Council

ADOPTION OF BUSHFIRE RISK MANAGEMENT PLAN

Shire of Plantagenet Bushfire Risk Management Plan 2021 – 2026, Version One

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Shire of Plantagenet

BUSHFIRE RISK MANAGEMENT PLAN

2021-2026

Office of Bushfire Risk Management Bushfire Risk Management (BRM Plan) reviewed 29 April 2021

Local Government Council BRM Plan endorsement XX Month 2021

Contents

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Document Endorsements

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

Local Government	Representative	Signature	Date
Shire of Plantagenet	CEO		

Version	Date	Author	Section
1	Jan 2021	M Haymont	all

Publication Information

Disclaimer

In approving this BRM Plan, The Shire of Plantagenet Council is acknowledging the assets that have been identified and the risk ratings and treatment priorities assigned. Approval of the plan is a commitment by the Shire of Plantagenet to work with landowners and managers to address unacceptable risk within the community. Endorsement of this plan is not committing the Shire of Plantagenet 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]

[1] *Source: Guidelines for Preparing a Bushfire Risk Management Plan*. November 2015. Page 79

1. Introduction

1.1. Background

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

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

1.2. Aim and Objectives

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

- guide and coordinate a tenure blind, multi-agency BRM program over a five-year period;
- document the process used to identify, analyse and evaluate risk, determine priorities and develop a plan to systematically treat risk;
- facilitate the effective use of the financial and physical resources available for BRM activities;
- integrate BRM into the business processes of local government, land owners and other agencies;
- ensure there is integration between land owners, BRM programs and activities; and
- document processes used to monitor and review the implementation of treatment plans to ensure they are adaptable and that risk is managed at an acceptable level.

1.3. Legislation, Policy and Standards

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

1.3.1 Legislation and Policy

- Aboriginal Heritage Act 1972
- Biodiversity Conservation Act 2016
- Building Act 2011
- Bush Fires Act 1954
- Conservation and Land Management Act 1984
- Country Areas Water Supply Act 1947
- Emergency Management Act 2005
- Environmental Protection Act 1986
- Environmental Protection and Biodiversity Conservation Act 1999 (Cth)
- Fire Brigades Act 1942
- Fire and Emergency Service Act 1998
- Metropolitan Water Supply, Sewerage and Drainage Act 1909
- Bush Fires Regulations 1954
- Emergency Management Regulations 2006
- Planning and Development (Local Planning Scheme) Regulations 2015
- SEM Plan (State Emergency Management Committee (SEMC) 2019)
- SEM Policy (SEMC 2019)
- SEM Prevention and Mitigation Procedure 1 (SEMC 2019)
- State Hazard Plan Fire (SEMC 2019)
- State Planning Policy 3.4: Natural Hazards and Disasters (Western Australian Planning Commission (WAPC) 2006)
- State Planning Policy 3.7: Planning in Bushfire Prone Areas (WAPC 2015, as amended)

1.3.2 Other Related Documents

- A Capability Roadmap: Enhancing Emergency Management in Australia 2016 (Australasian Fire and Emergency Services Authorities Council 2016)
- A Guide to Constructing and Maintaining Fire-Breaks (DFES 2018)
- A Guide to the Use of Pesticides in Western Australia (Dept. of Health 2010)
- AS 3959:2009 Construction of Buildings in Bushfire–Prone Areas (Standards Australia 2009)
- AS/NZ ISO 31000:2009 Risk Management – Principles and Guidelines (Standards Australia 2009)
  Australian Disaster Resilience Handbook 10: National Emergency Risk Assessment Guidelines (Australian Institute for Disaster Resilience 2015
- Building Protection Zone Standards (DFES)
- Bushfire Risk Management System (BRMS) User Guide (DFES)
- Bushfire Risk Management Planning Handbook (DFES 2018)
- Code of Practice for Timber Plantations in Western Australia (Forest Products Commission (FPC) 2006)
- Guidelines for Preparing a Bushfire Risk Management Plan 2020 (DFES 2020)
- Guidelines for Planning in Bushfire Prone Areas (WAPC 2017)
- Guidelines for Plantation Fire Protection (DFES 2011)
- National Disaster Risk Reduction Framework (Department of Home Affairs 2018)
- National Strategy for Disaster Resilience (Attorney-General's Department 2011)
- Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Department of Health 2007)
- Western Australian Emergency Risk Management Guide (SEMC 2015)

1.3.3 Shire of Plantagenet Documents and References

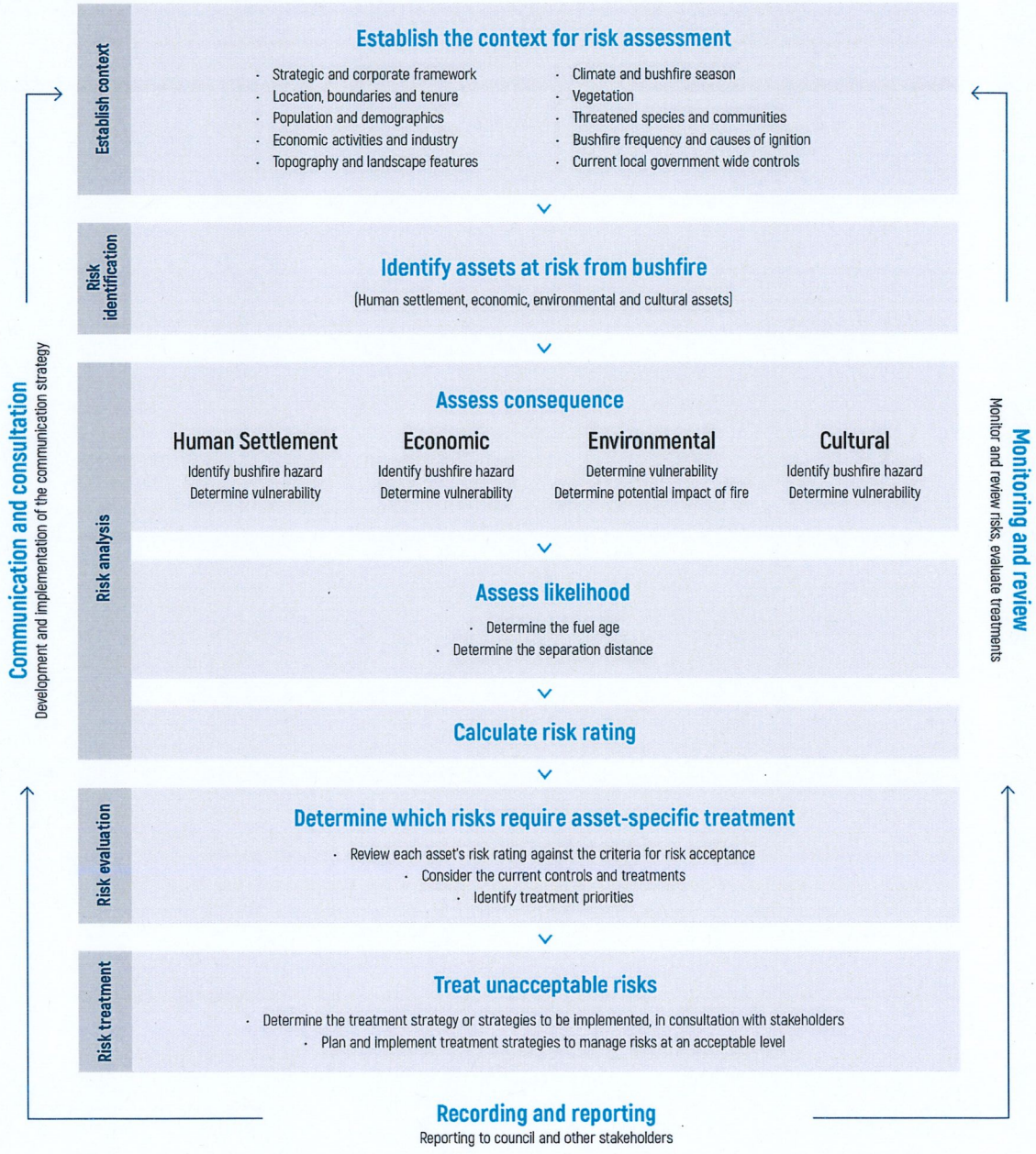
- Shire of Plantagenet Strategic Community Plan (SCP) 2017-2026
- Shire of Plantagenet Corporate Business Plan 2019/20-2022/23
- Municipal Heritage inventory 1997
- Bushfire Brigades local Law
- Local Emergency Management Arrangements 2018
- Community engagement policy and framework -Adopted 050515
- Shire of Plantagenet Pest Plants Local Law 1987
- Delegations register
- Draft Plantagenet Trails master plan
- Shire of Plantagenet Risk Management Governance Framework
- POLICY No: I/R/15 Road Verge Burning

- POLICY No: RS/FP/3 Permits to burn
- POLICY No: RS/FP/2 Vehicle movement bans
- POLICY No: C/RM/1 Risk Management
- POLICY No: I/RR/2 Rural Road Verge Vegetation management
- POLICY No: I/RR/4 Town Street Verge Management Policy
- POLICY No: I/OA/1 Standpipe location and regulation of water supply to users
- POLICY No: I/R/16 Rural Road Hierarchy
- POLICY No: NRM/C/2 Native Flora and Vegetation collection
- POLICY No: F/FM/7 Purchasing and Tender guide
- Town Planning Scheme Policy No. 14. Rural Tourist Accommodation & Additional Houses
- Town Planning Scheme Policy No. 19. Kendenup Rural Surrounds
- Town Planning Scheme Policy No. 20. Porongurup Rural Village Design Guidelines
- Local Planning Strategy
- Town Planning Scheme Policy No. 18.1 Planning Vision
- Town Planning Scheme Policy No. 18.1 Appendix 3 Narrikup Rural village
- Town Planning Scheme Policy No. 18.1 Appendix 4 Porongurup Rural Village and Environs
- Porongurups Rural Strategy (1997)
- Mt Barker Local Rural Strategy (1997)
- Town Planning Scheme Policy No. 18.1 Appendix 5 Rocky Gully Rural Village
- Town Planning Scheme No 3
- Memorandum of Agreement Oyster Harbour Catchment Group

2. The Risk Management Process

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

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



Adapted from: AS/NZS ISO 31000:2009, with permission from SAI Global under licence number 1510-c081.

2.1. Roles and Responsibilities

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

Table 1 – Roles and Responsibilities

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

Stakeholder Name	Roles and Responsibilities
	Provide information about their assets and current risk treatment programs. Undertake treatments on lands owned or managed by them.
Department of Planning, Lands and Heritage	Provide advice for the identification of their assets and infrastructure, specifically Aboriginal and European heritage.
Other State and Federal Government Agencies and Public Utilities	Provide information about their assets and current risk treatment programs. Participate in and contribute to the development and implementation of BRM Plans. Undertake treatments on lands they manage.
Corporations and Private Land Owners	Provide information about their assets and current risk treatment programs.
Indigenous representation, South West Aboriginal Land and Sea Council	Participate in and contribute to the development and implementation of treatment strategies under the BRM Plan. Provide advice to support the protection of Aboriginal heritage values.
Other Chief Bushfire Control Officer (CBFCO) Bushfire Advisory Committee (BFAC) District Operations Advisory Committee (DOAC) Local Emergency Management Committee (LEMC) Bushfire Brigades (BFB's) and other Emergency Services Volunteers Landcare Groups	Participate in and contribute to the development and implementation of the BRM Plan and treatment schedule. Provide advice for the identification of assets that are vulnerable to bushfire. Provide advice on appropriate treatment strategies for asset protection.

2.2. Communication and Consultation

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

3. Establishing the Context

The Plantagenet Road District was gazetted on 3rd March 1871 as one of 18 elected boards to manage roads and services in Western Australia, and initially included a reasonably large section of the Great Southern region. On 1 July 1961, it became the Shire of Plantagenet following the enactment of the Local Government Act 1960, which reformed all remaining road districts within the Great Southern into shires[2]

Mixed farming was established towards the end of the nineteenth century and by 1910 there were 75 commercial orchards (mostly concentrating on apple growing) in the area. In 1917 the Mount Barker Fruit Growers Cool Storage Cooperative was established. The orchards have largely given way to a thriving grape growing industry with high quality vineyards producing a range of excellent wines, and mixed farming and cropping being the main contributor to the Plantagenet economy.

3.1. Description of the Local Government and Community Context

The area has always been agriculturally rich. Noted for wheat, sheep, beef cattle, wine, canola and olives. Silverculture, especially plantations of Tasmanian Blue gums (*Eucalyptus globulus*), is a major industry in the shire.

The Shire has spectacular scenery, which is a major tourist attraction, such as the Porongurup and the Stirling Range National Park. The Porongurup National Park lies east of Mount Barker and covers 2,350 hectares. The Porongurup Range boasts a number of popular tourist walks and unusual rock formations such as Castle Rock and the Balancing Rock.

The Stirling Range to the north is breath taking, being one of the few true rugged mountain ranges in Western Australia. It is one of the world's most spectacular wildflower areas with approximately 1,525 species of plants, of which 87 are found nowhere else in the world.

Both of these sites can provide challenges for the Shire of Plantagenet in the bushfire risk management space through the frequency of bushfires occurring in both of these National Parks, the difficulty in supressing fires in the mountainous terrain and the numbers of tourists visiting the area in bushfire season.

The chief historical attraction in Mount Barker is the old Police Station Museum. Built in 1867-68 by a convict road party, it originally consisted of a living quarters, coach house and stables for the police horses. Today it is an unusual thematic museum, with each room being a careful recreation of the way the rooms were used originally. There are also other pioneer structures such as St Werburghs Chapel.

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[2] Source Wikipedia

The Kendenup town site was once the centre of a vast sheep station, and was, in the early years of the Western Australian colony, one of the largest farming enterprises so far established.

At the time of the first European discovery, the area was known to local Aboriginals as "Moor-ilup". "Kendenup" is another local indigenous word which was used to describe the area

Kendenup is a historical development site set up by Jack De Garis in the 1920s. The "DeGaris Kendenup W.A. Development Company" was established and planned for subdivision of the estate with a town site, which would include an administrative and civic centre, public parks, recreation areas, factory areas, a school and church sites. A dehydrating factory under the name of Kendenup Fruit Packing Company was established to pack farm produce for the community at a cost of £4,000.

De Garis promoted the scheme around Australia, and from late 1920 settlers started to arrive and were granted farm blocks of between 10 and 60 acres (4.0 and 24.3 ha) on the purchase of ten-year interest-free debenture notes to grow fruit, vegetables and other farm produce. However, the project was under capitalised and lot sizes were considered to be too small to be fully viable, so after a peak of about 350 families settling, debenture sales dried up.[3]

What remains are several small residential lots. As this development pre-dates modern planning and development controls, it is subject to an increased level of bushfire risk due to the limited access/egress for residents in the event of a bushfire emergency. The town site was one of the subject sites for the Bushfire Resilience in the Great Southern (BRIGS) study, which looked at the potential impacts of a bushfire on the community and infrastructure, along with identifying options for evacuation and bushfire refuge/safer places in an attempt to rectify legacy development issues.

