control Notice and general engagement with the community regarding bushfire risk.

Community values regarding fire risk and mitigation should be understood and incorporated into engagement programs to maximise the effectiveness of engagement efforts. The Morawa community however, is generally resilient and well versed in responding to changing weather and climate conditions.

Large numbers of tourists travel annually through the Shire during wildflower season (June to October) with wildflowers, Astro-tourism and agriculture providing consistent tourism interests. It is common for travellers to stay overnight for one or multiple nights in the Shire, at caravan and camping accommodation. Tourists are an important consideration, as travel continues to occur in bushfire season, and visitors may be unfamiliar with the area and unsure how to respond in a bushfire emergency.

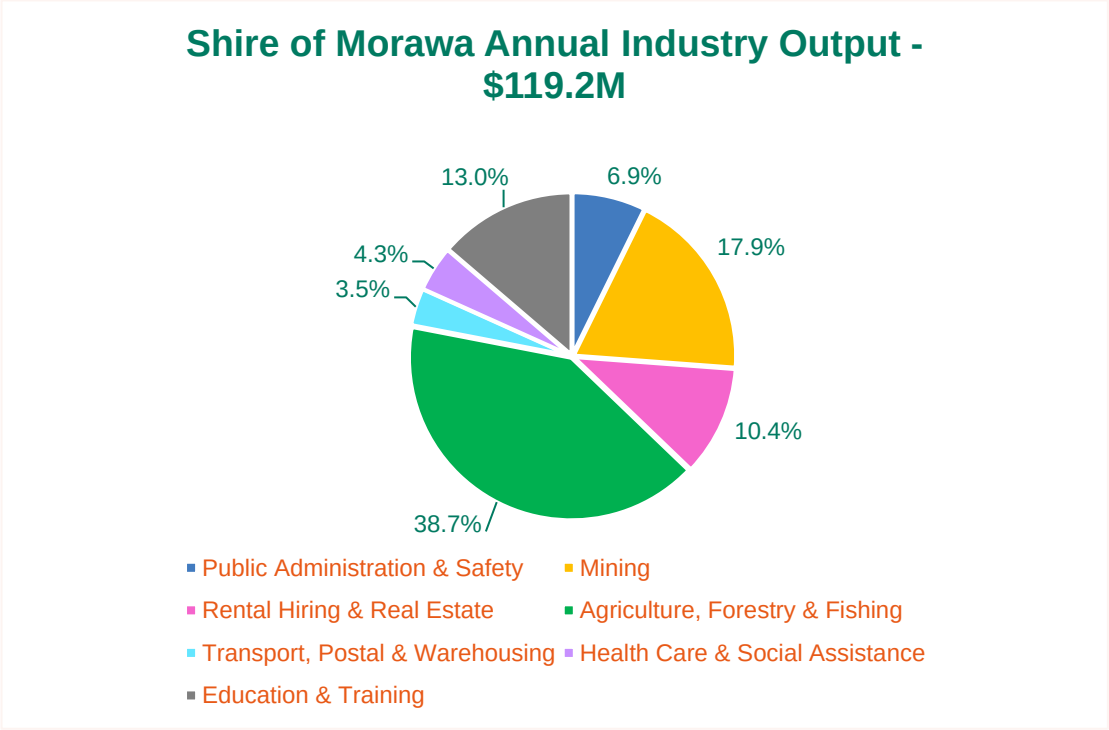
3.1.4. Economic Activities and Industry

The Shire is comprised almost exclusively of broadacre farming lots with the exception of mining ventures at Koolanooka and residential density lots in Morawa town. The 211,959ha total area of agricultural holdings is operated by 50 agricultural businesses and produced agricultural commodities worth $84,018,042 gross value in 2020/2021.[9]

Wheat, pulses and legumes continue to remain as the dominant crops in the Morawa region. However, with changing rainfall patterns, farms in some instances are having to diversify their crops in order to maintain a resilient business structure. Generally, wheat, pulse and legume crops will remain on productive agricultural land with less viable land being utilised for alternative crops such as carbon farming and sandalwood.

The ABS 2019/2020 National Input Output Tables indicates that the Shire of Morawa generates an estimated $119 million in output. Output data represents the gross revenue generated by businesses/organisations in each of the industry sectors. Agriculture, Forestry & Fishing is the biggest contributor accounting for 38.7% of the Shire's economy followed by Mining with 17.9%, Education & Training (13.0%) and Rental, Hiring & Real Estate Services (10.4%), and Public Administration & Safety with 6.9%[10] as shown in Graph 3.

9 https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-produced-australia/2020-21
10 Remplan - Midwest Region – Economic Output - Morawa



Graph 3 – Total Gross Revenue by Industry

The economy of the Shire of Morawa depends primarily on agriculture and related services. The 2021 Census data indicates that the Agriculture, Forestry & Fishing industry is also the largest employing industry in the Shire which employs 31.5% of the working population. This is significantly higher than the regional WA average, emphasising Morawa's rural based economy. Local farming includes the production of cereal crops (wheat, pulses, legumes) and livestock (primarily sheep).

Longer term trends in the aggregation of farms, modern farming methods and prolonged periods of drought has impacted on populations in agricultural regions such as the North Midlands. However, agriculture still remains the largest employer in the region and provides a significant export industry from which the local economy can build upon and further develop.

The heavy economic reliance on agricultural and mining industries contributes to increased bushfire risk and therefore elevates the importance of managing risk. A severe bushfire would have a crippling impact on these industries, through the destruction of crops, feed sources, impacts to transport corridors and production rates.

The agricultural landscape provides a variable risk and fires in this area can significantly impact the Shires economics. The period of October through to January is when crops have matured and cured, ready for harvest. Before harvest, dried crops are particularly flammable, which increases the fuel load. Added to this abundance of fine, dry fuel is the increased use of machinery in the paddocks during this period.

Fires can start easily and creating an environment for a fast moving fire that can cover large areas in a short amount of time. This can result in considerable financial losses of crops and infrastructure (fences, machinery, wind breaks), and increase the risk of topsoil erosion by wind and rain causing possible additional financial loss in the future.

3.1.4.1. Major Transport Routes

The Mid West Region is well serviced with a network of major sealed roads connecting Geraldton to Perth, the North West and the hinterland, which provides extensive use by double and triple road trains.

The Morawa townsite is directly accessible from the south and north via the Mullewa-Wubin Road. This road is under the jurisdiction of Main Roads and provides an inter-town link between Wubin, Perenjori, Morawa and Mullewa. It also acts as a feeder for traffic into Geraldton, via Geraldton-Mt Magnet Road, and into Perth via Great Northern Highway. This road caters for heavy seasonal grain and fertilizer cartage as well as tourists during the wildflower season.

The Mingenew-Morawa Road approaches the town from the west and the Morawa-Yalgoo Road from the east. These roads form part of an east-west link from the agricultural pastoral regions to the Geraldton Port, various recreation areas and a major grain receival point at Mingenew. In the event of a large-scale bushfire impacting major road networks within the Shire, the potential impact could be reduction of supplies, commodities and exports to outlying areas, neighbouring towns and disruptions to services.

The Perenjori Rail Line, which runs through the town, was once used for passenger services but is now used for freight services, including transporting of iron ore. Whilst initially only transporting 5 trips per week of grain during season, recent iron ore transport has increased the use of this railway.

Both Main Roads and Arc Infrastructure who manage major road and rail networks within the Shire have bushfire mitigation programs in place. These strategies are aimed to reduce bushfire risk from vegetated corridors through hazard separation whilst considering the protection of and minimising any environmental impacts.

3.1.4.2. Tourism

Morawa is a Shire with scenic beauty and ambiance of a truly agricultural district. It is prominently located in the central east of ‘Wildflower Country’ and is incorporated into the path of the popular ‘Wildflower Way’ self-guided tour. Known as the ‘Heart of the Wildflowers’, Morawa is one of the most prolific areas for native flowering plants during late winter and early October.

Carpets of everlastings are a feature and attraction however the area is known world-wide for the unique and distinctive Wreath Flower (Leschenaultia macrantha)[11]. Large numbers of tourists travel annually through the Shire in search of vibrant wildflower displays and picturesque camping locations.

Figure 6[12] – Wreath flower (above), pink heart everlasting (centre), yellow everlastings at Koolanooka Springs (right)

Astro-tourism also draws visitors to Morawa, who take advantage of the clear dark skies to view the Milky Way, Southern Cross and Magellanic Clouds, amongst others. In addition, the beautiful Aboriginal constellation referred to as the 'Emu in the Sky' can be seen here. The Strategic Tourism Plan project initiated by the Wildflower Committee is to develop a strategic vision for the future of tourism in the shires of the Mid-West Region. Currently, tourism generates approximately $1.2 million.

The Shire has partnered with local regional Council's to promote the wildflower region and in addition to wildflower trails, the region is known for the following tourism activities:

- Nature based – including bushwalking, bird watching, photography, camping
- Culture and heritage – including historic towns, Aboriginal heritage sites, museums
- Festivals and events – including Agricultural Expos, Arts and Crafts Expos, individual iconic town events
- Diverse range of industry in the area
- A unique rural way of life

A number of events are held within the Shire with the largest event being the Biennial Art Awards & Exhibitions held in August every two years. The Morawa Speedway holds regular events from March through to October with the Russell Ormesher and the Clinton Flavel weekends being the most popular. The Shire also hold Naidoc Week, Anzac Day, Christmas and Australia Day celebrations each year.

