



Bushfire Risk Management Plan

2020 – 2025

DRAFT v1

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

Xx October 2020

Local Government Council BRM Plan endorsement XX Month 2020

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Document Control

Document Name	Bushfire Risk Management Plan	Current Version	
Document Owner	Shire of Victoria Plains CEO	Issue Date	DD/MM/YYYY
Document Location	Shire Office	Next Review Date	DD/MM/YYYY

Document Endorsements

The Shire of Victoria Plains (SoVP) Council endorses that the Bushfire Risk Management Plan (BRM Plan) has been reviewed and assessed by the Office of Bushfire Risk Management as compliant with the standard for bushfire risk management planning in Western Australia, the *Guidelines for Preparing a Bushfire Risk Management Plan*.

The SoVP is the owner of this document and has responsibility, as far as is reasonable, to manage the implementation of the BRM Plan and facilitate the implementation of bushfire risk management treatments by risk owners.

The endorsement of the BRM Plan by the Shire satisfies their endorsement obligations under section 2.2.7 of the *State Hazard Plan for Fire (Interim, Nov 2017)* (formerly *Westplan Fire*).

Local Government	Representative	Signature	Date
Shire of Victoria Plains	CEO		

Local Government Disclaimer

In approving this BRM Plan, the SoVP is acknowledging the assets that have been identified and the risk ratings and treatment priorities assigned. Endorsement of the plan is a commitment by the Shire to work with landowners and managers to address unacceptable risk within the community. Endorsement of this plan is not committing the Shire to a program of treatment works to be implemented by others, or an acceptance of responsibility for risk occurring on land that is not owned or managed by the Shire.¹

Amendment List

Version	Date	Author	Section
.7	05/10/2020	D. Wilson	All
1	13/10/2020	D. Wilson	All

¹ *Guidelines for Preparing a Bushfire Risk Management Plan, November 2015, Page 79*

Publication Information

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Privacy and Release of Information

Information captured through the Bushfire Risk Management System (BRMS) includes data that is considered sensitive, such as the location of culturally and environmentally significant sites, land ownership details and risk information.

The Chief Executive Officer is to be consulted prior to public release of any data relating to the Shire's Bushfire Risk Management Plan.

1. Introduction

1.1 Background

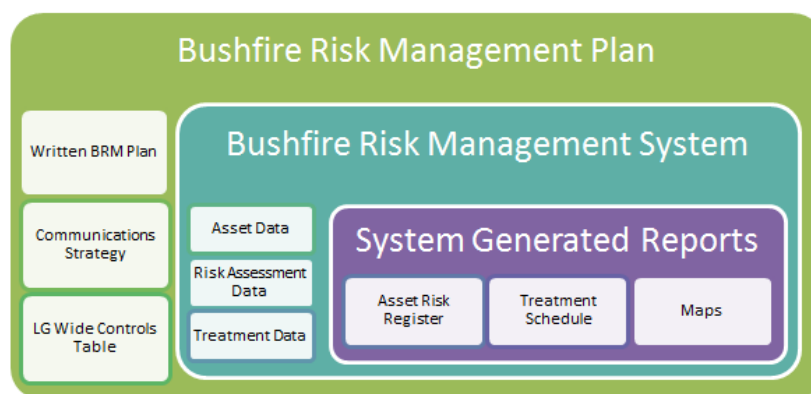
Under the *State Hazard Plan (Fire)* an integrated Bushfire Risk Management Plan (BRM Plan) is to be developed for local governments identified as having a significant bushfire risk. This BRM Plan has been prepared for the SoVP in accordance with the requirements of the *Guidelines for Preparing a Bushfire Risk Management Plan*.

The risk management processes used to develop this BRM Plan are aligned to the key principles of *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines (AS/NZS ISO 31000:2009)*, as described in the Second Edition of the *National Emergency Risk Assessment Guidelines (NERAG 2015)*. This approach is consistent with the policies of the State Emergency Management Committee.

This BRM Plan is a strategic document that identifies assets at risk from bushfire and their priority for treatment. The resulting 'Treatment Schedule' sets out a broad program of coordinated multi-agency treatments to address risks identified in the BRM Plan. Government agencies and other land managers responsible for implementing treatments participate in developing the BRM Plan to ensure treatment strategies are collaborative and efficient, regardless of land tenure. Treatments will be guided by risk priority, not land tenure, and will not be limited to local government managed lands.

This BRM Plan, as reflected in *Figure 1* below, consists of:

- Bushfire Risk Management Plan
- Communications Strategy (**Appendix 1**)
- Local Government Wide Controls & Multi Agency Work Plan (**Appendix 2**)
- Asset Risk Register (*refer to section 4.2.4*)
- Treatment Schedule (to be completed within 6 months of endorsement of the BRM Plan)



*Figure 1: Components of the Bushfire Risk Management Plan*²

Assets, risk assessments and treatment data are stored and maintained in an electronic database – the Bushfire Risk Management System (BRMS). Shire personnel will have access to the Shire's data and are able to produce reports including the *Asset Risk Register* and *Treatment Schedule* as well as maps.

² Source: *Bushfire Risk Management Handbook, Department of Fire and Emergency Services, 2017*.

1.2 Aim and Objectives

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

The overarching objective of the BRM Plan is to effectively manage bushfire risk within the SoVP to protect people, assets and other things of local value. Additional objectives of this BRM Plan include:

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

1.3 Legislation, Policy and Standards

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

1.3.1 Legislation

- *Aboriginal Heritage Act 1972*
- *Building Act 2011*
- *Bush Fires Act 1954*
- *Bush Fires Regulations 1954*
- *Conservation and Land Management Act 1984*
- *Country Areas Water Supply Act 1947*
- *Emergency Management Act 2005*
- *Emergency Management Regulations 2006*
- *Environmental Protection Act 1986*
- *Environmental Protection and Biodiversity Conservation Act 1999 (Cth)*
- *Fire and Emergency Service Act 1998*
- *Fire Brigades Act 1942*
- *Metropolitan Water Supply, Sewerage and Drainage Act 1909*
- *Planning and Development (Local Planning Scheme) Regulations 2015*
- *Wildlife Conservation Act 1950*

1.3.2 Policies, Guidelines and Standards

- AS 3959-2009 Construction of buildings in bushfire-prone areas
- AS/NZS ISO 31000:2009 - Risk Management – Principles and Guidelines
- Building Protection Zone Standards (DFES)
- Bushfire Risk Management Planning – Guidelines for preparing a Bushfire Risk Management Plan (2015)

- Firebreak Location, Construction and Maintenance Guidelines (DFES)
- Guidelines for Planning in Bushfire Prone Areas (2015)
- Guidelines for Plantation Fire Protection (DFES 2011)
- National Emergency Risk Assessment Guidelines (NERAG) (Second Edition 2015)
- State Emergency Management Policy 2.5 – Local Arrangements
- State Emergency Management Policy 3.2 – Emergency Risk Management Planning
- State Emergency Management Preparedness Procedure 7 – Local Emergency Management Committee (LEMC)
- State Emergency Management Preparedness Procedure 8 – Local Emergency Management Arrangements
- State Emergency Management Prevention Procedure 1 – Emergency Risk Management Planning
- State Hazard Plan for Fire (formerly Westplan Fire)
- State Planning Policy 3.4: Natural Hazards and Disasters
- State Planning Policy 3.7: Planning in Bushfire Prone Areas
- Western Australian Emergency Risk Management Guide 2015

1.3.3 SoVP References

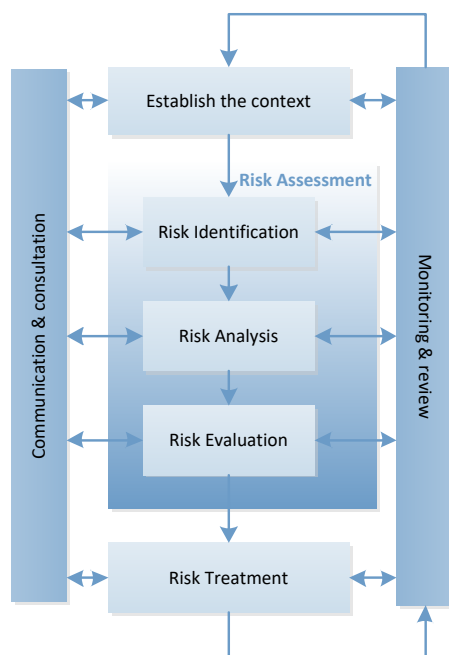
- Shire of Victoria Plains Corporate Business Plan 2019 - 2023
- Shire of Victoria Plains Strategic Community Plan 2017/18 -2027/28
- Shire of Victoria Plains Annual Report 2018 – 2019
- Shire of Victoria Plains Policy Manual – June 2019
- Shire of Victoria Plains Bush Fire Brigades Local Law 2017
- Shire of Victoria Plains Strategic Resource Plan 2019 – 2024
- Shire of Victoria Plains Local Planning Strategy
- Shire of Victoria Plains Local Emergency Management Arrangements
- Shire of Victoria Plains – Firebreak and Fuel Hazard Reduction Notice
- Victoria Plains Bridge Inventory

1.3.4 Other Related Documents

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

2. The Risk Management Process

The risk management processes used to identify and address risk in this BRM Plan are aligned with the international standard for risk management, AS/NZS ISO 31000:2009, as described in NERAG (2015). This process is outlined in *Figure 2* below.



*Figure 2 - An overview of the risk management process*³

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	<ul style="list-style-type: none"> ▪ As custodian of the BRM Plan, coordination of the development and ongoing review of the integrated BRM Plan. ▪ Negotiation of commitment from landowners to treat risks identified in the BRM Plan. ▪ As treatment manager, implementation of treatment strategies. ▪ As part of the approval process, submission of the draft BRM Plan to the Office of Bushfire Risk Management (OBRM) to review it for consistency with the Guidelines. ▪ As part of the approval process, submission of the final BRM Plan to council for their endorsement and adoption.
Department of Fire and Emergency Services (DFES)	<ul style="list-style-type: none"> ▪ Participation in and contribution to the development and implementation of BRM Plans, as per their agency responsibilities as the Hazard Management Agency for fire. ▪ Support to local government through expert knowledge and advice in relation to the identification, prevention and treatment of bushfire risk.

³ Source: AS/NZS ISO 31000:2009, Figure 2, reproduced under SAI Global copyright Licence 1411-c083.

Stakeholder Name	Roles and Responsibilities
	<ul style="list-style-type: none"> ▪ Facilitation of local government engagement with state and federal government agencies in the local planning process. ▪ Undertake treatment strategies, including prescribed burning on behalf of Department of Lands for Unmanaged Reserves and Unallocated Crown Land within gazetted town site boundaries. ▪ In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders. ▪ Ensure bushfire risk is managed in accordance with AS/NZS ISO 31000 and reporting on the state of bushfire risk across Western Australia. ▪ Review BRM Plans for consistency with the Guidelines prior to final endorsement by council.
Department of Biodiversity, Conservation and Attractions - Parks and Wildlife Service (PWS)	<ul style="list-style-type: none"> ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ Providing advice for the identification of environmental assets that are vulnerable to fire and planning appropriate treatment strategies for their protection. ▪ As treatment manager, implementation of treatment strategies on department managed land and for Unmanaged Reserves (UMR) and Unallocated Crown Land (UCL) outside gazetted town site boundaries. ▪ In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders.
Other State and Federal Government Agencies	<ul style="list-style-type: none"> ▪ Assist the local government by providing information about their assets and current risk treatment programs. ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ As treatment manager (where applicable), identification and implementation of treatment strategies.
Public Utilities	<ul style="list-style-type: none"> ▪ Assist the local government by providing information about their assets and current risk treatment programs. ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ As treatment manager, implementation of treatment strategies.
Corporations and Private Land Owners	<ul style="list-style-type: none"> ▪ Assist the local government by providing information about their assets and current risk treatment programs. ▪ Participation in and contribution to the development and implementation of BRM Plans and Treatment Schedules. ▪ As landowner/treatment manager, identification and implementation of treatment strategies.
Other Stakeholders	<ul style="list-style-type: none"> ▪ Participation in and contribution to the development and implementation of BRM Plans and Treatment Schedules. ▪ Providing advice for the identification of assets that are vulnerable to fire. ▪ Providing advice on appropriate treatment strategies for asset protection.

2.2 Communication & Consultation

As indicated in Figure 2, communication and consultation throughout the risk management process is fundamental to the preparation of an effective BRM Plan. To ensure appropriate and effective communication occurred with relevant stakeholders in the development of the BRM Plan, a *Communication Strategy* was prepared. This is provided at **Appendix 1**.

3. Establishing the Context

3.1 Description of the Local Government and Community Context

3.1.1 Strategic and Corporate Framework

The SoVP' Strategic Community Plan (2017 – 2027), which incorporates the Shire's Corporate Business Plan (2016 – 2020), reflects the Shire's commitment to promoting community health and wellbeing and the effective management and sustainability of the environment and natural resources.

A key element of this is ensuring that the bushfire risk is managed to reduce impacts on life, critical infrastructure and services as well as ensuring the preparation and resilience of communities to fire events.

Responsibility for the BRMP process rests with the SoVP Chief Executive Officer (CEO), however; the management and implementation of the plan is the responsibility of the SoVP Community and Emergency Services Manager (CESM). The effective implementation of this plan depends upon the engagement and involvement of multiple stakeholders, including private landowners and state and federal government agencies. The SoVP has a pivotal role in ensuring effective management of bushfire risk on private and local government managed land and may be supported via DFES regional programs to achieve these objectives.

The BRM Plan will play an integral part in guiding and informing the Shire's Strategic Community Plan and Corporate Business Plan (Integrated Planning Reporting Framework) which sets out the communities' aspirations into Council objectives via specific focus areas. The development of these plans is underpinned by a community consultation process involving a series of workshops held in each locality.

The Strategic Community Plan highlights specific outcomes for each focus area and corresponding priorities via service areas. The intent of the Corporate Business Plan is to capture the priorities into actions for delivery. The Corporate Business Plan in essence, is a plan of actions over a four-year period. Projects are divided into "operational" and "Council". A quarterly status report is provided to Council for all projects identified as "Council" actions.

Whilst there are no specific outcomes directly referencing a BRM Plan, the Community Wellbeing focus area within the Strategic Community Plan identifies the need to "support the SoVP community to be inclusive, vibrant, healthy and safe through the Shire's service delivery." Local Emergency Services is listed as a Shire key service area in the achievement of this objective.

*Strategic Community Plan 2017-2027*⁴

Community Wellbeing	
Theme 1 Community - to enhance and improve a sense of community in the Shire	
Outcomes	Key Service Area
1.3 - Promote health and well being	Local Emergency Services
1.4 - Support sporting, volunteer, and community groups	

*Corporate Business Plan 2019 - 2023*⁵

Strategy 1.4
Support sporting, volunteer, and community groups

The SoVP's values include:

- **Integrity** – we take responsibility for our actions in an honest and open way.
- **Courage** - we take steps to create new and better ways of doing business.
- **Accountability** - we take responsibility for decisions and actions to achieve outcomes.
- **Respect** - we consider and value the perspective and contribution of others.
- **Excellence** - we continuously improve our performance to achieve outstanding outcomes for the SoVP.

The Shire is committed to community safety, risk management and effective management of the environment and natural resources.

The following key areas are identified as having direct relevance to the objectives of this BRM Plan:

Community:

Intrinsic within the Shire's strategies is the need to create and maintain a safe environment for the community with support for all ages and abilities.

In the context of the Bushfire Risk Management Plan the Shire is committed to the raising of community awareness of the risk from bushfires, bushfire preparedness, mitigation activities and the protection of its community members.

The Shire specifically recognises and values the efforts and dedication of the members of the local volunteer emergency services brigades and is committed to providing the necessary support and resources to enable them to respond to bushfires in a safe and effective manner.

Environment:

The SoVP values the biodiversity of its environment and is committed to ensuring that its natural resources are managed in a sustainable manner. This includes recognising the environmental and recreational value of Shire managed reserves and the significance of land tenure owned/managed by other government agencies within their Shire boundaries.

⁴ Shire of Victoria Plains Strategic Community Plan 2017-2027

⁵ Shire of Victoria Plains Corporate Business Plan 2019 - 2023

In the context of this BRM Plan, the SoVP is committed to addressing the risk of fire and working with all stakeholders to reduce this risk in a manner that recognises and seeks to minimise negative impacts upon the environment.

Economic:

The SoVP has a strong dependency on road, rail, and other infrastructure in support of the strong agricultural activities within the Shire.

In the context of this BRM Plan, the SoVP is committed to ensuring land and infrastructure maintenance and/or developments reflect best practice in bushfire risk management.

In the context of the BRM Plan, the SoVP is committed to engaging with the community and stakeholders on matters related to bushfire risk management and maintaining compliance with bushfire related legislation including the responsible expenditure of any mitigation grant funding.

Governance and Leadership:

The SoVP recognises the importance of leadership and coordination in emergency management and has an established Local Emergency Management Committee (LEMC) with multi agency membership and a Bushfire Advisory Committee. This committee provides an important multi-agency forum to enable consultation around the Shire’s BRM Plan.

The LEMC has endorsed Local Emergency Management Arrangements (LEMA) for the Shire. The Local Emergency Management Arrangements reflect bushfire as a high risk within the SoVP.

In the development of the LEMA, the Committee undertook a risk assessment process resulting in a ‘Risk Register Schedule’ being developed that outlines the identified hazards presenting a risk within the Shire, risk levels and treatment options. The SoVP ‘Risk Register Schedule’ reflects Bushfire as a ‘high’ risk to the Shire.

The size of the Shire’s structure and available funding does not support a full-time role specifically allocated to Emergency Management. The Shire has joint access (2 days per week) with the Shire of Moora to a Community and Emergency Services Manager. Tasks may be delegated to the Chief Bush Fire Control Officer (CBFCO), which is a volunteer position appointed by the Shire in accordance with the *Bush Fires Act 1954*.

The following table 2, reflects the functions and positions within the SoVP critical to the successful achievement of the objectives of this BRM Plan.

Table 2 – Functions/positions within SoVP critical to this Bushfire Risk Management Plan

Function	Roles
<p>Community Emergency Services Manager / SoVP Leadership Team</p>	<ul style="list-style-type: none"> ▪ Oversight of the implementation, monitoring and review of the Bushfire Risk Management Plan ▪ Sourcing and approving funding and expenditure ▪ Monitoring the implementation of agreed treatments ▪ Liaison with key stakeholders ▪ Participation on Local Emergency Management Committee (LEMC) ▪ Management of the release of BRMS Plan and BRMS data

Person/s Tasked with Emergency Management within the Shire Administration Team	<ul style="list-style-type: none"> ▪ Develop practices for fire management on LG, UCL and UMR land ▪ In consultation, planning annual schedule of works ▪ Build knowledge and understanding of fire management practices within the community ▪ Participation on Bushfire Advisory Committee (BFAC) ▪ Support bushfire meetings and committees ▪ Oversee burning programs and support from local brigades ▪ Contributing to treatment planning ▪ Negotiating with stakeholders
Community Emergency Services Manager / Chief Bushfire Control Officer	<ul style="list-style-type: none"> ▪ Oversee burning programs and support from local brigades ▪ Contributing to treatment planning ▪ Negotiating with stakeholders ▪ Fire breaks inspection and enforcement ▪ Participation on Bushfire Advisory Committee (BFAC)
SoVP Works Department	<ul style="list-style-type: none"> ▪ Contributing to treatment planning ▪ Undertake planned works
SoVP Town Planning	<ul style="list-style-type: none"> ▪ Ensure adherence to building codes and planning scheme ▪ Bushfire prone mapping
SoVP Finance Department	<ul style="list-style-type: none"> ▪ Accessing and managing grants and funding

NOTE: Some functions outlined above may/are currently fulfilled through the employment of contract personnel

The Shire's Local Emergency Management Committee (LEMC) and Bushfire Advisory Committee (BFAC) are identified as key stakeholders in the development, implementation, and review of the BRM Plan. Their input and advice are critical to the bushfire risk management process and will provide an important forum for consultation, joint-agency partnerships and the resolution of local issues affecting bushfire risk management. The Local Emergency Management Arrangements reflect bushfire as a high risk within the SoVP.

The BRM Plan will assist by improving the community's awareness of bushfire risk and planned treatment activities. Identification of treatment priorities will assist the Shire's forward planning and budgeting for treatment activities related to bushfire risk within the BRM Plan area.

The Shire has a scheduled annual works program and proactively addresses risks identified on Shire managed land, within their budgetary constraints. Consideration around bushfire preparedness, prevention, response, and recovery are embedded into the Shire's daily business.

The following challenges have been identified for the Shire, all of which have the potential to impact the objectives of this BRM Plan. Consequently, special consideration will need to be given to these areas during the life of this plan:

- Population decline
- Increased compliance requirements due to Government Policy and Legislation
- Changing community expectations in relation to service levels
- Changes to agricultural practices
- Aging population

- Climate change and impact on natural environment
- Extreme weather events
- Attraction and retention of residents impacting succession planning and operational capability within the emergency services volunteer brigades
- Vulnerable groups, such as the elderly, itinerant workers, and recreational visitors
- The volume of traffic moving through the Shire along potential ignition routes
- Telecommunications network and phone coverage

The challenges outlined above, and the priority areas detailed below, together with the actions being undertaken by the Shire in relation to these areas, are referenced further in this document.

The Shire has identified several priority areas that need to be considered in the bushfire risk planning processes both in the context of this BRM Plan and beyond. These include:

- The risk of fire travelling along waterways acting as a wick to bring fire into adjacent parcels
- Limitations of water access particularly smaller residential areas with water pressure issues and long delays in turnaround times when refilling
- Bridges have been identified as a significant risk due to the replacement cost and the potential economic impact if transport routes are interrupted for extended periods. The Bridges in the Shire are predominantly timber construction
- Management of unallocated crown land (UCL) and unmanaged reserves (UMR)
- Management of reserves around the residential boundaries
- Vegetation in and around telecommunications and public utility infrastructure such as the communications towers, water pipelines, pumping station(s) and the railway line
- Road reserves – known fire ignition points

These priority areas have been identified from matters raised through corporate governance processes such as Council, Local Emergency Management Committee, Bushfire Advisory Committee, and local knowledge.

The location of assets in relation to vegetation and their importance for the Shire's response and recovery activities have highlighted these risks.

3.1.2 Location, Boundaries and Tenure

The SoVP is located in the Wheatbelt Region of Western Australia 160 kilometres north of Perth. Consisting of a small cluster of towns in the North West of the Avon Valley Victoria Plains covers an area of approximately 256,973ha.

The SoVP covers an area of 2,563 square kilometres and is approximately 64 kilometres wide and 64 kilometres deep. The main townsite of Calingiri is located 143 kilometres from Perth (via Bindoon), 39 kilometres from Wongan Hills and 61 kilometres from Toodyay to the south. Calingiri townsite is located on the hub of several important transport routes.

The SoVP includes the inland townsites of:

- *Bolgart*
- *Calingiri*
- *Piawanning*
- *Yerecoin*
- *New Norcia**
- *Mogumber*
- *Gillingarra*

* New Norcia is Australia’s only monastic town. Established in 1847 the township has 69 Spanish influenced buildings, 27 of which are listed by the National Trust.

The SoVP is bounded by the Shire of Gingin to the south west, the Shire of Dandaragan to the north west, the Shire of Moora to the North, the Shire of Wongan-Ballidu to the north east, the Shire of Goomaling to the south east, Chittering and the Shire of Toodyay to the south.