Plantagenet at a Glance[4]

- Distance from Perth (from Mount Barker) 359 km
- Distance from Albany (from Mount Barker) 51 km
- Population 5,168 (ABS 2017 ERP)
- Area(Km2) 4,792
- Number of elected members (Shire) 9
- Number of dwellings 2,540
- Number of rate assessments 3,512
- Length of sealed roads 384 km
- Length of unsealed roads 935 km
- Number of electors 3,584
- Number of bushfire brigades 12

[3] https://en.wikipedia.org/wiki/Kendenup,_Western_Australia
[4] 2018-2019 Shire of Plantagenet Annual Report

3.1.1 Strategic and Corporate Framework

The Shire of Plantagenet's Strategic Community Plan (SCP) and corporate framework is outlined in the *The Shire of Plantagenet Corporate Business Plan 2019/20-2022/23.*

The BRM Plan aims to support the shire achieve its strategic vision of *"" Building a sustainable community, where natural beauty and diversity provide opportunities for all "and* the mission statement *"to enhance the quality of life for the people of Plantagenet and the region through the provision of leadership, services and infrastructure."* Both the vision and mission statement are supported through the following values:

- **Integrity** through honesty, ethical behaviour and trustworthiness
- **Professionalism** through understanding our roles and responsibility, the need to work efficiently and strive for excellence
- **Accountability** through openness and transparency
- **Supportiveness** by being patient, caring and friendly
- **Responsibility** by taking ownership and not blaming others
- **Customer Focus** by understanding needs, being proactive and responsive[5]

The Corporate Business Plan aligns to the priorities in the SCP and identifies purpose specific strategies and actions to be delivered each year. Resource allocation and capital investment are considered over a four-year period and aligned to ensure each team within the organisation is working, in an integrated way, towards the aspirations and priorities contained within the SCP.

There is an action plan associated with the Corporate Business Plan, this comprises of four goals to guide strategic planning:

1. **Community pride and wellbeing**. Scope: Foster community pride, safety, wellbeing and involvement through the provision of services.
2. **Enhancing Natural and Built environment.** Scope: Planning, provision and maintenance of physical infrastructure that supports service delivery as well as protection and care of our natural environment.
3. **Prosperous and sustainable local economy**. Scope: A strong local economy supports the business and residential sectors and contributes to employment opportunities and a broad range of services.
4. **Effective Governance and organisation**. Scope: An open and accountable professional organisation providing leadership for the community.

[5] Corporate Business Plan 2019/20-2022-23

The Strategic Community Plan drives the development of the Corporate Business Plan, both of which are integrated with and informed by the Council's Asset Management, Workforce and Long-Term Financial Plans. Together they form the Local Government Integrated Planning and Reporting Framework.

To inform development of the Strategic Community Plan, the Plantagenet Shire carried out a community survey in October 2016. The survey was distributed to all residents on the Shire of Plantagenet electoral roll seeking their views on a range of issues. A total of 3,191 surveys were distributed with 710 usable surveys being received back (22.25%).

From this survey 24% of the community felt that the Shire should allocate more resources to fire prevention.

In response to being asked what the Shire should be doing, the community responded with a number of areas for greater attention:

- The top four answers were related to key environmental issues within the Shire, including weed control, fire hazard reduction/fire prevention, bushland/fauna and flora preservation and conservation, and feral animals/pest management.
- A number of respondents asked the Shire to ensure land owners / tenants take more responsible action to reduce fire hazards.
- In relation to fire hazard reduction / fire prevention, the suggestions included:
    - Continue bushfire mitigation planning and controlled burns;
    - Enforce bushfire legislation;
    - Establish more Bushfire Ready community groups;
    - Reduce fire risk in parks and road reserves and ensure land owners comply with hazard reduction requirements.[6]

Environmental issues and fire management are often seen as mutually exclusive. This is not always the case and, in some circumstances, can be a synergistic relationship, such as Banksia woodland reinvigoration through the application of fire. More community education needs to be undertaken to explore the relationships between responsible fire application and the environment to promote the benefits of bushfire mitigation strategies.

This Strategic Community Plan demonstrates the Councils commitment in Plantagenet, for multiple outcomes driven through the community. This will be a major factor influencing the BRM plan. Prioritising treatments for bushfire risk, identified within the shire and the methodology in executing

[6] Plantagenet 2026-Building Success through opportunity and Participation-Strategic Community Plan

these treatments. There are a number of issues which are priorities for the Plantagenet community that are to be addressed through the BRM planning process.

The BRM plan is a supporting strategy that **embeds a coordinated approach towards the identification, assessment and treatment of assets exposed to unacceptable bushfire risks.**

The bushfire risk planning process identifies vulnerabilities within the Local Government which exposes the community and its infrastructure to greater bushfire risk, whilst identifying these vulnerabilities the plan proposes methodology, structure and treatment ~~strategy to~~strategy to address bushfire risk specific to the Plantagenet community The planning process also contributes to the achievement of the four goals associated with the Corporate Business Plan.

The Shire of Plantagenet recognises the importance of leadership and coordination in emergency management and has an established Local Emergency Management Committee (LEMC) with multi-agency membership.

The Shire's LEMC and Bush Fire 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 identify bushfire as a high risk within the Shire of Plantagenet.

The Shire of Plantagenet BFAC has been informed of the BRM Plan and encouraged to contribute to the planning process. This group will also be a key stakeholder in determining appropriate treatment strategies to manage bushfire risk within the Shire of Plantagenet.

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

The BRM Plan will assist by improving the community's awareness of bushfire risk and treatment activities planned in their area.

The Shire has a scheduled annual works program and proactively addresses risks identified on Shire managed land. The treatment priorities identified in the BRM Plan will assist the Shire's prioritisation, forward planning and budgeting for treatment activities to manage unacceptable bushfire risks, within their budgetary constraints.

3.1.1.1 Challenges

The following challenges have been identified through the Bushfire Risk Planning process, through consultation with community, agency and Local Government representatives. These challenges have

the potential to impact the objectives of this BRM Plan. Consequently, special consideration should be given to these matters during the life of this plan:

- Changes to agricultural practices that result in increased bushfire risk;
- Aging population and its impact on volunteerism, service delivery, community preparedness and emergency planning for vulnerable / special risk groups and facilities within the community;
- Attraction and retention of residents and its impact on succession planning within the emergency services volunteer brigades and community understanding of bushfire risk;
- Vulnerable groups, such as the elderly, itinerant workers and recreational visitors who have either limited local knowledge or impaired ability to respond to the rapidly changing circumstances posed by a bushfire event
- The volume of traffic moving through the Shire, escalating the potential for ignitions and increasing the requirement for evacuation planning or disruption to key transport links during a bushfire;
- Steep terrain in close proximity to residential development; making access for suppression difficult and
- Historical development not controlled by contemporary planning mechanisms. Properties are often designed with one way access/egress and not constructed to current Bushfire Attack Level standards

In addition to the above challenges, the Shire has identified a number of priority areas that need to be considered in bushfire risk management planning, both in the context of this BRM Plan and in other programs and activities that underpin bushfire planning and emergency management. These include:

- The risk of fires travelling along rail corridors in and around the more populated areas of the Shire;
- Limitations of water access and supply, particularly in the Kendenup and Mt Barker town site, with all water for these sites being piped from the Albany supply;
- Management of Unallocated Crown Land (UCL) and Unmanaged Reserves (UMR), both within and outside gazetted town site boundaries;
- Fuel accumulation on road reserves, particularly along evacuation routes.;
- Management of reserves within the Shire; and
- Vegetation hazards in close proximity to critical infrastructure, such as communications towers, power infrastructure, bridges, water pipelines pumping stations and the railway.

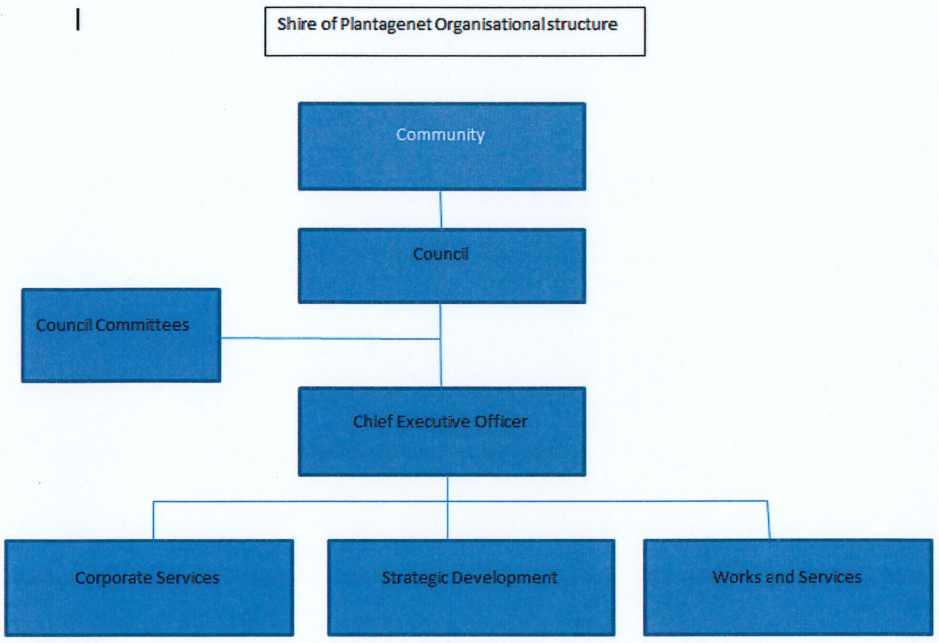

Figure 2 Organisational Structure Shire of Plantagenet

The Strategic Community Plan drives the development of the Corporate Business Plan, both of which are integrated with and informed by the Council's Asset Management, Workforce and Long-Term Financial Plans. Together they form the Local Government Integrated Planning and Reporting Framework.

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- Reduce fire risk in parks and road reserves and ensure land owners comply with hazard reduction requirements.[7]

This Strategic Community Plan demonstrates the Councils commitment in Plantagenet, for multiple outcomes driven through the community. This will be a major factor influencing the BRM plan. Prioritising treatments for bushfire risk, identified within the shire and the methodology in executing these treatments. There are a number of issues which are priorities for the Plantagenet community that are to be addressed through the BRM planning process.

These will include :

- Education and engagement around private property preparation techniques;
- Review of access and egress for the town of Mt Barker and the outlying settlements (4) of Plantagenet and vulnerable subdivisions;
- Evacuation planning and communication;
- Reserves Management Plan;
- Support for the enforcement of the Firebreak notice by the Shire of Plantagenet from the BFAC, LEMC, Council and Shire executive; and
- Access to vegetated areas for fire control and mitigation activities.

Ultimately, the Shire of Plantagenet's Chief Executive Officer (CEO) is responsible for the BRM Plan's development, implementation and review, noting that the CEO is able to delegate all or some of these responsibilities. The Shire of Plantagenet's CEO shall delegate responsibility for the implementation and maintenance of this plan to the Bushfire Risk Planning Coordinator, whilst this role is in place. This role fits in Works and services team/area and it is anticipated this group would continue the work once the BRPC role is no longer in place within Shire of Plantagenet resourcing capabilities

There are multiple stakeholders involved in the effective implementation of the BRM Plan. The Shire's responsibility is to address unacceptable bushfire risks within resource capability on land they own or manage and ensure bushfire risk on private property is managed in accordance with the Bushfires Act 1954 and relevant local laws

The following functions within the Shire of Plantagenet administration team, have been identified as having specific roles and responsibilities in line with the successful implementation of the BRM Plan. These are outlined in Table 2.

[7] Plantagenet 2026-Building Success through opportunity and Participation-Strategic Community Plan

Table 2 – Functions within the Shire of Plantagenet with roles and responsibilities associated to the Bushfire Risk Management Plan

Function	Roles & Responsibilities
Community	▪ Contribute to reasonable, open and transparent communication with the Shire on matters relating to Bushfire risk planning and treatment implementation
Council	▪ Build knowledge and understanding of fire management practices within the community ▪ Participation on Bushfire Advisory Committee (BFAC) ▪ Support bushfire meetings and committees ▪ Endorse completed BRM Plan ▪ Support directorates in matters relating to BRM planning
Council Committees	▪ Contributing to treatment planning ▪ Liaise with stakeholders Remain informed regarding the development and implementation of the BRM plan and associated treatment schedule
Executive Leadership Team & Bushfire Risk Planning Coordinator	▪ Oversight of the implementation, review and monitoring of the Bushfire Risk Management Plan, ▪ Sourcing and approving funding and expenditure for local government managed / owned land. ▪ Ensure implementation and regular review/currency of the Bushfire Risk Management Plan, ▪ Monitoring the implementation of agreed treatments to Shire owned sources of risk, ▪ Liaise with key stakeholders at the executive level, ▪ Participation on Local Emergency Management Committee (LEMC).
Works and Services: Fire and Ranger Services	▪ Develop practices for fire management on Shire owned lands, ▪ Support DFES with strategies for bushfire risk reduction on UCL and UMR land, ▪ Planning annual schedule of works, ▪ Work to improve knowledge and understanding of fire risk and fire management practices, within the community, through the Bushfire Ready Program and other platforms, ▪ Support and contribute to bushfire meetings and committees, ▪ Oversee burning programs and support from local brigades, ▪ Contributing to treatment planning, ▪ Negotiating with stakeholders, as required, ▪ Ensuring that planned works are undertaken, ▪ Enforce Bush Fire Order and other statutory bushfire requirements, ▪ Provide advice to asset owners on bushfire risk mitigation options, ▪ Support ongoing bushfire response capability, through LGGS funding applications, volunteer training and other means, as required.
Chief Bushfire Control Officer	▪ Oversee burning programs and support from local brigades, ▪ Contributing to treatment planning,

	▪ Negotiating with stakeholders and brigade,
Strategic Development	▪ Ensure adherence to building codes, ▪ Provide development advice for bushfire risk management, ▪ Provide support and environmental advice for the management of bushfire risk.
Corporate Services	▪ Accessing grants and funding, ▪ LGGS and other grant funding acquittals and governance.

3.1.1.4 Local Planning Strategy

Local Planning Strategy (LPS) 2013 for the Shire of Plantagenet includes the following in relation to:

Natural Hazards Risk

Land use planning can be used to reduce the impact of risks associated with natural hazards. It guides the use of land and can reduce risk whilst enhancing sustainability for areas prone to natural hazards such as bushfire, flooding and landslip.

Over the years there have been changes in settlement patterns, with people moving closer to natural areas where hazards can be present. Community attitudes demand particular land use activities and design requirements from a lifestyle perspective, without regard to the impact on the environment or exposure to hazards such as bushfire.