[11] www.morawa.wa.gov.au/tourism/what-to-do/wildflowers.aspx
[12] Photo credits: Katrina Sasse (left), Lilian Silva (centre), Ellie Cuthbert (right)

The period from October through to the end of November when tourists are still travelling in and around the Shire, particularly in the more remote camping locations is the highest risk in the event of a fire. Whilst tourists have little impact on the cause of a fire during their travels in Morawa, in the event of a large fire, consideration needs to be made for an additional large volume of people in the area that may require support.

3.2. Description of the Environment and Bushfire Context

3.2.1. Topography and Landscape Features

Covering approximately 3,528 km^2, the land within the Shire comprises of pastoral farmland, mining leases, Crown land and townsites, and is within the Yarra Yarra catchment area. The landscape varies from large flat plains, to rolling hills and rugged breakaway country. Approximately 12.8 km^2 of land is salt affected or salt lakes.

The mid-western boundary of the Shire lies on Wangina sandstone formations, formed in the Permian period from sedimentary and volcanic rocks and comprised of fine to medium grained clayey quartz sandstone, minor conglomerate, shale, siltstone and coal. The south -western portion lies on the Coomberdale subgroup, formed during the Mesoproterozoic era from sedimentary and volcanic rocks and comprised of sandstone, siltstone, dolomite rock and stromatolitic dolomite rock. The Billeranga subgroup, formed during the Mesoproterozoic era from sedimentary and volcanic rock comprises of sandstone, stiltstone, basalt and volcanic sandstone, forms the eastern scarp of the Coomberdale subgroup.

The remainder of the Shire, including the town of Morawa, lies within the Yilgarn Craton with extensive granitoid rocks formed in the Neoarchean era. The Yilgarn Craton includes the Youanmi terrain which is comprised of rocks rich in magnesium and iron along with sills of gabbro and dolerite. Undulating sandplains intersect with low rocky rises and narrow limestone ridges. Narrow drainage lines connect salt plains and saline lakes.[13]

The district in which Morawa is located lies on the Darling Plateau, a gently undulating surface approximately 300 m above sea level relieved by some low hills and resistant rocks which reach 375 m in the Billeranga Hills, 370 m in the Moonagin Range and 434 m at Koolonooka. Morawa town generally is sloping to the south-east, towards the extensive salt lake system located south and east of the townsite. The district is generally described as having large areas of undulating country with long, narrow valleys and rock outcrops on hill crests as well as extensive areas of sandplain.

[13] Narvis.com.au/shire_profile/shire-of-morawa

Topography can have a significant effect on bushfire behaviour and its management. Undulating sandplains, rocky outcrops and breakaway country can limit access to the landscape reducing suppression effects. Fires that start in the east of the Shire can increase in size and intensity due to the rugged and remote landscape and distances to travel for fire suppression. These complex landscape features of the Shire can influence the potential for long distance spot fires from winds channelling through the narrow valleys and hill crests. Limitations arising from access and egress for fire fighters as well as localised weather patterns and wind effects can make fires a challenge to predict and control. Mitigation options in these landscapes may also increase the cost and/or feasibility and the range of mitigation activities will need to be considered and, in some cases alternative treatment solutions may have to be explored.

The Shire has a vast mosaic of different soils with two primary soil landscape units, being 'Morawa' (Mw) and 'Noolabbbi' (Ng), and a further unit 'Saline Drainage' (Sd) to the south-east of Morawa (Rogers 1996). The major drainage systems have level to very gently sloping valley floors with extensive adjacent lower slopes.

3.2.2. Climate and Bushfire Season

The Shire of Morawa is classified, using a modified Köppen climate classification[14], as grassland, with hot, dry summers (November to April) and mild, wet winters (May to October). This is reflected in temperature and rainfall data obtained by the Bureau of Meteorology (BoM). Monthly averages collected over the last 25 years indicate that mean maximum temperatures range from 18.8°C in July to 37.4°C in January and mean minimum temperature range from 6.1°C in July to 20.4°C in February.

Monthly rainfall averages range from 43.2 mm in July, to 8.6 mm in December. The Shire has a clearly defined winter season in June to August, and a clearly defined summer season in December to February. Annual average rainfall for the Morawa area is 333 mm a year, with the wettest month generally in July. However, rainfall patterns have changed over the last ten years, with a decrease in rainfall of approximately 20 per cent. An example of this was in 2019 when Morawa experienced one of its driest years recording only 191 mm of rainfall at the Morawa Airport weather station.

Overall evaporation within the area generally exceeds rainfall, however evaporation is highest during summer, when the least rainfall occurs, and lowest during winter when rainfall is greatest. The most significant winter rains are generally associated with frontal systems from the southwest, which weaken considerably by the time they reach the Morawa district.

[14] http://www.bom.gov.au/jsp/ncc/climate_averages/climate-classifications/index.jsp?maptype=kpngrp#maps

Summer rains are in the form of heavy showers derived from thunderstorms. The summer rainfall is therefore unreliable, local and erratic whereas the winter rains are reliable and widespread.

Morawa averages eight dry months, giving a classification of Dry Warm Mediterranean, a typical West Australian wheatbelt climate. In a north-easterly direction as rainfall decreases and mean temperature increase, there is change to a semi-desert Mediterranean type of climate. This change occurs approximately at the 300 mm isohyet and marks the outer limit of farming country.

Rainfall in this semi-arid region either infiltrates into the substrate, runs off in creeks or evaporates. High temperatures and high evaporation rates associated with summer conditions ensure a much drier climate during the summer months. Consistent winter rainfall drives vegetation growth, and coupled with drying conditions in spring, can lead to consistently high fuel loads in summer, the high threat period for bushfires in the Shire. Understanding rainfall and temperature patterns is critical not only for understanding fuel loads and the timing of bushfire season, but also for the planning of appropriate mitigation activities.

A BoM Automatic Weather Station (AWS) is located at Morawa Airport where the following graphs reflect the mean rainfall and temperature from this site.

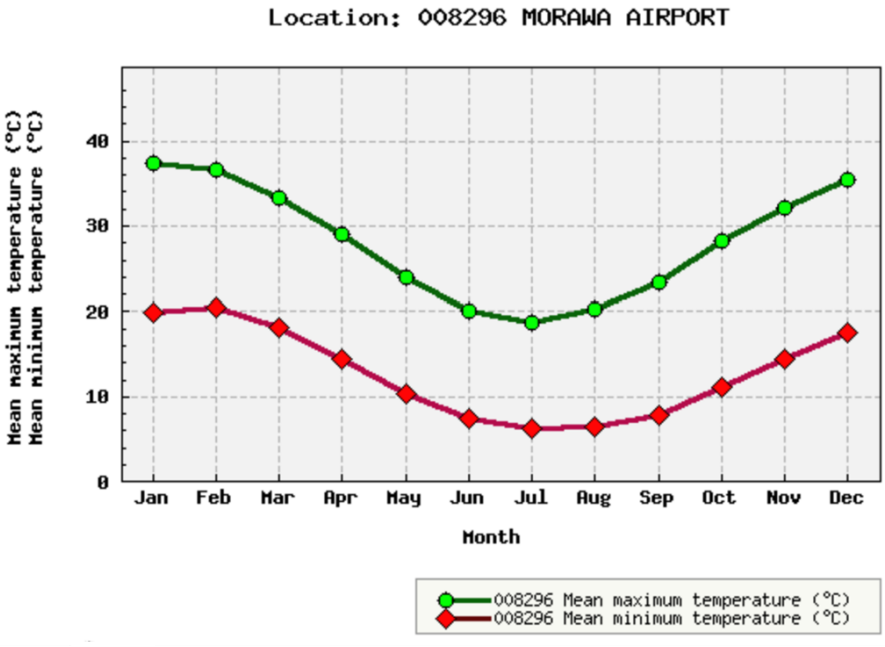


Figure 7 – Monthly mean temperatures from 1997-2022[15]

[15] Bureau of Meteorology (Site No. 008296) www.bom.wa.gov.au

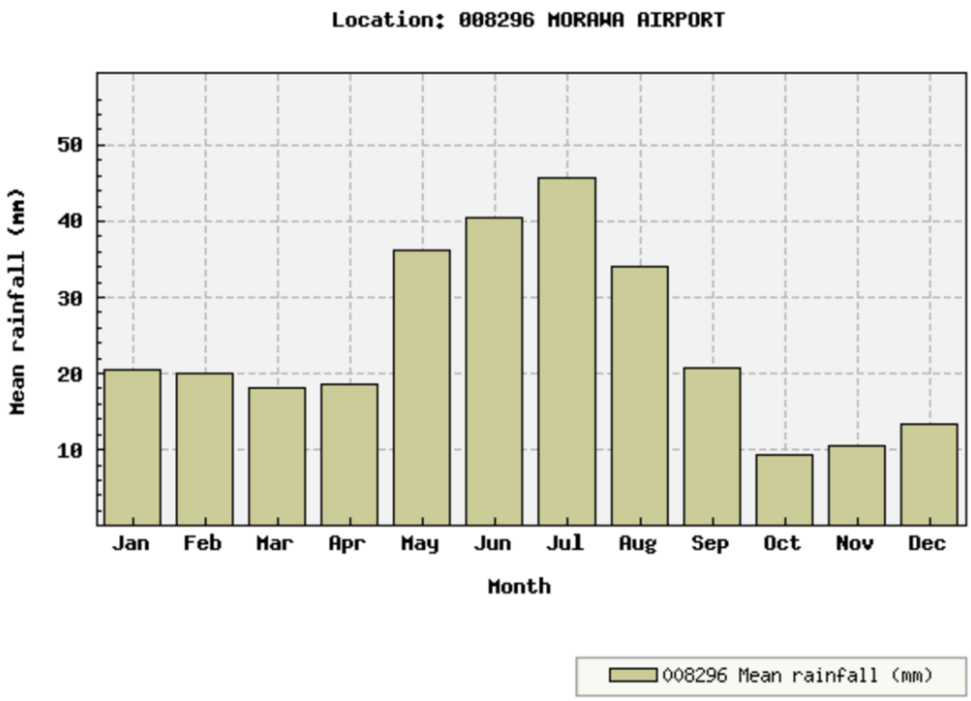


Figure 8 – Monthly mean rainfall from 1997-2022

From October to February (spring and summer), the prevailing wind pattern is generally from the south, while from March (winter/spring) the prevailing wind pattern is generally from the east, south-east and from June to September (winter-spring) the prevailing wind pattern is generally from the west, north-west.