Originally, Victoria Plains stretched from the Indian Ocean to the South Australian border and from Carnamah in the North, to Bolgart in the South

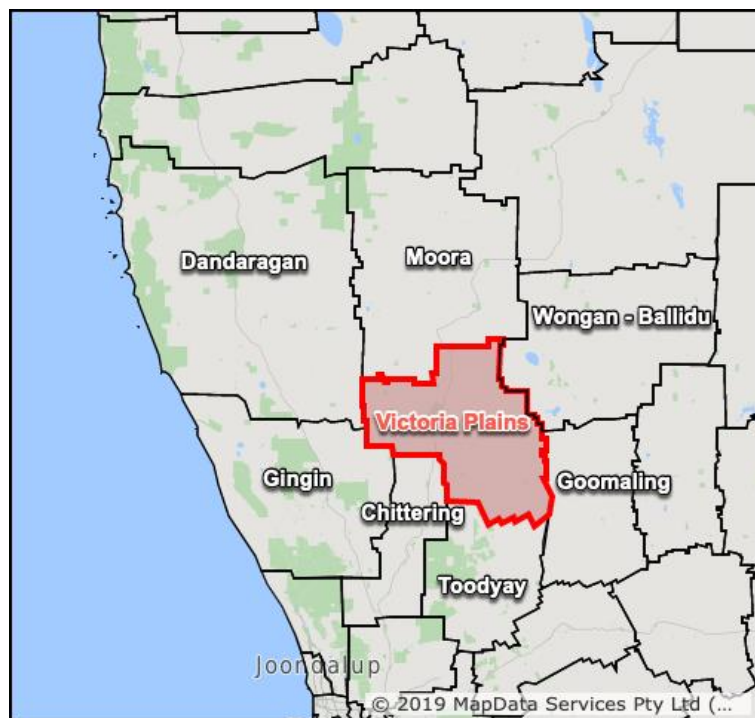


Figure 4: SoVP District Map (Source: SoVP)



Figure 3: SoVP Planning Areas (Source: SoVP)

The SoVP has 207 kilometres of sealed roads with over 600 more kilometres remaining unsealed. Figure 4 shows the location of the Shire in relation to the surrounding settlements and the Perth Metropolitan Region.

The Wongan Hills – Calingiri Road is a State Road and classified as a Priority A Route in the Wheatbelt Regional Road Development Strategy. The route functions as a rural arterial road that provides access to Wongan Hills and areas further north, and westwards to Great Northern Highway and the Perth Metropolitan Area. The road also provides an alternative to the Highway and carries heavy farm vehicles carting fertiliser and grain, heavy freight vehicles and local traffic.

Table 3 reflects 99.18% of land tenure is private ownership with the majority of this used for agricultural purposes, predominantly broad acre farming. Approximately 74% of the SoVP is arable land.⁶

Table 3 – Overview of Land Tenure and Management within the SoVP⁷

Land Manager	Area ha	% of Plan Area
SoVP	216.38	.084
Department of Planning Lands and Heritage	178.51	.069
Water Corp	254.96	.099
Department of Biodiversity, Conservation and Attractions	1341.50	.522
Public Transport Authority	7.33	.003
Main Roads	5.66	.002
Department of Water and Environmental Regulation	89.72	.035
Department of Education	8.43	.003
Private (predominantly agricultural holdings)	254,871	99.18
Total		100

⁶ Department of Primary Industry and Regional Development

⁷ Landgate

Agricultural land holdings are predominantly owned by local families with fewer landowners owning residential parcels of land. Some of the challenges related to this include:

- If one agricultural landholder does not act in accordance with the Shires bylaws this can increase the risk to other agricultural landowners, particularly those on adjoining properties
- The loss of one agricultural parcel can have significant economic and social implications for the Shire
- Consideration needs to be given to balancing the impacts of mitigation and risk reduction in the context of productivity and associated costs

Private properties within the semi-rural inland townsites are at varying degrees of bushfire readiness. Of the 438 dwellings identified in the 2016 Census, 397 are pre 1980 construction with 314 predicted to have asbestos containing products.

Fires may impact on multiple tenures and move through various land uses. Some properties are well prepared, where others are at extreme risk. The identification of treatments and engagement and acceptance of property owners to mitigate bushfire risk will require a strong collaborative approach between local government and property owners.

A proportion of rural properties within the shire have demonstrated self-sufficiency, to varying degrees, having access to equipment such as their own fire-fighting equipment, appliances, pumps, and water sources. This is more evident in the rural farming areas and to a lesser extent in the townsites.

Some of the communities have an atmosphere of neighbour helping neighbour with phone trees and social media being used to keep each other informed. This was demonstrated during the recent Mogumber fire (December 2019) where farm community members initially coordinated amongst themselves in an effort to contain a rapidly spreading ground fire scenario.

Within the SoVP there are areas of cultural and environmental significance which limits the ability to carry out treatments thus creating a more complex situation when attempting to reduce risk.

Where applicable land manager/agencies have been consulted, and guidance sought in the development of the BRM Plan. Further consultation will occur in the next phase of the plan as appropriate treatment strategies are identified and implemented.

Unallocated Crown Land (UCL) and Unmanaged Reserves (UMR) constitutes less than 0.1% of the total land tenure within the SoVP (Figure 5). UCL/UMR located within the townsites are managed by the Department of Fire and Emergency Services with UCL/UMR located outside of the townsites managed by the Department of Biodiversity, Conservation and Attractions (DBCA). These management arrangements result from a memorandum of understanding (MOU) with the WA Department of Lands.

Embers can create spot fires ahead of a main fire front and threaten inland townsites. This type of fire behaviour can increase the spread of fire and significantly increase risk to fire fighters and the townsite community. The ability for embers to travel well ahead of the main fire is one reason landowners are encouraged to reduce fuels around their properties both within townsites and on agricultural parcels. Low fuel zones, such as 'Asset Protection Zones' around properties can contribute to reduced fire spread, reduce the impact on assets, result in less intense fire behaviour and ultimately a more successful fire response outcome. Installing and maintaining APZ's and Hazard Separation Zones are a key element of the Shire's Bushfire readiness and community engagement strategies.

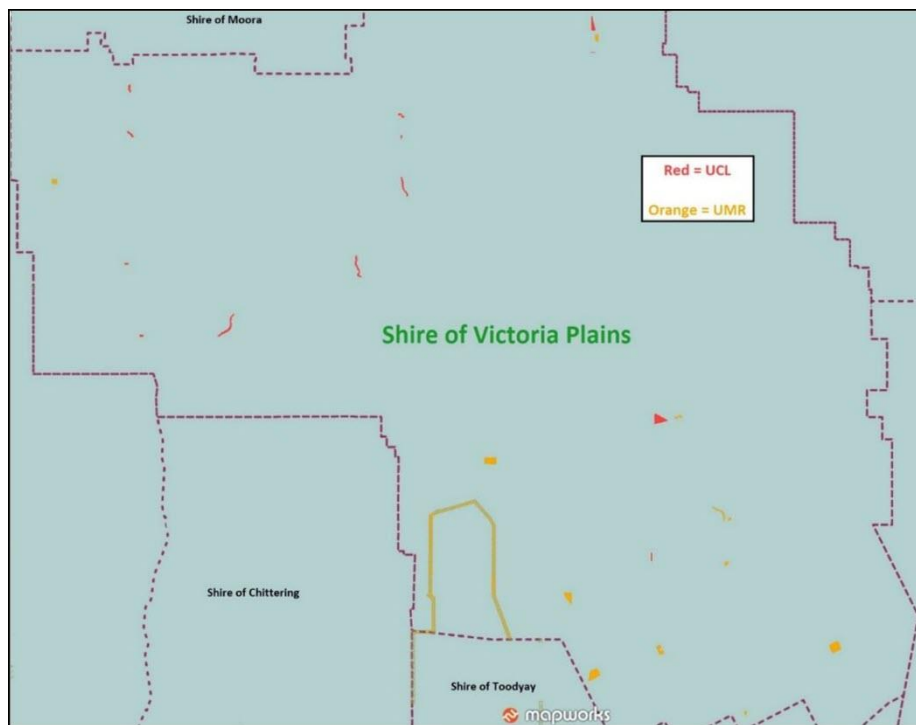


Figure 5: The SoVP Land Tenure⁸

Whilst constituting less than .1% the effective UCL/UMR Management within the SoVP presents a significant bushfire risk to adjacent townsites. A strong relationship has already been developed between the Shire, DFES and DBCA in recognition of the bushfire risk posed by UCL/UMR.

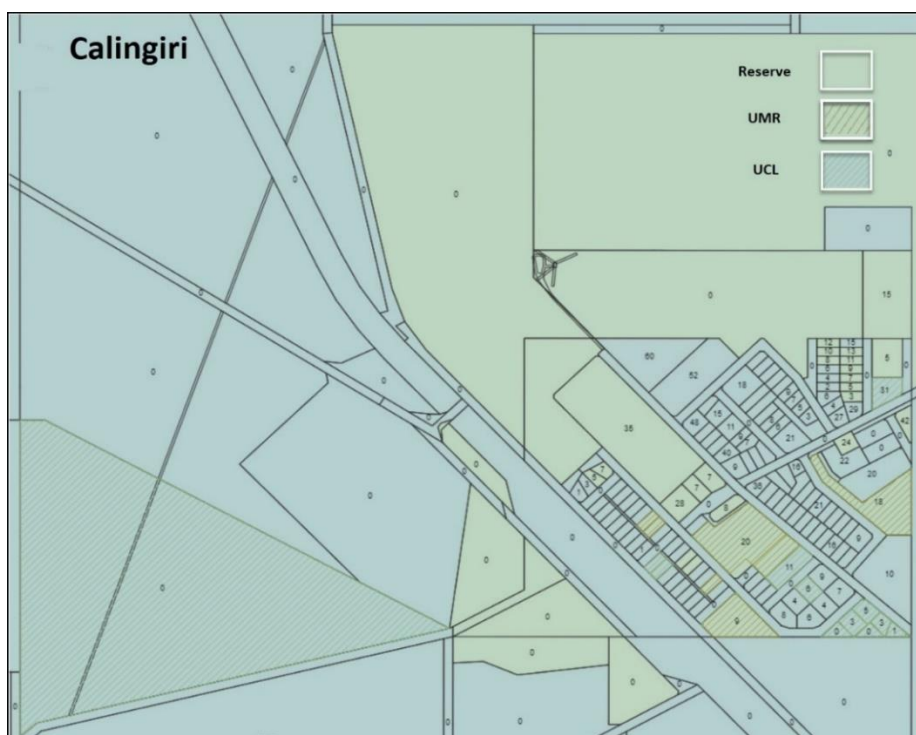


Figure 6: The location of Reserves, UCL and UMR in immediate vicinity of Calingiri⁹

⁸ SoVP Local Planning Strategy

⁹ Source: DFES Bushfire Risk Management System

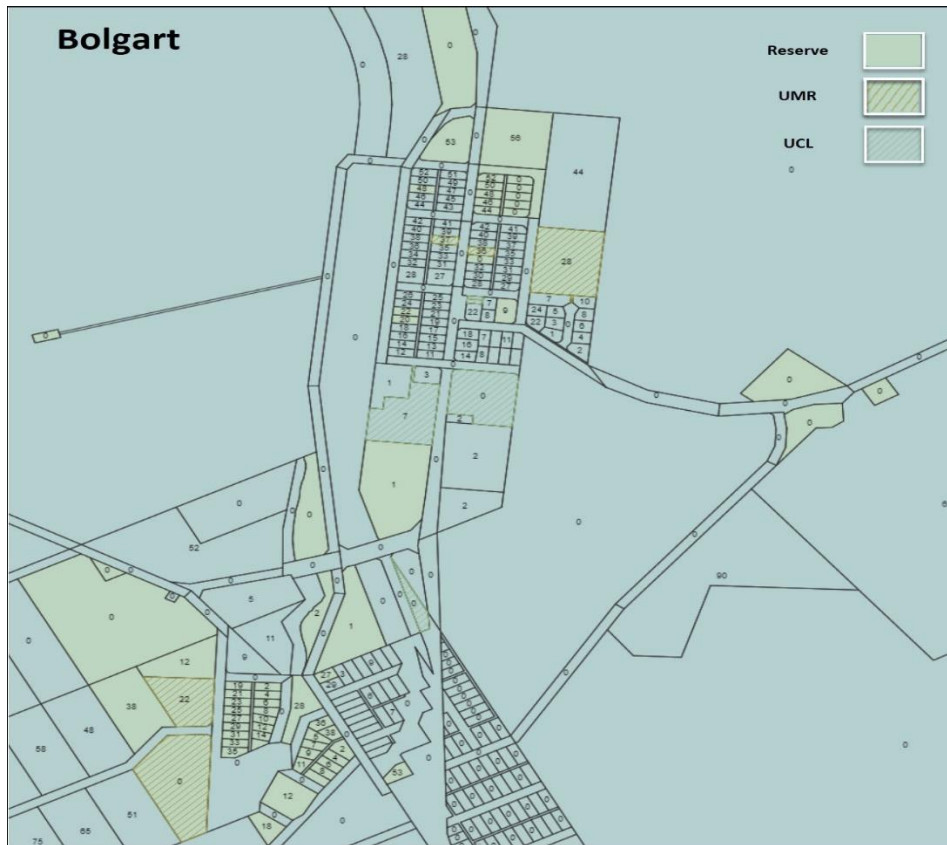


Figure 7: The location of Reserves, UCL and UMR in immediate vicinity of Bolgart ¹⁰

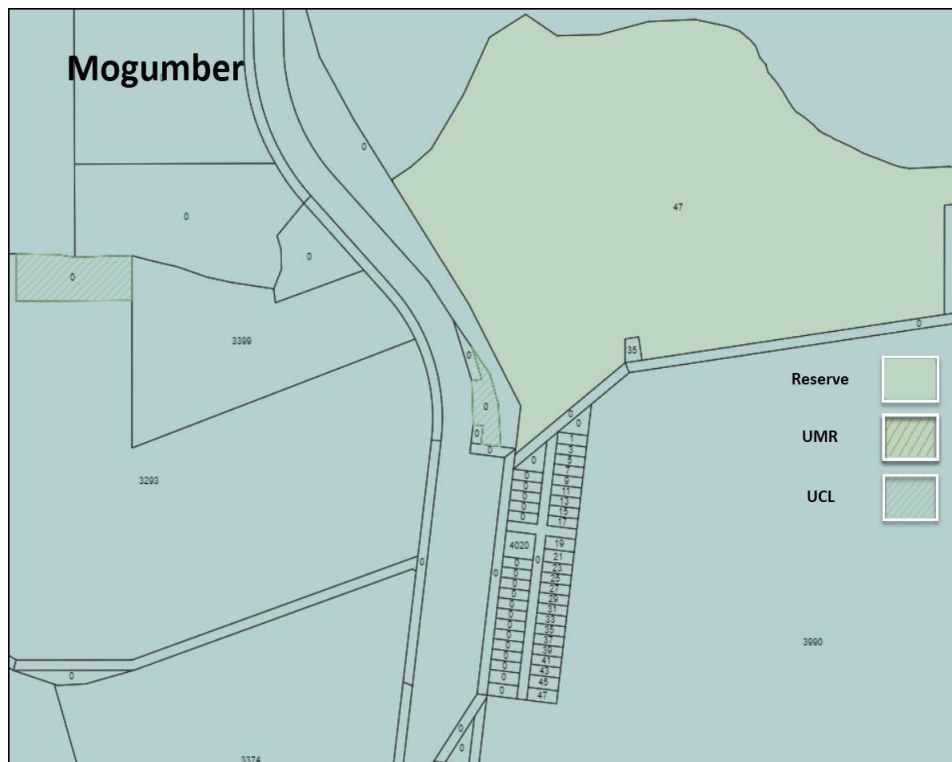


Figure 8: The location of Reserves, UCL and UMR in immediate vicinity of Mogumber ¹¹

¹⁰ Source: DFES Bushfire Risk Management System

¹¹ Source: DFES Bushfire Risk Management System

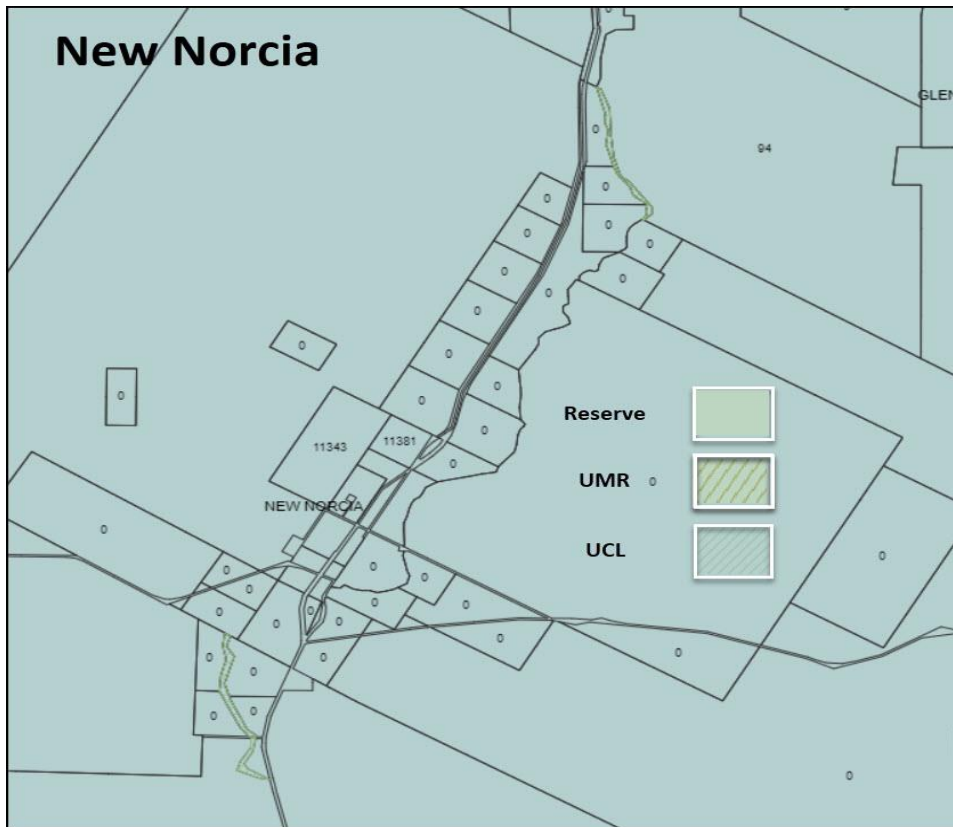


Figure 9: The location of Reserves, UCL and UMR in immediate vicinity of New Norcia ¹²

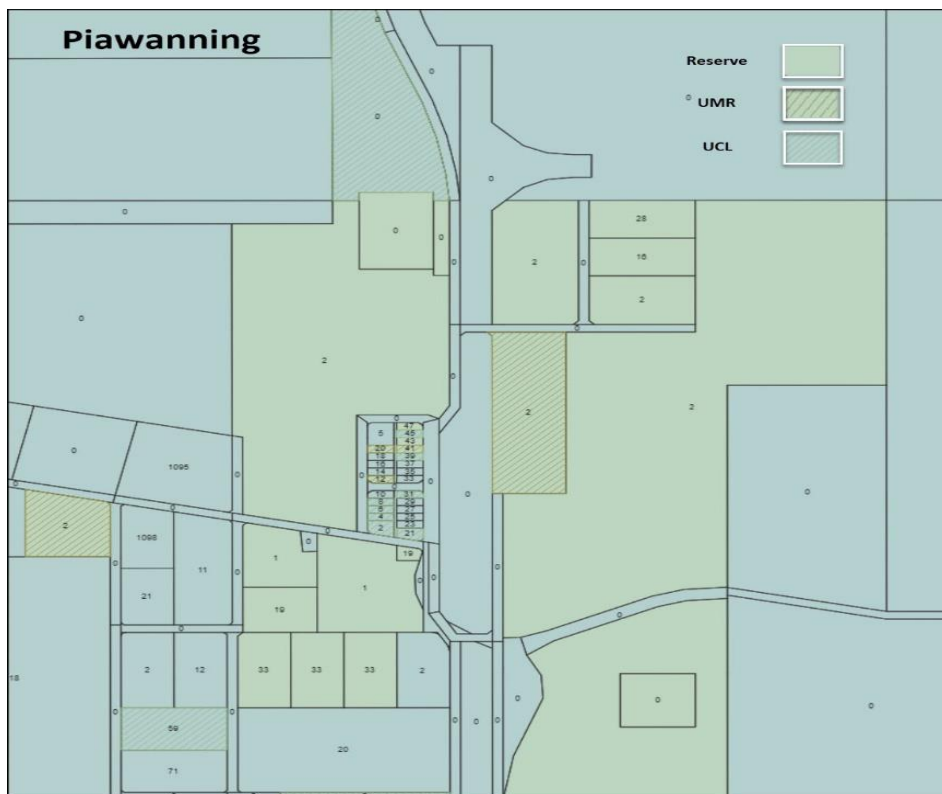


Figure 10: The location of Reserves, UCL and UMR in immediate vicinity of Piawanning ¹³

¹² Source: DFES Bushfire Risk Management System

¹³ Source: DFES Bushfire Risk Management System

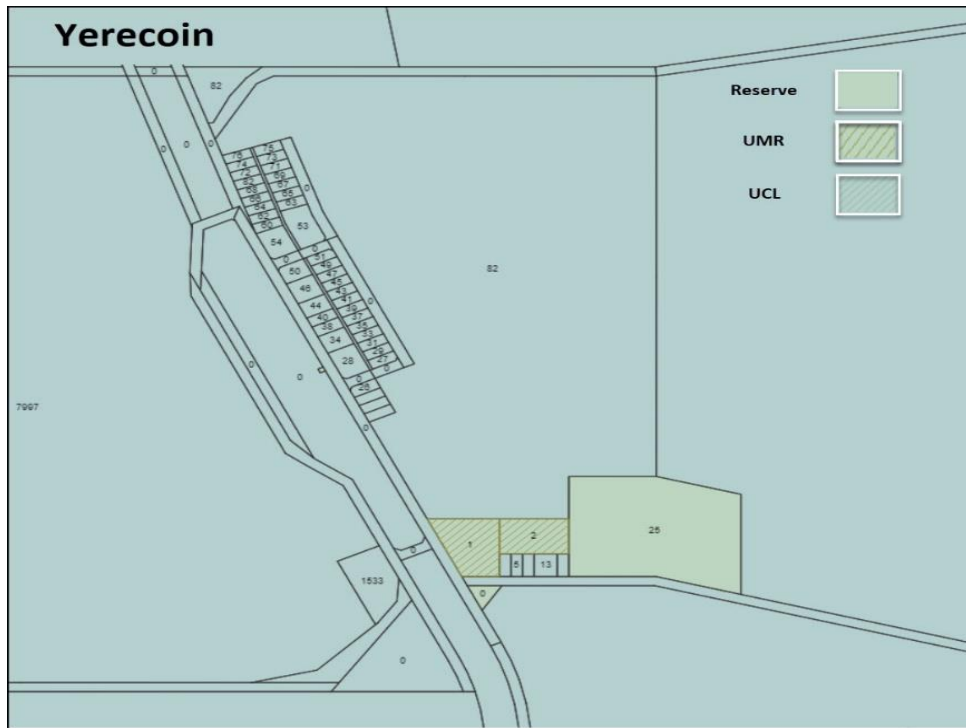


Figure 11: The location of Reserves, UCL and UMR in immediate vicinity of Yerecoin ¹⁴

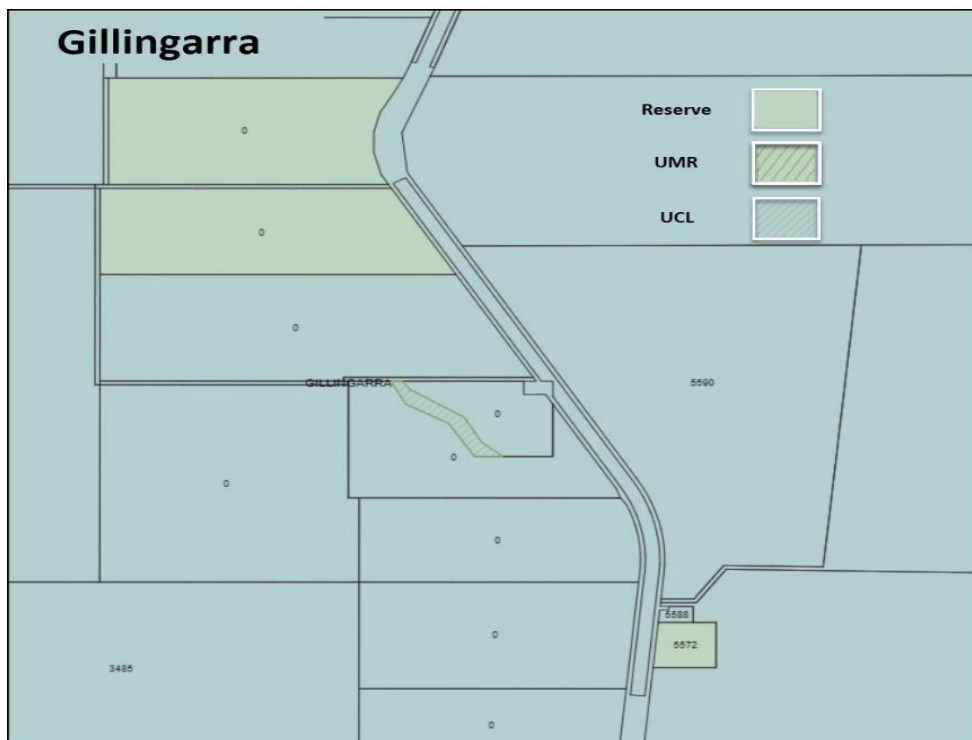


Figure 12: The location of Reserves, UCL and UMR in immediate vicinity of Gillingarra ¹⁵

¹⁴ Source: DFES Bushfire Risk Management System

¹⁵ Source: DFES Bushfire Risk Management System

3.1.3 Population and Demographics

The SoVP current estimated population is 910, with the majority of people living in the residential areas of Bolgart, Calingiri, Gillingarra, Mogumber, New Norcia Community, Piawaning and Yerecoin as of 2016 Census. Of the 438 dwellings in the Shire the 2016 census found 77.4% of private dwellings were occupied and 22.6% were unoccupied¹⁶.