To ensure adequate consideration is given to natural hazards at the development planning stage, effective state and local planning schemes and policies are essential. Some relevant considerations can be:

- Locating development away from sites where natural processes could be affected by development;
- Implementing management practices during and after development to protect particular natural processes;
- Maintaining the maximum amount of natural vegetation cover, including ground and understorey vegetation, especially on slopes above 10 degrees;
- Using flat, low-lying areas for activities upon which the impact of floods will be minimal, such as, open space, agriculture, habitat protection or conservation;
- Maintaining natural flow regimes of rivers and ground water systems;
- Maintaining the absorptive capacity of soils;
- Maintaining or creating wetlands as a means of absorbing peak flows from floods;
- Maintaining riparian vegetation to protect streams from erosion and changes to stream profiles; and

- Implementing risk reduction practices, such as hazard reduction burning, and slope stabilisation, that reflect natural regimes and maintain the risk reduction capacity of the natural environment.

It is important to avoid exposure to risk wherever possible and this can be done by avoiding areas where development will increase the likelihood of risk. Design and siting controls can be used to reduce the risk. Controls can be set in place that involve setbacks, lot sizes, development exclusion areas, low fuel zones and density of development.

Bushfire

With the heavily vegetated nature of parts of the Shire the risk from bushfire is ever present. Additional human activity increases the risk of bushfire ignitions. The vegetation is one of the reasons why people find the Shire an attractive place to settle. This vegetation combined with sometimes steep slopes increases the fire risk.

For more intensive development, such as conventional residential development through to rural residential and rural smallholdings, the Shire will require the preparation of a Bushfire Management Plan to form part of individual proposals to rezone land. These Bushfire Management Plans will have a critical bearing on and will substantially influence the subdivisional form envisaged for the land.

The Shire will prefer new developments (in particular residential, rural residential, rural smallholdings and tourist) to take place on land which has already been cleared of substantial vegetation by past farming practices. If vegetated land was proposed for more intense development, then extensive vegetation clearing would be required for fire safety reasons and this is not a sustainable approach.[8]

The intent for bushfire management in the Local Planning Scheme (LPS) is conditioned to individual localities through the Shire of Plantagenet Town Planning Scheme 3 (TPS). The TPS identifies actions to be taken by the landholder and sub divider to ensure adequate bushfire management measures can be enforced by the Shire of Plantagenet.

The Kendenup historical development is an example of a residential area established prior to contemporary controls such as State Planning Policy - 3.7. Areas such as Kendenup pose many challenges to the Shire with respect to effective bushfire mitigation treatments through insufficient evacuation options, limited access for bushfire suppression and community sentiment towards personal property preparedness.

[8] Endorsed LPS Shire of Plantagenet

Bushfire Management

The Shire may request the WA Planning Commission to impose a range of conditions at the subdivision stage, including:

- Installation of strategic firebreaks (to gravel standard), fire hydrants and any other requirements of the Bushfire Management Plan.
- Lodging of a Section 70A Notification on each Certificate of Title proposed by the subdivision in respect of AS 3959 Construction of Buildings in Bush Fire Prone Areas, which will be applied to all dwellings and associated buildings. The S70A Notification is to also advise that such buildings are required to comply in all aspects to a minimum Building Attack Level 19 standard of construction, unless the outcomes of the Building Attack Level (BAL) assessment prepared and submitted to the Shire by individual lot owners at the building application stage requires a higher standard to be applied.
- Implementation of a hazard reduction program, to ensure fuel loads do not exceed 8 tonnes per hectare and the hazard separation zone is established.
- Prospective purchasers of land are made aware of the Bushfire Management Plan, DFES' Homeowners Bushfire Survival Manual (or equivalent) and the Shire of Plantagenet Annual Fire Break Notice.
- Individual landowners responsibilities for the maintenance of hazard reduction areas around approved buildings and any strategic firebreak where it crosses the landowner's lot.
- Unlocked fire gates to be installed where fences are erected across strategic fire accesses shown on the Subdivision Guide Plan. [9]

3.1.2 Location, Boundaries and Tenure

The Shire of Plantagenet is located in the Great Southern Region of Western Australia, covering 4,875 square kilometres (487,534ha) and has spectacular scenery including the Porongurup and a part of the Stirling Ranges. It is bordered by the Shires of Denmark, Manjimup, Cranbrook, Gnowangerup and the City of Albany.

[9] Town Planning Scheme 10

Fig 3 Location of the Plantagenet Shire with in the Great Southern Region

The Shire encompasses the town sites of Rocky Gully, Kendenup, Narrikup, Mount Barker and the village of Porongurup. Mount Barker services a wide and diverse agricultural area and is the administrative and commercial centre for the Shire of Plantagenet.

Mount Barker is centrally located and is easily accessible from Muir Highway from the south-west, Albany Highway from the north and south and Porongurup Road from the East.

Mount Barker is an ideal holiday centre with ample shopping and recreation facilities. It is also within easy reach of the southern coastline and other regional tourist attractions.[10]

There are 135 reserves vested with the Shire of Plantagenet. Of these reserves 43 are listed as remnant vegetation, these reserves have some degree of natural resource management (NRM). The remaining reserves are community-oriented services such as drainage, emergency services sites and communications and road reserve.

These reserves total 1700ha vested with the Shire of Plantagenet, this places substantial pressure on local government and its rate payers to adequately maintain Bushfire Management Requirements without additional resources, both financially and capability based.

[10] Shire of Plantagenet _Corporate business Plan

Table 3 – Overview of Protected areas within The Shire of Plantagenet

Protected Areas 2018	Number	Ha	%
National Parks	4	138177	28.3
Nature Reserves	21	4922	1
All other protected areas	29	571	.2
Protected areas Total	54	143670	29.5

There are four significant National Parks within the Shire of Plantagenet. They are:

- Mt Roe National Park
- Mt Lindsay National Park
- Stirling Range National Park
- Porongurup National Park

In conjunction with these national parks there are several nature/conservation reserves within the Shire. All national parks and nature/conservation reserves are managed by DBCA and have associated fire management plans. To aid in the management of these parks from a fire perspective there are three working groups. The membership consists of Local Government, Brigade, DBCA, DFES, Grape grower's association, Friends of and community interest group representatives These working groups all serve the function of the formulation and dissemination of management plans for the parks and surrounds. The groups are currently chaired by DBCA representatives and are as follows:

- Porongurup Area Bushfire Mitigation Group
- Porongurup National Park Fire Working Group
- Stirling Range National Park Fire Working Group

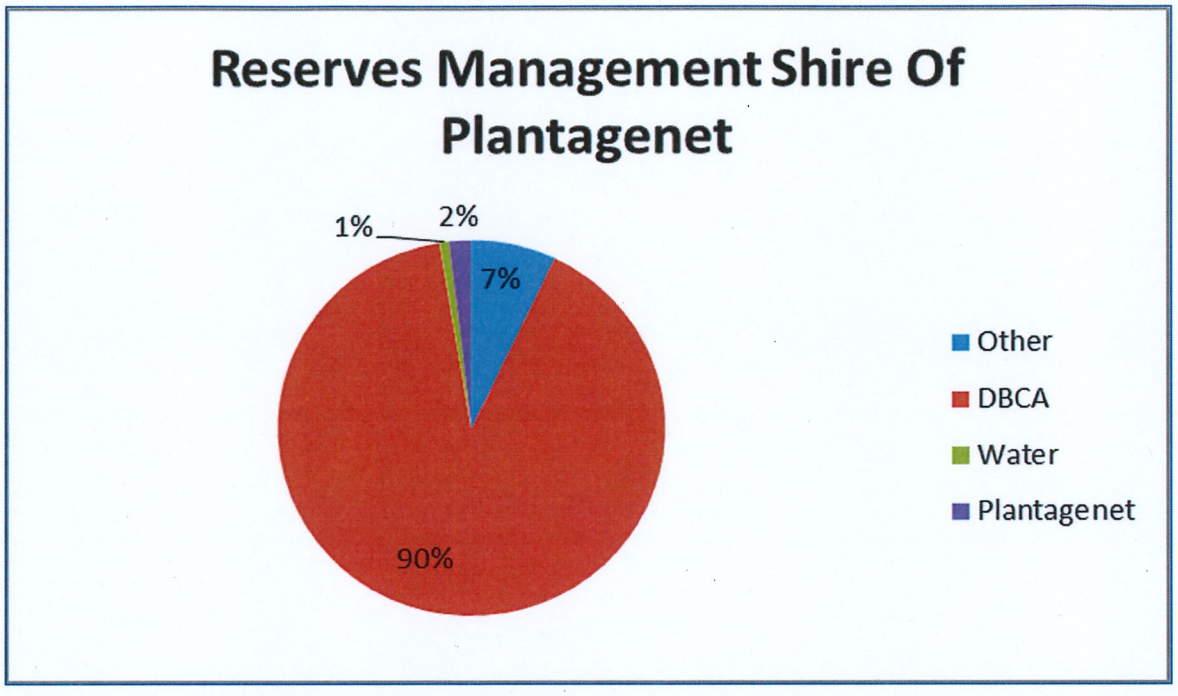


Fig 4 Reserves Vested in the Shire of Plantagenet

The large percentage of privately managed land within the Shire of Plantagenet can provide challenges to the Local government in terms of Bushfire management. There are few mechanisms available to the Local Government to ensure responsible fire management on private property the Local Government employs additional staff over the Fire Control Notice (FCN) inspection period. This aids in the fast and effective inspections of all properties and the education over enforcement model the Shire of Plantagenet employs through the course of normal business. Compliance is generally high across the Shire due to this early intervention practice. The Shire places high value in educating residents as to their responsibilities for bushfire mitigation to maintain a safer community. Community members are generally receptive to this messaging through organised Bushfire awareness events and educational sessions to teach the principals of fuel management in the asset protection Zone.

Table 4 Land Tenure and Management within the Shire of Plantagenet[11]

Land Manager/Agency	Percent of Local Government Area
Local Government	8
Private	56
Department of Biodiversity, Conservation and Attractions	29
Department of Planning, Lands and Heritage	7
Total	100

3.1.2.1 Localities

The shire has five major townships, Mt Barker being the main hub with Porongorup, Narrikup, Kendenup and Rocky Gully having smaller population numbers. The five townships have varying levels of complexity in terms of bushfire risk due to different factors. All are very different in landscape, core economic activity and community lifestyle.

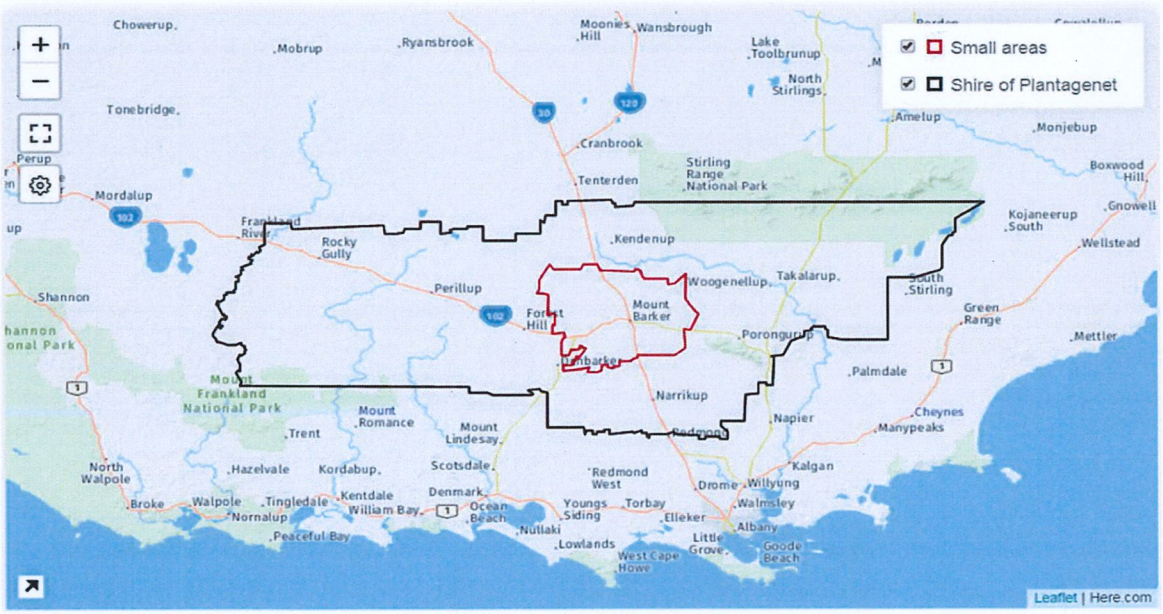


Fig 5 Shire of Plantagenet Boundaries

[11] Landgate

Mount Barker is the major town within the Shire of Plantagenet and is located 50km north of Albany. Mount Barker is a significant service centre for the surrounding agricultural areas and it is anticipated that it will play an increasingly important role in the development of the region, particularly in relation to the horticultural industry, the development of value-added industries such as wood chipping and abattoirs and provision of facilities such as the regional sale yards.

Mount Barker has a Volunteer Fire and Rescue Service (VFRS) located centrally in Lowood Road. Standpipes for water supply are located off Marmion Street and Mitchell Street near the cemetery.[12] The bushfire risk in the town of Mt Barker is exacerbated by the presence of the Albany Hwy running through the centre of the town. This highway is the major route to link the Great Southern to the capital of Perth. The Albany Highway is a major freight and general traffic route and is notorious for accidents and high incidents of arson.

Kendenup is located approximately 20 kilometres north of Mount Barker and to the east of Albany Highway. The Great Southern railway line passes the eastern boundary of the town.

The settlement pattern of Kendenup consists of 595 lots and reserves in the town site which is the centre of the district. The pattern surrounding the village contains a range of relatively small rural lots from west of Albany Highway to the east of the Great Southern railway line. These rural surrounds are shown on the locality map and include in the order of 1,300 lots and that area is shown for information purposes only. The total number of lots including the village is some 1,900. Lot sizes in the surrounding rural district range from 30-50ha to the east, 18-40ha to the north, 8-30ha to the west and 10-25ha to the south.

Kendenup presents a number of challenges and opportunities, as the town site is a historic subdivision created in the early 1920's. The venture subsequently failed in 1923 and until recently the original village remained largely undeveloped. During the last 10 to 20 years, the individual titles have been released, sometimes creating conflict between buyers and service providers as most of the lots had no access to basic services such as constructed roads, power and water.

Bushfire risk in Kendenup is increased due to the large number of undeveloped lots, of which some are still heavily vegetated, and lots where it can be difficult to enforce the Plantagenet Fire Control Notice effectively. The area is largely surrounded by cropping to the north and west, which during harvest poses a threat to the town from harvest and machinery related fires.