Morawa is significantly inland and is known for its windy conditions, with average wind speeds since 2010 consistently between 10 and 15 km/h and maximum gust speeds in excess of 150 km/h. Winds tend predominantly from the west, south-west and south-west sectors, with notable gusts from the north, north-west and north sectors, as reflected in Figure 9. Winds are mainly from the east, north-east in the morning. Afternoon wind patterns are more varied but tend strongly from the west and south-west. Wind direction and speeds are depicted in Figure 10.

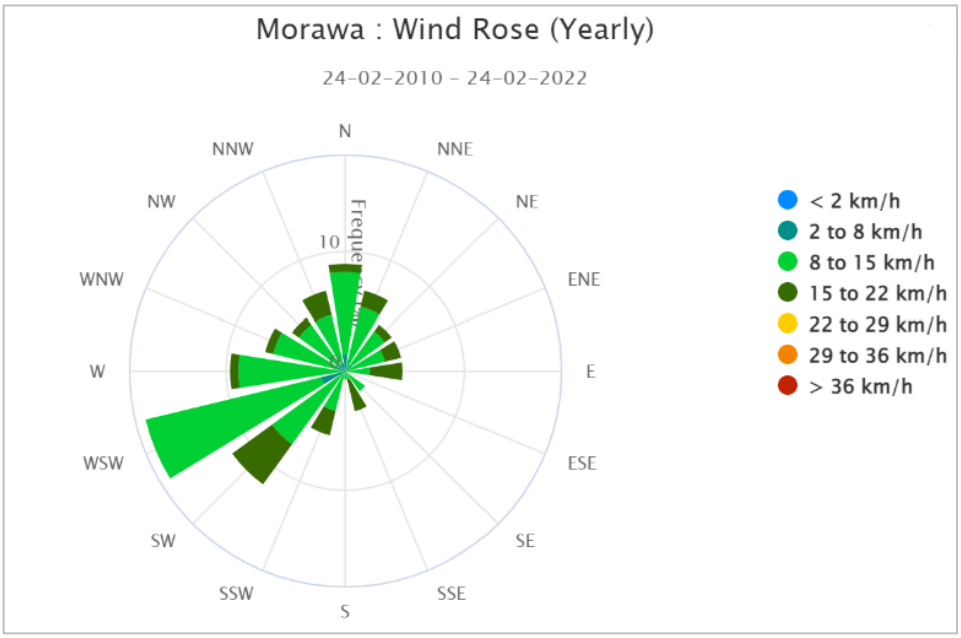


Figure 9 - Morawa Wind Rose[16]

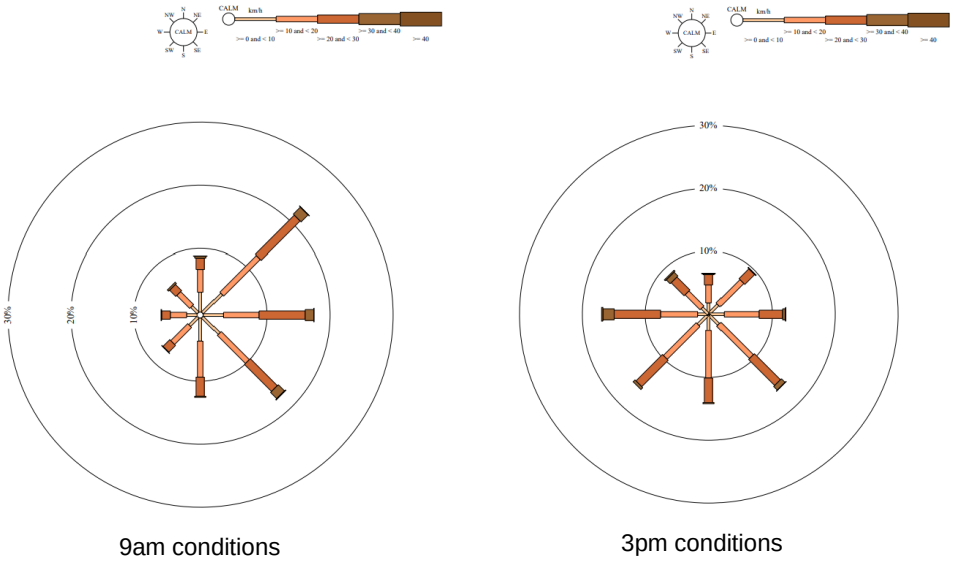


Figure 10 – Wind speed vs direction plot, Morawa[17]

[16] https://weather.agric.wa.gov.au/station/MO
[17] annual wind speed vs. direction plot 9am and 3pm

Relative humidity is commonly used to measure atmospheric moisture. The BoM defined it as "the ratio of the amount of water vapour measured to what the air could hold at saturation point". Low relative humidity can cause vegetation to dry out and become more flammable. Relative humidity in the Shire indicates that minimum humidity levels since 2009 range from 0.1% - 7.5%, average humidity levels range from 48.2–59.4% and maximum humidity levels range from 95%-100.2%. Low humidity levels occur during the high-threat period from October to March, where vegetation that has grown through the winter rainfall months begins to dry and contributes to the level of bushfire risk. During a bushfire, low relative humidity will ensure that a fire begins quickly and burns more vigorously.

Bushfire Season

Bushfires can happen all year round but the risk is much higher during the hotter and drier times of the year. The BoM identifies the Shire of Morawa as having a spring-summer/summer bushfire season, shown in Figure 11. This supports the understanding that in the mid-west, fuel load development is driven by wet weather in the winter months, and fire risk occurs during dry and hot conditions in the spring/summer. This is coupled with seasonal fire risk associated with crop harvesting. Bushfire season and risk are measured and informed by the Forest Fire Danger Index (FFDI) and the Grassland Fire Danger Index (GFDI).

Figure 11 – Fire Danger Seasons (Bureau of Meteorology)[18]

[18] http://reg.bom.gov.au/weather-services/fire-weather-centre/bushfire-weather/index.shtml

Generally, the bushfire season for Southern WA is from October through to April, however seasonal factors may influence and vary these times. The greatest danger is between late spring and early autumn when fuels have dried after the winter rains. During the summer months anti-cyclones move along the southern edge of the continent directing easterly winds across the south-west, accompanied by the development of a west coast trough. Winds associated with this synoptic pattern are predominately easterly overnight and during the morning and may be strong and gusty close to the escarpment and on adjacent parts of the coastal plain.

Weather conditions influence the size, intensity, speed and predictability of bushfires and how dangerous they can be to the community. Vegetation growth can be encouraged by periods of wet weather, increasing the amount of fuel available (grass, leaf litter, twigs, bark). When the weather is hot, the humidity is low and there has been little recent rain, this vegetation dries out and becomes more flammable. A fire is more likely to start, and continue to burn in hot, dry and windy conditions. Strong gusty winds help fan the flames and cause a fire to spread faster across the landscape. Strong winds can carry hot embers long distances, these can start spot fires many kilometres ahead of the main fire front. Changes in wind directions can bring periods of dangerous bushfire activity.

Consideration could be given to the changes in climatic conditions over time that may impact bushfire conditions in the future. Recent projections indicate that average temperatures will continue to increase in all seasons, and more hot days are expected. When this is combined with the expectation of a continued decrease in winter and spring rainfall, it further supports a continued trend of harsher fire weather climate in the future.

Mitigation activities should also be considered in the broader context of changing weather patterns, as current practices may not always be possible in the coming years. Hazard reduction burning, which relies heavily on favourable weather conditions, may become increasingly difficult as appropriate burning windows are impacted by changes in rainfall, temperature and humidity. Particular attention should also be paid to how remnant vegetation is managed, as available habitat for wildlife and endemic plant species continues to be impacted by changes in land use and weather patterns.

Consideration could also be given to emerging agricultural trends, practices and principles, to ensure risk management is embedded as part of a holistic approach to land management.

Fire Danger Ratings

Fire Danger Ratings (FDR) describe the potential level of danger should a bushfire start. They are important because they provide people with information so that they can take action to protect themselves and others from potentially dangerous impacts of bushfires. Ratings are calculated using a combination of weather forecasting and information about vegetation that could fuel a fire. They do not indicate the chance of a fire occurring.

FDRs are issued on days when there is a fire risk. Each rating will have a clear set of messages, including the actions the community can take to reduce their risk. The BoM issue fire weather warnings when forecast weather conditions are likely to be dangerous. Warnings are issued for the following day via radio news broadcasts and other media platforms. These warnings are issued for the areas delineated by fire weather districts and knowledge of these districts is beneficial for local bushfire brigades, the community and in particular, the rural farming communities.