The population in the SoVP remained stable between the last census in 2011 and the most recent census in 2016 but is projected to decrease by ~10% by 2031¹⁷.

There is minimal building activity in the Shire, with between 2 and 5 building permits for private dwellings issued per year from 2011 to 2016¹⁸.

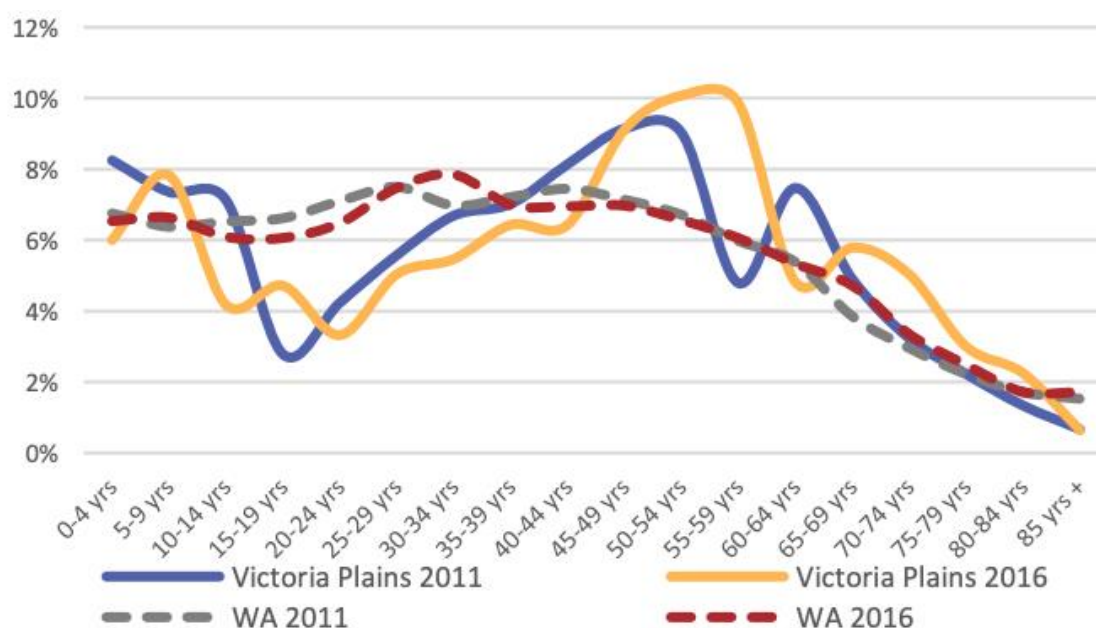


Figure 13: Population Distribution by Age

The chart above shows the population distribution for the Shire by age, highlighting changes within the Shire in relation State (WA) from 2011 to 2016 data. The yellow and blue lines also show the higher proportion of residents over 55 years of age in the local community, contributing to specific service requirements.

It is clear from census figures the Shire’s population is aging. In 2011 59% of the population was under 45: in 2016 this dropped to 47%. The greatest change was in the 25 – 44 age brackets, where the percentage of population dropped from 30.8% to 22.3% of the total. The median age of the Shire is 45 compared to 37.2 for the rest of Australia¹⁹.

¹⁶ Australian Bureau of Statistics - 2016 Census

¹⁷ Australian Bureau of Statistics - 2016 Census

¹⁸ SoVP – Strategic Community Plan 2017 - 2027

¹⁹ SoVP – Strategic Community Plan 2017 - 2027

Age	Victoria Plains (S)	%	Western Australia	%	Australia	%
Median age	45	--	36	--	38	--
0-4 years	56	6.0	161,727	6.5	1,464,779	6.3
5-9 years	73	7.8	164,153	6.6	1,502,646	6.4
10-14 years	39	4.2	150,806	6.1	1,397,183	6.0
15-19 years	44	4.7	149,997	6.1	1,421,595	6.1
20-24 years	31	3.3	160,332	6.5	1,566,793	6.7
25-29 years	47	5.0	184,908	7.5	1,664,602	7.1
30-34 years	51	5.5	194,267	7.9	1,703,847	7.3
35-39 years	60	6.4	173,041	7.0	1,561,679	6.7
40-44 years	60	6.4	171,996	7.0	1,583,257	6.8
45-49 years	85	9.1	172,520	7.0	1,581,455	6.8
50-54 years	94	10.1	162,438	6.6	1,523,551	6.5
55-59 years	92	9.9	149,899	6.1	1,454,332	6.2
60-64 years	45	4.8	132,145	5.3	1,299,397	5.6
65-69 years	54	5.8	116,755	4.7	1,188,999	5.1
70-74 years	47	5.0	82,911	3.4	887,716	3.8
75-79 years	28	3.0	61,509	2.5	652,657	2.8
80-84 years	21	2.3	42,590	1.7	460,549	2.0
85 years and over	6	0.6	42,420	1.7	486,842	2.1

The median age of people in Victoria Plains (S) (Local Government Areas) was 45 years. Children aged 0 - 14 years made up 18.0% of the population and people aged 65

Figure 14: Population within the SoVP by Age²⁰

The most common Service Age Groups are: Parents & Homebuilders (aged 35-49) (21.9% v 21% WA); Empty Nesters & Retirees (aged 60-69) (10.6% v 10% WA); and Older Workers & Retirees (aged 50-59) (20% v 12.7%). The Shire has lower than average Service Age Groups of Young Workforce (aged 25-34) (10.5% v 15.4% WA) and Tertiary Education & Independence (aged 18-24) (4.5% v 9.7% WA). The unemployment rate for the SoVP is below the national average (2.7% vs 5.6%).

The largest age demographics, as reflected in Figure 14, are people aged between 45 - 64. The lower number of residents than the state average in the 15 - 24 age bracket is likely to be the result of children leaving town for further education and/or employment. This increase in the population in the 25 – 44+ age brackets may be the result of these residents returning to the community, or similar communities, when they have young families of their own and/or seeking to return to a similar lifestyle they experienced as children.

The statistics show a lower than average distribution for the state in the 25 – 64 year old bracket, the source of emergency services volunteers. The low population numbers in this age bracket translates to limited access to bushfire volunteers particularly when considering the broad competing priorities associated with smaller rural communities. This is a key consideration for the Shire.

Country of Birth	Victoria Plains	%	Western Australia	%	Australia	%
Australia	670	73.6	1,492,842	60.3	15,614,835	66.7
<i>Other top locations</i>						
England	50	5.49	194,163	7.8	907,570	3.9
New Zealand	39	4.28	79,221	3.2	518,466	2.2
Philippines	18	1.97	30,835	1.2	232,386	1.0
Other (combined)	21	2.3	677,352	27.5	6,853,943	26.2
Not Stated	100	10.98	NA		NA	

In the SoVP (Local Government Areas), 73.6% of people were born in Australia. The most common countries outside of Australia were England 5.49%, New Zealand 4.28%, and the Philippines 1.97%. The place of birth of 100 people 10.9% is unknown.

Table 4: Population within the SoVP by Country of Birth²¹

²⁰ Source: SoVP Strategic Community Plan 2017 - 2027

²¹ Source: SoVP Strategic Community Plan 2017 - 2027

The demographics of the SoVP present a range of challenges for fire management. Thirty-six percent (35.6%) of the population are in vulnerable groups (under 14 or over 65) which require special consideration when planning around prevention, preparedness, response, and recovery.

The numbers within the 0 – 14 age bracket suggests that a school-based fire awareness program such as the program implemented in the Shire of Gingin in 2020 may assist in increasing bushfire awareness and the building of the Shire’s volunteer firefighting capability. Children can influence behaviour changes within families and increasing awareness within the school environment via ‘Fire Chats’, for example, could result in increased awareness throughout the community.

The over 65 group accounts for approx. 17.6% of the population. Elderly people can be vulnerable in fire management, they might have reduced capacity to defend property or to protect themselves during a fire event and have additional needs should an evacuation be required. As a result, additional consideration for this group is essential to ensure that their needs are addressed in fire management planning, communications during events, community education and mitigation works. The Shire Strategic Community Plan 2017-27 identifies the need to support an ageing population as a strategic objective within the ‘Community Wellbeing’ focus area.

The aging population in the Shire also presents challenges for attraction and retention of residents to volunteer roles, particularly physical roles such as firefighting, which then impacts succession planning within the emergency services volunteer brigades. This is key in future planning for the Shire’s ability to respond to unplanned fires as well as to support mitigation activities.

The Demographics for Bushfire Risk Analysis (2018) issued by the Victorian State Government highlighted that the higher percentage of ‘Retirees’ living within a bushfire prone area may increase the risk of exposure to the impact of fire, reduce their ability to defend and/or leave the scene of an incident in a timely and safe manner. The report also highlighted the increased health hazards from the effects of smoke on this group.²²

Whilst the SoVP Strategic Community Plan 2017-2027 does not specifically reference ‘fire’, Theme 1 Strategy 1.3 highlights the need to care for the Shire’s aging community. This will be expanded in the next review of the Strategic Community Plan to specifically reference the support of an ageing population during emergencies such as fire.

The SoVP also plays host to recreational visitors year-round as well as itinerant workers largely employed in the agricultural industry during the peak seeding, harvesting and shearing seasons. Some of the challenges associated with recreational visitors and itinerant workers, in the context of bushfire management, include:

- They are often not connected to local networks so do not have ready access to information shared via this means or may not monitor local social media
- They may not understand the risk associated with bushfires which may result in actions such as lighting campfires in restricted periods or not managing campfires appropriately
- Not being familiar with road networks

These groups need to form part of targeted community education programs where practicable.

The Shire is proactive in sharing emergency prevention, preparation, response, and recovery related information using the Shire’s Facebook page and website.

²² *Demographics for Bushfire Risk Analysis (2018) Victorian Government*

3.1.4 Economic Activities and Industry

The Shire of Victoria Plains is highly dependent upon the agriculture industry. The industrialisation of agriculture, uncertain weather conditions, opening of global markets and declining terms of trade have been major factors impacting on farm production. This has potential implications for businesses dependent on farms for their main source of income and has had a negative economic impact on the townsites within the SoVP town.

The total Western Australian agricultural economy was worth approximately \$10.7 billion in 2018-19 (\$60 Billion Australia wide). Whilst numbers for the 2019-20 year are not yet available the SoVP is estimated to have contributed \$92,495,990 (Gross Value) to the statewide agricultural revenue in 2015 - 2016²³.

The ABS 10216 survey highlighted approximately 445 of the total 910 population were in employment.

Industry of employment, top responses <i>Employed people aged 15 years and over</i>	Victoria Plains (\$)	%	Western Australia	%	Australia	%
Other Grain Growing	60	14.8	4,000	0.3	19,053	0.2
Grain-Sheep or Grain-Beef Cattle Farming	56	13.8	4,107	0.4	15,056	0.1
Primary Education	22	5.4	29,683	2.6	231,198	2.2
Sheep Farming (Specialised)	18	4.4	2,232	0.2	18,197	0.2
Other Agricultural Product Wholesaling	18	4.4	1,260	0.1	10,610	0.1

Of the employed people in Victoria Plains (S) (Local Government Areas), 14.8% worked in Other Grain Growing. Other major industries of employment included Grain-Sheep or Grain-Beef Cattle Farming 13.8%, Primary Education 5.4%, Sheep Farming (Specialised) 4.4% and Other Agricultural Product Wholesaling 4.4%.
View the data quality statement for Industry of employment (INDP)

Figure 16: Industry of Employment – Top Responses²⁴

Agriculture is the Shire’s primary economic contributor, accounting for 42.8% of employment and some 215,200ha²⁵ of land.

When analysing the above distribution from the 2016 census it can be seen that 14.8% worked in ‘Other’ Grain Growing activities, 13.8% in Grain-Sheep or Grain-Beef Cattle Farming, 4.4% in Sheep Farming (Specialised), and 4.4% in ‘Other Agricultural Product Wholesaling. Accommodation and food services that support the agricultural industry account for approximately 6.9%.²⁶

The Agricultural industry is known to be impacted by fire events through both physical loss and post fire impacts such as soil erosion, and as such this is a significant consideration for the Shire’s fire management planning. The Shires Fire Break notice contains specific requirements related to agricultural operations.

As outlined in Section 3.1.2, the dependency on broad acre farming introduces additional complexities in the identification, planning, risk management, stakeholder engagement, and execution of fire management and mitigation activities given the timing of harvesting activities during periods of high fire danger.

There has been a move to progressively explore alternative crops throughout the broader wheatbelt region with some crops (i.e. canola or rapeseed) burning at a higher temperature which can be harder to extinguish and mop up than native pastures.²⁷ Stubble is retained post-harvest to reduce soil erosion which maintains a combustible ground cover and increases fuel loads in pre-harvest fields. These changes in practice increases the landscape fire risk with higher probability of more intense fires which travel further due to fewer low fuel areas from which to manage or ‘hold up’ fires.

²³ Australian Bureau of Statistics – 2016 Census

²⁴ Australian Bureau of Statistics – 2016 Census

²⁵ Geoscience Australia

²⁶ Australian Bureau of Statistics – 2016 Census

²⁷ Department of Primary Industries and Regional Development www.agric.wa.gov.au

The recent Mogumber Fire (December 2019) on similar agriculturally focused land tenure have shown that fires on agricultural parcels can have significant economic impact including:

- The loss of topsoil can reduce the soil conditioning and may take years for the soil quality to return to the pre-fire condition. This in turn can impact:
 - quality of future crops
 - increased operational costs
- The potential loss of even one farm may have long term significant economic and social costs to the Shire through families leaving the shire which in turn can impact local businesses through loss of customer base as well as the number of people available to volunteering.

There is significant value in the Shire reviewing post incident reviews from fires in terrain, vegetation types and/or land tenure usage identical/similar to the SoVP when these become publicly available, in the context of identifying relevant 'lessons learnt' that can be applied to their BRM Plan.

Transport of grain is predominantly transported by farmers to one of 3 CBH storage facilities located in Piawanning, Calingiri or Bolgart utilising the main arterial roads shown in figure 13. From these storage facilities the grain is transported via rail to the CBH Grain handling facility in Kwinana.

Both Road and Rail transport links are key economic drivers of agricultural industries within the Shire, as well as known fire ignition points (*Refer Section 3.2.4*).

These transport routes, highlighted in Figure 17, pose a fire risk to the SoVP during harvesting times which coincide with the restricted and prohibited fire periods.

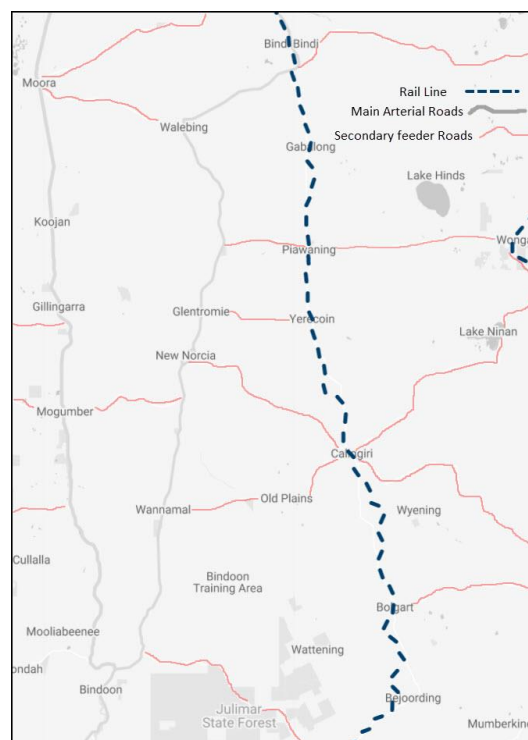


Figure 17: SoVP Transportation Routes ²⁸

²⁸ ARC Infrastructure

As part of the SoVP's existing fire mitigation they undertake an ongoing fuel management maintenance program along major transport routes which includes roadside spraying, tree trimming and shoulder grading.

Whilst the Australian Rail Corporation (ARC), through their own internal bushfire risk management project(s), have undertaken some fire mitigation work along their rail infrastructure, lessons learned from fires along rail lines in Victoria Plains and neighbouring Shires have raised concerns around the risks associated with rail infrastructure corridors. The SoVP is engaged in discussions with ARC as a result of past incidents, lessons learned, and priorities identified through this BRM Planning process.

Tourism is viewed as a secondary industry in the Shire. The Shire includes New Norcia, Australia's only monastic town, which welcomes approximately 60,000 visitors each year.

Both Bolgart and Calingiri have caravan parks, and the Victoria Plains Tourism Association holds an annual 'Wildflower Walk' just south of Calingiri each year around August. An 800 km² tract of land around the town has been classified as an 'Important Bird Area' due to it supporting up to 20 breeding pairs of the endangered Carnaby's Black-Cockatoo.

The SoVP also boasts three DBCA designated 'Flora Roads' (Great Northern Highway, Old Plains Road & Old Telegraph Road South) which are significant tourist attractions in spring. Whilst Great Northern Highway is the responsibility of Main Roads WA, Old Plains Road and Old Telegraph Road South are managed by the SoVP along with the interconnecting roads that, whilst not designated flora roads, attract tourists to view the variety of flora on show.

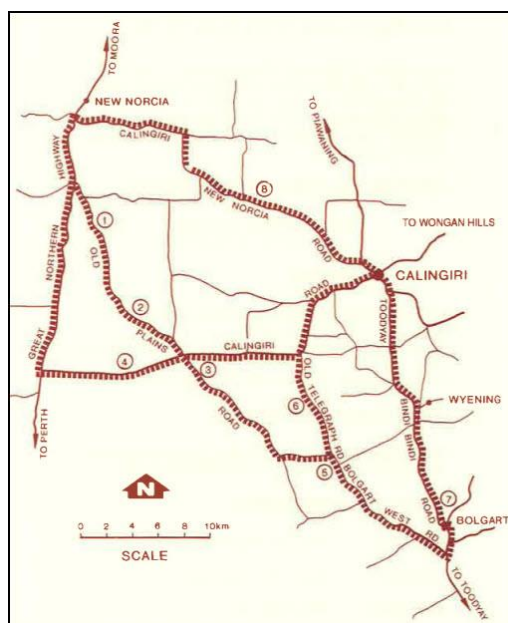


Figure 18: Designated Flora Roads (DBCA) and interconnecting roadways²⁹

Whilst tourism is an important part of the Shire's future economic objectives this creates some tensions between tourism, risk reduction and the impact of treatment works. While vital to protect people and assets from the potential impacts of bushfires it is also important to minimise the impacts of treatment works in sensitive tourist areas to ensure that the impact of smoke, disruption to tourists, loss of amenity values at popular locations and risks associated with the additional population in the landscape are managed and minimised.

²⁹ Shire of Victoria Plains

3.2 Description of the Environment and Bushfire Context

3.2.1 Topography and Landscape Features

The agricultural areas of Western Australia are remarkably diverse, with a wide range of landscapes, soils, and landscape features.

Geological Survey WA indicates that about 90 per cent of the SoVP overlies crystalline rocks of Archaean age (i.e. > 2500 million years). These are predominantly various types of granite, but a belt of metamorphic rocks of the Jimperding Gneiss Complex passes diagonally through the area. The remaining 10 per cent of the Shire lies to the west of the Darling Fault and comprises flat-lying Cretaceous sedimentary rocks of the Perth Basin. Apart from small-scale quarrying of construction materials for road, etc, the last recorded mining activity within the Shire was the extraction of kaolin from in the vicinity of Piawaning.

Other mineral occurrences recorded from the area include gold and anthophyllite asbestos near Bolgart, and platinum-group elements with associated nickel and copper at Yarwindah Brook, near New Norcia.³⁰

Topography contributes to bushfire risk by influencing fire rate of spread (ROS) (and therefore intensity), impeding access for suppression resources and limiting options for fuel reduction, as inappropriate removal of vegetation can lead to erosion and other issues. The influence topography has on bushfire risk has to be considered in relation to its effect on treatment and response access, and as a variable in predicting the potential fire behaviour assets may be exposed to, including the likelihood of ember attack(s).

Clearing for agriculture has taken place mainly on the alluvial soils of the slopes and valleys. The area is dominated by agricultural land use and the natural vegetation has been extensively cleared. This area presents a significant bushfire hazard, especially during harvest season (November to March) when harvesting activities have the greatest potential to ignite a fire and crops are cured. Fortunately, the landscape in these areas is gently undulating with broad fields and scattered remnants on the periphery, making access for firefighting appliances easier.

The western boundary of the shire is dominated by the 'Osborne Formation'. The Osborne Formation was formed during the cretaceous period from volcanic and sedimentary rocks, which is interbedded with sandstone, siltstone shale and claystone. To the east of the Osborne formation, this area is characterised by mylonite and gneiss that has derived from archean rocks. The eastern portion of the shire underlying geology occurs in the south western terrain of the Yilgarn craton. The underlying geology comprises of igneous and metamorphic rocks, layered with quartz feldspar and biotite gneiss. The geology underlying the eastern boundary of the shire includes granitic rock

The eastern area of the shire is characterised by undulating rises to low hills migmatitic rocky outcrops and granitic rocks. The soils are described as deep yellow sandy with yellow to brown sandy earth soils overlying gravelly subsoil. Small of areas of non-alkaline soils of sandy and loamy duplexes exist in this area. The western portion of the Shire is characterised by alluvial sand plains with undulating rises to steep breakaway slopes. Loamy and sandy gravelly soils underlie the western portion of the Shire, with small areas of loamy earth soils and deep siliceous pale sands.³¹

³⁰ *Shire of Victoria Plains Local Planning Strategy*

³¹ *Source: Landscape and soils of the Victoria Plains District, Dept of Agriculture and Food WA*

Topography can significantly impact the bushfire behaviour, impeding access for suppression resources and limiting options for mitigation works which makes it a significant factor in bushfire risk and management.

The impact of topography is more significant where the rock outcrops can restrict and, in some cases, prevent access by fire appliances. In areas where the rocky formations prevent ground-based firefighting, direct attack of a fire is limited to aerial response or alternatively, ground crews waiting for access when the fire reaches an area of suitable topography. This method however greatly increases the time for fire to be suppressed which means fires have time to grow resulting in larger fires often with higher intensities and rates of spread.