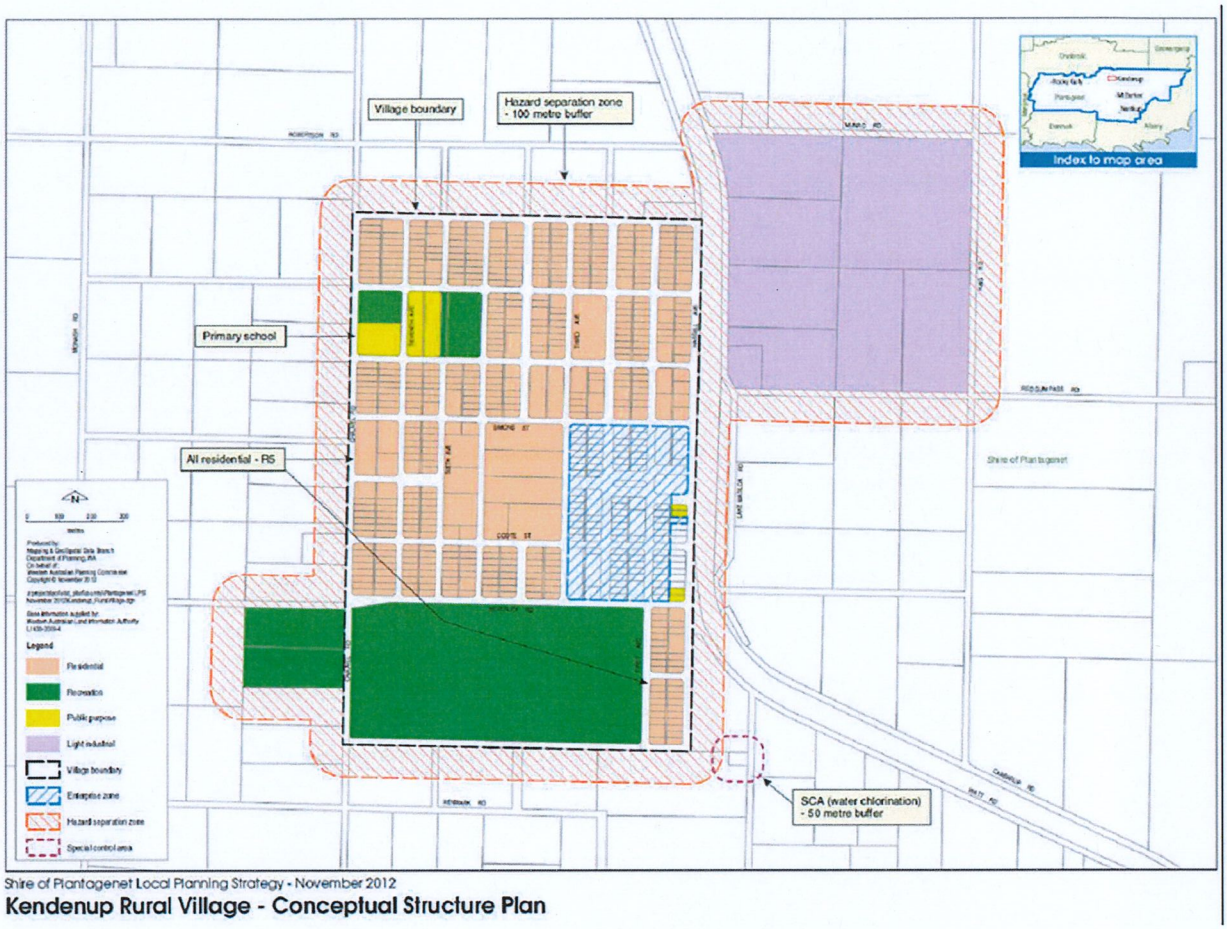
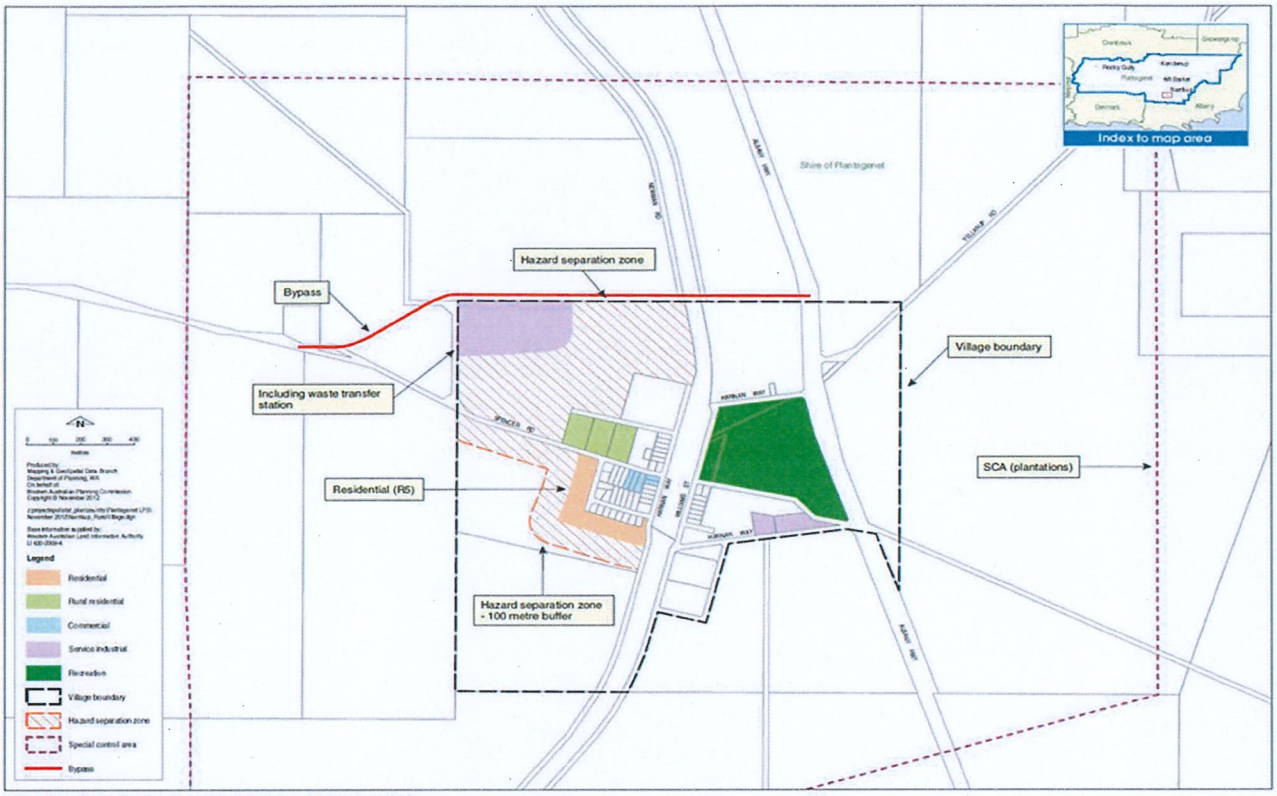


Fig 6 Kendenup Structure Plan

Narrikup is an important part of the settlement pattern providing a focal point and service centre for the rural locality. The town provides an attractive alternative lifestyle to the larger regional towns and it has good accessibility to both Mount Barker and Albany. Narrikup has been an important growth area within the shire and its main attraction has been its small-scale village character, the low cost of land and its role as a service centre for surrounding rural areas.

Given the resources that have already been invested in the village and the fact that there has been a steady demand for lots, efforts should be made to ensure it remains a viable and vibrant centre.

The developed area of the village is surrounded by extensive remnant vegetation, which represents a bushfire hazard. A 100m hazard separation zone is shown on the conceptual structure plan, which was never established to its full extent and could form part of the overall treatment plan for this locality.



Shire of Plantagenet Local Planning Strategy - November 2012
Narrikup Rural Village - Conceptual Structure Plan

Fig 7 Narrikup Structure plan

The **Porongurup** area is rich in natural and cultural heritage values. The area has a diversity of flora, fauna and is within the South-West Botanical Province, which has been identified as one of the world's 25 biodiversity 'hot spots. The peaks in the Porongurup National Park are an important landscape feature and the Porongurup Range is the dominating physical characteristic of the area. As well as being a highly desirable place to live, the area has long been recognised as a significant tourist attraction.

The National Park attracts more than 43,000 visitors per year[13]. Karribank Lodge and Bolganup Homestead were established in the 1920's and both are listed in the Schedule of Places of Heritage Value under the Shire's Town Planning Scheme No. 3. Other tourist accommodation includes caravan and camping facilities, farm stay, a hostel and a variety of chalets. In addition to the Porongurup Shop and Tearooms, there are numerous craft outlets. The number of vineyards, wineries and cellar sales outlets is continuing to increase, and the area conducts an annual wine festival.

Because of the unique qualities of the area, the land surrounding the National Park was one of the first areas within the Shire to have a rural strategy. The purpose of that strategy was to reconcile the

[13] Porongurup National Park -National assessment

development aspirations of land owners and the high environmental qualities of the area having regard to the protection and management of natural resources and the integrity of the National Park.

The National Park , given its terrain and species composition is both vulnerable to bushfire impacts and poses a significant risk to the surrounding residential area. Bushfire management plans need to specifically address the issues posed but the relationship between development and preservation of the Park

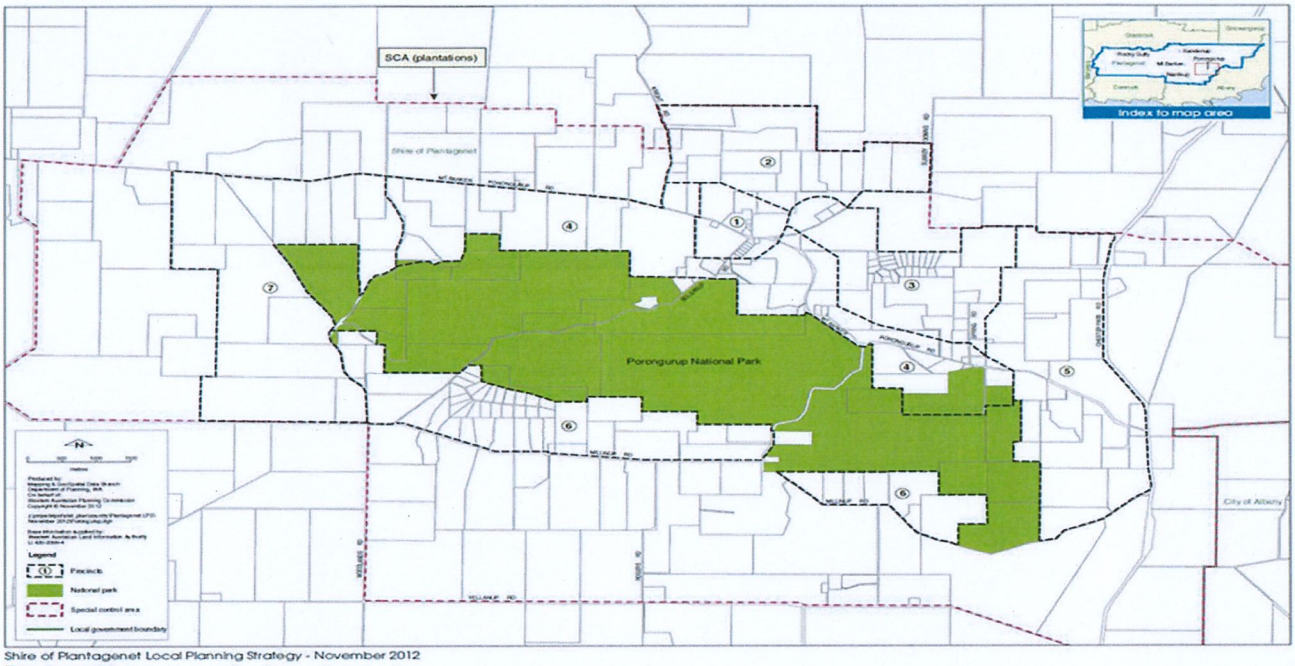


Fig 8 Porongurup Structure Plan

Rocky Gully is a rural town site located on the south side of Muir Highway at the western end of the shire and some 68km from Mount Barker. Land in this area was subdivided in the 1930's. The town was established as part of the War Service Land Settlement Scheme in the 1950's. It also served as a centre for timber milling. With the decline in timber milling and changing rural land practices, Rocky gully has ceased to maintain adequate local services, with Franklin being the nearest service centre.

Despite past rural depopulation, Rocky Gully is well situated to serve the western most portion of the shire and the expanding viticulture industry. Its main attributes are the low cost of land, water and power supply and community and recreation facilities. The formal town site of Rocky Gully was Gazetted on 30 November 1950 and is quite large compared to the actual subdivided village, which is located in the north western portion of the town site area. The remaining eastern and south eastern parts of the town site are heavily vegetated with native vegetation. The remnants of a former oval

and tennis courts exist on the eastern edge of the town site, but these facilities are deteriorated and no longer serviceable.

In respect to bushfire risk management, Rocky Gully It is surrounded by extensive remnant vegetation, which is an extreme bushfire hazard. Provision of a hazard separation zone around the built area, as well as preparation of a comprehensive bushfire management plan for the town site may be needed.

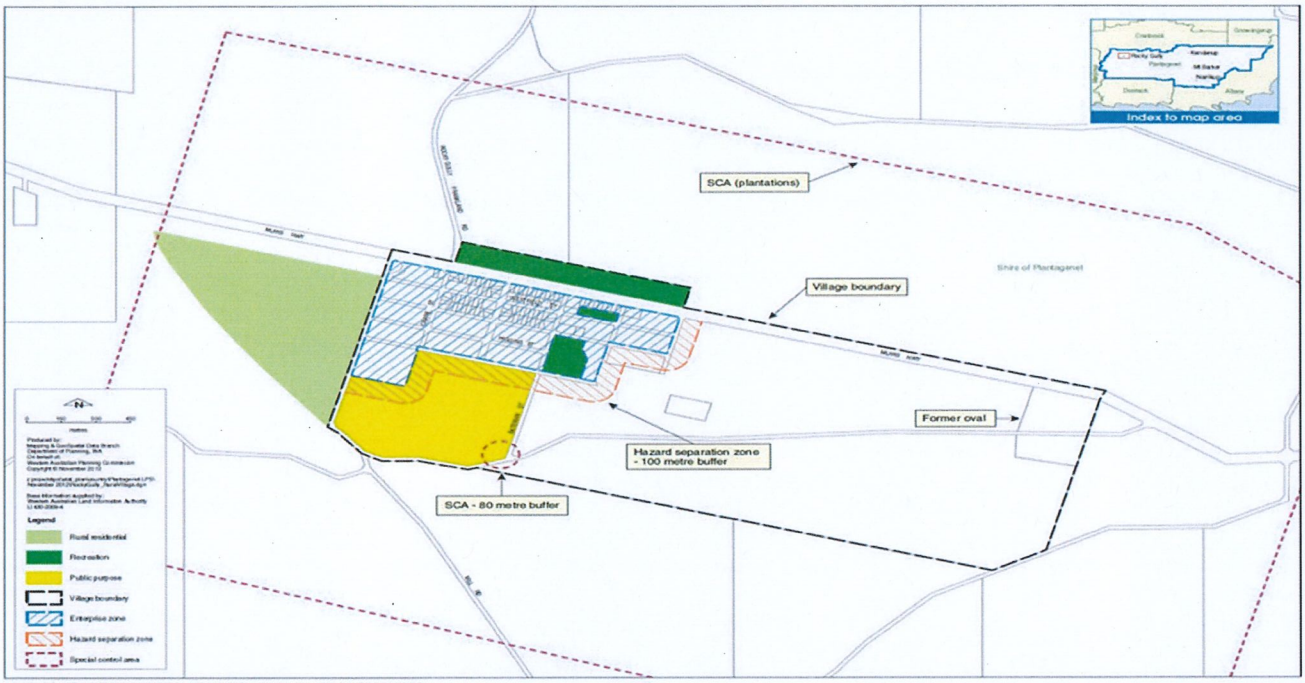


Fig 9 Rocky Gully Structure plan

3.1.3 Population and Demographics

The Shire of Plantagenet estimated residential population for 2020 is 5263 with a population density of 0.01 persons per hectare[14]. The 2016 census has these people residing in 2,462, dwellings with an average household size of 2.33 people.