Until recently, the Shire of Morawa was within the Inland Central West – North, fire weather district of the Southwest Land Division. Over the past six years, the Shire has experienced an average of 69.5 days per year above 'Very High' Fire Danger, however fires can still occur at the lower fire danger ratings. During this period there were no 'Catastrophic' days recorded.

Table 5 shows the FDR for the Inland Central West – North, fire weather districts from 2015 to 2021. The data is taken from the 4pm forecast only, not including any updates or revision that occur in the evening or early morning. The data is per financial year and is not intended as a direct indicator of future conditions.

Table 5 – Number of FDR Ratings above Very High for the Inland Central West – North fire district from 2015 - 2021

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
District	**FDR**						
Inland	Very High	34	45	55	56	47	46
Central West	Severe	15	13	15	18	34	28
- North	Extreme	1	1	0	2	5	2

On the 1 September 2022, FDRs changed nationally to align with the Australian Fire Danger Rating System (AFDRS). The AFDRS will enhance public safety and reduce the impacts of bushfires by improving the scientific accuracy behind fire danger predictions and improving how fire danger is communicated. AFDRS uses the latest scientific understanding about weather, fuel and how fire behaves in different types of vegetation to improve the reliability of fire danger forecasts. This strengthens the ability of those working in emergency services to be better prepared, make improved decisions and provide better advice to the community.

This will replace the GFDI and FFDI and reduce the FDR from six to four action orientated ratings as shown below.

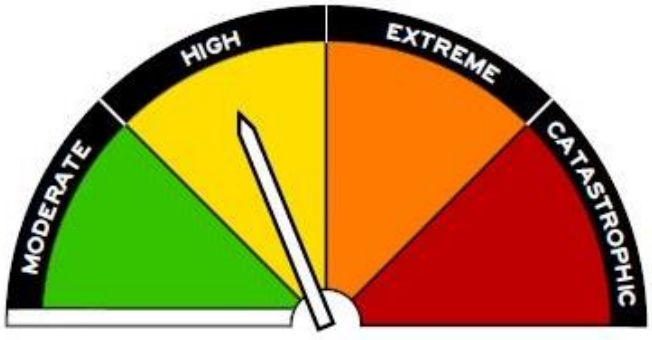


Figure 12 – The new FDR used in the Australian Fire Danger Rating System implemented from 1 September 2022

There are four levels of fire danger in the new system:

1. **Moderate**: Plan and prepare
2. **High**: Be ready to act.
3. **Extreme**: Take action now to protect your life and property.
4. **Catastrophic**: For your survival, leave bush fire risk areas.

In addition to the new FDR, a review of the current Fire Weather Districts was conducted by the DFES and BoM to improve how FDR's are communicated. The new boundaries consider many factors such as fuel types, climate, population and alignment with local government boundaries. The new Fire Weather Districts were introduced with the release of the ADFRS.

On the 1 September 2022, the Fire Weather District for the Shire of Morawa changed to the Midwest Inland fire district of the South West Land Division.

Total Fire Bans

A Total Fire Ban (TFB) is declared on days when fires are most likely to threaten lives and property. This is because of predicted extreme fire weather or when there are already widespread fires and firefighting resources are stretched. Occasionally, TFBs may be declared outside of a fire season (such as in May or June) due to other factors such as higher temperatures and expected strong winds preceding a storm front. A TFB is declared by DFES following consultation with local governments. TFBs apply to the whole local government boundary and often apply to more than one local government area.

A total of 77 TFBs affecting the Shire of Morawa were declared over the period 2017 to 2022 as seen in Table 6.

Table 6 – TFBs declared in the Shire of Morawa between 2017 and 2022

Shire	2017-18	2018-19	2019-20	2020-21	2021-22
Morawa	2	8	18	16	33

The statistics in Table 6 show that the 2019-20 through to 2021-22 fire seasons recorded the highest number of TFBs declared which aligns with the extreme climatic conditions for those years. Climate data for Western Australia recorded 2019 as the warmest and driest year on record followed by 2020 as the second warmest year on record.[19]

The hot conditions combined with the dry landscape and strong winds produced dangerous fire weather during December 2019 into early January 2020 continuing a run of three consecutive months of highest accumulated FFDI on record.

Harvest and Vehicle Movement Bans

Harvest and Vehicle Movement Bans (HVMB) are imposed by local governments under the *Bush Fires Regulations 1954* Section 38A, and/or Section 24C, when prevailing and/or anticipated weather conditions and/or availability and/or response capacity of the local firefighting resources are reduced. The local government can issue HVMBs to restrict the use of vehicles and machinery that have an increased risk of igniting a fire.

HVMBs are issued from the advice of the Shire's Chief Bush Fire Control Officer (CBFCO) when the use of engines, vehicles, plant or machinery during the Limited Burning Times is likely to cause a fire or contribute to the spread of a bushfire. A HVMB 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.

On average, the Shire of Morawa issues five to six HVMBs per year. No harvesting operations are permitted on Christmas Day, Boxing Day and New Year's Day. In addition, all burning is prohibited on days when the FDR is Very High or above, a TFB is declared or a HVMB is enforced. A free SMS service is available to residents notifying them when there is a variation to the Limited Burning Times and/or when a HVMB is enforced. The SMS alerts are an opt-in service for members of the community who wish to receive these notifications.

[19] Bureau of Meteorology/Annual Climate Summary for Western Australia

3.2.3. Vegetation

The majority of the Shire has been primarily cleared for agricultural purposes including broad acre cropping and grazing. Large areas of low open woodlands and crop paddocks are found around the townsites. Contained within the farming paddocks are smaller pockets of protaceous scrub or low woodland vegetation depending on the landscape.

Morawa is found within the Avon Wheatbelt Interim Biogeographic Regionalisation for Australia (IBRA) region and within the Ancient Drainage subregion. The majority of the Avon Wheatbelt IRBA area has been extensively cleared with an estimated 13% of the original remnant vegetation remaining.

Located within the Tallering (YAL01) and Merredin (AVW01) IBRA sub-regions, the vegetation within the Shire is characterised by low, open woodlands and proteaceous scrub. It includes the plant assemblages of the Billeranga, Koolanooka and Moonagin Systems which are Threatened Ecological Communities (TECs) protected under the *Biodiversity Conservation Act 2016*. These plant assemblages are characterised by Acacia, Eucalypt and Allocasuarina scrub and all three are listed under Western Australia's environmental law.

Regional scale mapping indicates that Morawa forms part of two main vegetation systems being the Perenjori and the Jibberding Systems with several smaller systems across the landscape. Vegetation systems consist of a particular series of plant communities recurring in a connected sequence or mosaic pattern linked to topographic and/or geological features. Both systems are very similar however the Jibberding System is located towards the eastern boundary of the Shire and has lower and less reliable rainfall.

The Perenjori System covers the moister western part of the Darling Plateau on granite and gneiss where the rainfall is higher. Vegetation is described as Casuarina thicket, Eucalyptus woodland and salt country complex. Characteristic native plant species in this landscape consist of York Gum, Jam, Gimlet, Sandalwood and Salmon Gum with shrubs and understorey of Shrubby Sheoak, Mallee, Grevillea, Wattles and Samphire around salt pans.

The Jibberding System is very similar to the Perenjori System but has lower and less reliable rainfall as it is situated on the eastern portion of the Shire. Vegetation is also similar with the difference being the Acacia thicket is more dominant than the Casuarina. Native species include York Gum, Jam, Salmon Gum, Red Mallee, Pixie Bush with understorey of Grevillea, Myrtles, Wattles with Samphire and Myrtle around the vicinity of the salt lakes.

To the south west of Morawa town site, the Billeranga system comprises of sandstone, siltstone, shale and conglomerate. The plant communities include dense thicket of Tammar, Shrubby Sheoak, Grevillea and Myrtle, open mallee of York Gum and Jam with a mixed understorey of Jam and Dodonaea inaequifolia.

A number of taxa within the Billeranga System are listed as Priority and are either totally confined to the Billeranga Hills or are very restricted in their distribution in Western Australia.

To the south east of the Shire, the Koolanooka system covers the Koolanooka Hills and their surrounding footslopes and ranges. These ranges are formed of Archaean metamorphic rocks included banded iron-stones which have been mined at Koolanooka and are highly ferruginous. Plant cover consists of open woodland of Rock Sheoak, Sandplain Mallee, Jam and Dodonaea inaequifolia, interspersed with thickets of Casuarina campestris, Jam, Grevilleas and Myrtles. On the footslopes the pattern becomes York Gum woodland interspersed with patches of the same thicket.

The Moonagin system covers a relatively small area on the Moonagin and Milhun Ranges north-east of Morawa. The landscape consists of rounded hills of some fine-grained Archaean rock which weathers to a red soil covered with Acacia scrub, and red loam flats at the foot of the hills which carry either Acacia scrub with scattered Eucalypts or Eucalypt woodland. There are also areas of Boom Bush thickets along creek lines and Salmon Gum on clay patches on the summits of the lower hills.

The alluvial plains associated with drainage lines are dominated by Eucalypts, Casuarina's, York Gum and Jam Wattle woodlands. Proteaceous scrub-heath and Acacia-casuarina Melaleuca thickets occur on the sandplains.