When fighting larger more intense fires in rocky outcrops, alternate methods of fire control may be required. For example, constructing fire lines (tracking), around the perimeter of the fire, using heavy machinery or by lowering fuels through methods such as backburning. 'Tracking' is a form of direct attack that can minimise the final fire area. An indirect attack, such as backburning, may increase the overall fire size. While land formations can make installing firebreaks and fire lines challenging, this issue highlights the need to ensure good strategic fire breaks are created ahead of time, which can be used to contain fires in this more difficult terrain. Environmental impacts, such as impacts to remnant vegetation, can be best managed by strategic fire access tracks. Fire access tracks are relatively less effective when suppressing larger more intense fires however are preferable to provide safe, effective, and quicker access and therefore improve the ability to control a fire whilst small.

The waterways in the Shire are often riparian vegetation corridors which creates areas where the vegetation is separated by rivers making movement across the landscape challenging. This is particularly the case for firefighters as fires often spot across the watercourses where firefighters cannot easily cross and they may have to travel some distance to be able to get to the other side. This can often result in a significant delay in firefighting response allowing the fires to be able to grow quickly.

Waterways, particularly those in and around assets, are significant as the riparian vegetation corridors produce a wick-like effect and are often associated with fire runs with marked changes in fire behaviour, intensity and spread expected in this vegetation.

Valley formations that are often associated with watercourses result in slopes which can exceed 20 degrees. Slope has a major influence on fire behaviour, the rate of spread of a bushfire will double for each 10 degrees slope meaning a fire going up a 20-degree slope will move four times faster than on flat ground. Because of this, fires in these valley formations will often move quickly and can be difficult to stop. Valley formations are also predisposed the formation of eddies on the leeward side which can make the behaviour of fire unpredictable and expose firefighters to increased risk during firefighting operations.

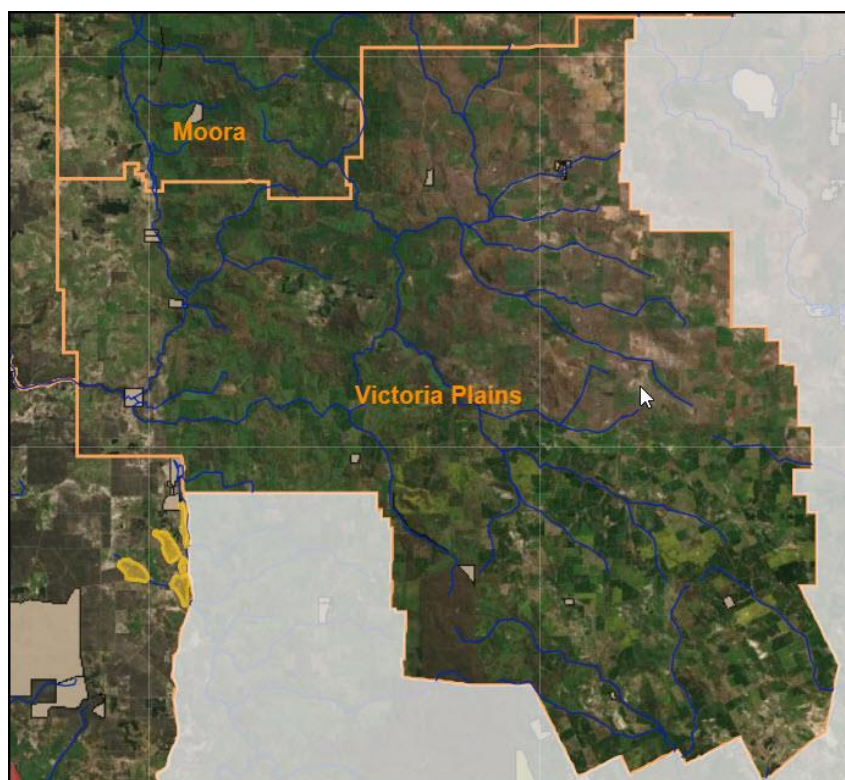


Figure 19: Shire of Victoria Plains Waterways³²

As a result of the prevalence of waterways 17 bridges are found throughout the Shire. These are critical features in the landscape, particularly for fire management. They are traffic routes, critical to tourism as well as the movement of agricultural produce and therefore the local and regional economy can be adversely affected if bridges are damaged/destroyed by fire. For fire management they are vital for the movement of firefighting response vehicles as well as the evacuation of communities if required. The BRM Planning process has identified the bridges, particularly timber bridges, as a strategic risk for the Shire and they will be a priority during mitigation works.

A major challenge for the shire is access and crossing landscape features during fire events, water way valleys, pipelines and the rail network all pose challenges to fire fighting vehicles moving through areas of the landscape.

There is an above ground pipelines in areas running from storage tanks. These supply water to the inland townsites in SoVP. This can restrict movement with limited crossovers accessible. This is a significant consideration and limitation when responding to fires but also when planning bushfire mitigation activities particularly in the context of risk management.

3.2.2 Vegetation

Vegetation is one of the most significant influencers on fire risk and subsequent mitigation strategies. Further details about the indicative vegetation in the Victoria Plains District is located at **Appendix 3**.

Within the Calingiri – New Norcia – Piawaning district approximately 30% of native vegetation remains which is significantly more than other parts of the Western Australian cropping zone where only 2-5% of native vegetation is estimated to remain. “Added to this is the districts location within the

³² Source: Northern Agricultural Regional Vision

Southwest Australia Eco-region – an area of outstanding yet critically endangered biological diversity and Australia's only global biodiversity hotspot"³³

Remnant vegetation within the SoVP is mostly wando woodland, mallee and dryandra shrubland on the lateritic ironstone and granite ridges and upper slopes, shrubland/heath on some valley slopes and occasionally valley floors, York gum, wando and salmon gum woodland along drainage lines, and some ephemeral wetlands on valley floors. The woodlands contain many of Western Australia's threatened plants and birds. The area is particularly rich in endemic plants - Grevilleas, Hakeas, Eucalypts, Acacias, Eriostemons, and the Asteraceae family.

Some upland plant communities are known to be in good ecological condition following fencing by property owners and exclusion of livestock. Other areas are recovering from past grazing and weed invasion.

The heaviest human footprint is typically seen on the sandy/loamy valley floors and lower slopes where the removal of woodland, shrubland and heathland has fragmented and degraded areas of natural vegetation. As a consequence, remaining patches of vegetation have become fragmented and disconnected from vegetation found on the crests.

Whilst farming/pastureland is dominant, there are areas of differing vegetation types that include trees and understories of varying densities which can have an impact on fire behaviour and rates of spread. In some instances, this can pose difficulties for fire fighters with regards to extinguishment strategies and gaining access, particularly in areas of sandy or loam soils found in the low-lying areas.

Large portions of the Shire are dominated by agricultural land use and the natural vegetation has been extensively cleared.

The SoVP vegetation types consist primarily of:

- Woodland characterised by Trees 10–30 metres high; 10–30% foliage cover dominated by eucalypts; understorey of low trees to tall shrubs typically dominated by Acacia, Callitris or Casuarina.
- Shrubland characterised by shrubs <2 metres high; greater than 30% foliage cover. Understoreys can contain grasses. Acacia and Casuarina often dominant in the arid and semi-arid zones.
- Grasslands including situations with shrubs and trees if the overstorey foliage cover is less than 10%. Also includes broadacre farming

Whilst agricultural holdings (grassland) may appear to be a low bushfire risk, this vegetation presents a significant bushfire hazard, especially during harvest season (November to January) when harvesting activities have the potential to ignite a fire in fully cured crops. The impact of wind on open terrain regardless of whether it is under crop, should not be underestimated. The landscape in much of the agricultural tenure within the Shire is gently undulating with broad fields and only scattered remnant vegetation, making access for firefighting purposes easier.

There is a not significant amount of UCL or UMR in the SoVP. *Figure 7* reflects the location of UCL/UMR across the Shire whereas *Figures 5 - 11* show the location of the UCL/UMR within the townsites of Calingiri, Bolgart, Mogumber, New Norcia, Piawanning, Yerecoin and Gillingarra respectively.

Embers can create spot fires ahead of a main fire front and threaten inland townsites. This type of fire behaviour can increase the spread of fire and significantly increase risk to fire fighters and the townsite community. The ability for embers to travel well ahead of the main fire is one reason landowners are

³³ *Improving Habitat and Connectivity in the Farming Landscape (2021) Moore Catchment Council*

encouraged to reduce fuels around their properties both within townsites and on agricultural parcels. Low fuel zones, such as ‘Asset Protection Zones’ around properties can contribute to reduced fire spread, reduce the impact on assets, result in less intense fire behaviour and ultimately a more successful fire response outcome. Installing and maintaining APZ’s and Hazard Separation Zones are a key element of the Shire’s Bushfire readiness and community engagement strategies.

Environmental Considerations – Flora and Fauna

Flora and Fauna represent significance for the Shire as they are not only recognised environmental assets, but also impact the treatment options available for identified risks in relation to other assets. For example, the breeding cycle of some threatened fauna, such as Numbats, may restrict the period in which prescribed burns can be undertaken due to the need to ensure nests are not disturbed during the breeding season.

Located 10km East of Bolgart is the Drummond Nature Reserve (A Class) managed by Parks and Wildlife is constructed with a series of lateritic hills with spillway deposits and a small outcrop of bedrock.

There are two declared rare fauna; Aquatic leptomys (only known location of this species at time of surveying) and the *Eleocharis keigheryi*. Additionally, there are seven priority species found within the reserve.

Acacia chapmanii subsp. *australis* has an extent of occurrence of 17km² and an area of occupancy of 0.045km² in the Wyening and Bolgart areas, growing in brown, grey or yellow sand or sandy gravel in woodlands and shrublands with *Corymbia calophylla*, *Eucalyptus wandoo*, *Xanthorrhoea preissii*, *Banksia armata*, *Leptospermum erubescens* and *Santalum acuminatum* (Collins 2009).

It is considered that all known habitat for wild populations is critical to the survival of *Acacia chapmanii* subsp. *australis* and that all wild populations are important populations.

Species	Priority	Key
<i>Acacia chapmanii</i> subsp. <i>Australis</i>	T	Threatened Flora (Declared Rare Flora – Extant)
<i>Comesperma rhadinocarpum</i>	3	Poorly known Species
<i>Tricoryne arenicola</i>*	2	Poorly known Species
<i>Platysace ramosissima</i>	3	Poorly known Species
<i>Stenanthemum tridentatum</i>*	3	Priority Three - Poorly known Species
<i>Hydrocotyle lemnoides</i>	4	Rare, Near Threatened and other species in need of monitoring
<i>Schoenus natans</i>	4	Rare, Near Threatened and other species in need of monitoring

Figure 20: DBCA Threatened and Priority Flora List (December 2018)³⁴

³⁴ Department of Parks and Wildlife Interim Recovery Plan No. 357

Threats to *Acacia chapmanii* subsp. *australis* include road, track and railway maintenance, weeds, hydrological changes, altered fire regimes, grazing, gravel extraction and disease. Due to the risk of altered fire regimes and associated risk of introduction of weeds etc the development and implementation of the appropriate fire management strategies will need to be considered.³⁵

The Carnaby's Cockatoo (EN), and one species, Rainbow Bee-eater (*Merops ornatus*) (IA), protected under Schedule 3 of the Wildlife Conservation Notice 2013 for migratory birds, also occur within the range of populations and will benefit from the protection and management of *Acacia chapmanii* subsp. *australis* and its habitat.

All treatments identified as part of the SoVP BRM Plan need to consider the requirements of the flora and fauna on site including the opportunity for weeds and/or non-natives to become established post mitigation works. Burning small remnants in the wrong way, wrong time and wrong frequency can potentially result in higher fuel loads. Response strategies should be environmentally sensitive within the constraints of the incident. The Shire will take every opportunity to remind landowners/managers of their obligation to obtain appropriate clearances and approvals prior to commencing vegetation-based treatments.

A further consideration in relation to both bushfire prevention and response strategies is the potential spread of weeds or diseases such as *Phytophthora Cinnamomi* (Dieback). It is easily spread through moist soil movement from vehicles, animals, water, and feet. Other fungal-borne diseases can also be spread through these pathways. This risk must be considered in the context of planned prevention and response strategies and the risk minimised wherever possible.

A full list of the Declared Rare Flora and Declared Rare Fauna applicable to the SoVP is included at **Appendix 4**. Figure 21 below shows the indicative locations of endangered flora and fauna within the Shire noting the significant concentration along the Moore River North and the Mogumber West Nature Reserve on the Western boundary of the Shire.

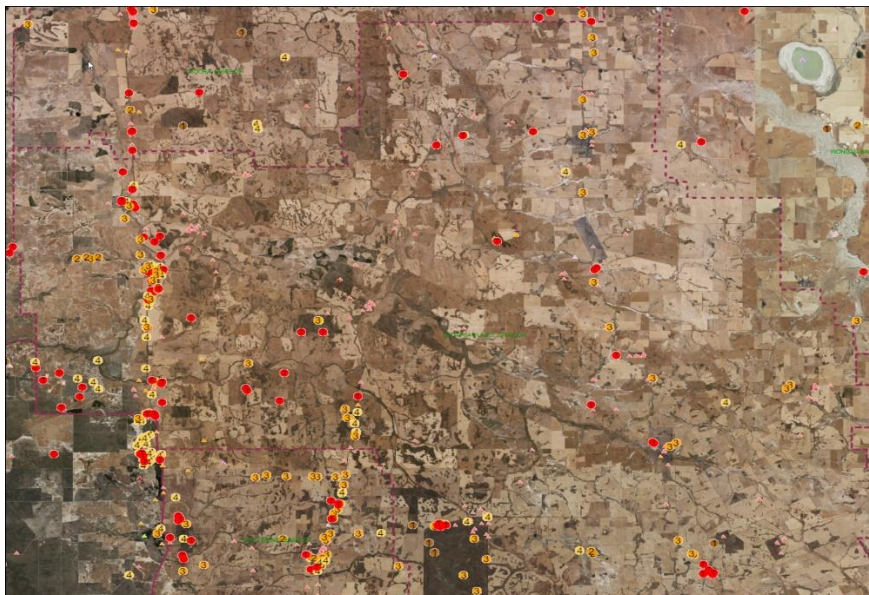


Figure 21: Map reflecting the indicative locations of endangered flora and fauna in the SoVP³⁶

³⁵ Department of Parks and Wildlife Interim Recovery Plan No. 357

³⁶ DFES Bushfire Risk Management System

Threatened Ecological Communities

The SoVP is within the catchment of the *Western Australian Wheatbelt Ecological Community* with a significant portion of the Shire falling within the boundaries of the Eucalypt Woodlands of the WA Wheatbelt.

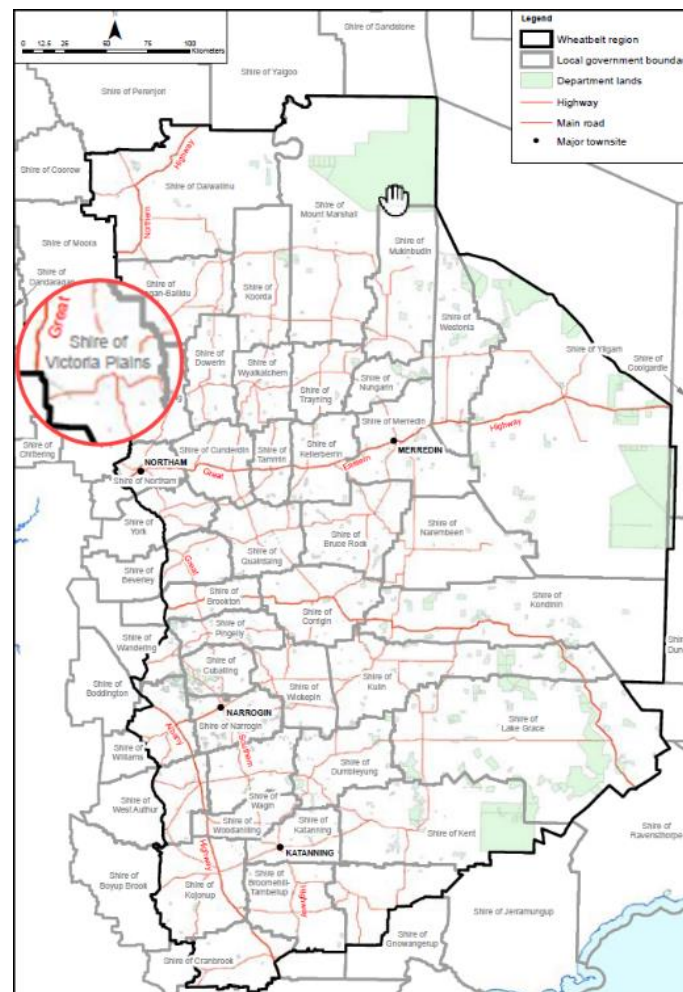


Figure 22: Wheatbelt Region Parks and Reserves³⁷

The *Wheatbelt* has several federally registered Threatened Ecological Community (TEC) some of which are also registered as a Matter of National Environmental Significance (MNES) which provides unique national environmental protections.

A TEC is “a community presumed to be totally destroyed or at risk of becoming totally destroyed.”³⁸ Being listed as a TEC offers the vegetation protections under the *Environment Protection and Biodiversity Conservation Act 1999*. The following map (Figure 23) depicts the coverage of known TEC within SoVP.

³⁷ Government of Western Australia – *Wheatbelt Region Parks and Reserves Draft Management Plan 2019*

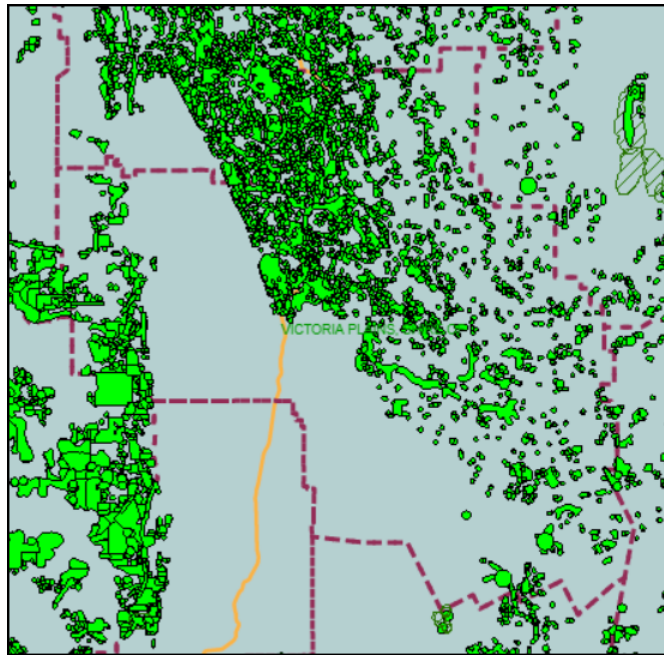


Figure 23: Map reflecting TEC Presence in SoVP³⁹

Changes to fire frequency and/or fire intensity and season, (such as occurs during prescribed burning) is a key threat to ecological communities. As a consequence, there is a risk that a prescribed burn may have a significant impact on the threatened community. However, conservation advice also notes that the response of the TEC to fire is site specific, that the TEC can benefit from an appropriate fire regime and that many responses to fire disturbance can be relatively temporary and/or minor.

Therefore, when planning treatments on tenure within the TEC catchment, particularly prescribed burns, the following should be considered:

- The extent to which the proposed clearing or controlled burn will remove or substantially damage a TEC.
- The extent to which the understoreys are likely to be impacted and/or recover after the fire event.
- Whether there is a risk that the controlled burn or clearing will facilitate the invasion and/or spread of fast colonising weed species benefiting from the temporary reduction in vegetative competition.
- Control measures to implement to prevent the fire from intensifying or spreading; noting that a ‘hot’ burn is likely to substantially alter the vegetative structure or change the nature of the understorey of the TEC (e.g. high intensity fires can scar trees allowing entry of wood decaying fungi).
- Whether fire sensitive eucalypts, such as gimlet or salmon gums are present.

³⁹ DFES Bushfire Risk Management System

Fauna

The Carnaby Black Cockatoo (*Calyptorhynchus latirostris*) found in the SoVP is currently threatened with extinction with estimates of between 11,00 and 60,000 left in the wild⁴⁰.

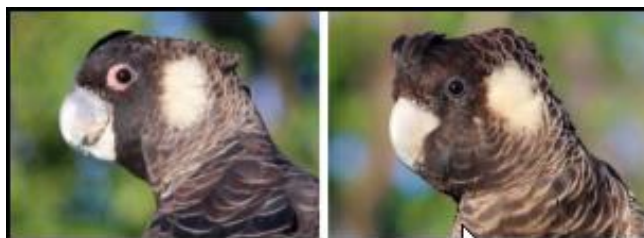


Figure 24: Western Australian Threatened with Extinction Carnaby Black Cockatoos (*Calyptorhynchus latirostris*).⁴¹

All treatments identified as part of the SoVP BRM Plan also need to consider the protection of endangered fauna including the need to protect and maintain the natural habitats of all fauna and the protection of all wild populations that are also important to the survival of DRF and TECs.

3.2.3 Climate and Bushfire Season

The SoVP experiences a Mediterranean climate with cool wet winters and warm/hot dry summers. Rainfall largely occurs from late autumn through to spring with an average annual rainfall of 449.2mm⁴² in Victoria Plains. Rainfall is lowest from December through to February. This rainfall pattern supports substantial vegetation growth during the winter and spring months. This vegetation dries out during spring and into summer increasing fuel loads available for bushfires.

Bushfire threat is typically associated with very hot (above average temperatures), dry (less than 20% humidity), windy (above 12 – 15 Km per hour) conditions, low soil moisture and high fuel loads. The climate influences all these factors and is the primary control on fire activity. The combination of prevailing winds during the warmer months, (predominantly morning easterly followed by afternoon west/south westerly winds) and desiccated vegetation increases bushfire risk.

Table 5 shows that the SoVP can experience these thresholds (as highlighted) throughout the year particularly during October to March inclusive. The wettest months are May through August/September when about 70% of the annual rainfall occurs. Weather is the primary influencer on fire activity⁴³ and therefore needs to be a significant consideration when planning both mitigation and response activities.

The following table reflects the average climatic conditions for the SoVP since records commenced. Weather statistics are taken from the Bureau of Meteorology Site 008137 in Wongan - Hills which is the closest observation point to the Shire.

⁴⁰ Moore River Catchment Association

⁴¹ Source: Moore River Catchment Association

⁴² Bureau of Meteorology (Victoria Plains) average rainfall 1996-2015'

⁴³ The Burning Issue: Climate Change and the Australian Bushfire Threat www.climatecouncil.org.au

Table 5 - Average Annual Climatic Conditions for the SoVP⁴⁴

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	
Temperature															
Mean Max Temp (°C)	34.6	34.1	31.0	26.5	21.6	18.2	17.1	18.0	20.8	25.33	29.2	32.5	25.7	52	1996-2019
Mean Min Temp (°C)	17.8	18.2	16.4	13.4	9.9	7.7	6.6	6.7	7.6	10.1	13.2	15.8	12.0	52	1996-2019
Rainfall															
Mean Rainfall (mm)	15.3	15.3	20.5	22.3	51.3	69.5	69.4	69.4	29.4	19.8	12.4	10.0	388	52	1996-2019

Red = highest value Blue = lowest value

Relative Humidity (RH) plays a big part in firefighting as the lower the relative humidity the more vigorously fuels can burn. Figures 28 and 29 show the lowest RH's are recorded from December through to February. Figures 25 through to 29 confirm the higher fire danger period in the SoVP is between December through to February.

Table 6 reflects the mean summer statistics for temperature, relative humidity, and wind speed for the Shire, taken at Wongan – Hills (36km from Calingiri) between 1996 and 2019.

Table 7 is provided as a comparison in terms of the nearest monitoring station to the west of Victoria Plains. The comparison is significant from a fire risk and firefighting perspective when looking at the variation in temperature and relative humidity as you move inland. Whilst no supporting data is available for comparison it could be hypothesised that there would be a correlation in the Soil Dryness Index (SDI) associated with this variation.