The population is spread among the four town sites of Mount Barker, Rocky Gully, Narrikup and Kendenup. The Shire is divided into nine localities of Perillup, Forest Hill, Denbarker, Woogennellup, Takalarup, Porongurup, Mount Barker, Narrikup and Rocky Gully as seen in Figure 11. The majority of

[14] https://profile.id.com.au/plantagenet

the Shire's residents live in the town of Mount Barker and the major localities of Rocky Gully, Forrest Hill, Kendenup, Porongurup and Narrikup according to the 2016 census. The majority of these areas of higher population density are set within heavily vegetated and or remote areas with high fuel loads. This provides challenges for the Shire's mitigation program, due to the value placed on maintaining the amenity of the area by many local residents and the proximity of reserves and remnant vegetation to residential areas.

The distance between these localities and the differing nature of land use and tenure presents challenges for the local government in disseminating consistent bushfire preparedness information, adherence to the Fire Control Notice and general engagement with the community regarding bushfire risk.

Population growth for Plantagenet has been between 0.3 and 1.5% per annum on the long term (2006-2016) population statistics from the Australian Bureau of Statistics (ABS)[15]. According to the current population forecast, growth is at 1.68% in 2021, dropping to 1.35% in 2026, which is lower than the forecast average for WA.[16]

The median age within Plantagenet is 46 years, which is older than the median age for Western Australia (36 Years) and Australia (38 years). A large proportion of these people are farmers, which in general terms lends itself to a greater capacity to respond quickly to bushfire events with farm-based equipment or the local brigade. A high percentage of the population live and work in the area and there is a small percentage of absentee landholders centred around the Poronguup/Kendenup region.

There is a significant under representation of persons aged 20-29 years in the Shire (at 8%) compared to Western Australia (14%). This is becoming a common trend in many regional areas as young adults leave the area to move to larger population centres for tertiary education or employment.[17]

The shire has an ageing demographic, with an average of 20.9% of the population being 65 years or older as compared with the Western Australian average of 14.1%. These figures see an increase in percentage of aging population from 16.5% in 2011. This increase contributes to the need for assistance for core activities and a decreasing pool of volunteers to support mitigation and firefighting.

On average, the elderly community members are more fragile, have limited mobility, suffer from health conditions and/or require the care of others. Elderly population often have specific needs or

[15] ABS (July 2017), 3218.0 Regional Population Growth, Australia
[16] WAPC (March 2019), Western Australia Tomorrow: Population report No.11
[17] Great southern Plantagenet Regional Land supply assessment December 2017

requirements during evacuation to address these limitations. There is a need to ensure that elderly people have prepared evacuation plans specific to their situation.

Elderly people may have less capacity to prepare and defend property or protect themselves during a fire event. Elderly people may over estimate their current abilities based on previous experiences. Because of this, there is need for increased planning for this group to ensure that they are adequately considered in bushfire management planning, with targeted communications before and during fire events and when planning mitigation works.

It is a challenge for the Shire to develop effective strategies to engage with the limited younger age groups within the community to maintain the volunteer numbers required to manage both bushfire response and the large program of prescribed burning within the Shire, whilst maintaining and transferring the vast knowledge base currently residing within the older volunteers.

Engagement of the community from a bushfire preparedness perspective needs to be centred on the community values that are inherent to the local residents. These values can vary greatly across the differing demographics of the Shire. For example, Kendenup has a population of predominantly hobby farm/small holdings and seasonal workers, opposed to the Porongurup community that has a greater focus on the environment, with a lot of residents moving from more urban landscapes to enjoy the pristine natural characteristic and biodiversity of the area. Planning mitigation strategies in these different landscapes will require a unique approach, tailored to the bushfire risks, as well as, the needs and values of the local community.

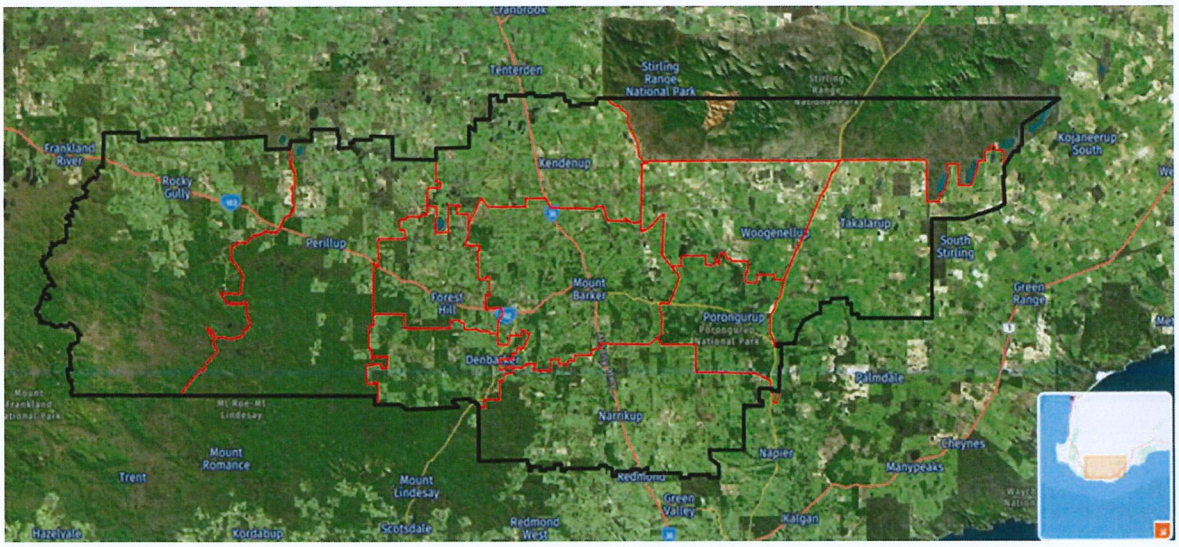


Fig 10 Localities within the Shire of Plantagenet18

[18]https://profile.id.com.au/plantagenet/locality-snapshots

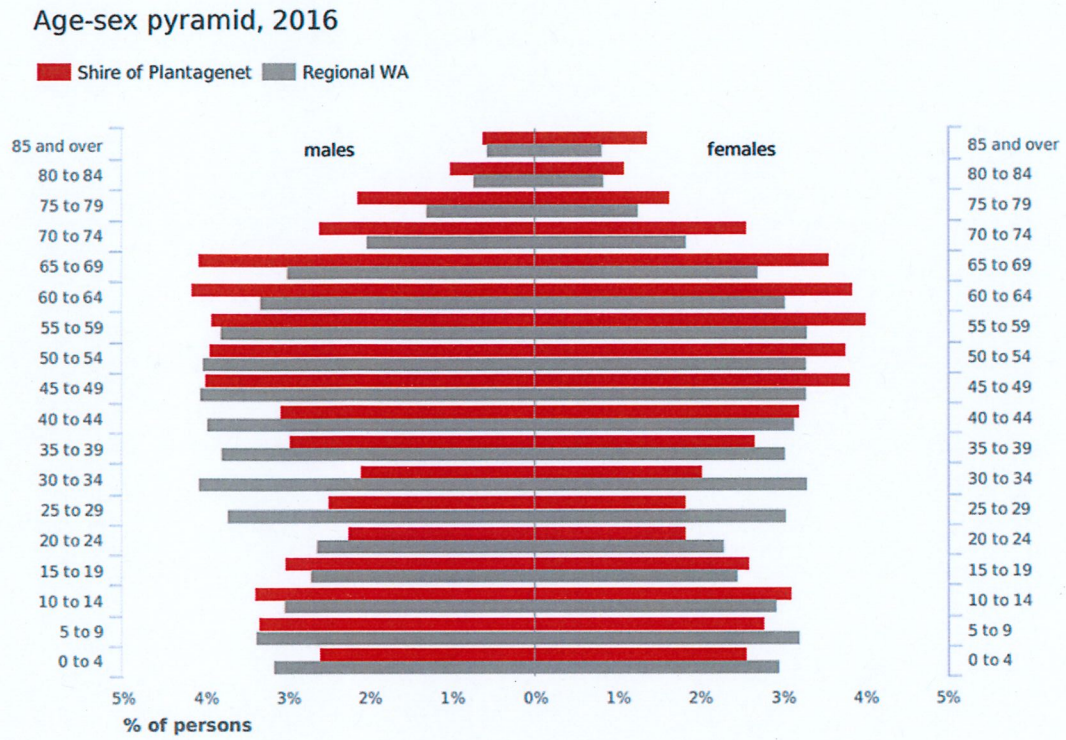


Figure 11 Age sex pyramid 2016 19

3.1.4 Economic Activities and Industry

The area has always been agriculturally rich. Mixed farming was established towards the end of the nineteenth century and by 1910 there were 75 commercial orchards (mostly concentrating on apple growing) in the area. In 1917 the Mount Barker Fruitgrowers Cool Storage Co-operative was established. It was closed in 1975 and the orchards have largely given way to a thriving grape growing industry with high quality vineyards producing a range of excellent wines.[20]

The main agricultural focus is cropping, horticulture, plantation timber, sheep, cattle and wine production. There are also many lifestyle opportunities set within a beautiful natural environment. these opportunities are provided through an abundance of smaller hobby/lifestyle blocks throughout the Plantagenet Shire.

The Shire of Plantagenet's gross regional product is estimated at $0.29 Billion which represents 0.11%of the State's gross state product [21]

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[19] Plantagenet 2027, Strategic Community Plan, December 2017
[20]Plantagenet 2027, Strategic Community Plan, December 2017
[21] https://itt.abs.gov.au/itt/r.jsp?RegionSummary&region

Table 5 -Number of Business by industry

Agriculture, forestry and fishing (no.)	401
Mining (no.)	3
Manufacturing (no.)	26
Construction (no.)	57
Wholesale trade (no.)	6
Retail trade (no.)	28
Accommodation and food services (no.)	19
Transport, postal and warehousing (no.)	30
Financial and insurance services (no.)	29
Rental, hiring and real estate services (no.)	45
Professional, scientific and technical services (no.)	27
Administrative and support services (no.)	11
Education and training (no.)	3
Health care and social assistance (no.)	12
Other services (no.)	18
Currently unknown (no.)	7
Number of Businesses By Industry Total	728

The major employment industry in the Shire of Plantagenet is Agriculture, Forestry and Fishing which makes up 26.4% of the total employment.

Table 6 -Employment by industry in the Shire of Plantagenet

Agriculture, forestry and fishing (%)	24.4
Mining (%)	2.8
Manufacturing (%)	8.8
Electricity, gas water and waste services (%)	0.5
Construction (%)	6.8
Wholesale trade (%)	2
Retail trade (%)	7.1
Accommodation and food services (%)	4.1
Transport, postal and warehousing (%)	4
Information media and telecommunications (%)	0.3
Financial and insurance services (%)	0.8
Rental, hiring and real estate services (%)	0.9
Professional, scientific and technical services (%)	3.3
Administrative and support services (%)	2.5
Public administration and safety (%)	5.3
Education and training (%)	7.7
Health care and social assistance (%)	10.2
Arts and recreation services (%)	0.5
Other services (%)	3.7
Total persons employed (no.)	2120

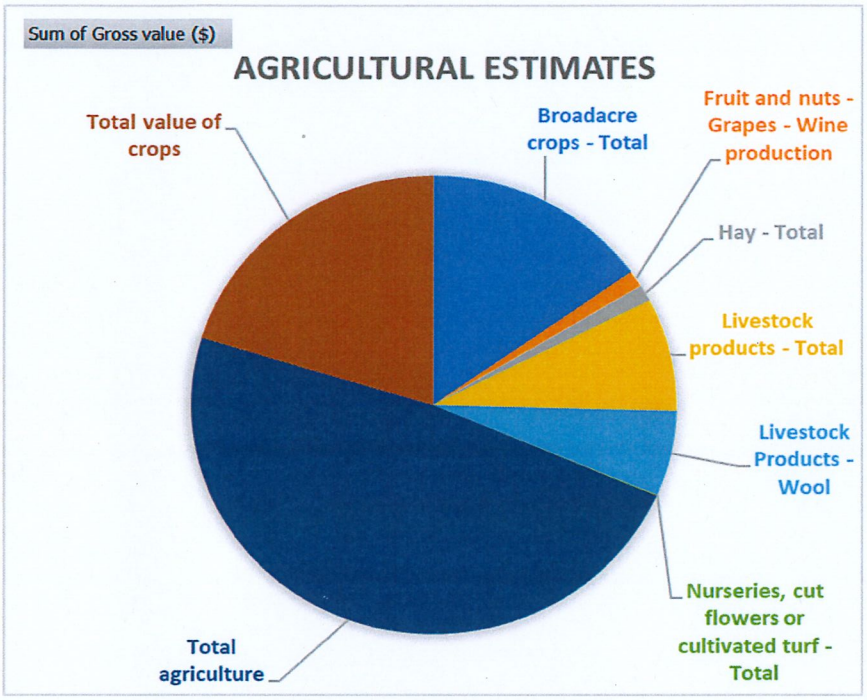

Fig 12 Agricultural estimates within the shire of Plantagenet

The tourism, agriculture and forestry industries are the most vulnerable to impacts from bushfire, due to the nature and location of their activities, and the reliance on the road network for both inputs and outputs.