Fire management of woodlands must consider the appropriate fire regime intervals of the understorey, regeneration of the eucalypt species and maintenance of the native fauna habitat. Dry Eucalypt woodlands typically have sparse understorey which does not usually carry hot fire. This is particularly so for woodlands with Saltbush and Samphire understorey as these shrubs develop foliage with low flammability due to high salt content.

In the areas where rainfall is higher, woodlands with low medium density shrubs of Acacia and Allocasuarina, Hakea and Melaleuca have a higher fuel load and continuity. Low woodlands of Rock Sheoak and Jam are fire prone but regenerate well following fire if grazing pressure is managed. Fire frequency is these woodlands is likely to be low following above average rainfall years.

For many plant species in this semi-arid region, fire is a cue or stimulus for regeneration, while other species have evolved ways of avoiding fire. Inappropriate fire regimes may result in local extinctions of plants and animals

Remnant vegetation in the Shire equates to 22,224 ha of private land, 54,007 ha of public land and 15,825 ha of private land modified for grazing purposes. All remnant vegetation is considered important for biodiversity and landscape integrity (i.e. minimising the impacts of salinity). A large proportion of Morawa townsite appears to contain remnant vegetation.

Within the Shire, there are 30 'Beard' vegetation associations (Beard Vegetation Survey of Western Australia 1976). Table 7 shows the extent of each vegetation associated with the Morawa Shire.

Table 7 – Native vegetation associations recorded within the Shire and the comparative extent of each[20]

Beard Vegetation Association	Pre-European Extent (Ha)	Current Extent (Ha)	% Remaining	Current Extent Protected for Conservation* (Ha)	% Current Extent Protected for Conservation* (Proportion of Pre-European Extent)
40	2,079.01	1,346.90	64.79		
125	744.40	744.40	100.00		
142	73,567.92	7,292.44	9.91	140.63	0.19
352	28,284.90	8,063.15	28.51	175.83	0.62
354	973.35	306.74	31.51		
355	4,946.56	3,829.42	77.42		
358	273.94	213.47	77.92		
364	6,864.24	6,864.24	100.00		
365	4,037.60	2,213.01	54.81		
374	898.55	757.29	84.28	105.23	11.71
380	1,667.12	191.26	11.47		
385	1,220.93	37.43	3.07		
392	243.68	135.40	55.57		
412	301.11	100.40	33.34		
419	24,928.96	16,556.91	66.42		
420	10,883.92	4,379.17	40.24		
437	13,220.64	4,986.60	37.72	1,026.41	7.76
438	278.91	156.99	56.29		
551	16,154.60	2,861.60	17.71	329.84	2.04
631	18,484.50	10,885.14	58.89		
676	10,177.43	1,357.76	13.34	4.15	0.04
683	3,452.70	3,452.70	100.00		
684	80,152.18	19,883.80	24.81	502.52	0.63
686	1,938.88	148.93	7.68		
692	2,695.43	1,640.15	60.85	73.92	2.74
693	2,774.37	2,284.74	82.35		
988	3,112.62	2,870.45	92.22		
1155	4,033.39	2,158.97	53.53		
1413	20,175.73	3,912.46	19.39	14.58	0.07
2081	12,461.57	2,337.40	18.76		

*Land protected for conservation is defined as Crown reserves having an international Union for Conservation of Nature (ICN) category of I – IV.

[20] Shire of Morawa Local Planning Strategy 2021

The National Objectives and Targets for Biodiversity Conservation 2001-2005 (Commonwealth of Australia 2001) suggests that the retention of 30% or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected. The threshold level which species loss appears to accelerate exponentially is outlined in the above table.

3.2.4. Threatened Species and Communities

An Ecological Community is defined as naturally occurring biological assemblages that occur in a particular type of habitat. TECs are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community, i.e Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable. Some TECs are protected under the *Environmental Protection and Biodiversity Conservation Act 1999 (Cth)*. This includes the nationally registered TEC – *Eucalypt Woodlands of the Western Australian Wheatbelt* located within the Shire.

Eucalypt woodlands are an iconic part of the wheatbelt landscape and are made up of 62 different vegetation communities, each with different species or structures. The main overstorey trees are eucalypts that have a single trunk (not mallees) and they have a diverse and variable understorey, ranging from bare and grass to shrubby. The ecological community provides habitat for many plants and animals that rely on Eucalypt woodlands for their homes and food. They also offer numerous ecosystem services including maintaining current water table levels and salinity.

Table 8 shows the Threatened Ecological Communities (TECs) located within the Shire.

Table 8 – TECs recorded within the Shire of Morawa

Community Name	TEC/PEC Status
Eucalypt Woodlands of the Western Australian Wheatbelt	TEC (Critically Endangered)
Plant assemblages of the Billeranga System	TEC (Vulnerable)
Plant assemblages of the Koolanooka System	TEC (Vulnerable)
Plant assemblages of the Moonagin System	TEC (Vulnerable)

A further consideration in relation to both bushfire protection and response strategies is the potential spread of weeds or diseases. Fungal-borne diseases can be spread through soil movement from vehicles, animals, water and feet. This risk must be considered in the context of planned prevention and response strategies and the risk minimised wherever possible.

Flora

Threatened flora are plants which have been assessed as being at risk of extinction. In Western Australia, the term Declared Rare Flora (DRF) is applied to threatened flora. The DRF designator reflects that the plant needs to be specifically protected because they are under identifiable threat of extinction, are rare, or otherwise in need of special protection. There are a number of priority species within the Shire recorded and nine species of DRF. The DRF species are listed at Table 9:

Table 9 – DRF flora recorded in the Shire of Morawa[21]

Species	Common Name	Conservation Status
Androcalva adenothalia		T (CE)
Eremophila nivea	Silky Eremophila	T (EN)
Eucalyptus synandra	Jingymia Mallee	T (VU)
Grevillea bracteosa subsp. howatharra		T (CE)
Grevillea murex		T (EN)
Gyrostemon reticulatus	Net-veined Gyrostemon	T (CE)
Schoenia filifolia subsp. subulifolia	Showy Everlasting	T (EN)
Tecticornia bulbosa	Large-articled Samphire	T (VU)
Verticordia spicata subsp. squamosa	Scaly-leaved Featherflower	T (EN)

EN – Endangered, CE – Critically Endangered, VU - Vulnerable

Fauna

The *Biodiversity Conservation Act 2016* defines threatened fauna as fauna that is rare or is likely to become extinct. Threatened fauna is listed on the basis that it has been adequately surveyed and is deemed to be rare, in danger of extinction, or otherwise in need of special protection.

Other fauna that are specifically protected under the *Biodiversity Conservation Act 2016* include migratory birds protected under the international agreements, presumed extinct species, and other specially protected fauna. Threatened and specially protected fauna within the Shire are listed in Table 10.

[21] Florabase.dpaw.wa.gov.au

Table 10 – Threatened fauna within the Shire of Morawa[22]

Species	Common Name	Conservation Status
Calyptorynchus latirostris	Carnaby's Cockatoo	T (EN)
Egernia stokesli badia	Western Spiny-tailed Skink	T (EN)
Idiosoma nigrum	Shield-backed Trapdoor Spider	T (VU)
Leipoa acellata	Malleefowl	T (VU)

Figure 14 – Carnaby's Cockatoo (Left), and the Malleefowl (right)

Frequently burnt areas are unsuitable for some of these species and while managing bushfire risk forms an important part of preserving these species, consideration must be given to the potential impact of treatments, to ensure they do not have adverse outcomes.

Due to the sensitive nature of information around protected flora and fauna, some discretion has been applied to the amount of information recorded so further advice will need to be sought from subject matter experts to confirm the location of environmental assets with the Shire and the potential impact of both mitigation and response strategies.

Flora and Fauna represent particular significance for the Shire as they are not only recognised environmental assets in their own right, but also impact the treatment options available for identified risks in relation to other assets. The selection of treatments must consider the impact to environmental and heritage sensitivities.

[22] EPBC Act Protected Matters Report – LGA Shire of Morawa

Poor treatment selection could result in detrimental impacts such as damage to environmentally sensitive areas, loss of biodiversity, destruction of habitat and /or damage to natural, historic and indigenous values. All treatments need to be assessed in line with the requirements of the identified flora and/or fauna detailed below with care given to ensure appropriate authorities are consulted prior to any mitigation work commencing.