Table 6 – Average Summer Climate Data @ 3pm (Wongan-Hills)⁴⁵

Month	Mean Max Temp	Mean 3pm Relative Humidity	Mean Monthly Rainfall (mm)	Mean 3pm Wind Speed	Average Wind Direction
December	31.2°C	26 %	10.0	13.2 km/h	SW
January	33.2°C	24 %	15.3	13.7 km/h	S
February	32.7°C	28 %	15.3	13.6 km/h	SE-E
March	29.8°C	31 %	20.5	12.7 km/h	S-SE

Table 7 – Average Summer Climate Data @ 3pm (Gingin Aero)⁴⁶ – for comparison purposes

Month	Mean Max Temp	Mean 3pm Relative Humidity	Mean Monthly Rainfall (mm)	Mean 3pm Wind Speed	Average Wind Direction
December	25.9°C	35 %	10.5	25.9 km/h	SW
January	30.8°C	33 %	16.3	25.5 km/h	SW
February	31.0°C	33 %	15.0	24.3 km/h	S
March	29.0°C	35 %	19.5	22.4 km/h	SW

⁴⁴ Bureau of Meteorology www.bom.gov.au

⁴⁵ Bureau of Meteorology (Wongan Hills Weather Station)

⁴⁶ Bureau of Meteorology (Gingin Aero Weather Station)

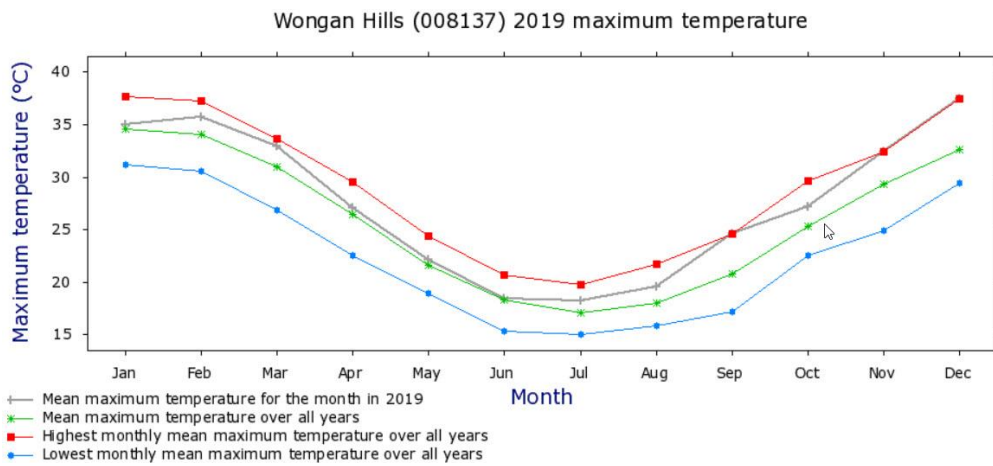


Figure 25: Graph depicting the mean maximum monthly temperate and the highest and lowest mean monthly temperature over all years in comparison to the mean maximum monthly temperatures during 2019.⁴⁷

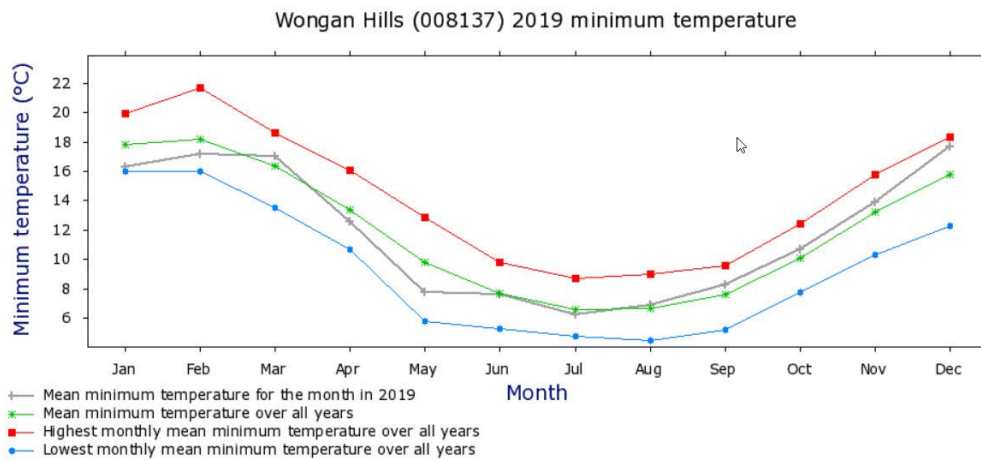


Figure 26: Graph depicting the mean maximum monthly temperate and the highest and lowest mean monthly temperature over all years in comparison to the mean maximum monthly temperatures during 2019.⁴⁸

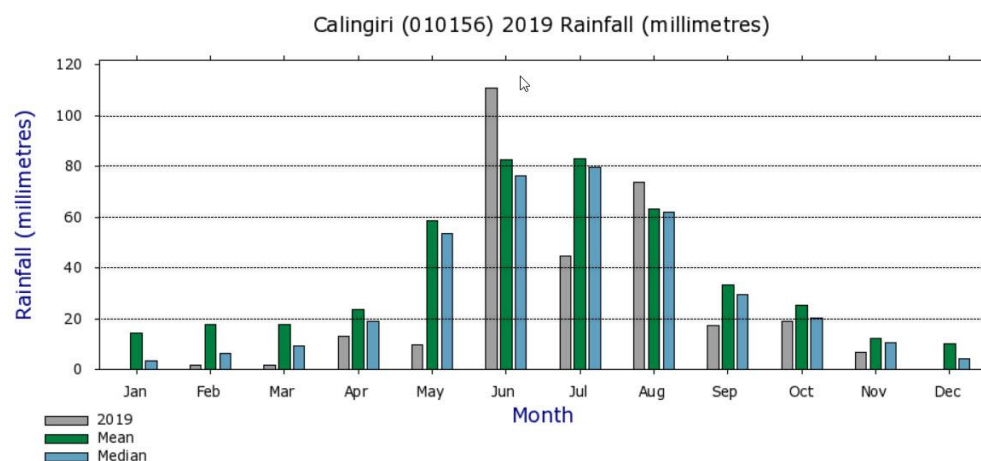


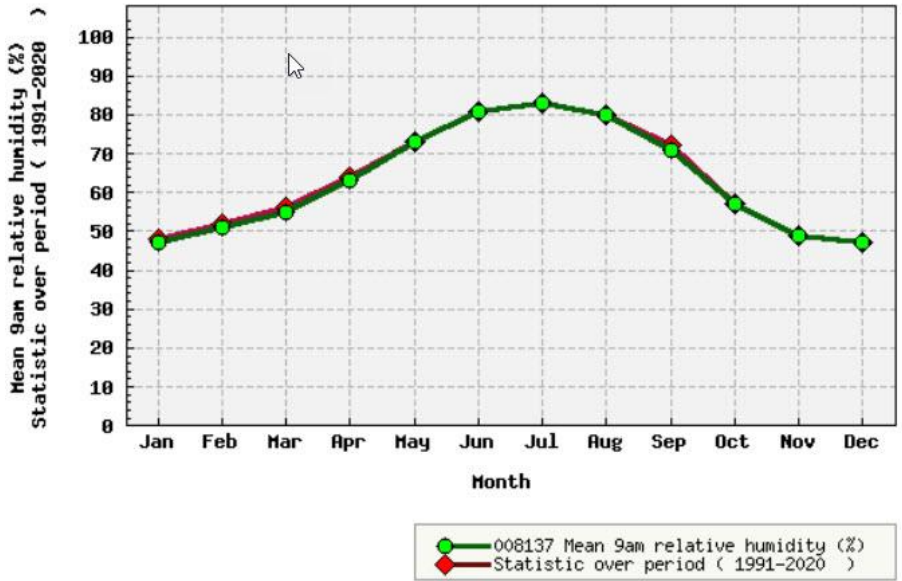
Figure 27: Graph depicting the 2019 vs mean rainfall between 1929 to 2019⁴⁹

⁴⁷ Bureau of Meteorology (Wongan Hills Weather Station)

⁴⁸ Bureau of Meteorology (Wongan Hills Weather Station)

⁴⁹ Bureau of Meteorology (Wongan Hills Weather Station)

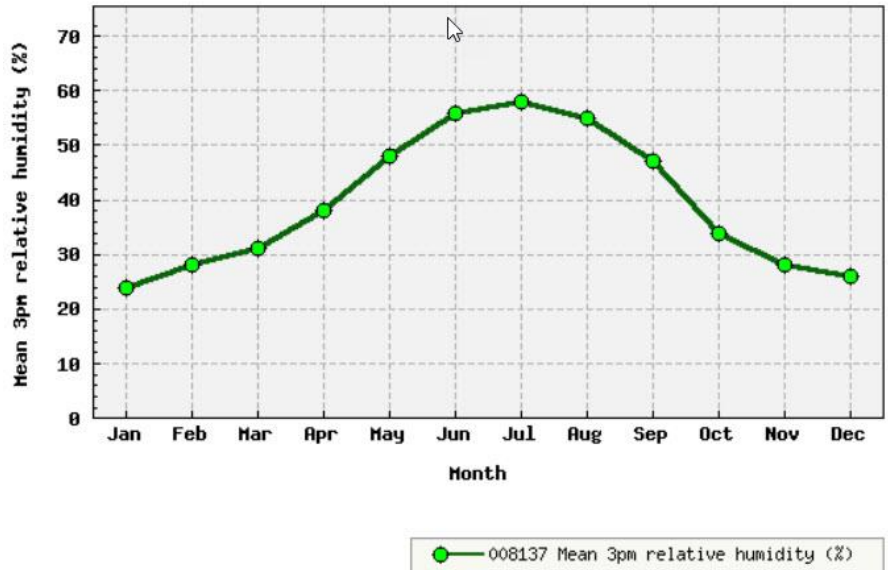
Location: 008137 WONGAN HILLS



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean 9am relative humidity (%) for years 1966 to 2010	47	51	55	63	73	81	83	80	71	57	49	47	63	32

Figure 28: Graph depicting the 9am relative humidity for year 1972 to 2010⁵⁰

Location: 008137 WONGAN HILLS



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean 3pm relative humidity (%) for years 1966 to 2010	24	28	31	38	48	56	58	55	47	34	28	26	39	32

Figure 29: Graph depicting the 3pm Relative Humidity between 1966 to 2020⁵¹

⁵⁰ Bureau of Meteorology (Wongan Hills Weather Station)

⁵¹ Bureau of Meteorology (Wongan Hills Weather Station)

Wind Direction and Speed

The following diagram of a wind rose covering the period 2008 – 2020 reflects the prevailing wind direction for the SoVP at Victoria Plains. Viewed in conjunction with Tables 6/7 this would indicate that the prevailing winds and strongest winds are from the West – South/South West during early summer trending to the SE – E in the latter part of summer. This is significant for both operational response as well as determining effective mitigation treatments.

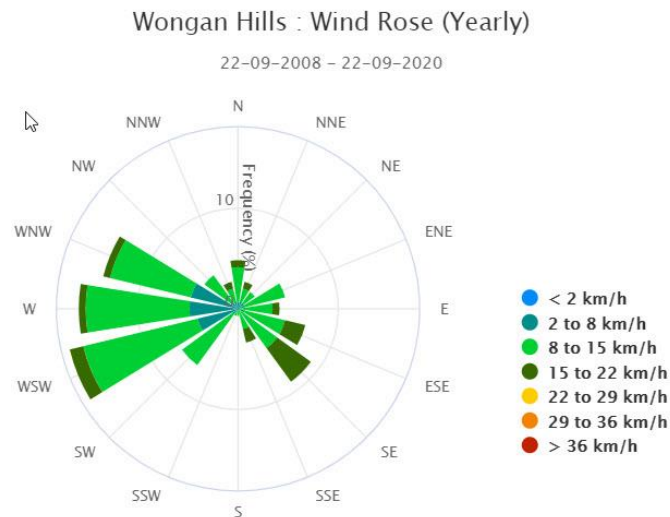
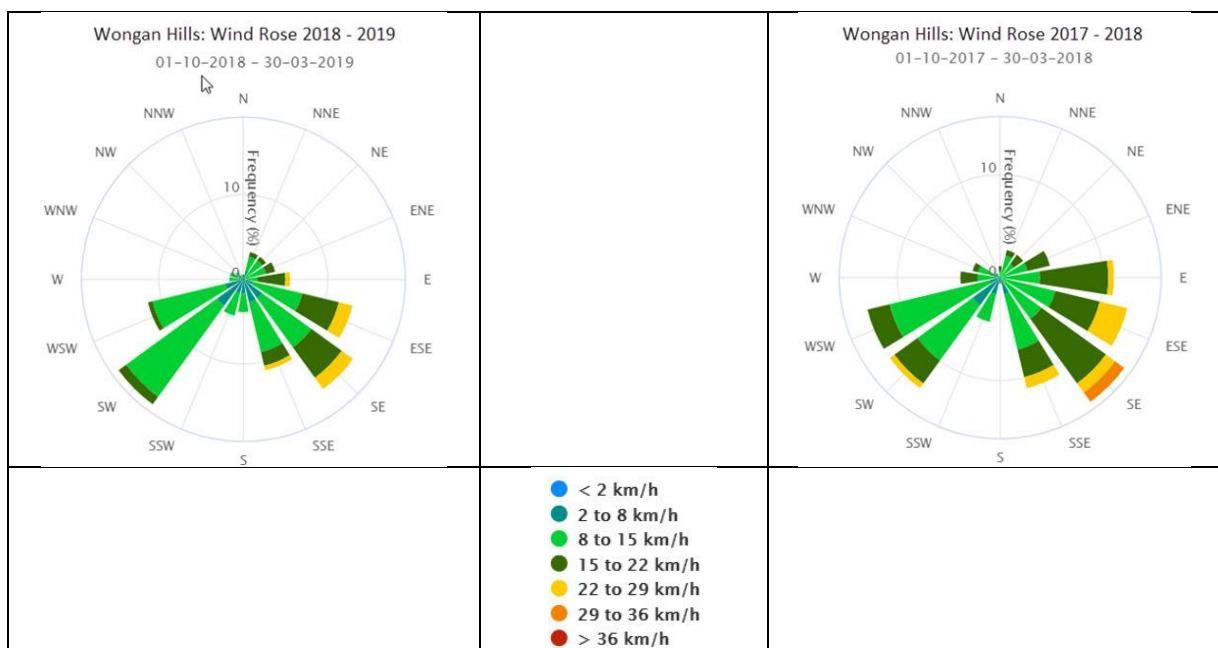


Figure 30: Wind rose reflecting predominant winds and wind speeds over the period 2008 – 18 Nov 2020 taken from the Dept of Agriculture Weather Station Wongan Hills.⁵²

The following wind roses (figure 31) look at prevailing winds in the context of the hotter months corresponding with the peak of the fire season – January and February. These wind roses also indicate winds predominantly from the South-East, East South East and to a lesser extent from the West.



⁵² Bureau of Meteorology (Wongan Hills Weather Station)

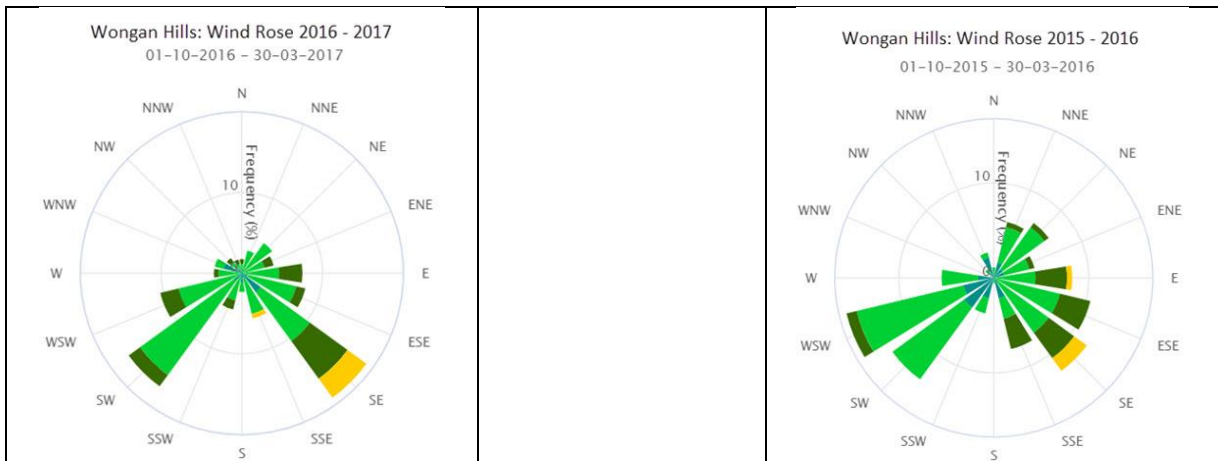


Figure 31: Wind rose reflecting predominant winds and wind speeds during fire seasons 2015 – 2019 taken from the Dept of Agriculture Weather Station Wongan Hills.⁵³

The prevailing winds during the warmer part of the day (afternoon sea breeze) are typically from the South-East. This is well understood by fire response personnel and present challenges in controlling fires which may have occurred late morning and subsequently subject to changes in direction and intensity as the afternoon breeze arrives.

The Rate of Spread (ROS) and intensity of grassland or stubble fires in agricultural areas are particularly susceptible to the effects of wind and wind changes. Prevailing winds are a significant consideration in relation to both operational response as well as determining effective mitigation treatments in these areas.

3.2.4 Bushfire Frequency and Causes of Ignition

Reports from the Department of Fire and Emergency Services identified an average of 56 fires occurred within the SoVP each year between June 2012 and July 2019 with a fire on average of a fire every 6.5 days. This was heightened during the Shires Restricted and Prohibited Burning Times with a reported fire on average every 4 days⁵⁴.

Anecdotal evidence would suggest that this figure may not be accurate with the local belief that there have been other non-reported fires. Attention to the improvement in the reporting of fires will form part of the SoVP’s ongoing BRM Plan.

Ongoing education is planned, through pre-fire season briefings, to ensure ongoing accuracy of reportable incidents.

⁵³ Bureau of Meteorology (Wongan Hills Weather Station)

⁵⁴ Department of Fire and Emergency Services



All Bushfires
LGA of VICTORIA PLAINS
from 01/07/2015 to 30/06/2020

A Bushfire is considered to be any vegetation fire (bush, grass, scrub, forest) of any size

Bushfires Summary of Ignition

Total for the Shire of Victoria Plains

	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	Total
Total Number of Bushfires:	11	17	3	12	13	56
Burn off fires	2	7	1	4	2	16
Campfires/bonfires/outdoor cooking	0	0	0	1	0	1
Construction, installation, design deficiency	0	1	0	0	0	1
Electrical distribution (excl. power lines)	0	0	0	0	1	1
Power lines	0	1	0	0	3	4
Reignition of previous fire	0	0	0	0	2	2
Suspicious/Deliberate	0	2	0	1	0	3
Unreported	0	0	0	1	2	3
Vehicles (incl. Farming Equipment/Activities)	5	2	0	1	2	10
Weather Conditions - Lightning	4	4	2	4	1	15

Figure 32 – Recorded fires within the SoVP 2015 -2019⁵⁵

Analysis revealed 26.8% of fire ignition sources within the Shire were as a result of Weather Condition (lightning), Burn off fires (28.57%), Vehicles 17.85%, 5.35% Suspicious or Deliberately lit, 5.35% Unreported, Re-ignition of previous fire (3.57%), Power lines (7.1%) with 1.7% attributed to Electrical faults, Heat from Objects and Campfires/Outdoor Cooking.

The SoVP Bush Fire Service operational procedures promote the identification of ignition points and the preservation of evidence that can assist fire investigation operations by DFES and/or Police and/or improve the classification of bush fires.

The distribution of fires, as shown in Figure 33, reflects that fires are concentrated in the New Norcia, Mogumber and Calingiri areas. The primary causes in these areas are ‘controlled burns’ and ‘vehicle’ (farm machinery).

⁵⁵ Source: Department of Fire and Emergency Services

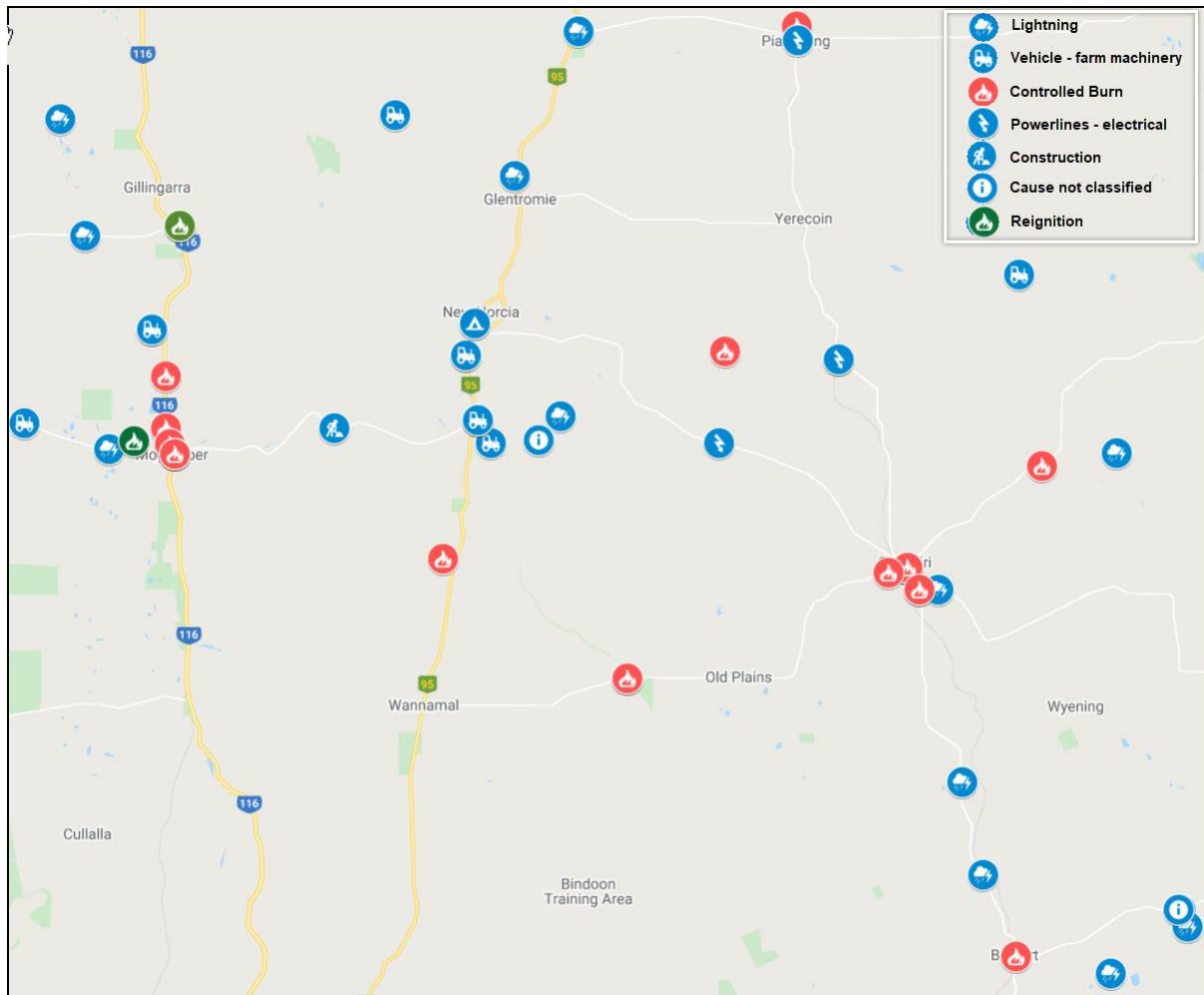


Figure 33 - Map reflecting the location of recorded fires within the SoVP (2015-2019)⁵⁶

Under the right conditions, the risk of re-ignitions of weather induced fires is difficult to totally mitigate and local Brigades undertake extensive patrols to minimise this risk.

Local Brigades and FCO's are also encouraged to proactively engage with the community to educate landowners on safe burning techniques and avoidance of re-ignition of 'controlled' burns.