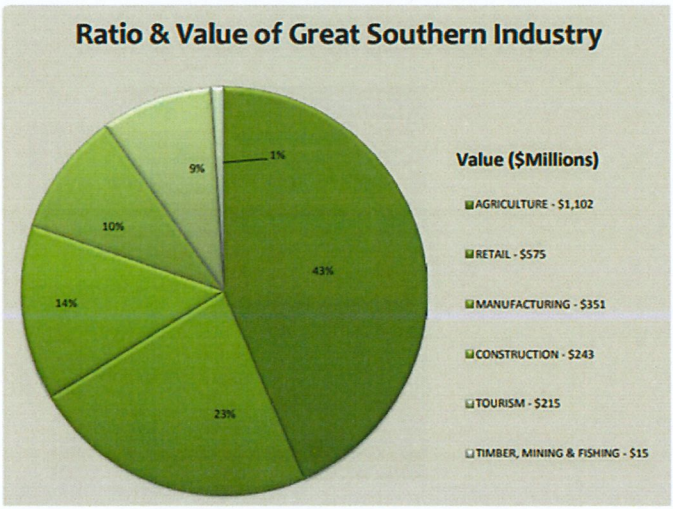

Fig 13 Values of great Southern industry22

[22] http://www.rdagreatsouthern.com.au/our_region_industry.html

3.1.4.1 Agriculture/Horticulture/Forestry

Viticulture is a major industry in the Shire of Plantagenet, its impact on the economy is two-fold, as a primary production industry and as a major draw for tourism in the area. The presence of a viticulture industry is a consideration for the Shire and other land managers when executing prescribed burning programs due to potential smoke impacts on grape harvesting.

The bulk of the viticulture properties are located in the rural sections of the Shire with some bordering National Parks, Shire reserves or private stands of remnant vegetation. These tracts of vegetation can pose substantial risk to the community and/or business assets. However, treatment options need to be carefully planned and balanced to avoid potential negative impacts to the vineyards such as the impacts of possible smoke taint from planned burns. Other treatment strategies need to be considered in these circumstances, along with consultation with asset and land owners to identify opportunities to undertake planned burning and other hazard reduction activities.

The traditional agricultural industry within the Shire of Plantagenet consists of some intensive primary production, including chicken and pig farming, and broad acre cropping for fodder and grain production. Cultivation of curing crops can contribute to bushfire risk over the late spring and early summer when harvesting occurs. The combination of drying vegetation, cured grasses and working machinery can result in fire ignitions that have the potential to spread rapidly under certain conditions. This is not a common cause of bushfires in the Shire, and only accounts for 5% of the total number of vegetation fires in the last nine years.

The impacts of a significant bushfire can have a crippling effect on agricultural industries, through the destruction of crops and feed, and disruption to transport corridors within the town site that are necessary to move stock and produce out of the area.

The forestry industry is a major sector within the Shire of Plantagenet, employing approximately 1500 personnel in the Great Southern region (including Esperance). This represents 25% of the Western Australian forestry Industry and accounts for approximately $345m of gross regional value. It is estimated that there is approximately 213,000ha under forestry production in the Great Southern. Within the Shire, there are large plantations in Rocky Gully and other scattered plantations throughout the Porongurup, Kendenup and Narrikup areas. Harvesting of standing reserves is ongoing, as is the re-establishment of theses plantations in some productive areas. The close proximity to the woodchip plant and export facilities at the Albany Port contributes greatly to the ongoing viability of this industry in Plantagenet. Although, the declining rainfall in the Great Southern is leading to a reduction in the replanting in some areas. The harvesting of timber resources can lead to an increased risk of bushfire ignitions during harvest due to the use of mechanical equipment, and from post-harvest clean-up activities that involve burning waste material.

Without the ongoing maintenance undertaken by the timber industry, there would be a gradual deterioration of access tracks through the more heavily forested areas of the Shire. Due to the unique nature of the plantations, which are predominantly are fully surrounded by native forests, in the Shire of Plantagenet this is particularly concerning. An increase in the density of unmanaged stands, which over time will leading to increased fuel loads over a set period of time until the vegetation reaches a plateau is also a problem in areas where the plantations are no longer managed. This issue of increasing/declining/plateau of fuel loads in the Karri/Tingle stands of the South West and Great Southern is an ongoing issue for debate amongst the scientific community.

The plantations in the Shire of Plantagenet are predominantly Blue Gum (*Eucalyptus globulus*). The private plantation managers of WA have formed a fire management co-operative, where all members commit to assist each other to attend and suppress bushfires on, or threatening, any member's plantation. This fire co-operative has been co-ordinated through Forest Industries Federation of WA (FIFWA) and has been in operation since 2007. Each year the group updates the details of members' estates and publishes an atlas of all participating privately managed plantations across the South West and Great Southern regions. The estates of each participating member are colour coded in the atlas, with fireline contact details provided in the directory. This atlas is made available annually to shires, district DBCA offices and DFES offices via either a hard copy A3 map book or on digitally. This another resource which contributes to the diversity of response resources the Shire of Plantagenet can draw on in the event of a wildfire impacting the Local Government area.

3.1.1.3 Infrastructure

Communications: Communications towers in the Plantagenet shire are predominantly located on the tops of hills and in high fuel areas. These are vital to maintaining effective communications and issuing community warnings during a bushfire fire and are a priority for treatment under the BRM Plan.

Water: Potable water supplies to Mount Barker, Kendenup and Narrikup are provided through the Lower Great Southern Town Water Supply Scheme. This supply originates in Albany to the South. Water is trucked into Rocky Gully from the Mt Barker reservoir. The Bolganup Creek in the Porongurup Range National Park, the Kent River and the upper section of the Denmark River were the only designated public water supply areas within the Shire of Plantagenet. The Bolganup Dam has recently been decommissioned. Water supply to Mt Barker and surrounding town sites is largely dependent on the Albany supply, which is vulnerable to natural disasters such as bushfire. In the event of a large fire impacting the supply of water to the Shire, response capability would be severely impacted.

Roads: There are two major highways and two main roads running through the Shire that fall under the responsibility of Main Roads;

- *Albany Highway (north-south transit);*
- *Muir Highway (east-west transit);*
- *Denmark Mt Barker Road; and*
- *Chester Pass Road.*

Woogenellup, Spencer, Settlement and Porongurup Roads are also major roads within the local network that are managed by the Shire of Plantagenet. Road reserves within the Shire have been reviewed for their conservation values and need to be considered when planning treatments, as some road reserves with high conservation values are also primary evacuation routes.

These major transport routes pose significant ignition sources to remnant vegetation, road Reserve and farmland through:

- *increased vehicle movement*
- *Accidents*
- *Breakdown*
- *Population transit (arson/accidental ignition)*
- *Power corridors (Clashing lines/pole top fires ect)*

Rail: The Great Southern railway line linking Albany to Northam and Perth runs through Kendenup, Mount Barker and Narrikup.

The potential to disrupt vital supply chains through a bushfire event impacting these transport routes is extremely high and would cause major disruption to the towns to the North and South of the Plantagenet Shire

3.1.4.2 Tourism

An estimated 408,500 tourists visit the Great Southern annually with around 22% coming from interstate or international locations23. Tourism in the Great Southern is an important industry and a growth industry for the Shire of Plantagenet, with strong linkages to local businesses, arts, culture, food and social needs. There is significant potential for market specialisation in food, eco-tourism and/or adventure tourism in the region due to the natural endowments, diverse gourmet produce and quality wine. This creates some tensions between tourism, risk reduction and the impacts of treatment works. While it is 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 during these times. Careful planning is needed when undertaking mitigation works in these areas to ensure that the impact of smoke, disruption to tourists, loss of amenity values at popular locations and risks associated with additional population in the landscape are managed and minimised. The balance between maintaining amenity, and therefore the appeal to tourists, without compromising community safety is a challenge for the BRM planning process.

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[23] http://www.rdagreatsouthern.com.au/pdf/RDA_RegionalPlan_web.pdf

3.2. Description of the Environment and Bushfire Context

3.2.1 Topography and Landscape Features

Topography contributes to risk by influencing fire rate of spread (ROS), and therefore intensity, and by effecting access for suppression forces. The risk associated with topography is considered in relation to response access and as a variable in predicting fire behaviour and assessment in line with the Bushfire Management Zones (Asset Protection, Hazard separation, Land management) for each community/asset.

Generally, the terrain within the shire of Plantagenet is undulating. However, steep gradients, particularly in the Stirling and Porongurup Ranges, numerous rivers and some heavily forested areas can severely restrict responding personnel from accessing a fire quickly, allowing a bushfire time to establish and grow in size and intensity.

The overall terrain, expanse of remnant vegetation and plantation areas, waterways and gravel roads within the Shire lead to difficulties with timely evacuation of residents in the event of a bushfire. This may be improved by identifying treatment strategies and engagement that provide safe access/egress for communities and ensuring that evacuation is given due consideration at the application stage for new development proposals.

Three distinct soil-landscape zones occur within the Shire (Figure 15). These are the Warren-Denmark Southlands, the Stirling Range, and the Albany Sandplain.

Warren-Denmark Southlands

The Warren-Denmark Southlands Zone covers majority of the Shire, west of the Porongurups, where the drainage systems of the Frankland, Kent, Denmark and Hay Rivers have dissected the southern portion of the ancient Darling Plateau.

The broad surface of the Darling Plateau is formed from gneissic and granitic rocks of Proterozoic age (1 200 to 1 800 million years old). In more recent geological times, swampy sediments have been deposited on lower-lying portions. Deep weathering has also produced a lateritic soil profile over much of the landscape, although the southerly flowing rivers have subsequently removed some of this material.

The gently undulating plateau surface is today dominated by broad lateritic divides with a mix of yellow-brown to red loamy sandy gravels. Broad tracts of poorly drained flats with deep grey sands or sandy duplex soils are also present. Within the valley systems the major soils include loamy gravels, sandy gravels, loamy earths, stony soils and loamy duplex soils.

Uplifting and warping of the southern portion of the Darling Plateau has resulted in generally poor drainage with rain-borne salts gradually accumulating in the deep soil profiles over a geological time frame. Although much of the Warren Denmark Southlands zone in the Shire remains under natural vegetation within State Forest, substantial clearing elsewhere has caused groundwater levels to rise, bringing with them the accumulated salts. Salinity of soils and natural drainage systems within the Warren Denmark Southlands Zone is therefore a major land management issue in the Shire.

Dense Marri/Jarrah and integrated creek systems in sections of this landscape can prove difficult to manage from a bushfire perspective. The majority of the southern section of this land system is managed by DBCA and there is a network of access tracks through this area maintained to varying levels of serviceability. Fires in this landscape vary with the changing vegetation and time of year. Summer can see catastrophic fires fuelled by hot dry northerly winds and low humidity. River systems bisecting this area provide barriers to timely suppression by wheeled or tracked vehicles. Aerial suppression is heavily relied upon

Stirling Range

The Stirling Range Zone is represented in the northern portion of the Shire by the mountains of the Stirling Range and their associated rocky and gravel soils. The mountainous terrain associated with this landscape requires careful management due to its inaccessibility, gradient and sensitive biodiversity. Numerous large-scale fires have occurred in the Stirling Range, often due to lighting strikes in inaccessible terrain. Establishing control lines and targeted aerial attack are the most common approaches used to control these bushfire events, which can severely impact environmental values and surrounding farmland. These fires are described in section 3.2.5 Bushfire Frequency and Causes of Ignition.

Albany Sandplain

The Albany Sandplain Zone occurs south of the Stirling Range, and generally east of Mount Barker/Kendenup. It is a gently undulating plain dissected by the southward flowing Kalgan and King Rivers, and is punctuated by the granite massif of the Porongurup Range. Marine sediments of

Eocene age (predominantly Pallinup siltstone) overlie Proterozoic granitic and metamorphic rocks over most of the Sandplain Zone.[24] The dominant soils are sandy duplex types which are often alkaline and sodic, with some sands and gravels. These sandy soils lead to access and egress issues for response vehicles

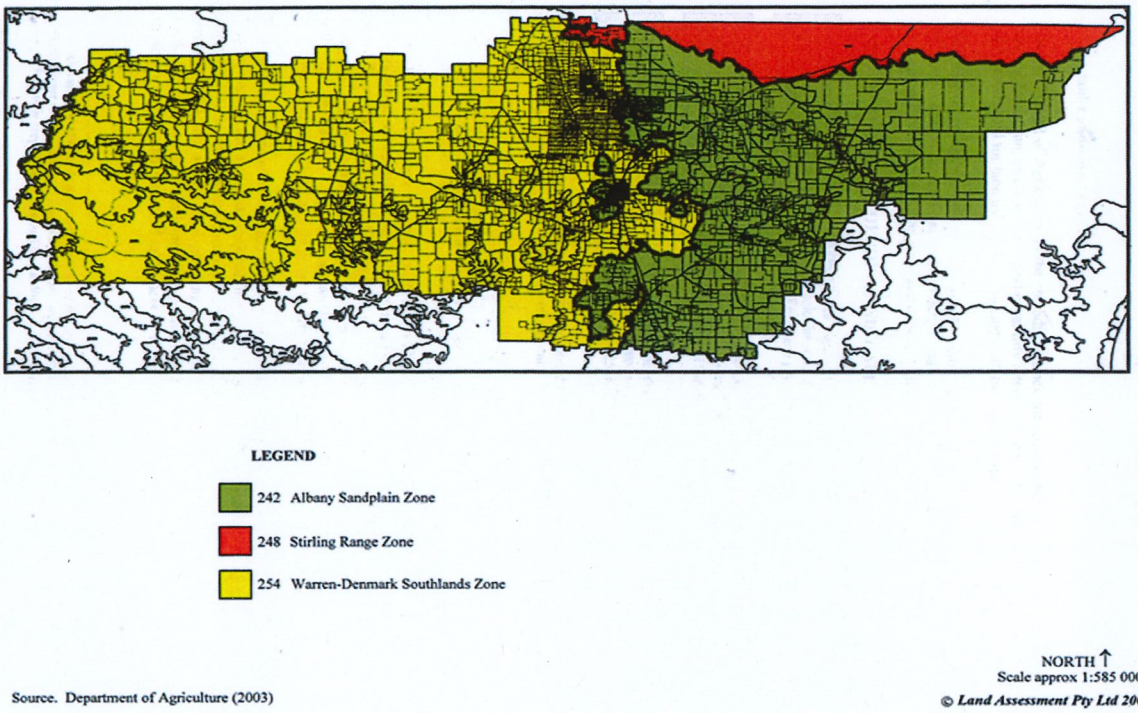

Fig 14 Plantagenet land systems 25

The topography of the Porongurup range within this land system provides similar challenges to the Stirling system with regards to bushfire suppression and management, with the extreme slope producing heightened bushfire behaviour to the surrounding properties. Again, this is an area for targeted aerial suppression and backburning activities to effectively control the spread of bushfire.

2.2 Climate and Bushfire Season

The Shire's climate is characterised by warm to hot dry summers and cool wet winters. These are conducive to a range of agricultural pursuits, commercial tree plantations, tourist ventures and rural-residential retirement opportunities.

[24] Shire of Plantagenet Local Rural Strategy Environmental Component
[25] Shire of Plantagenet Local Rural Strategy Environmental Component

Average maximum temperature ranges from 26.2°C in January to 14.3°C in July, while the average minimum temperature ranges from 13°C in February to 6.0°C in July and August (Bureau of Meteorology website). Light snow occasionally falls on the Stirling and Porongurup Ranges, although it rarely persists for more than a few hours. Winds are predominantly from the east to south-east in summer and from the west and north-west in winter.