The Shire will, where possible, remind landowners/managers of their obligation to obtain appropriate clearances and approvals prior to commencing vegetation based treatments. This includes:

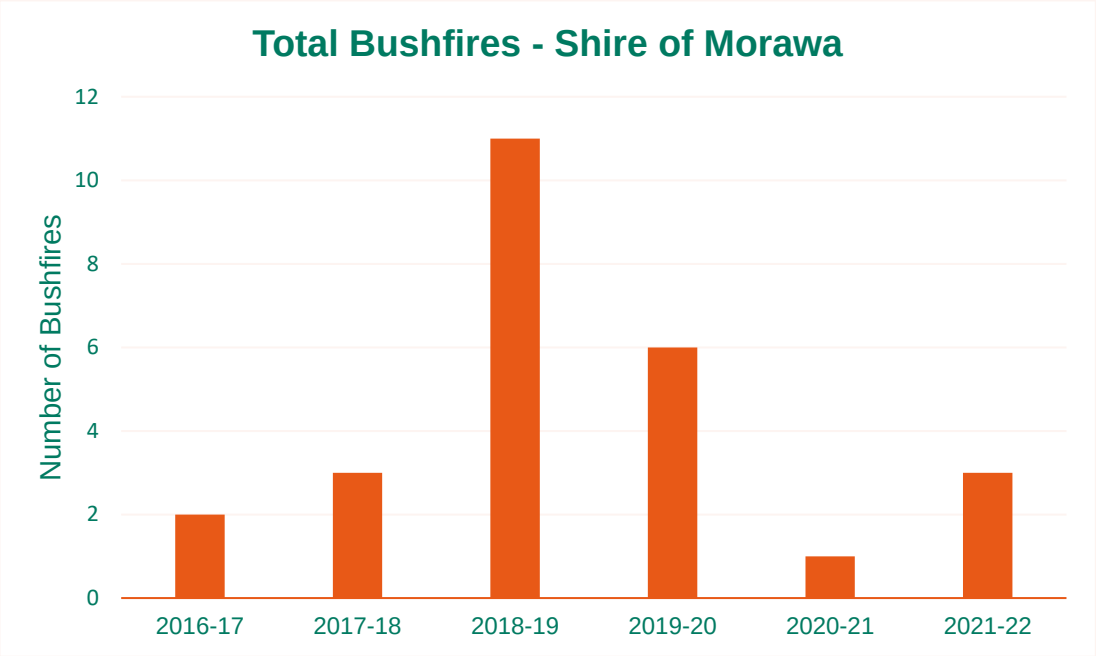
- Environmentally Sensitive Areas
- Threatened Fauna and Declared Rare Flora
- TECs

3.2.5. Bushfire Frequency and Causes of Ignition

Fires are recorded using the DFES Incident Reporting System (IRS). The data retrieved however, has its limitations and not all ignitions are reported and recorded within the IRS. The figures may also not reflect all incidents attended only by the DBCA – Parks and Wildlife Service within the Shire of Morawa.

A bushfire is considered to be any vegetation fire (bush, grass, scrub, forest) of any size. Fire (large) is a bushfire more than one hectare in size.

Between 1 July 2016 and 30 June 2022, a total of 26 bushfire incidents were recorded within the Shire of Morawa. Weather conditions - lightning/weather was the primary source of ignition over this period with a total of 13 incidents reported. Unreported and suspicious/deliberate fires were the second highest contributors, accounting for an additional 6 fires combined. Most fire incidents occurred in the areas of Morawa (8), Merkanooka (7) and Canna (6).



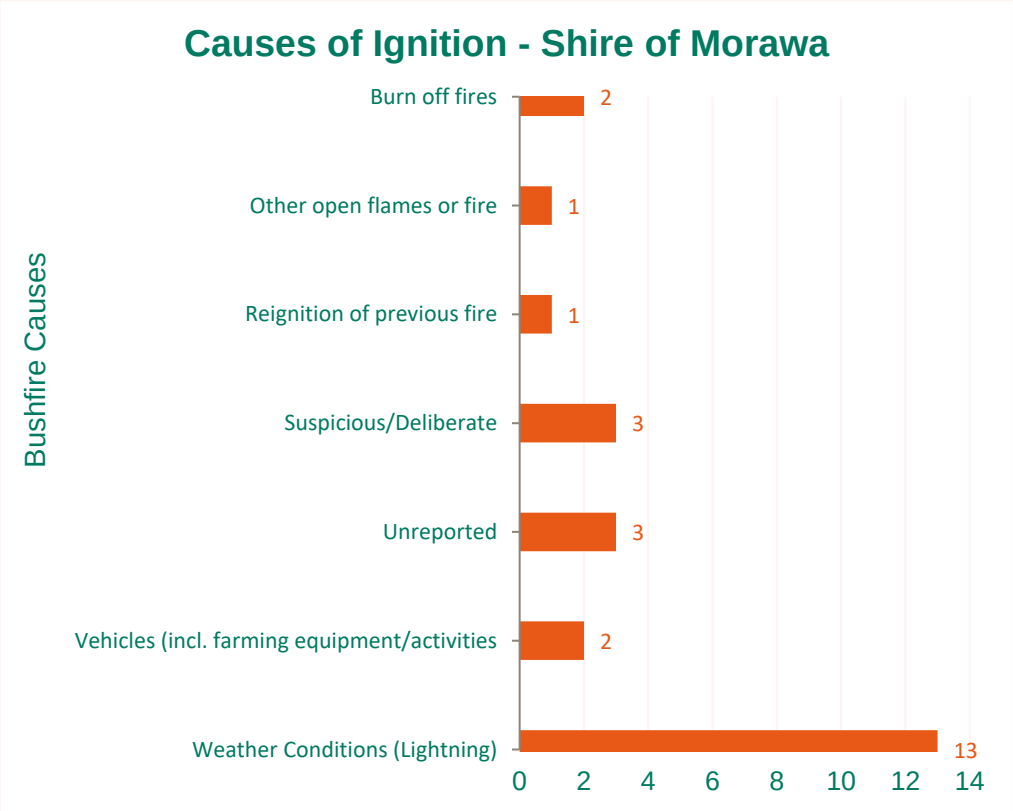
Graph 4 – Total Number of Bushfires within the Shire of Morawa[23]

There are a number of reasons why bushfires occur. Graph 5 shows that 50% of all ignitions across the Shire are caused by weather conditions – Lightning which is conducive to the weather patterns within the Mid-West region during the bushfire season.

Lightning strikes during summer are common in agricultural areas and fires can travel rapidly in open cereal and stubble paddocks. Firefighting resources are usually able to attend these fires quickly and minimise the areas burnt.

Suspicious/deliberate and Unreported fires account for 23% followed by vehicles (incl farming equipment/activities) and burn off fires with 15%. Re-ignition of previous fires and open flame fires account for the remaining 7% of all ignitions.

[23] DFES Operational Information Systems Branch



Graph 5 – Summary of Bushfire Causes of Ignition[24] (2016/17 to 2021/22)

This fire history data may serve to influence the decision making process by identifying potential areas where fires are more likely to start and why, contributing to the implementation of appropriate treatment strategies.

Targeted education and prevention programs are just one example of allocating resources effectively to implement strategies in the BRM Plan where, for example, suspicious/deliberate fires, burn off fires and re-ignition of previous fires are occurring most.

Figure 14 shows the ignition causes by map location for the period 1 July 2016 to 30 June 2022.

[24] DFES Operational Information Systems Branch

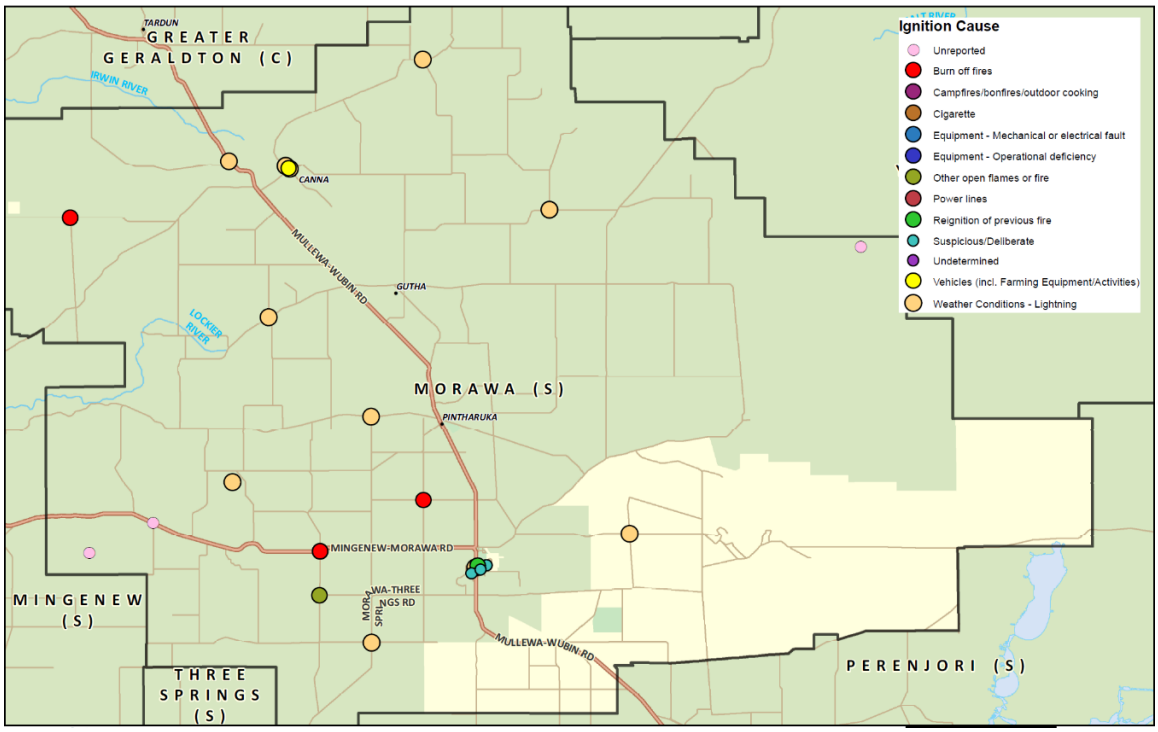


Figure 15 – Total Number of Bushfires within the Shire of Morawa

The risk of a fire outbreak is significantly greater prior to, and during harvesting. This increase in bushfire risk is driven by an increase in readily available fuel in the form of curing crops and grasses, coupled with frequently windy, warm and dry weather conditions. The situation is compounded further by the possibility of ignition from the machinery used for harvesting. As a result, any harvesting activity is required to be accompanied by a fire appliance containing a minimum water capacity of 400 litres and an engine powered pump[25]. Fuel loads and fire risk are significantly reduced following harvest, and the burning of stubble and windrows is generally undertaken outside of the fire season to further manage bushfire risk.