Local fire personnel also make use of new technology such as phone apps (Lightening Tracker) to monitor lightning strikes and forward deploy personnel to conduct 'on group' checks.

3.2.5 Current Bushfire Management Activities

Bushfire Control Activities

The *Bush Fires Act 1954*, sections 17 and 18, provides for the 'declaration and gazettal' of Prohibited and Restricted Burning Times as well as the ability to adjust burning times to suit changing weather conditions.

The SoVP bushfire season is generally considered to be from October through to April. The SoVP 'Restricted' and 'Prohibited Burning' Times are shown in Table 6.

⁵⁶ Source: Department of Fire and Emergency Services

The Restricted and Prohibited Burning times are subject to possible variation depending on each bushfire season with the Shire also imposing an annual ban during the festive season:

Burning Times	Dates
Restricted Burning	March 1 st – March 31 st
Prohibited Burning	November 1 st – February 29 th
Restricted Burning	October 1 st – October 31 st
Open Burning	April 1 st – September 30 th

Figure 34 - Map reflecting the location of recorded fires within the SoVP⁵⁷

The SoVP currently does not have a local planning strategy in relation to bushfire. A key focus of the Bushfire Risk Management Plan will be the establishment of a local planning strategy that is embedded within the Shire of Victoria Plains Strategic Community Plan.

Bushfire Prone Mapping

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.⁵⁸ 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. As the policy does not apply retrospectively and focuses on individual developments and buildings, the BRM Plan focuses on identifying existing bushfire risk and establishing an effective treatment plan to manage unacceptable community risks.

Bushfire Prone Areas are subject to increased planning and construction requirements as detailed in the Planning and Development (Local Planning Scheme amendment) Regulations 2015.

Broad-scale mapping of bushfire prone areas within the SoVP indicates that large parts of the district are bushfire prone particularly in the western area of the Shire. This is reflected in *Figure 35 below*. Whilst the percentage of bushfire prone areas within the Shire is lower than neighbouring Shires of Chittering and Toodyay to the South and Gingin to the West, fuel present in the Julimar State Forest / Bindoon Army camp presents significant risk to the SoVP in the advent of a fire in these areas. This risk will need to be considered as part of the treatment strategy arising from the Bushfire Risk Management Plan.

⁵⁷ Source: Department of Fire and Emergency Services

⁵⁸ Source: State Planning Policy 3.7 – Planning in Bushfire Prone Areas

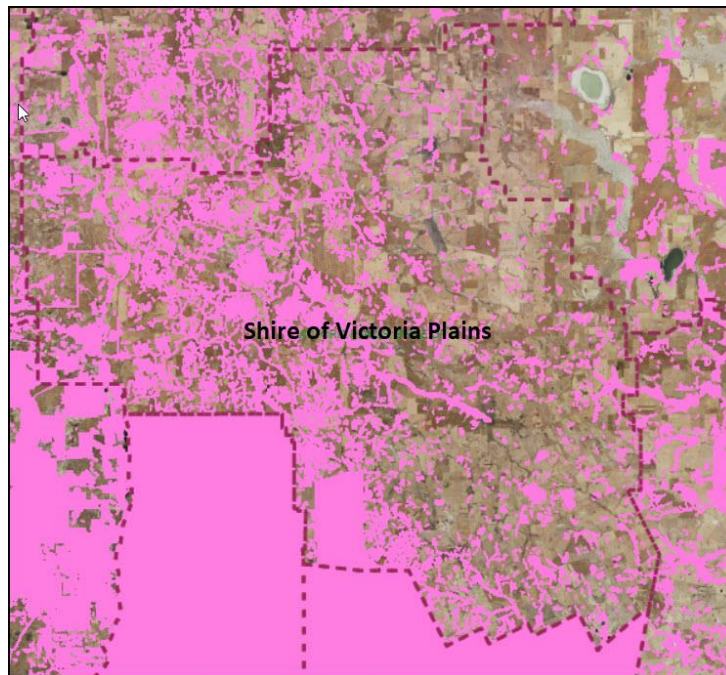


Figure 35: Map reflecting Bushfire Prone areas within the SoVP as at Dec 2019⁵⁹

Harvest and Vehicle Movement Bans

Agricultural related vehicle fires which account for a significant number of the fires within the Shire during the period reported in Figure 32.

In recognising the significance of agricultural activities in the Shire, and to reduce the risk of crop related bushfires; the Shire has controls in place pursuant to the *Bush Fires Regulations 1954*. These controls are reviewed annually by the Bushfire Advisory Committee (BFAC). One such control is the issuing of Harvest and Vehicle Movement Bans. The Shire can issue Harvest and Vehicle Movement Bans under *Bush Fires Regulations 1954 Section 38A, and/or Section 24C* to restrict the use of vehicles and machinery that have an increased risk of igniting a fire on days when weather conditions are considered unfavourable. Bans are generally issued because of the risk posed by agricultural practices during severe fire weather events.

Harvest and Vehicle Movement Bans are issued by the Shire's Chief Bush Fire Control Officer, in consultation with the Bushfire Brigade Fire Control Officers, when the use of engines, vehicles, plant or machinery during the Prohibited Burning Times or the Restricted Burning Times (or both) is likely to cause a fire or contribute to the spread of a bushfire. A Harvest and Vehicle Movement Ban may be imposed for any length of time but is generally imposed for the 'heat of the day' periods and may be extended or revoked by the local government, should weather conditions change.

Whilst detailed records have not been kept for Harvest and Vehicle Movement Bans within the Shire, it is believed that on average, 6 bans are issued annually.⁶⁰

⁵⁹ DFES Bushfire Risk Management System

⁶⁰ SoVP Community Emergency Services Manager

Response Capacity

Victoria Plains has five Volunteer Bush Fire Brigades with State Government Emergency Services Levy (ESL) funding the vehicles located in:

- Calingiri
- Bolgart
- Yerecoin/Piawaning
- New Norcia
- Mogumber/Gillingarra

The Shire has 160 registered emergency services volunteers as of September 2020.

Collectively, these brigades house one 4.4 appliance (4000lt water capacity), two 2.4 appliances (2 x 2000ltr water capacity), two 3.4 (2 x 3000ltr water capacity).

Initial fire suppression is typically supported by local farmer response units. Private appliances range from 500L slip on water units to various sized water carts.

The Shire has an active Bushfire Advisory Committee (BFAC) with the membership including those in leadership positions from each of the Brigades. BFAC members hold considerable bushfire firefighting skills and experience. This forum has been integral to the development of the BRM Plan and the BFAC membership will continue to be key stakeholders in the implementation and review of the plan.

In the context of the four stages of emergency management – *Prevention, Preparation, Response and Recovery*, the SoVP has a strong and very proactive approach to bushfires. As bushfire events can directly impact a farmer's livelihood, colloquially '*if the smoke goes up*', history has shown a positive response reflecting the community's values and willingness to help their neighbours. There is an all hands on-deck approach with farmer response units arriving from neighbouring farms and further afield. The bushfire skills and experience level is considered to be high amongst the volunteers, with many of the volunteers amassing considerable years of service. The Shire and the community of Victoria Plains benefit greatly from the depth of skills, knowledge, experience, and commitment from their emergency services volunteers.

The Emergency Services Volunteer figure of 160 does not reflect the additional personnel, sometimes referred to as 'spontaneous volunteers', who are not officially registered as Emergency Services (ES) Volunteers, but spring into action upon the first sight or smell of smoke. In line with the Shire's demographics, it is expected that most spontaneous volunteers would be farmers. Together with the registered farmer response personnel this has inherent benefits including:

- Access to mobile fire units
- Bushfire fighting skills
- Familiarity with the terrain, tracks, landmarks, landowners etc.

The local agricultural industry peaks in late October through to late December with the curing of crops and harvesting. The high reliance upon farmers for response may become an issue during the harvest season, when many local resources are engaged with agricultural activities however, whilst harvesting, farmers are required to have firefighting units at the ready allowing for a quick response. Conversely, there are more resources available for fire suppression and a greater sense of urgency to contain fire threatening unharvested paddocks.

Following harvest many farmers take their holidays which often involves leaving the Shire with their families. Consequently, this leads to fewer resources being available for observing and reporting bushfires, and possibly a reduced response and suppression capability during the critical summer months. There is however a drop in the risk in early February, post-harvest, as it is around this time that stock is rotated, effectively reducing fuel loads through grazing. The risk rises again in March – May as some farmers undertake stubble burns in preparation for seeding, and escapes from burn-offs are a known cause of fires in the area.

The key times within the SoVP that may impact response are:

- Preparation for Seeding: March - May
- Seeding: April – June
- Hay/Harvest: September – January

Like most Local Governments the SoVP has an annually issued Fire Break notice which details the requirements for residents to maintain and construct fire breaks, asset protection zones and undertake other fire mitigation activities. When firefighting resources are committed it is vital that the community have adequately prepared their properties and enacted their bushfire plans, as the demand for assistance will quickly exceed the capacity of available resources.

During the dry season (December to February) there is a general lack of water throughout the Shire. Calingiri, Bolgart, New Norcia and Yerecoin have reticulated water mains supplies. Piawaning has a reticulated supply but gets its water piped from the Yerecoin supply.

The Shire has a 22000 ltr. Water Tanker which is available during incidents. Water supplies during an incident may also be bolstered by private water carriers and neighbouring local government firefighting resources/tankers.

As per the experience in other rural areas challenges exist during larger and/or campaign fires with respect to the available water pressure and tank storage capacity. Water pressure issues are evident and there are long turnaround times can be experienced when refilling water firefighting resources.

4. Asset Identification and Risk Assessment

4.1 Asset Identification

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

Table 8 – Asset Categories and Subcategories

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

4.2 Assessment of Bushfire Risk

Risk assessments have been undertaken for each asset, or group of assets, identified using the methodology described in the Guidelines. Most risk assessments were undertaken via ‘desktop’ assessment in the first instance. However, assets with a preliminary rating of ‘very high’ and ‘extreme’ have been validated through field assessment.

At the time of completing this Bushfire Risk Management Plan, a total of 453 assets have undergone a bushfire risk assessment.

The percentage of assets within the local government in each asset category at the time of BRM Plan endorsement is shown in Table 7:

Table 9 – Asset Category Proportions

Asset category	Proportion of identified assets
Human Settlement	40.1
Economic	51.87
Environmental	4.06
Cultural	3.97

4.2.1 Likelihood Assessment

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

‘Likelihood’ has been assessed in the context of:

- **Separation Distance** – the distance between the asset and the hazard vegetation, and
- **Fuel Age** – the period elapsed since the fuel was last burnt

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

Table 10 – Likelihood Ratings

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

4.2.2 Consequence Assessment

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

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

Table 11 – Consequence Ratings

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

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

The methodology used to determine the consequence rating for each asset category is based on the following from the *Bushfire Risk Management Planning Handbook (2018)*:

- Consequence Rating - Human Settlement Assets**

The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the hazard posed by the classified vegetation and the vulnerability of the asset.
- Consequence Rating - Economic Assets**

The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the hazard posed by the classified vegetation and the vulnerability of the asset.
- Consequence Rating - Environmental Assets**

The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the vulnerability of the asset and the potential impact of a bushfire or fire regime.
- Consequence Rating - Cultural Assets**

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

Determining Bushfire Hazard

The level of bushfire hazard for human settlement, economic and cultural assets is determined using a quantified bushfire hazard assessment model.⁶¹ The model is based on the methodology set out in *AS3959-2009 Construction of buildings in bushfire prone areas* that is used to undertake a Bushfire Attack Level (BAL) assessment. The hazard assessment is used to measure the severity of an asset's potential exposure to ember attack, radiant heat, and direct flame contact. Criteria applied when undertaking the bushfire hazard assessment is as follows:⁶²

Application of Fire Danger Index (FDI) 80. - The fire danger index reflects the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short-term drought effects. Inputs to hazard assessment calculation are reflective of FDI 80 (Grass Fire Danger Index 110) conditions, as per AS3959-2009. The higher the rating, the less chance of controlling a fire until weather conditions improve.

The SoVP is located with the Upper Great Southern Fire Weather District. Given the prevalence of agricultural holdings within the SoVP, the Grass Fire Danger Index is the model applied to determine the FDI within the Shire given the prevalence of agricultural activities.

From the FDI, predictions can be made regarding a fire's rate of spread, intensity, and the potential for various suppression tactics to succeed. The FDI is the basis for determining the Fire Danger Rating, shown below, which is a scale developed to assist communities to better understand information about fire danger.⁶³

- **Classification of vegetation** - Vegetation is classified as per the vegetation categories listed in the Guidelines, and in accordance with AS3959-2009. Vegetation meeting the low hazard exclusion criteria is automatically rated as low hazard. Where more than one vegetation type is present, the assessment is based on the vegetation type that presents the greatest hazard to the asset.
- **Separation Distance** - Is measured from the closest part of the assets, such as a house, to the nearest edge of the hazard vegetation. Where there is a flammable structure within 6 metres (e.g. a shed or patio next to a house), it is included as a part of the asset.
- **Slope** - Two slope measurements are used in the hazard assessment calculation – the slope of the land under the hazard vegetation and the slope of the land between the asset and the hazard vegetation.

⁶¹ *Guidelines for Preparing a Bushfire Risk Management Plan (2015)*

⁶² *AS3959-2009 Construction of buildings in bushfire prone areas*

⁶³ *Source: Department of Fire and Emergency Services*

Hazard assessments are based around Bushfire Management Zones (BMZ) with a focus on hazards within the Asset Protection Zone (20 metres) and Hazard Separation Zone (80 metres).



Figure 36: Bushfire Management Zones ⁶⁴

The Fire Danger Ratings are explained below:







 Catastrophic FDI 100 +	Catastrophic What does it mean? These are the worst conditions for a bush or grass fire. Homes are not designed or constructed to withstand fires in these conditions. The safest place to be is away from high risk bushfire areas.
 Extreme FDI 75 - 99	Extreme What does it mean? Expect extremely hot, dry and windy conditions. If a fire starts and takes hold, it will be uncontrollable, unpredictable and fast moving. Spot fires will start, move quickly and come from many directions. Homes that are situated and constructed or modified to withstand a bushfire, that are well prepared and actively defended, may provide safety. You must be physically and mentally prepared to defend in these conditions.
 Severe FDI 50 - 74	Severe What does it mean? Expect hot, dry and possibly windy conditions. If a fire starts and takes hold, it may be uncontrollable. Well prepared homes that are actively defended can provide safety. You must be physically and mentally prepared to defend in these conditions.
 Very High FDI 32 - 49	Very High What does it mean? If a fire starts, it can most likely be controlled in these conditions and homes can provide safety. Be aware of how fires can start and minimise the risk. Controlled burning off may occur in these conditions if it is safe - check to see if permits apply.

Figure 37: Fire Danger Ratings ⁶⁵

⁶⁴ Bushfire Risk Management Planning Handbook, DFES (March 2018)

⁶⁵ Source: Department of Fire and Emergency Services www.dfes.wa.gov.au

4.2.3 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. The Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Services (PWS) assisted with the identification and assessment of Environmental assets. Environmental assets that were unlikely to 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.

4.2.4 Local Government Asset Risk Summary

A risk profile for the Shire is provided in the summary (*Table 10*) 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 12 – Local Government Asset Risk Summary

Risk Rating	Low	Medium	High	Very High	Extreme
Asset Category					
Human Settlement	5.52%	3.97%	13.69%	15.89%	1.10%
Economic	1.77%	7.06%	19.65%	20.53%	2.87%
Environmental	-	-	-	2.65%	1.32%
Cultural	-	-	-	1.32%	.22%

The ‘*Guidelines for Preparing a Bushfire Risk Management Plan*’ requires that only assets considered of value and vulnerable to bushfire are to be included in this plan consequently not all assets within the Shire have been included in the assessments.

An Asset Risk Register can be produced from the DFES managed Bushfire Risk Management System (BRMS). This details each asset, the risk assessment criteria applied and the resulting risk rating. Care should be maintained when releasing this data as the information is dynamic and should not be taken out of context or used for purposes other than those intended through this BRM Plan.

5. Risk Evaluation

5.1 Evaluating Bushfire risk

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

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

5.2 Treatment Priorities

The treatment priority for each asset has been automatically assigned by BRMS, based on the asset's risk rating. **Table 11** shows how likelihood and consequence combine to give the risk rating and subsequent treatment priority for an asset.

Table 13 – Treatment Priorities

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

5.3 Risk Acceptability

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

In most circumstances risk acceptability and treatment will be determined by the land owner, in collaboration with local government and fire agencies. However, the following courses of action, as a general rule, 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 (Priorities 1A, 1B, 1C)	<p>Requires asset specific treatment strategies to be applied.</p> <p>Treatment action is required within 2 years of the plan being endorsed.</p> <p>It is unlikely that Local Government Wide Controls would be adequate to manage the risk.</p>	<p>Specific action(s) required in the first 2 years of the BRM</p> <p>Assets to be included on the Shires annual fire break inspection</p> <p>Priorities will include</p> <ul style="list-style-type: none"> • treatments that will have maximum benefit to multiple assets and critical infrastructure

Risk Rating	Criteria for Acceptance of Risk	Course of Action
		<ul style="list-style-type: none"> • Identification of partnerships with other agencies for strategic mitigation • Assets within the townsite to be included on Fire Break inspection list <p>Communication with stakeholders as per the Communications Plan</p>
<p>Very High (Priorities 2A, 2B, 2C)</p>	<p>Requires asset specific treatment strategies to be applied.</p> <p>Treatment action is required with 2 years of the plan being endorsed.</p> <p>It is unlikely that Local Government Wide Controls would be adequate to manage the risk.</p>	<p>Specific action(s) required in the first 3 years of the BRM Plan</p> <p>Assets to be included on the Shires annual fire break inspection</p> <p>Priorities will include</p> <ul style="list-style-type: none"> • treatments that will have maximum benefit to multiple assets and critical infrastructure • Identification of partnerships with other agencies for strategic mitigation <p>Assets within the townsite to be included on Fire Break inspection list</p> <p>Communication with stakeholders as per the Communications Plan</p>
<p>High (Priorities 3A, 3B, 3C, 3D)</p>	<p>Asset specific treatment strategies will likely be required to adequately manage the risk.</p>	<p>Specific action(s) required in the first 4 years of the BRM Plan</p> <p>Priorities will include</p> <ul style="list-style-type: none"> • Assets that fall adjacent to Extreme or Very High-risk assets • treatments that will have maximum benefit to multiple assets and critical infrastructure • Identification of partnerships with other agencies for strategic mitigation <p>Communication with stakeholders as per the Communications Plan</p>
<p>Medium (Priorities 4A, 4B, 4C)</p>	<p>Asset specific treatments are not required, but risk should be monitored.</p>	<p>Addressed through Local Government Wide Controls</p> <p>Specific action is not required</p>

Risk Rating	Criteria for Acceptance of Risk	Course of Action
	<p>Local government wide controls should be sufficient to manage the risk</p> <p>If there is a change in the landscape / environment these assets may need to be reassessed more frequently.</p>	
<p>Low (Priorities 5A, 5B, 5C)</p>	<p>Asset specific treatments are not required, but risk should be monitored.</p> <p>Local government wide controls should be sufficient to manage the risk</p> <p>If there is a change in the landscape / environment these assets may need to be reassessed more frequently.</p>	<p>Addressed through Local Government Wide Controls and/or Community Education</p> <p>Specific action is not required</p>

6. Risk Treatment

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

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

6.1 Local Government-Wide Controls

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

- i. *Bush Fires Act 1954* Section 33 notices, including applicable fuel management requirements, firebreak standards and annual enforcement programs;
- ii. Declaration and management of Prohibited Burn Times, Restricted Burn Times and Harvest and Vehicle Movement Bans for the local government;
- iii. Public education campaigns, including Shire community education programs, 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*, *Are You Ready Campaign* etc;
- iv. State-wide arson prevention programs developed in conjunction with WA Police and DFES;
- v. 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;
- vi. Monitoring performance against the BRM Plan and reporting annually to the SoVP and OBRM;
- vii. SoVP's annual works program; and
- viii. Other practices and programs undertaken by local government or state agencies (**Multi-Agency Work Plans**) that contribute to bushfire risk management within the local government, including controls in place under state government policies, agreements or memorandums of understanding. These include:
 - a. Department of Fire and Emergency Services program of works on Unallocated Crown Land and Unmanaged Reserves;
 - b. Department of Biodiversity, Conservation and Attractions Master Burn Program;
 - c. Water Corporation Bushfire Risk Management Plan;
 - d. Western Power annual asset inspection and vegetation management program;
 - e. Department of Education Memorandum of Understanding;
 - f. Main Roads WA Bridge Assessment and Maintenance Works Plan;
 - g. SoVP's pre-season meetings and training with Fire Control Officers and local Brigade members covering high risk areas; and
 - h. Total Fire Bans.

A **Local Government-Wide Controls and Multi-Agency Work Plan** is attached at **Appendix 2**. The plan details work to be undertaken as a part of normal business, to improve current controls or to implement new controls to better manage bushfire risk across the local government.

6.2 Asset-Specific Treatment Strategies

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

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

6.3 Determining the Treatment Schedule

The Treatment Schedule will be developed in broad consultation with landowners and other stakeholders and efforts will be made to finalise the Treatment Schedule within twelve months of this BRM Plan being endorsed by council. It is expected that the Treatment Schedule will be a dynamic document and will be amended to account for changing circumstances, including changes to assets and/or risk ratings. Priority will need to be given to those treatments that will have the most significant impact on the safety of the community, impact on essential infrastructure, cultural and economic assets.

The Treatment Schedule will be developed in broad consultation with landowners and other stakeholders and will take into consideration treatment strategies that have been identified by individual stakeholder groups. E.g. PWS, Local Government and individual Brigades as a part of LG. Efforts will be made to adopt a collaborative approach towards treatments and the achievement of desired outcomes for all stakeholders.

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

In determining the treatment schedule initial focus will be targeted towards areas of higher residential groupings. Treatments in these areas may include fuel reduction through to community engagement, or a combination of several treatment types to address the identified risk.

It is important to note that some treatments, particularly those aimed at reducing the vegetation profile, will require ongoing management and will likely need to be repeated periodically in order to sustain risk reduction gains post the initial treatment. The maintenance regime should be included in the treatment schedule where possible.

7. Monitoring and Review

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

7.1 Review

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

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

7.2 Monitoring

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

The SoVP has determined that assets rated:

- ‘Extreme’ risk will be reassessed biennially and at the completion of a treatment as part of the post treatment evaluation
- ‘Very High’ risk will be reassessed biennially where possible and at the completion of a treatment as part of the post treatment evaluation
- ‘High’ risk will be reassessed at least once during the life of the plan or at the completion of a treatment as part of the post treatment evaluation
- ‘Low’ and ‘Medium’ risk should be reassessed during the development of future plans.

The plan will be monitored by the Community Emergency Services Manager and the Chief Executive Officer.

Post-treatment Risk Assessment, using the Bushfire Risk Management System, involves completing a risk re-assessment at the completion of any scheduled treatment/s to confirm that the treatment objectives have been achieved. This could include evaluation of the initial treatment or ongoing treatments included in a treatment management plan, noting that treatments may need to be repeated periodically to sustain risk reduction gains. The post-treatment risk assessment may identify that further treatments are required to reduce an asset’s risk rating to an acceptable level. The post-treatment assessment uses the same methodology as the original assessment. All inputs to the assessment should be reviewed and updated to reflect any change (e.g. changes to the asset or surrounding area).

Risk Re-assessment involves an additional assessment to determine if any factors have changed (e.g. increases in fuel age, developments) that may impact upon the asset’s risk rating. Risk re-assessments may be undertaken at any time using a ‘desktop’ assessment to review data and spatial information in BRMS. Ideally risk re-assessment for ‘extreme’ and ‘very high’ risk assets would include a site visit.

7.3 Reporting

The SoVP will submit an annual report to the Office of Bushfire Risk Management summarising progress made towards implementation of the BRM Plan. This report will also be submitted to the Council for endorsement.

The reporting requirements will be managed by the Community Emergency Services Manager and reported via the Chief Executive Officer.