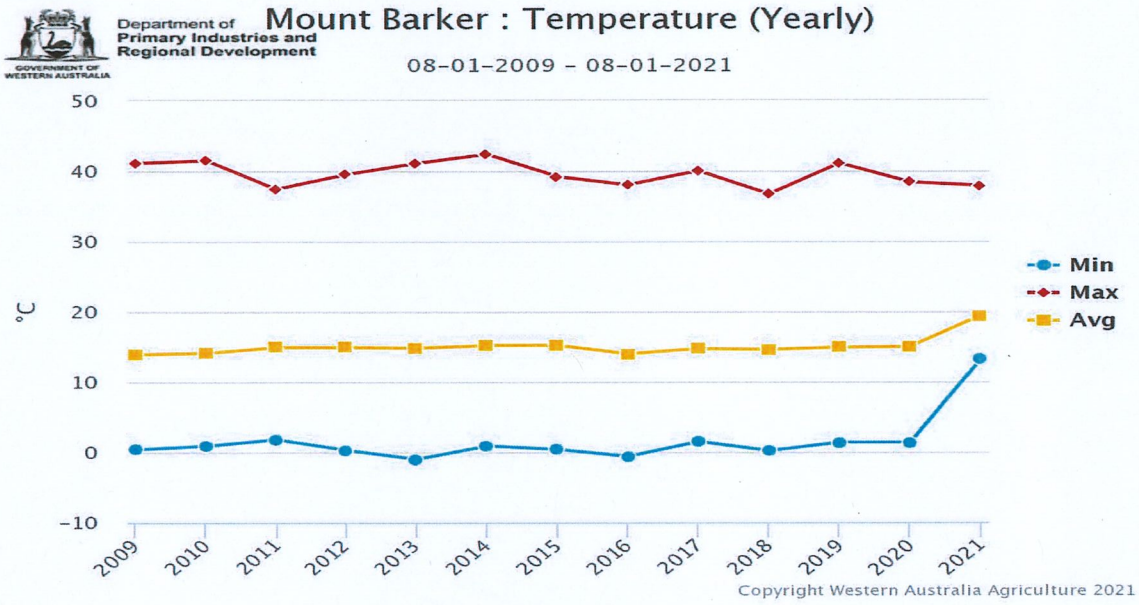

Fig 15 Plantagenet Yearly Temperature 26

The distribution of annual rainfall ranges from just over 1000 mm/annum in the south western portion of the shire to about 450 mm/annum within the north east. Mount Barker town site receives, on average, 762mm of rain per annum, with most rainfall occurring in the months May to October. Very little rain falls over the summer period December to March.

[26] https://weather.agric.wa.gov.au/station/MB

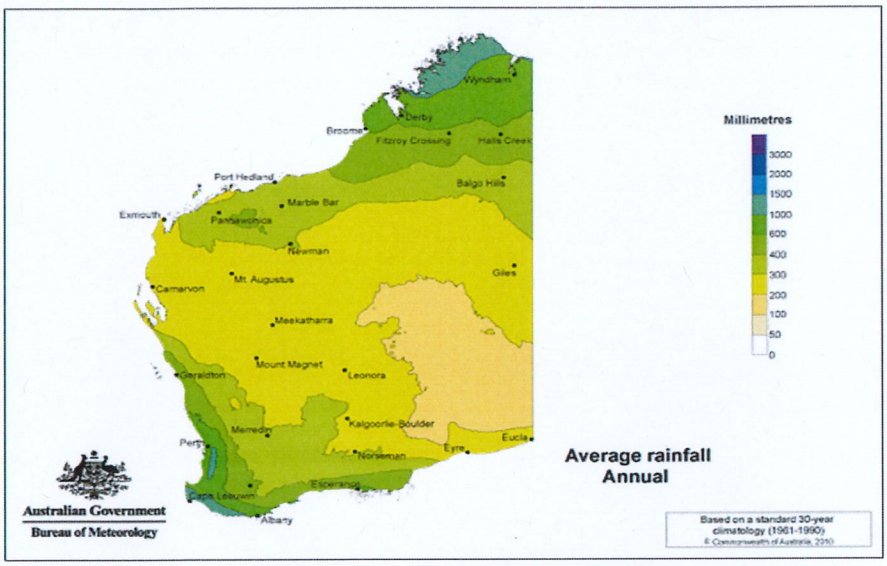

Fig 16 State wide average Rainfall belts

The average annual pan evaporation rate varies from around 1350 mm in the south west of the shire to just over 1500 mm in the north east. Potential evaporation therefore slightly exceeds annual rainfall in the south west of the shire, but is over three times greater in the north east. Together seasonal rainfall and potential evaporation determine the length of the growing season to be approximately 8 months, from mid-March to early November, within the shire[27].

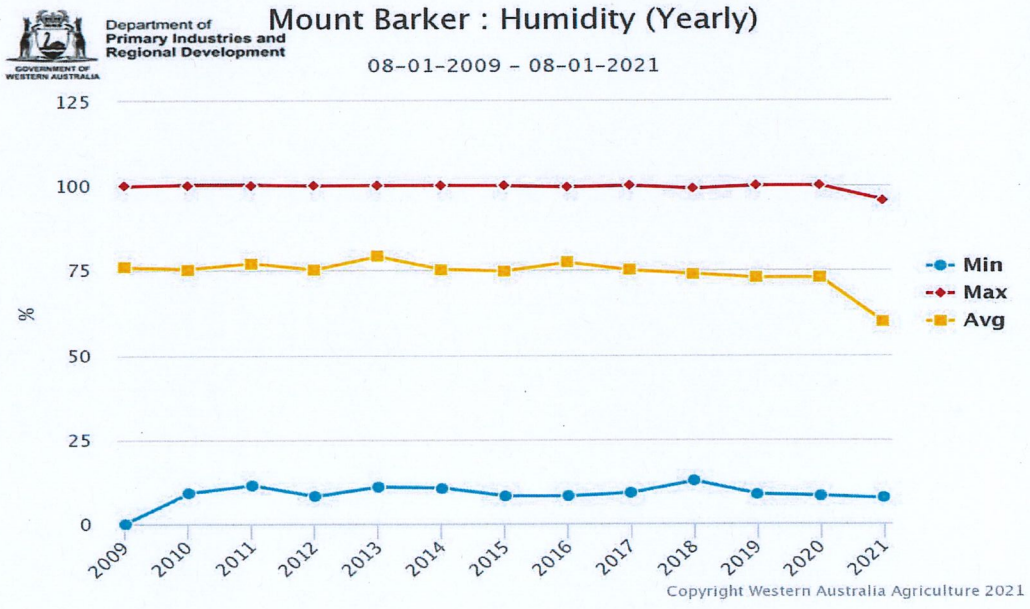

Fig 17 Plantagenet Yearly Humidity 28

[27] Shire of Plantagenet Website
[28] https://weather.agric.wa.gov.au/station/MB

The early to mid-summer is generally dominated by weekly weather cycles and movements of the west coast trough through the area, producing thunderstorms and lightning. This is one of the primary causes of bushfires in the Shire. Destructive gale force winds and widespread bushfires have resulted from periodic incursion of decaying tropical cyclones below the 30°S latitude. Summers are dry, with December to February receiving a monthly average of less than 25mm of rain. Summers are typically very warm and cloudless. The hot dry summers and seasonal strong winds create an environment where there is a significant risk of bushfire. With high temperatures , low humidity and high winds generated by unstable frontal movements , intense low pressure systems (cyclone remnants), deep coastal troughs and strong land and Sea breezes . this gives rise to days of High, Very High and Extreme fire danger

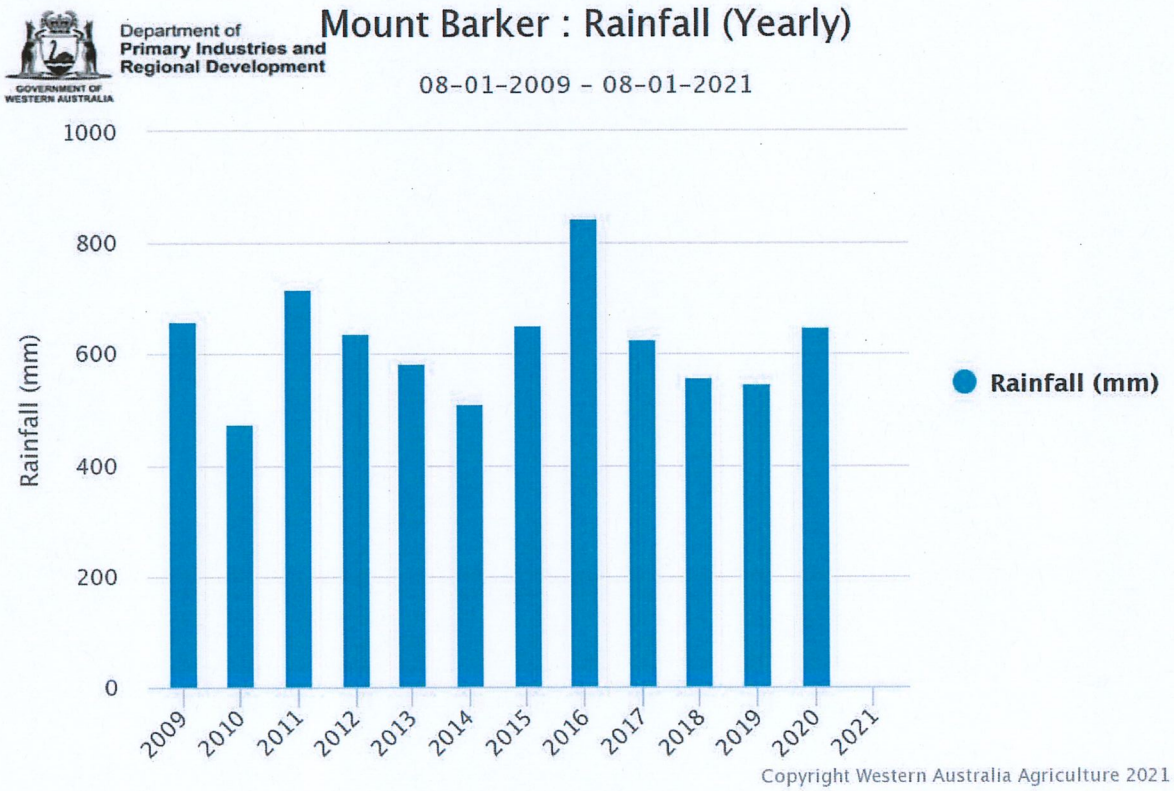

Fig 18 Plantagenet Average yearly Rainfall 29

[29] https://weather.agric.wa.gov.au/station/MB

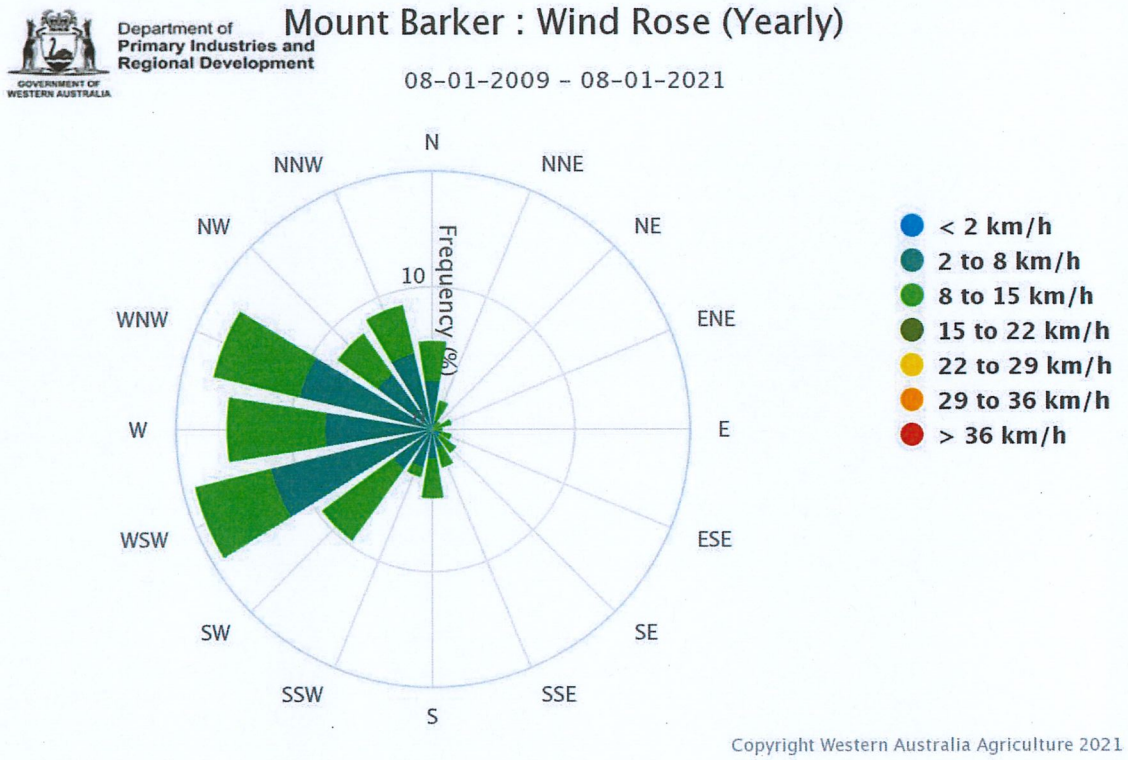

Fig 19 Average yearly wind strength and direction 30

Prevailing winds are from the West North West and West South West, which can prove challenging for suppression operations because they are generally strong and dry (refer Figure 19 above). These winds are predominately over the cooler months, but can still produce catastrophic fire weather conditions, as seen in May 2018 when there were more than 60 fire burning across the Great Southern region. The North-Westerly/North Easterly winds prevail between January and March. These winds are generally hot and dry and occur during the peak bushfire period. Strong winds have been recorded from these directions, with gusts recorded at 147Km/hr in January 2019.[31]

Climate Change

Over the past few years, a significant amount of data has been produced worldwide to demonstrate the effects that climate change will have on the regions.

Changes to temperature and rainfall regimes over the past 20 years, suggests increases in minimum temperatures and declining mean annual rainfall in the region[32]. These trends are predicted to increase under a climate change scenario with a further increase in minimum temperature,

[30] https://weather.agric.wa.gov.au/station/MB
[31] https://weather.agric.wa.gov.au/station/MB
[32] BoM 2003 The Greenhouse Effect and Climate Change

decreases in rainfall, increased storm activity and frequency of extreme fire weather. These may impact on remnant vegetation within the region and present some management challenges, particularly in relation to hydrology and fire management.[33]

In the South West and Great Southern the climate has become warmer and drier and is likely to continue to dry, with lower winter rainfall and increased average temperatures resulting in a longer 'fire season' and a greater proportion of the landscape that is sufficiently dry to burn.[34]

On average the temperature has increased by 1 degree Celsius. Rainfall has declined along the coast by 20%.[35] Declining rainfall has also extended the length of the high bushfire period into April and occasionally into the beginning of May.[36]

This may result in the window for prescribed burning in the Shire of Plantagenet opening up in spring from its current, relatively small window. However, this also has implications for a longer more severe bushfire season.