3.2.6. Current Bushfire Management Activities

The Shire of Morawa aims to mitigate the destructiveness of bushfire. The Shire is responsible for the inspection and management of fire mitigation/hazard reduction measures on land owned by, or vested to, the Shire which includes local parks and reserves, road reserves, recreation and drainage reserves. Annually, the Shire implements their Fire Prevention Program and undertakes hazard reduction works on land it owns and controls which include mechanical works, slashing, chemical spraying and pruning.

[25] Shire of Morawa Firebreak Notice

Prescribed burning is also undertaken where required to reduce fuel loads and support biodiversity.

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 Morawa bushfire prone areas are shown in Figure 15. Broad-scale mapping of bushfire prone areas indicates significant risk exists in the outer areas of the Shire, particularly towards the eastern and western boundaries, with many smaller bushfire prone areas providing connectivity across the district. Bushfire Prone Areas are subject to increased planning and construction requirements.

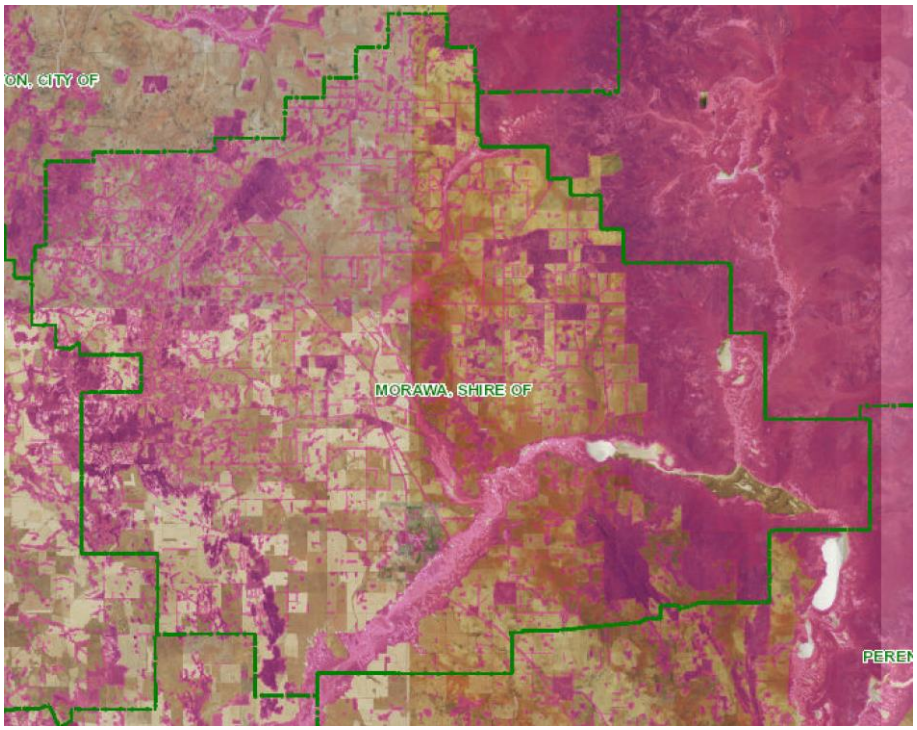


Figure 16 – Map of Bushfire Prone Areas within the Shire of Morawa[26]

[26] maps.slip.wa.gov.au/landgate/locate

Volunteer Fire Brigades

Bushfire response in the Shire of Morawa is wholly undertaken by volunteers. The following brigades exist within the district:

- Canna-Gutha Volunteer Bush Fire Brigade
- Koolanooka Volunteer Bush Fire Brigade (farmer response)
- Morawa Volunteer Fire and Emergency Service
- Morawa West Volunteer Bush Fire Brigade (farmer response)
- Pintharuka Volunteer Bush Fire Brigade (farmer response)

If additional resources are required to support bushfire response in the local government, they may be available through the DBCA – Parks and Wildlife Service, other DFES brigades and neighbouring local government bushfire brigades, at request.

The rate of volunteerism within the Shire is notably higher than the State average. This is of significant benefit to the community in the depth of local knowledge, confidence and connection around bushfire and response in the community. An ageing volunteer population may bring forward issues with crew turnaround and longevity. If recruitment and retention of younger volunteers slows over the coming years, this will remain a challenge for the Shire.

The Shire has a volunteer Chief Bushfire Control Officer (CBFCO) appointed by the Local Government under the *Bush Fires Act 1954*. The CBFCO is the most senior Fire Control Officer (FCO) in the Shire. The primary responsibility of the Chief is to manage, control and direct all operational bush fire-fighting activities within the district. Duties of the CBFCO include:

- Providing leadership to volunteer bush fire brigades;
- Liaising with the local government concerning fire prevention / suppression matters generally and to provide directions issued by the local government to bush fire control officers, bush fire brigades or brigade officers; and
- Issue directions as necessary to a FCO or a brigade member that is planning or conducting burning operations in the district.

Burning Restrictions

The *Bush Fires Act 1954,* s.17 and s.18 provide for the 'declaration and gazettal' of Prohibited and Restricted Burning Times (PBT & RBT), as well as the ability to adjust burning times to suit changing weather conditions.

The Shire's limited burning times are as follows:

- RBT 1 October to 14 October, and 1 March to 15 March
- PBT 15 October to 28 February

Permits to Set Fire to the Bush ('Permits') are issued by the Shire of Morawa during the RBT each year. Permits are issued in an effort to prevent the escape of controlled burns and to ensure property owners safely plan and carry out their burning activities.

Bush Fires Act 1954 section 33 Fire Management Notices

The Shire issues an annual Firebreak Notice in accordance with section 33 of the *Bush Fires Act 1954.* Also included is information on:

- FCO contacts;
- Dates of RBT and PBT;
- Communications and radio networks;
- Firebreak requirements and guidance; and
- Harvesting operation requirements

This notice is sent to residents each year with their Rates Notice, requiring the installation of compulsory firebreaks on or before 15 September. The intention of the Firebreak Notice is to ensure that private properties have clear access to their properties maintained during the high threat period, to ensure accessibility for responding personnel in the event of a fire. It also serves as an opportunity to educate residents on other requirements (bans, permits etc) to manage and reduce overall risk in the community during high threat periods.

Community Engagement Activities

Currently, the Shire does not lead any formal community engagement programs regarding bushfire safety, awareness or planning. The section 33 notices are supplied alongside Rates notices, ensuring strong visibility of compliance requirements and local bushfire brigade volunteers, as members of the community, share knowledge and information with other community members. Additionally, roadside banners are used to promote firebreak compliance and bushfire risk awareness. The Shire may choose to promote existing State-wide activations that encourage personal bushfire planning and bushfire safety and awareness to increase community resilience in the future. Consideration needs to be given to the costs of resourcing effective community engagement campaigns and the reasonable capacity of local governments to support their delivery.

Other Current Local Government Wide Controls

This BRM Plan is a hazard specific plan that addresses significant bushfire risk within the local government. It aims to integrate bushfire risk management programs and activities into the business processes of the Shire, other agencies and land owners. The outcomes of this Plan will be used to inform the Shire when preparing and then implementing bushfire mitigation strategies for Shire managed land. Bushfire is the highest risk factor to the community from an emergency management perspective in the Shire.

The increased fire risk to the community due to a drying climate and existing developments within and around high fuel load areas places increasing pressure on fire brigade volunteers to support fire response requirements. Existing and future bushfire risk management programs, such as the annual Firebreak notice issued under s.33 *Bush Fires Act 1954*, will utilise the BRM Plan to prioritise resources and influence the decision making process.

The use of social media platforms to communicate bushfire alerts and warnings to the community and provide information about prevention and preparedness is a popular tool with an increasing uptake of subscribers and views. The Shire uses their website, Facebook and Twitter accounts to keep the community informed.

Further information about the Local Government Wide Controls and how they will support the treatment of bushfire risk can be found in section 6.1 – Local Government Wide Controls.

4. Asset Identification and Risk Assessment

4.1. Planning Areas

The Shire of Morawa has a single planning area based on the Electoral Ward boundaries, which encompasses the whole Shire.

4.2. Asset Identification

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

Table 11 – 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.
Economic	**Agricultural** Areas under production, such as pasture, livestock, crops, viticulture, horticulture and associated infrastructure.

Asset Category	Asset Subcategories
	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 station, 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 Threated 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. **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.

Asset Category	Asset Subcategories
	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. **Recognised 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 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.

4.3. Assessment of Bushfire Risk

Risk assessments have been undertaken for each asset or group of assets identified using the methodology described in the Guidelines. The Asset Risk Register will be maintained in BRMS. This information is not included in the plan because information captured through BRMS includes data considered personal in nature including the names and addresses of landholders, and there is the potential for the data collected through the BRMS to be used for purposes other than bushfire risk mitigation

The Shire's CEO is to be consulted prior to any Bushfire Risk Management Planning data being released to the public domain. To actively encourage and support the implementation, monitoring and review of agreed actions, the Shire of Morawa as a matter of course or upon requests, will provide reports to key stakeholders that detail the assets and treatments that the stakeholders, (land owners/managers) have responsibility for.