7.3.1 Privacy Issues and Release of Information

Information captured through the Bushfire Risk Management System (BRMS) includes data considered 'personal' in nature including the names and addresses of landholders. There is therefore the potential for the data collected through the BRMS to be used for purposes other than bushfire risk mitigation (i.e. Insurance companies using this information to set insurance premiums).

The Chief Executive Officer 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 SoVP, as a matter of course or upon request, will provide reports to key stakeholders that detail the assets and treatments that the stakeholders (landowners) have responsibility for.

8. Glossary

Asset	A term used to describe anything of value that may be adversely impacted by bushfire. This may include residential houses, infrastructure, commercial, agriculture, industry, environmental, cultural and heritage sites.
Asset Category	There are four categories that classify the type of asset – Human Settlement, Economic, Environmental and Cultural.
Asset Owner	The owner, occupier or custodian of the asset itself. Note: this may differ from the owner of the land the asset is located on, for example a communication tower located on leased land or private property.
Asset Register	A component within the Bushfire Risk Management System used to record the details of assets identified in the Bushfire Risk Management Plan.
Asset Risk Register	A report produced within the Bushfire Risk Management System that details the consequence, likelihood, risk rating and treatment priority for each asset identified in the Bushfire Risk Management Plan.
Bushfire	Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective. ⁶⁶
Bushfire Hazard	The hazard posed by the classified vegetation, based on the vegetation category, slope and separation distance.
Bushfire Management Plan	A document that sets out short, medium and long term bushfire risk management strategies for the life of a development. ⁶⁷
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 Bushfire Risk Management Plan (BRM Plan) is submitted to the OBRM for review. Once the OBRM review is complete, the BRM Plan is called the 'Final BRM Plan' and can be progressed to local government council for endorsement.
Emergency Risk Management Plan	A document (developed under <i>State Emergency Management Policy 2.9</i>) that describes how an organisation(s) intends to undertake the activities of emergency risk management based on minimising risk. These plans help inform the ongoing development of Local Emergency Management Arrangements (LEMA) and Westplans.

⁶⁶ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne.

⁶⁷ Western Australian Planning Commission 2015, *State Planning Policy 3.7: Planning in Bushfire Prone Areas*, WAPC, Perth.

Geographic Information System (GIS)	A data base technology, linking any aspect of land-related information to its precise geographic location. ⁶⁸
Geographic Information System (GIS) Map	The mapping component of the Bushfire Risk Management System. Assets, treatments and other associated information is spatially identified, displayed and recorded within the GIS Map.
Landowner	The owner of the land, as listed on the Certificate of Title; or leaser under a registered lease agreement; or other entity that has a vested responsibility to manage the land.
Likelihood	The chance of something occurring. In this instance, the chance of a bushfire igniting, spreading, and reaching the asset.
Locality	The officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns).
Priority	See Treatment Priority.
Recovery Cost	The capacity of an asset to recover from the impacts of a bushfire.
Responsible Person	The person responsible for planning, coordinating, implementing, evaluating, and reporting on a risk treatment.
Risk acceptance	The informed decision to accept a risk, based on the knowledge gained during the risk assessment process.
Risk analysis	The application of consequence and likelihood to an event in order to determine the level of risk.
Risk assessment	The systematic process of identifying, analysing, and evaluating risk.
Risk evaluation	The process of comparing the outcomes of risk analysis to the risk criteria to determine whether a risk is acceptable or tolerable.
Risk identification	The process of recognising, identifying, and describing risks.
Risk Manager	The organisation or individual responsible for managing a risk identified in the Bushfire Risk Management Plan; including review, monitoring, and reporting.
Risk Register	A component within the Bushfire Risk Management System used to record, review and monitor risk assessments and treatments associated with assets recorded in the Bushfire Risk Management Plan.
Risk treatment	A process to select and implement appropriate measures undertaken to modify risk.

⁶⁸ Landgate 2015, *Glossary of terms*, Landgate, Perth

Rural	Any area where in residences and other developments are scattered and intermingled with forest, range, or farmland and native vegetation or cultivated crops. ⁶⁹
Rural Urban Interface (RUI)	The line or area where structures and other human development adjoin or overlap with undeveloped bushland. ⁷⁰
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, to complete the treatment. Treatment objectives should be specific and measurable.
Treatment Manager	The organisation, or individual, responsible for all aspects of a treatment listed in the Treatment Schedule of the Bushfire Risk Management Plan, including coordinating or undertaking work, monitoring, reviewing and reporting.
Treatment Priority	The order, importance or urgency for allocation of funding, resources and opportunity to treatments associated with a particular asset. The treatment priority is based on an asset's risk rating.
Treatment Schedule	A report produced within the Bushfire Risk Management System that details the treatment priority of each asset identified in the Bushfire Risk Management Plan and the treatments scheduled.
Treatment Strategy	The broad approach that will be used to modify risk, for example fuel management.
Treatment Type	The specific treatment activity that will be implemented to modify risk, for example a prescribed burn.
Vulnerability	The susceptibility of an asset to the impacts of bushfire.

⁶⁹ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne

⁷⁰ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne

9. Common Abbreviations

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

Appendix 1 – Communications Strategy



Shire of Victoria Plains

Bushfire Risk Management Planning Communication Strategy

Document Control

Document Name	Communications Strategy	Current Version	1.1
Document Owner	SoVP CEO	Issue Date	September 2020
Document Location	Shire Office	Next Review Date	September 2025

Related Documents

Title	Version	Date
SoVP Bushfire Risk Management Plan	1.0	October 8 th 2020

Amendment List

Version

1 INTRODUCTION

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

2 COMMUNICATIONS OVERVIEW

Communication Objectives

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

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

Communication Roles and Responsibilities

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

- SoVP CEO, Corporate Communications and Marketing, or nominee, is responsible for:
 - endorsement of the BRM Plan Communications Strategy,
 - external communication with the local government area,
 - operational-level communication between the Shire and the Department of Fire and Emergency Services
 - approve release of BRMS and BRM Plan data.
- Community Emergency Services Manager (CESM), is responsible for:
 - BRM Plan monitoring, review, and reporting

Key Stakeholders for Communication

The following table identifies key stakeholders in bushfire risk management planning. These are stakeholders that are identified as having a significant role or interest in the planning process or are likely to be significantly impacted by the outcomes.

Stakeholder	Role or interest	Level of impact on outcomes	Level of engagement
Shire of Victoria Plains	Significant role in plan and treatment development, implementation, and review. Responsible for treatments as a landowner/manager.	High	Inform, consult, involve, collaborate, and empower
Department of Fire and Emergency Services	Significant role in plan and treatment development, implementation, and review. Support role in treatment Implementation.	High	Inform, consult, involve and collaborate
Office of Bushfire Risk Management	Significant role in plan development, implementation, and review.	Medium	Inform, consult, and collaborate
Department of Biodiversity, Conservation and Attractions	Significant role in plan and treatment development, implementation, and review. Responsible for treatments as a landowner/manager.	High	Inform, consult, involve, collaborate, and empower
Main Roads WA	Role in plan and treatment development, implementation, and review. Responsible for treatments as a landowner/manager Critical infrastructure interest.	Medium	Inform, consult, involve, collaborate, and empower
Telstra	Role in plan and treatment development, implementation, and review. Responsible for treatments as a landowner/manager Critical infrastructure interest.	Medium	Inform, consult, involve, collaborate, and empower
Department of Planning Lands and Heritage, LandCorp & Landgate	Role in plan and treatment development, implementation, and review	Medium	Inform, consult, involve, collaborate, and empower
Australian Rail Corporation (ARC)	Role in plan and treatment development, implementation, and review	Medium	Inform, consult, involve, collaborate, and empower
Water Corporation & Department of Water	Role in plan and treatment development, implementation, and review. Responsible for treatments as a landowner/manager. Critical infrastructure interest.	Medium	Inform, consult, involve, collaborate, and empower
Department of Education	Role in plan and treatment development, implementation, and review. Responsible for treatments as a landowner/manager. Critical infrastructure interest.	Medium	Inform, consult, involve, collaborate, and empower
Private Land Owners	Role in plan and treatment development, implementation, and review. May have responsibilities for treatments as landowners/managers	High	Inform, consult, involve, collaborate, and empower

Western Power	Role in plan and treatment development, implementation, and review. Responsible for treatments as a landowner/manager Critical infrastructure interest.	Medium	Inform, consult, involve, collaborate and empower
Chief Bushfire Control Officer / COMMUNITY Emergency Services Manager	Significant role in plan and treatment development, implementation, and review	High	Inform, consult, involve, collaborate, and empower
Bushfire Brigades and other Emergency Services Volunteers	Significant role in plan and treatment development, implementation, and review	High	Inform, consult, involve, collaborate
Bushfire Advisory Committee, District Operations Advisory Committee & Local Emergency Management Committee	Role in plan development, implementation, and review	High	Inform, consult, involve, collaborate
Landcare, Local Community Conservation Groups	Role in plan and treatment development, implementation, and review	Medium	Inform, consult, and involve
Traditional Owners, Yued, Regional Corporation, South West Aboriginal Land and Sea Council & Department of Aboriginal Affairs	Role in plan and treatment development, implementation, and review	Medium	Inform, consult, and involve
Victoria Plains Community	Role in plan implementation and review	Low	Inform and consult

Communications Plan

Timing of Communication	Stakeholder (s)	Communication Objectives <i>(Refer to Page 68)</i>	Communication Method	Key Message or Purpose	Responsibility	Identified Risks to Communication	Strategy to Manage Risks	Monitoring & Evaluation Method
Development of the Initial BRM Plan								
Annually or as required	SoVP CEO, Senior Leadership Team and Council	1 – 3 & 5	Email Face to face meetings	Inform and consult Confirm accountability and responsibilities Input into plan and treatments	BRMO & BRPC	Resource constraints could limit their ability to participate	Clarify misunderstandings and intentions of plan Express value of meeting	Stakeholder's willingness to participate Feedback on the presentation
Annually or as required	SoVP Building and Works	2,3 & 5	Email Face to face meetings Phone	Input into plan and treatments	CEO or Delegate	Limited time Conflicting priorities	Plan meetings	Stakeholder's willingness to participate Contributions to treatment plan
Annually	Bushfire Advisory Committee (BFAC) and District Operations Advisory Committee (DOAC)	1 – 3 & 5	Face to face meeting Presentation	Inform and consult Confirm project objectives Seek input into treatment plans Project updates	BRMO & BRPC	Stakeholder's willingness to participate	Preparation Ensure current information on the BRM Plan Project is available	<ul style="list-style-type: none"> Seek feedback on the presentation and (anecdotal) community feedback
Quarterly	Local Emergency Management Committee (LEMC)	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meetings Presentation 	Confirm project objectives Seek input into treatment plans Project updates	BRMO & BRPC	<ul style="list-style-type: none"> Stakeholder's willingness to participate 	Preparation Ensure current information on the BRM Plan Project is available	<ul style="list-style-type: none"> Feedback on the presentation

Quarterly or as required	Chief Bushfire Control Officer (CBFCO), Bushfire Brigades Brigade Captains	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meetings 	<ul style="list-style-type: none"> Confirm project objectives Seek input into treatment plans and providing project updates Identify Risk and share information 	BRMO & BRPC	<ul style="list-style-type: none"> Time constraints No plan, unorganised Availability of volunteers 	<ul style="list-style-type: none"> Clarify misunderstandings and intentions of plan Confirm benefits Preparation Ensure current information on the BRM Plan Project is available 	<ul style="list-style-type: none"> Feedback Support for BRMP process Level of engagement
Biannually	Dept of Biodiversity, Conservation and Attractions	1 – 3 & 5	<ul style="list-style-type: none"> Face to face meetings Email Telephone 	<ul style="list-style-type: none"> Confirmation of environmental assets Identification of DBCA burn plans Confirming project objectives, seeking input into treatment plans and providing project updates Development of treatment options 	BRMO & BRPC	<ul style="list-style-type: none"> Resource constraints could limit their ability to participate Willingness to release 'confidential' data re environmental assets 	<ul style="list-style-type: none"> Clarify misunderstandings and intentions of plan Provide undertakings re the release of confidential data Restrict release of information and document in plan 	<ul style="list-style-type: none"> Level of engagement Environmental assets in BRMS
Annually and as required	Stakeholders – Landowners / Land Managers	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meeting Telephone Presentations Community Engagement activities 	<ul style="list-style-type: none"> Asset identification/ confirmation Outline BRMP process and objectives Identify assets at risk Identify existing controls/programs Development of treatment options 	BRMO & BRPC	<ul style="list-style-type: none"> Time constraints and travel Level of interest and engagements in process Lack of resourcing 	<ul style="list-style-type: none"> Select appropriate channel of communication Prepare materials and good planning Communicate funding opportunities when available 	<ul style="list-style-type: none"> Engagement and participation levels Feedback Contributions to treatment strategies

Annually or as required	Stakeholders – Others	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meeting Telephone Presentations Community Engagement activities 	<ul style="list-style-type: none"> Asset identification/confirmation Inform of BRMP process Identify assets at risk Identify existing controls/programs Development of treatment options 	BRMO & BRPC	<ul style="list-style-type: none"> Time constraints and travel Level of interest and engagements in process 	<ul style="list-style-type: none"> Select appropriate channel of communication Prepare materials Plan communication 	<ul style="list-style-type: none"> Engagement and participation levels Feedback
Annually and as required	Landcare	1 – 3 & 5	<ul style="list-style-type: none"> Face to Face meetings Email Telephone 	<ul style="list-style-type: none"> Confirmation of environmental assets Confirming project objectives Seeking input into treatment plans Providing project updates 	BRMO & BRPC	<ul style="list-style-type: none"> Time constraints Level of interest and engagement in process 	<ul style="list-style-type: none"> Select appropriate communication method Prepare materials Plan communications 	<ul style="list-style-type: none"> Participation levels Feedback
Annually and as required	Office of Bushfire Risk Management	1 & 2	<ul style="list-style-type: none"> Email Face to face meetings 	<ul style="list-style-type: none"> Compliance and governance Plan endorsement 	CEO or Delegate	<ul style="list-style-type: none"> Government funding Government priorities Identified noncompliance 	<ul style="list-style-type: none"> Stay up to date with process improvements 	<ul style="list-style-type: none"> Plan endorsed
Bi-annually and as required	Dept of Fire and Emergency Services (DFES) – District/Regional Office	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meetings Telephone 	<ul style="list-style-type: none"> UCL/UMR planned works Identification of treatment strategies Identification of other planned works Sharing information Identifying funding opportunities 	BRMO & BRPC	<ul style="list-style-type: none"> Time constraints Conflicting priorities Response obligations 	<ul style="list-style-type: none"> Plan communications Share information 	<ul style="list-style-type: none"> Other planned works identified Funding opportunities identified UCL/UMR treatments included on BRMS

Implementation of the BRM Plan								
Timing of Communication	Stakeholder (s)	Communication Objectives (Refer to Page 64)	Communication Method	Key Message or Purpose	Responsibility	Identified Risks to Communication	Strategy to Manage Risks	Monitoring & Evaluation Method
Annually or as required	SoVP CEO, Senior Leadership Team and Council	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meetings 	<ul style="list-style-type: none"> Inform and consult Confirm accountabilities and responsibilities. Progress update Issues identification and action planning 	CEO or Delegate	<ul style="list-style-type: none"> Time constraints Availability Lack of understanding Budget (for LG mitigation) 	<ul style="list-style-type: none"> Planning and time management Clear purpose Targeted communication Regular updates 	<ul style="list-style-type: none"> Feedback, Questions raised Level of support received
Annually or as required	SoVP Building and Works	1 -3 & 5	<ul style="list-style-type: none"> Email Face to face meetings 	<ul style="list-style-type: none"> Reduction of fuel loads on LG managed lands Upgrades to strategic firebreaks 	CEO or Delegate	<ul style="list-style-type: none"> Poor organisation Limited time Not preparing Poor communication from stakeholders and LG on completion of works 	<ul style="list-style-type: none"> Clarify misunderstandings and intentions of plan Plan communications Regular updates 	<ul style="list-style-type: none"> Treatments applied Positive feedback received on treatment supplied Risk ratings reduced
Biannually or as required	LEMC, BFAC & DOAC, CBFCO, CAPTS	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meetings 	<ul style="list-style-type: none"> Report on progress to plan Report issues/constraints 	CEO or Delegate	<ul style="list-style-type: none"> Availability Time 'Buy in' 	<ul style="list-style-type: none"> Collate data and report on success to plan Compliance to plan Keep informed 	<ul style="list-style-type: none"> Feedback received Level of engagement Issues identified and addressed
As per Section 7.2 of this plan	Stakeholders – Landowners / Land Managers	1 – 3 & 5	<ul style="list-style-type: none"> Email Face to face meetings Presentations Community Engagement 	<ul style="list-style-type: none"> Inform and consult Confirm accountability and responsibility Status and progress of plan Treatment status, gaps and issues to be addressed 	CEO or Delegate	<ul style="list-style-type: none"> Availability Time Loss of commitment Access to treatment resources Funding 	<ul style="list-style-type: none"> Planned sharing of information Negotiations conducted Communicate funding opportunities when available 	<ul style="list-style-type: none"> Feedback Commitment to implement agreed controls Highly engaged Treatments being completed

As required	Stakeholders – Others	1 – 3 & 5	<ul style="list-style-type: none"> • Face to face • Presentations • Community Engagement • Telephone • Email 	<ul style="list-style-type: none"> • Inform and consult • Confirm accountability and responsibility • Status and progress of plan • Treatment status • Gaps and issues to be addressed 	CEO or Delegate	<ul style="list-style-type: none"> • Availability • Time • Loss of commitment 	<ul style="list-style-type: none"> • Planned sharing of information • Negotiations conducted • Communicate funding opportunities when available 	<ul style="list-style-type: none"> • Feedback • Commitment to implement agreed controls • Highly engaged • Treatments being completed
Annually or as required	OBRM, DFES District / Regional Office	1 – 3 & 5	<ul style="list-style-type: none"> • Face to face meetings • Email • Telephone 	<ul style="list-style-type: none"> • UCL/UMR Management • Status and progress of plan • Treatment status, gaps, and issues to be addressed • Continuous improvement • Information sharing • Identification of other planned works • Identification of funding opportunities 	CEO or Delegate	<ul style="list-style-type: none"> • Time • Conflicting priorities 	<ul style="list-style-type: none"> • Schedule communication opportunities 	<ul style="list-style-type: none"> • Planned works identified • Improvements identified and implemented • Issues addressed
Annually	OBRM	1 – 3 & 5	<ul style="list-style-type: none"> • Written report 	<ul style="list-style-type: none"> • Governance and compliance • Continuous improvement 	CEO or Delegate	<ul style="list-style-type: none"> • Time • Conflicting priorities 	<ul style="list-style-type: none"> • Plan communication 	<ul style="list-style-type: none"> • Compliance requirements met
Annually – ideally prior to fire season	Community	5	<ul style="list-style-type: none"> • Newsletter • Website • Facebook 	<ul style="list-style-type: none"> • Continuous improvement 	CEO or Delegate	<ul style="list-style-type: none"> • Time • Conflicting priorities 	<ul style="list-style-type: none"> • Plan communication 	<ul style="list-style-type: none"> • Feedback received

Review of the BRM Plan								
Timing of Communication	Stakeholder (s)	Communication Objectives <i>(Refer to Page 64)</i>	Communication Method	Key Message or Purpose	Responsibility	Identified Risks to Communication	Strategy to Manage Risks	Monitoring & Evaluation Method
Annually	SoVP CEO and Councillors	4, 5	<ul style="list-style-type: none"> Email Face to face meetings 	<ul style="list-style-type: none"> Governance and compliance Review, monitoring and reporting to Council Status update Continuous improvement 	CEO, CESM or Delegate(s) as appropriate	<ul style="list-style-type: none"> Poor reporting and recording of information Review not completed by OBRM 	<ul style="list-style-type: none"> BRPC & BRMO to record data and information appropriately 	<ul style="list-style-type: none"> Feedback received Planned works completed Reporting & Statistics Risk ratings reduced
5 Yearly (Shire, DFES and OBRM)	OBRM & LG Council	4, 5	<ul style="list-style-type: none"> Email Face to face meetings Telephone Written report 	<ul style="list-style-type: none"> Governance and compliance Review, monitoring and reporting Future planning 	CEO, CESM or Delegate(s) as appropriate	<ul style="list-style-type: none"> Poor reporting and recording of information Review not completed by OBRM 	<ul style="list-style-type: none"> BRPC & BRMO to record data and information appropriately Endorsed by OBRM 	<ul style="list-style-type: none"> Feedback received Planned works completed Reporting & Statistics Risk ratings reduced
Quarterly and as required	SoVP – Building and Works	4, 5	<ul style="list-style-type: none"> Face to face meetings 	<ul style="list-style-type: none"> Report on actions and status of BRM Plan Continuous improvement 	CEO, CESM, Executive Manager Operations or Delegate(s) as appropriate	<ul style="list-style-type: none"> Time Availability Conflicting priorities 	<ul style="list-style-type: none"> Plan Communication Discuss with Shire Leadership Team 	<ul style="list-style-type: none"> Feedback on work completed Risk ratings reduced Improvements identified and implemented
Biannually and as required	DFES Regional / District Office	4, 5	<ul style="list-style-type: none"> Face to face meetings Email Telephone 	<ul style="list-style-type: none"> Report on actions and status of BRMP Continuous improvement UCL/UMR funding 	CEO, CESM, Executive Manager Operations or Delegate(s) as appropriate	<ul style="list-style-type: none"> Time Availability Conflicting priorities 	<ul style="list-style-type: none"> Plan communications 	<ul style="list-style-type: none"> Feedback on work completed Risk ratings reduced Improvements identified and implemented

Annually	BFAC, DOAC, LEMC, CBFCO, Captains	4, 5	<ul style="list-style-type: none"> • Face to face meetings • Email • Telephone • Presentations 	<ul style="list-style-type: none"> • Report on actions and status of BRMP • Continuous improvement 	CEO, CESM, Executive Manager Operations or Delegate(s) as appropriate	<ul style="list-style-type: none"> • Availability • Time • Conflicting priorities • Buy in 	<ul style="list-style-type: none"> • Keep informed • Share the wins 	<ul style="list-style-type: none"> • Feedback on work completed • Risk ratings reduced • Improvements identified and implemented
Every 2 years or as required	Stakeholders – Landowners / Land Managers	4, 5	<ul style="list-style-type: none"> • Face to face meetings • Telephone • Presentation • Community Engagement • Survey 	<ul style="list-style-type: none"> • Status of treatments • Success of treatments • Continuous improvement 	CEO, CESM, Executive Manager Operations or Delegate(s) as appropriate	<ul style="list-style-type: none"> • Availability • Time • Conflicting priorities • Buy in • Access to resources 	<ul style="list-style-type: none"> • Plan communication • Target communication • Planned and prepared 	<ul style="list-style-type: none"> • Feedback on work completed • Risk ratings reduced • Improvements identified and implemented

Appendix 2 – Local Government-Wide Controls and Multi-Agency Work Plans

Local Government-Wide Controls

Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments	
1.	BRMP Risk Analysis	<ul style="list-style-type: none"> Maintain and refine BRM Plan Inclusion of BRM Risk Analysis within CESM and Operations area annual analysis/planning process 	SoVP	Landowners DFES	<p>Treatment identification and planning for all very high and extreme risk assets within the Shire.</p> <p>Adoption of treatment plans within LG operational areas</p>
2.	Strategic Community Plan 2015 – 2025 & Corporate Plan 2015 - 2019	<ul style="list-style-type: none"> As per documented actions 	SoVP		As per section 3.1.1 of the Bushfire Risk Management Plan.
3.	SoVP Bush Fire Notice and (<i>Bush Fires Act 1954</i>)	<ul style="list-style-type: none"> Review annual Fire Access Track Notice Publish annual Fire Access Track Notice Inspection of Fire Access Tracks 	SoVP	CBFCO, FCO, Captains and the public	<p>Published Annually.</p> <p>Inspect local properties.</p> <p>'Fire Access Track' has the same meaning as 'Fire Break', in the <i>Bush Fires Act 1954</i>.</p>
4.	Shire Prohibited and Restricted burn times and issuing of permits. (<i>Bush Fires Act 1954</i>)	<ul style="list-style-type: none"> Restricted and Prohibited Burn Times set the requirement that 'a permit to set fire to the bush' must be obtained. 	SoVP	CBFCO, Community Safety Officer, FCO's	Published Annually.
5.	Harvest and Vehicle Movement Bans	<ul style="list-style-type: none"> Bans imposed when BFAC is of the opinion that the use of engines, vehicles, plant, or machinery is likely to cause/contribute to the spread of a bushfire. 	SoVP	CBFCO	A Harvest and Vehicle Movement Ban may be imposed for any length of time but is generally imposed for the 'heat of the day' periods and may be extended or revoked by the local government should weather conditions change.

Control		Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
6.	Local Emergency Management Arrangements	<ul style="list-style-type: none"> Emergency Management Plan 	SoVP	St John WAPOL DFES SES Child Protection Education CBFCO Mid-West DEMC OEM	Annual review of emergency plans and arrangements.
7.	Local Planning Scheme No 2	<ul style="list-style-type: none"> Requirement for new developments to complete a Fire Management Plan endorsed through the Dept of Fire and Emergency Services 	SoVP	DFES	Where a Fire Management Plan has been endorsed by DFES and the Shire, the affected land owners will be responsible for the ongoing implementation of the "land owners' responsibilities" as specified in that Fire Management Plan.
8.	Total Fire Bans	<ul style="list-style-type: none"> Restriction of activities that may cause or contribute to the spread of a bushfire 	Department of Fire and Emergency Services	LG	A Total Fire Ban (TFB) is declared because of extreme weather conditions or when widespread fires are stretching firefighting resources. A TFB is declared by DFES following consultation with the LG.
9.	State Planning Policy 3.7	<ul style="list-style-type: none"> Planning in Bushfire Prone Areas 	Department of Planning	WA Planning Commission LG	Land developers are required to implement a Fire Management Plan to ensure risk is managed and other controls implemented and monitored.
10.	State-wide arson prevention program	<ul style="list-style-type: none"> Education and awareness campaigns exist across the state for arson. 	WA Police Department of Fire and Emergency Services	LG	Participation as required. The Shire participates in campaigns for arson prevention.

Control		Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
11.	Bushfire Action Month	<ul style="list-style-type: none"> Public preparedness and education campaign 	Department of Fire and Emergency Services	CBFCO, FCO, Community Safety Officer and the public	During Bushfire Action Month, brigades and community groups hold a number of events across the State, to help you prepare your home and family ahead of the bushfire season. These events include street meets, property walks and fire brigade open days where the community can speak to volunteer firefighters and <u>Bushfire Ready</u> groups about how to prepare for bushfires.
12.	Are you Ready Campaign / 5 minute Fire Chat	<ul style="list-style-type: none"> Community Engagement 	WA Government	LG, Chief FCO, Rangers and the public	The key message of this campaign is - preparing for and responding to bushfires is a team effort and everyone needs to play their part www.areyouready.wa.gov.au
13.	The Principal's guide to Bushfire - Department of Education	<ul style="list-style-type: none"> All schools should include their plan for dealing with bushfire as a part of their governance documentation 	Department of Education	DFES	

Multi-Agency Work Plans

Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments	
1.	UCL / UMR Land Management	<ul style="list-style-type: none"> Preparedness, mitigation work conducted on lands owned by DoL and managed by DFES under an MOU 	Department of Fire and Emergency Services – Northam District Office	LG, P&W, Local Brigades	Annual funding is allocated to UCL/UMR land within gazetted boundary with priorities identified in consultation with stakeholders and managed through DFES Joondalup Office
2.	Water Corporation Bushfire Risk Management Plan	<ul style="list-style-type: none"> Mid West Region Annual Works Plan. Water Corporation assets are managed / maintained at the regional level. Each asset has a management plan referred to as an SAP. Water Corporation has an agreement with DPAW for undertaking mitigation and land management activities on their estate. Works include fuel load management on water reserves 	Water Corporation	DFES, LG, DPAW	<p>A plan is currently being developed. High risk areas are identified, and treatments planned then completed. Treatments and risk assessments are available through Water Corp BRM department.</p> <p>Some high-risk areas have been identified in the Shire to date. The Water Corp Plan will be aligned to this BRM Plan's risk treatment schedule.</p> <p>*The SAPs only address very basic maintenance (Inc. firebreaks as per Firebreak notice but not fuel load management etc., however any treatments from BRMS would be put through the SAP in order to raise a works order.</p>
3.	Western Power annual asset inspection and vegetation management program	<ul style="list-style-type: none"> Western Power Bushfire Plan 	Western Power	DFES, LG, DPAW	Annual vegetation management and asset inspections are completed to ensure risk is managed. Full asset inspections are completed every 4 years.
4.	Department of Biodiversity, Conservation and Attractions	<ul style="list-style-type: none"> DBCA have a 6 season burn program that is published on their website. Yearly plans are available. 	Department of Biodiversity, Conservation and	LG, DFES, Local Brigades	The plans can be accessed via their website, by sharing shape files (GIS) and are communicated at Local BFAC, ROAC and other various meetings.

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
5.	Department of Education of Memorandum of Understanding	<ul style="list-style-type: none"> • Coordination of bushfire risk management activities 		Lancelin Primary School Gingin High School/Primary School	If hazards are identified during inspections these can be raised with the Department of Education Bushfire Risk Management Team for early attention.
6.	Department of Education Bushfire Plan	<ul style="list-style-type: none"> • A plan designed to assist staff to prepare for a total fire ban, catastrophic fire danger rating, or a bushfire. 	Department of Education	DFES, LG	This plan was developed in accordance with the Emergency and Critical Incident Management Policy and the Principal's Guide to Bushfire with input from local emergency management agencies.
7.	Main Roads WA (MRWA) Bridge Assessment & Maintenance Works Plan	<ul style="list-style-type: none"> • As per MRWA Structures Inspection and Information Management Policy (2013) • Ensure that all bridges, gantries, culverts, and walls on the road network are kept in a safe condition with the most efficient use of resources. 	Main Roads	LG	Bridges and culverts are critical assets in the road network and represent a major investment of community resources. Because of their strategic function, any failure or load capacity reduction may limit or severely restrict traffic over a large part of the road network, with consequent inconvenience and economic loss. Walls and gantries are minor structures that too can have an impact on the road network. It is therefore imperative that these assets are properly managed to ensure they are maintained in a safe and serviceable condition.
8.	Australian Rail Corporation (ARC)	<ul style="list-style-type: none"> • This report identifies areas of high bushfire risk within targeted corridors to determine treatment priorities 	ARC	LG, DFES	This document addresses bushfire related risk within the rail corridor lands that are managed by ARC under its lease agreement with the State Government. This includes a treatment schedule.

Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments	
1.	BRMP Risk Analysis	<ul style="list-style-type: none"> Maintain and refine BRM Plan 	SoVP	Landowners DFES	Treatment identification and planning for all very high and extreme risk assets within the Shire.
2.	SoVP Bush Fire Notice (<i>Bush Fires Act 1954</i>)	<ul style="list-style-type: none"> Review annual notice Publish annual notice Inspections in accordance with annual notice 	SoVP	CBFCO, FCO, Captains and the public	Published Annually. Inspect local properties. 'Fire Access Track' has the same meaning as 'Fire Break', in the <i>Bush Fires Act 1954</i> .
3.	Shire Prohibited and Restricted burn times and issuing of permits. (<i>Bush Fires Act 1954</i>)	<ul style="list-style-type: none"> Restricted and Prohibited Burn Times set the requirement that 'a permit to set fire to the bush' must be obtained. 	SoVP	CBFCO, FCO's	Published Annually.
4.	Harvest and Vehicle Movement Bans	<ul style="list-style-type: none"> Bans imposed when the CBFCO and FCO's are of the opinion that the use of engines, vehicles, plant, or machinery is likely to cause/contribute to the spread of a bushfire. 	SoVP	CBFCO and FCO's	A Harvest and Vehicle Movement Ban may be imposed for any length of time but is generally imposed for the 'heat of the day' periods and may be extended or revoked by the local government should weather conditions change.
5.	Local Emergency Management Arrangements	<ul style="list-style-type: none"> Local Emergency Management Arrangements 	SoVP	St John Ambulance (SJA) WAPOL DFES Dept of Child Protection Dept of Education CBFCO Mid-West DEMC OEM	Annual review of emergency plans and arrangements.
6.	State Planning Policy 3.7 and Local Planning Scheme No 2	<ul style="list-style-type: none"> Planning in Bushfire Prone Areas Requirement for new developments to complete a Fire Management Plan endorsed through the Dept of Fire and Emergency Services (if in a Bushfire Prone area) 	Dept of Planning	SoVP WA Planning Commission DFES	Land developers are required to implement a Fire Management Plan to ensure risk is managed and other controls implemented and monitored. Where a Fire Management Plan has been endorsed by DFES and the Shire, the affected landowners will be responsible for the ongoing implementation of the "landowners' responsibilities" as specified in that Fire Management Plan.

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
7.	Total Fire Bans	<ul style="list-style-type: none"> Restriction of activities that may cause or contribute to the spread of a bushfire 	Department of Fire and Emergency Services	SoVP	A Total Fire Ban (TFB) is declared because of extreme weather conditions or when widespread fires are stretching firefighting resources. A TFB is declared by DFES subject to weather conditions.
8.	Public preparedness and education campaigns	<ul style="list-style-type: none"> Public preparedness and education campaign 	SoVP	DFES, WA Police, WA Government CBFCO, FCO, community	Local promotion activities of state campaigns held when opportunity arises to promote preparedness including local contractors, bushfire brigades and Bushfire Ready Groups

Appendix 3 – Indicative Vegetation of the Victoria Plains District

The following has been taken from the publication Landscapes and soils of the Northam District, D.N. Sawkins

Tree - single trunk, with branches that usually start more than 1 meter above the ground and occupy about half of the tree's height. If the main trunk is damaged, many branches can resprout from the base or stems (epicormic growth). Examples include salmon and York gums, wandoo, marri and jarrah.

Mallet - single trunk with relatively steep angled branches and a terminal crown. Mallets are sensitive to fire and do not recover if the main trunk is lost. Examples include mallets, yates, gimlet and moort. Mallets often occur as pure or massed stands.

Mallee - multi stemmed plants usually less than 10 meters high. Several stems come from a lignotuber that can replace them when one or more are lost. Mallees that have not had to regenerate may have a single stem, but also have the basal 'mallee root'.



Salmon gum (*E. salmonophloia* left, RDZ and ADZ) and **gimlet** (*E. salubris* right, ADZ, note fluted stem) are common on clay, clay loam soils and loamy duplex soils on slopes and valleys. Salmon gums often dominate on loamy duplex and deep loam soils, and gimlets on heavier clay soils.

Buds and fruit can differentiate salmon gum from similar looking species like silver mallet.



Salmon gum

Silver mallet

Brown mallet

Blue mallet

Silver mallet (*E. argyphaea*) grows on stony usually mafic gravel uplands, in the east of the district. It can be mistaken for salmon gum, but only occurs on upland gravels, has the characteristic mallet form, and distinctive buds.

Blue mallet (*E. gardneri*) often occurs with silver mallet, mainly on mafic stony uplands.

Brown mallet (*E. astringens*) is the most common mallet in this district. It is common below breakaways on poorly structured mottled zone soils ('mallet' soils), and may occur with silver and blue mallets.



Silver mallet (silver bark green shiny leaves) with blue mallet (brown bark dull blue green leaves)

Silver mallet (silver bark) with brown mallet (brown bark), both with shiny green leaves



Red morrel (*E. longicornis*) is an upright rough barked tree that occurs on the following aeolian or mafic soils

- (1) Soils formed on mafic rock uplands in the RDZ and ADZ. Red brown stony and loamy gravels grading to gravelly loams with alkaline subsoils.
- (2) Aeolian loamy soils usually on the west and southern sides of trunk valleys in the ADZ.
- (3) Duplex soils with a brown subsoil on slopes.

York gum can be distinguished from red morrel by its generally rougher bark and more branching form. There are several species of trees and mallees with a stocking of rough bark that occur on alkaline valley soils (often aeolian loams), and red brown clay loam soils north and east of Harrismith. These include Yorrel (*E. yilgarnensis* syn Beard *E. gracilis*), *E. myriadena* (syn Beard *E. ovularis*).

These species all have shiny leaves and rough bark, but can be differentiated from York gum by narrower leaves and smaller fruit.

DRZ = Darling Range Zone, RDZ = Rejuvenated Drainage Zone, ADZ = Ancient Drainage Zone



York Gum (*E. loxophleba*) has 3 types in the Narrogin district. They all have characteristic shiny green leaves but differ in their form and bark characteristics.

Ssp. loxophleba (tree with rough bark on whole stem) is the most common form and occurs mainly on loamy soils formed from crystalline rock (usually with jam *Acacia acuminata*).

Ssp. lissophloia is the smooth bark mallee form that occurs on lower slopes and valleys, generally on loams or loamy duplex soils often with salmon gum and gimlet east and north of Jitarning, and is common in the Merredin district.

An intergrade form that has rough bark part way up the stem is common in the Corrigin and Kukerin systems.

On the left is York gum (*E. loxophleba ssp. loxophleba*) with jam understorey.



York gum mallee (*E. loxophleba ssp. lissophloia.*)



Intergrade form



Flooded gum (*E. rudis* left) is a multi-branched tree that occurs on winter wet soils that were originally non saline, mainly in valleys and granitic duplex slopes in the DRZ and western RDZ.

Many waterways with flooded gum have become mildly saline. These areas and fresh seepages have often been colonised by the introduced weed Spiny rush (*Dacutus spp*) below.



Wandoo (*E. wandoo subsp. wandoo*) is widespread, ranging from gravels (in association with dryandras, jarrah and marri), to valley duplex soils. Where wandoo is the dominant vegetation it often indicates deep or grey sandy duplex and gravelly duplex soils. With other vegetation, it usually becomes more dominant when the soil becomes more duplex. Wandoo is widespread on lower slopes and sandy duplex valleys, often in association with salmon gum and rock sheoak.

Salmon gums dominate on very shallow sandy duplex, clay or calcareous duplex soils, with wandoo being more common sandy duplexes in deeper sandy duplexes, and rock sheoak on very deep sandy duplex patches.

Salmon gums with their shiny leaves and layered foliage can be readily distinguished from dull leafed wandoos with bunchy foliage.



Sandy duplex wandoo woodland



Broad valley with salmon gum flanked by two wandoos



Powder-bark wandoo (*E. accedens* left) generally occurs in the west of the RDZ north of Williams on breakaways and stony ridges. It often occurs near brown mallet. Both are typical of highly water repellent soils.

Powder-bark wandoo can be distinguished from wandoo by its powdery smooth bark, and much brighter white-seasonally pink bark. Wandoo bark colour is generally steel grey-yellow



Powder-bark wandoo

Wandoo

Jarrah (*E. marginata*) (below) occurs in the gravelly uplands in the DRZ and western RDZ. It indicates very gravelly and sandy gravelly soil, often with ironstone ridges, associated with marri and dryandras, but can also occur on deep pale sands.



Marri (*Corymbia calophylla*) occurs on gravelly rises and slopes in the DRZ and western RDZ, often down-slope of jarrah or dryandra ironstone ridges. It may be intermixed with jarrah on gravelly rises or wandoo on gravelly duplex soils. It generally grows on better water holding soils than jarrah, but can occur on deep grey sand over gravel.



Jam (*Acacia acuminata*) often occurs with York gum and rock sheoak, and can dominate in shallow granitic and mafic soils, with another less common wattle (*Acacia saligna*.) Sometimes it can be scattered in lower slope sandy duplex soils in dissected landscapes.

Manna wattle (*Acacia microbotrya*) can be mistaken for jam, as they often occur together. However unlike jam, manna wattle can occur on a wide range of soils, including lateritic gravels and sands.

Plant differences are that jam has slender pointed leaves, rod shaped flowers, and flowers in spring; while manna wattle has broader sickle-shaped leaves, ball flowers and flowers in late autumn.



Mallees are most common in the ADZ and eastern RDZ). The eastern edge of the district is the start of the mallee zone with widespread mallee duplex soils. Mallee scrub with melaleuca understorey usually indicates duplex or shallow soils(e.g. near breakaways, and rocky, or hard setting areas.

A few species - mottlecah (*E. macrocarpa*), white mallee (*E. albidata*), ridge fruited mallee (*E. incrassata*), and mallee white gum (*E. phaenophylla*) occur with sandplain and gravel heath

Apart from a few easily identifiable species like mottlecah, it is difficult to associate the many species with soil type without species identification keys. You can gain an idea of soil type by noting the type of understorey in conjunction with landscape clues like slope, rock fragments, and topsoil features.



Mottlecah (*E. macrocarpa*) is commonly found on yellow sandy soils and some pale gravelly sands in ADZ



White mallee (*E. albidata*) is found in the same areas as Mottlecah on grey sandy laterites



Mallee scrub; shallow hard-setting mallee duplex soil with sparse understorey



Mallee scrub; shallow sandy duplex with dense melaleuca understorey



Melaleucas occur in all zones and many landscape positions. They are common on mallee duplex soils, or soils that can be winter wet. Where melaleucas are the dominant vegetation, they often indicate soils that are waterlogged in winter

The plants shown are from the frequently occurring *Melaleuca uncinata* group.



Sheoaks (small trees) and **Tammas** (mainly shrubs) have needle type foliage with separate male (pollen) and female ('nut') plants. Salt sheoak (*Casuarina obesa*) favours saline and wet areas, but the others are *Allocasuarina* species that indicate well drained sandy or gravelly soils.

Rock sheoak (*Allocasuarina huegeliana*) is widespread. Before agriculture, it was mainly on granitic sandy surfaced soils, sandy gravels and deep sandy duplex soils. However it has colonised many different well drained soils on roadsides.

Black tamma (*Allocasuarina acutivalvis*) occurs mainly on mafic and yellow stony and shallow gravels, in the east of the district.

Tamma, the most common tamma (*Allocasuarina campestris*) occurs with black tamma, but tends to be more common in deeper or loamier gravels and yellow earths.



Rock sheoak

Salt sheoak with samphire near a salt lake



Tamma

Black tamma

Male tamma with pollen and typical needle like foliage

Sandy soil vegetation



Roadside tea tree (*Leptospermum erubescens*) is common on well drained sandy surfaced soil. Tea trees are common on deep grey sands, but are colonising species that have spread on well drained disturbed areas.



Christmas tree (*Nuytsia floribunda* left) an indicator of deep grey sandy soils, with **sheoak** (*Allocasuarina fraseriana* right) that occurs on Darling Range sands and sandy gravels.



Sandplain cypress (*Actinostrobus arenarius*) often occurs in sandy soil, particularly yellow aeolian deep sands with Acorn banksia and woody pear



Woody Pear (*Xylomelum angustifolium*) occurs mainly on smooth slopes and crests and in dunes adjoining salt lakes and old drainage lines, mainly north and east of Pingelly.

It often occurs with banksias, sandplain cypress, roadside tea tree and sandplain heath. It indicates aeolian deep yellow sands. The image on the left shows woody pear with tamma.

Proteaceous species are major components of lateritic and sandy heaths, and as understorey species are a good guide to differentiating mallee duplex gravels from other duplexes.

Banksias are generally a good guide to sandy gravel and deep sandy soils.



Bull banksia (*Banksia grandis*) is a common tree on Darling Range gravels



Acorn banksia (*B. prionotes*) is a common tree on aeolian yellow sand



Sphere banksia (*B. sphaerocarpa*) is a shrub found in many sand and gravel heaths



Woolly banksia (*B. baueri*) is a feature of lateritic grey sandy soils to the east.

Grevilleas are also noticeable in lower rainfall sandplain heath, particularly yellow sand over gravel, but also occur on other well drained upland soils.



Flame grevillea (*G. eriostachya*) is a feature of yellow sandplain.



Hookers grevillea (*G. hookeriana*) is a feature of yellow sand over gravel soils.

Hakeas have similar flowers to grevilleas, but have a persistent woody fruit (see below). They are very common on sandy gravel to shallow and loamy gravel soils, but can occur on a range of soils. Needle hakea (*Hakea preissii*) occurs on red clay soils)



Fan leaf hakea
(*Hakea brownii*)

Marble hakea
(*Hakea incrassata*)

Honeybush
(*Hakea lissocarpa*)

Dryandras (now in the *Banksia* genus) with their prickly vegetation are a noticeable feature of shallow gravel and sandy gravel soils.



Parrot bush (*Banksia sessilis*) is common on Darling Range gravels.

Prickly dryandra (*Banksia armata*) is widespread on shallow gravels

Dryandra rich shallow sand over gravel vegetation near Harrismith.

Other sandplain Proteaceae



Stinkwood (*Jacksonia stembergiana*) is common on deep grey sandy soils

Chittick (*Lambertia inermis*) is common on grey sand over gravel soils in the south east

Woolly bush (*Adenanthos sericea*) is also common on deep grey sandy soils.

Appendix 4 – Declared Rare Flora and Fauna in the SoVP

The following has been taken from the Protected Matters Report produced by the Federal Department of Agriculture, Water, and the Environment in March 2020. This report provides general guidance on matters of national environment significance and other matters protected by the *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999*.

Threatened Ecological Communities	[Resource Information]
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For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Community likely to occur within area

Threatened Species	[Resource Information]
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Name	Status	Type of Presence
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BIRDS

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat may occur within area
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Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Species or species habitat likely to occur within area
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Calyptorhynchus latirostris Camaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
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Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
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MAMMALS

Bettongia lesueur lesueur Burrowing Bettong (Shark Bay), Boodie [66659]	Vulnerable	Translocated population known to occur within area
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Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
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Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
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Macrotis lagotis Greater Bilby [282]	Vulnerable	Translocated population known to occur within area
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Myrmecobius fasciatus Numbat [294]	Endangered	Species or species habitat known to occur within area
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Phascogale calura Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor [316]	Vulnerable	Species or species habitat known to occur
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PLANTS

Acacia cochlocarpa subsp. cochlocarpa Spiral-fruited Wattle [23877]	Endangered	Species or species habitat may occur within area
Acacia insolita subsp. recurva Yormaning Wattle [64495]	Endangered	Species or species habitat known to occur within area
Banksia cuneata Matchstick Banksia, Quairading Banksia [9827]	Endangered	Species or species habitat known to occur within area
Banksia oligantha Wagin Banksia [20697]	Endangered	Species or species habitat likely to occur within area
Boronia capitata subsp. capitata a shrub [29156]	Endangered	Species or species habitat likely to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area
Darwinia carnea Mogumber Bell, Narrogin Bell [9736]	Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat known to occur within area
Grevillea dryandroides subsp. hirsuta Hairy Phalanx Grevillea [64577]	Endangered	Species or species habitat likely to occur within area
Grevillea scapigera Corrigin Grevillea [12195]	Endangered	Species or species habitat may occur within area
Pultenaea pauciflora Narrogin Pea [14013]	Vulnerable	Species or species habitat likely to occur within area
Roycea pycnophylloides Saltmat [21161]	Endangered	Species or species habitat likely to occur within area
Thelymitra dedmanianum Cinnamon Sun Orchid [65105]	Endangered	Species or species habitat may occur within area
Thomasia montana Hill Thomasia [12136]	Vulnerable	Species or species habitat likely to occur within area
Verticordia fimbriolepis subsp. fimbriolepis Shy Featherflower [24631]	Endangered	Species or species habitat known to occur within area

Migratory Terrestrial Species

[Motacilla cinerea](#)

Grey Wagtail [642]

Species or species habitat
may occur within area

Migratory Wetlands Species

[Actitis hypoleucos](#)

Common Sandpiper [59309]

Species or species habitat
may occur within area

[Calidris acuminata](#)

Sharp-tailed Sandpiper [874]

Species or species habitat
may occur within area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species habitat
may occur within area

[Calidris melanotos](#)

Pectoral Sandpiper [858]

Species or species habitat
may occur within area