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

Table 12 – Asset Category Proportions

Asset Category	Number of identified assets
Human Settlement	161
Economic	23
Environmental	8
Cultural	7

4.3.1. 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 asserts, 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.

4.3.2. Likelihood Assessment

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

4.3.3. Assessment of Environmental Assets

Using available biological information and fire history data, environmental assets with a known minimum fire threshold were assessed to determine if they were at risk from bushfire, within the five year life of the BRM Plan. Environmental assets that would not be adversely impacted by bushfire within the five year period have not been included and assessed in the BRM Plan.

The negative impact of a fire on these assets (within the period of this BRM Plan), was determined to be minimal and may even be of benefit to the asset and surrounding habitat.

4.3.4. Local Government Asset Risk Summary

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

Table 13 – Local Government Asset Risk Summary

Asset Category	Risk Rating				
	Low	Medium	High	Very High	Extreme
Human Settlement	6.5%	25.1%	28.2%	14.1%	7.0%
Economic	2.0%	6.1%	1.5%	2.0%	0.0%
Environmental	0.5%	2.5%	1.0%	0.0%	0.0%
Cultural	0.5%	0.5%	1.0%	1.5%	0.0%

5. Risk Evaluation

5.1. Evaluating Bushfire Risk

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

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

5.2. 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 land owner, in collaboration with local government and fire agencies. However, as a general rule, the following courses of action have been adopted for each risk rating.

Table 14 – Criteria for Acceptance of Risk and Course of Action

Risk Rating	Criteria for Acceptance of Risk	Course of Action
Extreme	Requires the application of asset specific treatment strategies. Treatment action is required within the first two years of this plan being endorsed. CEO may specify criteria. It is unlikely that Local Government wide controls would be adequate to manage the risk.	Routine controls are not enough to adequately manage the risk. Specific action is required in the first two years of BRM Plan where resourcing and funding permits. Treatments will be approached by: • Priorities will be made for treatments that will have maximum benefit to multiple assets and critical infrastructure; • Identification of partnerships with other agencies for strategic mitigation; • Treatments that benefit vulnerable communities will be given priority; and

		• Communication with stakeholders as identified in the Communications Plan. Assets will be reviewed post treatment.
Very High	Requires the application of asset specific treatment strategies. Treatment action is required within the first three years of this plan being endorsed. CEO may specify criteria. It is unlikely that Local Government wide controls would be adequate to manage the risk.	Routine controls are not enough to adequately manage the risk. Specific action is required in the first three years of BRM Plan where resourcing and funding permits. Treatments will be approached by: • Prioritisation of treatments that will have maximum benefit to multiple assets and critical infrastructure; • Identification of partnerships with other agencies for strategic mitigation; and • Communication with stakeholders as identified in the Communications Plan. Assets will be reviewed post treatment.
High	Asset specific treatment strategies may be required to adequately manage the risk. CEO may specify criteria. Local Government wide controls may contribute to management of risk.	Routine controls may not be enough to adequately manage the risk. Specific action is required during the life of the BRM Plan where resourcing and funding permits. Treatments will be approached by: • Priorities will be made for treatments that will have maximum benefit to multiple assets and critical infrastructure; • Where assets fall adjacent to Extreme or Very High assets, treatments may be extended and included where there may be strategic benefit; and • Communication with stakeholders as identified in the Communications Plan.

		Assets will be reviewed post treatment. Risk assessments to be reviewed at least once within the life of the BRM Plan.
Medium	Risk rating is considered acceptable with adequate controls. Asset specific treatments are not required, but risk should be monitored. Local Government wide controls should be sufficient to manage risk.	A specific action is not required. Risk will be managed with routine controls and monitored as required. Risk assessments to be reviewed at least once within the life of the BRM Plan.
Low	Risk rating is considered acceptable with adequate controls. Treatment action is not required but risk must be monitored.	Specific actions are not required. Risk will be managed with routine controls and monitored as required.

5.3. 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 15 – 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)

6. Risk Treatment

The purpose of risk treatment is to reduce the likelihood of a bushfire occurring and/or the potential impact of a bushfire on the social, economic, built and natural environments. This is achieved by implementing treatments that modify the characteristics of the hazard, the community or the built and natural environment.

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

6.1. Local Government-Wide Controls

Local government wide controls are activities that are non-asset specific, rather they reduce the overall bushfire risk within the local government. The following controls are currently in place across 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;
- Public education campaigns and the use of DBCA and DFES state-wide programs, tailored to suit local needs; including programs such as 5 Minute Fire Chat, Bushfire Action Month and Are You Ready Campaign;
- 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;
- Monitoring performance against the BRM Plan and reporting annually to the local government Council and OBRM;
- BFAC meetings as required to review current practices and contemporary bushfire management concepts; and
- Quarterly LEMC meetings.

A local government wide controls, multi-agency work plan has been developed **(Appendix 2).** The plan details work to be undertaken as part of normal business, improvements to current controls and new controls to be implemented to better manage bushfire risk across the local government area.

6.2. Asset-Specific Treatment Strategies

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

6.3. Development of the Treatment Schedule

The treatment schedule is a list of bushfire risk treatments recorded within BRMS. The Shire of Morawa 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 will be developed in broad consultation with land owners and other stakeholders including DFES and DBCA.

Land owners are ultimately responsible for treatments implemented on their own land. This includes any costs associated with the treatment and obtaining the relevant approvals, permits or licences to undertake an activity. Where agreed, another agency may manage a treatment on behalf of a land owner. However, the onus is still on the land owner to ensure treatments detailed in this BRM Plan's Treatment Schedule are completed.

7. Monitoring and Review

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

7.1. Review

A comprehensive review of this BRM Plan will be undertaken at least once every five years, from the date of Council 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.

7.2. Monitoring

BRMS will be used to monitor the risk ratings for each asset identified in the BRM Plan and record the treatments implemented. Risk ratings are reviewed on a regular basis 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.

7.3. Reporting

The Shire of Morawa will be requested to contribute information relating to their fuel management activities to assist in the annual OBRM *Fuel Management Activity Report*. Reporting the progress of mitigation works and the management of bushfire risk through the BRM Plan to the Council sub-committees being the BFAC, LEMC and other relevant working groups will be made by the CEO or an appropriate delegate, annually or more often as the need dictates.

7.3.1. Privacy and Release of Information

Information captured through the BRMS incudes data considered ‘personal’ in nature including the names and addresses of landholders. There is therefore the potential for the data collected through the BRMS to be used for purposes other than bushfire risk mitigation. The Chief Executive Officer is to be consulted prior to any Bushfire Risk Management data being released to the public domain.

8. Glossary

Asset	A term used to describe anything of value that may be adversely impacted by bushfire. This may include residential houses, infrastructure, commercial, agriculture, industry, environmental, cultural and heritage sites.
Asset Category	There are four categories that classify the type of asset – Human Settlement, Economic, Environmental and Cultural.
Asset Owner	The owner, occupier or custodian of the asset itself. Note: this may differ from the owner of the land the asset is located on, for example a communication tower located on leased land or private property.
Asset Register	A component within the Bushfire Risk Management System (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.
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 determined by the local government which is used to provide a suitable scale for risk assessment and stakeholder engagement.
Priority	See Treatment Priority.
Recovery Cost	The capacity of an asset to recover from the impacts of a bushfire.
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 risk assessments and treatments associated with assets recorded in the BRM Plan.
Risk Treatment	A process to select and implement appropriate measures undertaken to modify risk.
Rural	Any area where in residences and other developments are scattered and intermingled with forest, range, or farmland and native vegetation or cultivated crops.
Rural Urban Interface	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 considered as a whole, regardless of individual ownership or management arrangements.

Treatment	An activity undertaken to modify risk, for example a prescribed burn.
Treatment Objective	The specific aim to be achieved or action to be undertaken, in order to complete the treatment. Treatment objectives should be specific and measurable.
Treatment Manager	The organisation, or individual, 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 prescribed burn.
Vulnerability	The susceptibility of an asset to the impacts of bushfire.

9. Common Abbreviations

AFAC	Australasian Fire and Emergency Services Authorities Council
APZ	Asset Protection Zone
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
BRPC	Bushfire Risk Planning Coordinator
CALD	Culturally and Linguistically Diverse
CBFCO	Chief Bush Fire Control Officer
CEO	Chief Executive Officer
CBH	Cooperative Bulk Handling
CESM	Community Emergency Services Manager
DBCA	Department of Biodiversity, Conservation and Attractions
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
EPBC Act	Environmental Protection and Biodiversity Conservation Act
FCO	Fire Control Officer
FDI	Fire Danger Rating
FFDI	Forest Fire Danger Index
FMP / BMP	Fire Management Plan / Bushfire Management Plan
GFDI	Grassland Fire Danger Index
GIS	Geographic Information System
HSZ	Hazard Separation Zone

JAFFA	Juvenile and Family Fire Awareness
LEMA	Local Emergency Management Arrangements
LEMC	Local Emergency Management Committee
LG	Local Government
LMZ	Land Management Zone
MoU	Memorandum of Understanding
OBRM	Office of Bushfire Risk Management
PEC	Priority Ecological Community
PWS	Parks and Wildlife Service
SEMC	State Emergency Management Committee
SLIP	Shared Land Information Platform
TEC	Threatened Ecological Community
UCL	Unallocated Crown Land
UMR	Unmanaged Reserve
WA	Western Australia
WAPC	Western Australian Planning Commission

10. Appendices

10.1. Communications Strategy

10.2. Local Government Wide Controls