[33] Mondurup Reserve management plan
[34] www.dpaw.wa.gov.au
[35] /www.agric.wa.gov.au
[36] Prescribed burning in Southwest forests N Burrows and L McCaw

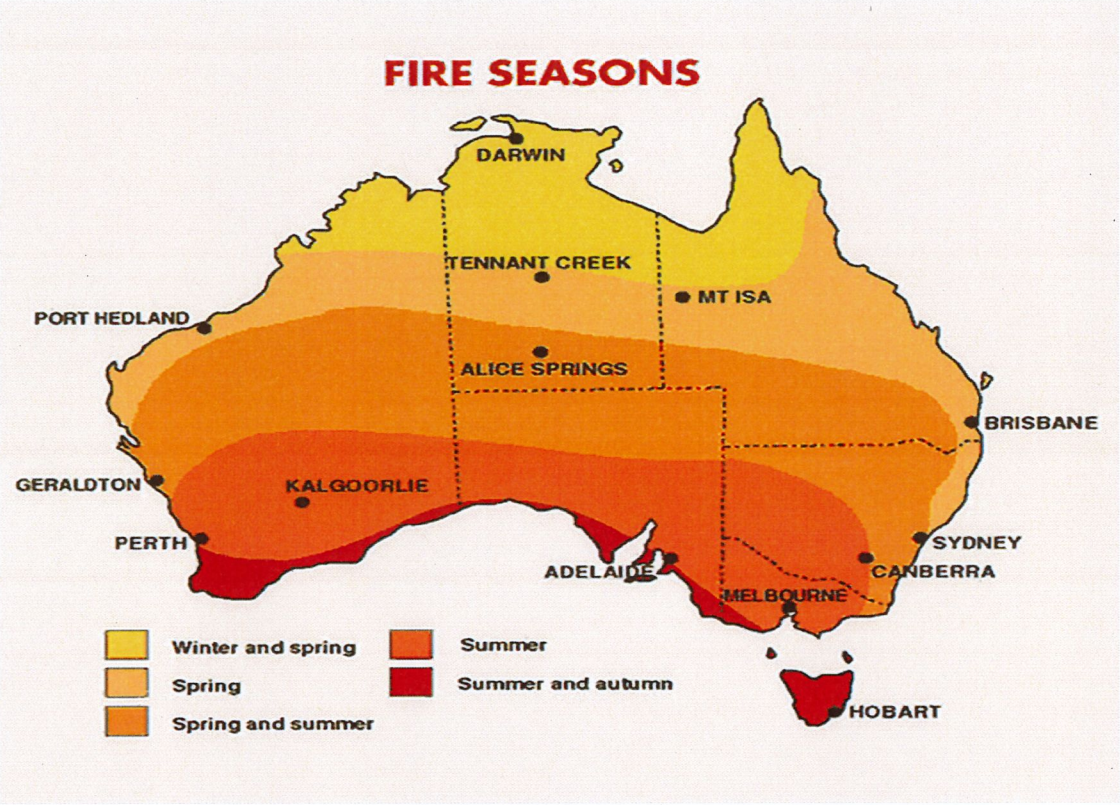

Fig 20 Fire Seasons of Australia

Fire Danger Index

The Fire Danger Index (FDI) is based on a combination of different weather conditions acknowledged to influence the risk of dangerous bushfire conditions in Australia, including temperature, rainfall, humidity and wind speed. In addition to the weather, bushfire events in Australia are also influenced by factors such as vegetation conditions, terrain and ignition sources. 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 at Figure 23, which is a scale developed to assist communities to better understand information about fire danger.[37] When the FDI reaches 50 the Fire Danger Rating is Severe; when conditions reach an FDI of 75 the FDR is extreme. The Forest Fire Danger Index (FFDI) and the Grass Fire Danger Index (GFDI) are calculated using fire behavior models relevant to the vegetation type.

The Shire of Plantagenet is located with the Stirling Inland Fire Weather District. Given the mix of agricultural holdings and forest within the Shire of Plantagenet, the GFDI is the model applied to determine the FDI within the Shire given the prevalence of agricultural activities. Harvest / vehicle movement bans are also set using the GFDI. Where an FFDI of 50 and above is recorded between the

[37] *Source: Department of Fire and Emergency Services*

months of November to February and is during the harvesting period can, increase the ignition risk and making any fire difficult to suppress[38].

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. [39]

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.

Fig 22 Fire danger Ratings 40

3.2.3 Vegetation

The Pre European vegetation across the Shire of Plantagenet, dataset is an output of a joint project between DAFWA and DBCA. It maps original natural vegetation presumed to have existed prior to European settlement in Western Australia. Descriptions of each of the vegetation types can be found

[38] *https://www.dfes.wa.gov.au/bushfire/prepare/*
[39] *Source: Department of Fire and Emergency Services*
[40] Source: Department of Fire and Emergency Services www.dfes.wa.gov.au

in the memoir. Published as Published as Beard, J. S., Beeston, G.R., Harvey, J.M., Hopkins, A. J. M. and Shepherd, D. P. 2013[41] and is shown in Figure 24. The Shire is predominantly located within the Darling Botanical District (Menzies Subdistrict), however a section of the eastern part of the Shire, which takes in the Stirling Range National Park, occurs within the Eyre Botanical District.

The variation in climate and soils across the shire is reflected by the changes in vegetation. The transition from the Darling Botanical District to the Eyre Botanical District generally marks the transition from forest/woodland to Mallee across the southern part of Western Australia.

To the North West of the Shire is predominantly Jarrah /Marri forests with patches of low forest Jarrah. These sections of forest are connected through to large tracts of national park and state forest within the Shire of Denmark. The connectivity and vertical structure of these forests can produce intense bushfires, which prove challenging to supress due to both the structure of the forest and the accessibility for suppression activities.

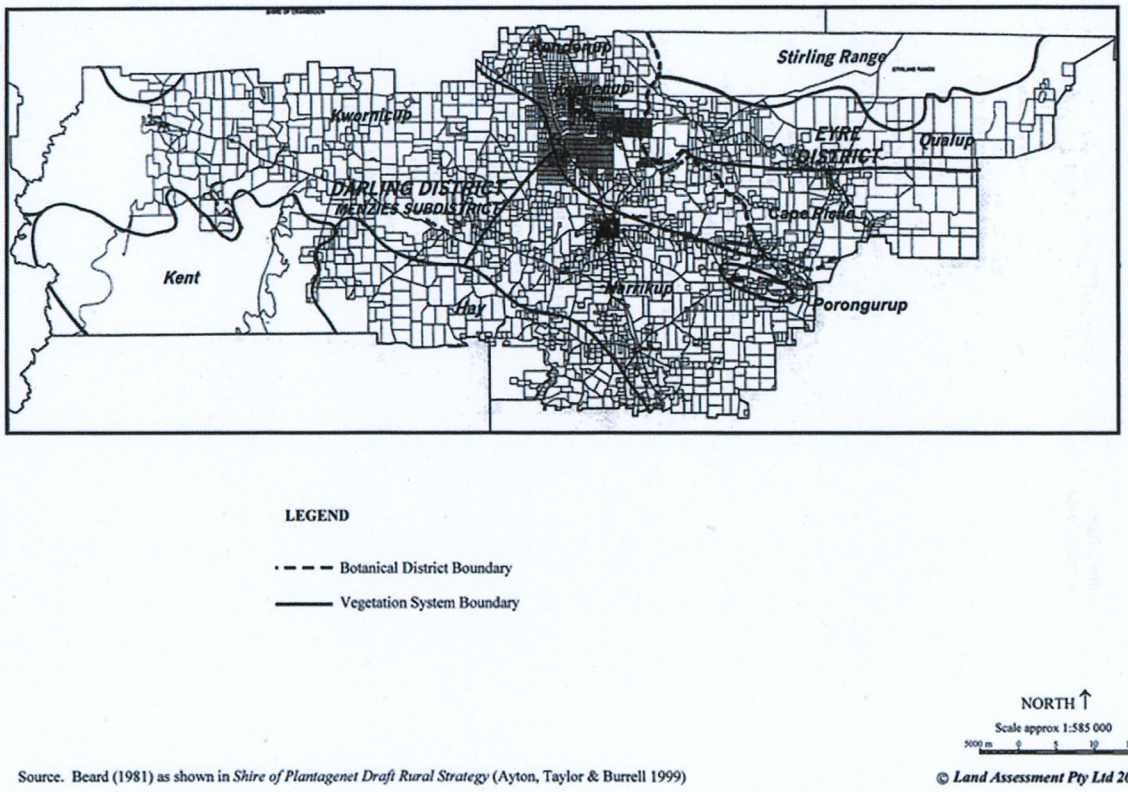

Fig 23 Vegetation Mapping within the Shire of Plantagenet[42]

[41] https://services.slip.wa.gov.au/public/rest/services/SLIP_Public_Services/Environment/MapServer/17
[42] Shire of Plantagenet Local Rural Strategy Environmental Component

The **Kendenup system** occurs in the central northern portion of the Shire, and as the name suggests, around Kendenup. Vegetation is predominantly woodland rather than forest with Jarrah present. Both Marri and Wandoo occur on the upper slopes and Yate and Wandoo are present on the lower slopes. Although generally of sparser nature that the Sothern Jarrah associated to the North West, the sparse structure of this vegetation type can lead to faster rates of spread and can be hard to supress in high winds, or if not acted on quickly.

The **Narrikup Vegetation System** - This system covers the dissected laterite plain generally to the south east and south of Mount Barker where there are few lakes and swamps. Jarrah and Marri forests dominated prior to clearing for agriculture. Small patches of Banksia woodland occur on sand, and small Yate occurs along creek lines. The remnant vegetation amongst crops and pasture in this landscape provides challenges for suppression with changing intensities in fire behaviour and rates of spread due to the strong influence of wind on a more open vegetation structure between land systems. The wooded creek lines act as wicks carrying fire into agricultural and residential zones.

This system contains patches of remnant dense Jarrah/Marri forest close to the Narrikup settlement. This forest type can produce intense fire behaviour due to its contiguous vertical structure and needs to be closely managed near the town site to create an appropriate buffer, as noted in the Kendenup Structure Plan.

The **Porongurup Vegetation System** - This is a small enclave, centred on the Porongurup National Park. Tall forests of Karri predominate on top of the range, surrounding bare granite domes. Low to medium Jarrah and Marri forests occur on the lower slopes. A key difference between the Jarrah and Karri vegetation types is the rate at which fuel accumulates. Fuels in Jarrah forests accumulate at approximately 1-2 tones/ha annually, reaching a maximum of about 20 tones/ha in 20 years. Whereas fuels in Karri forests accumulate at 3-4 tones/ha annually to reach a maximum of about 60 tonnes/ha in 20 Years. Vegetation in the Karri land system is highly flammable for 3-6mths of the year with heavy fuel loads proving difficult to supress in combination with steep terrain. Fire behaviour can result in crowning and spotting hundreds of meters ahead of the Fire front

Stirling Range Vegetation System - As the name suggests, this system is associated with the Stirling Range in the north eastern portion of the Shire. Mountain tops support mixed thicket with Jarrah Mallee heath on lower slopes merging to Jarrah low woodland on footslopes. Woodlands and open woodlands consisting of Jarrah, Marri, Wandoo, Yate, and River gum are found in many of the valleys. Mallee heath occurs on all the mountain slopes and on the surrounding plains. This landscape provides challenges for suppression with intensive fire behaviour and rates of spread due to the strong influence of wind on this more open vegetation structure.

Qualup Vegetation System - Occurring within the footslopes south of the Stirling Range, the principal formation of this system is Mallee-heath with Tallerak (Eucalyptus tetragona) as a characteristic species on sand overlying clay. Proteaceous scrub-heath is found on deep sand. The plains contain many salt lakes and swampy depressions which support Mallee if sandy or Yate if loamy. Swampy areas are generally associated with peat soils which has a high carbon content and are naturally porous. once dry peat areas are highly vulnerable to ignition and the resulting fires are almost impossible to extinguish without restoring natural groundwater levels

Cape Riche Vegetation System - This system within the central eastern portion of the shire is comprised predominantly Mallee heath with Jarrah (Eucalyptus marginata) dominant.

As in the Kendenup System, fire in the Mallee Heath Systems of the Qualup and Cape Riche Systems can produce rapid rates of spread, which if not brought under control quickly, can be difficult to suppress under fire weather conditions.

The extent of remnant native vegetation within the Shire is shown in Figure 25, with most contained within land managed by DBCA, within State Forests, or within other Crown land.

The Stirling and Porongurup Vegetation Systems are almost totally contained within conservation reserves and hence are protected. Vegetation in the Kent System is contiguous with forest areas, most is still uncleared. This makes these systems and the species diversity contained within susceptible to extinction through large bushfire events. Mitigation treatments are concentrated in these areas to protect the biodiversity and the surrounding communities.

3.2.4 Threatened Species and Communities

Flora and Fauna represent particular significance for the Shire as they are not only recognised environmental assets in their own right, but also impact the treatment options available to address the bushfire risk to other assets.

All treatments need to be planned to consider the flora and fauna present and where possible reduce the impacts on these, where listed species or communities occur the appropriate authorities are consulted prior to any mitigation work commencing. Where possible, consultation should also occur prior to implementing any response strategies as they may have negative effects on a particular species or community. The Shire will, where possible, remind landowners/managers of their obligation to obtain appropriate clearances and approvals prior to commencing vegetation-based treatments. This includes:

- Environmentally Sensitive Areas (ESA)

- Declared Rare Flora and Fauna (DRF)
- Threatened Ecological Communities (TEC).

A further consideration in relation to both bushfire prevention and response strategies is the potential spread of weeds or diseases such as *Phytopthora Cinnamomi* (Dieback). Dieback has infected large areas of Jarrah forest. It is easily spread through 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.

There is a strong relationship between climate and patterns of species distribution. Over the last million years or so the climate of the Great Southern has been highly variable, experiencing unusually turbulent climatic fluctuations associated with increased aridity which led to isolation and colonisation of plant communities. The process forced many plants into small fragmented populations some of which remain today and others that either went extinct or evolved ways to cope. Those that evolved may be able to adapt or have flexibility in their response to climate change, but those species that have evolved little will have limited capacity to adapt.

Where organisms are able to persist in the face of a changing climate there are likely to be either contractions or expansions in range, so long as dispersal is facilitated. Where dispersal is not possible and habitat parameters are no longer suitable, extinction is the ultimate fate [43].

The warming and drying climate is predicted have the most impact around wetlands, rivers, streams, rainforests and peat swamps, all of which are present in the landscape of the Plantagenet Shire. These ecosystems are most likely to be adversely impacted if drying leads to an increased frequency of bushfire.

Flora

Large areas within the Shire of Plantagenet have been cleared for agricultural activities. There still remains significant remnant vegetation to the West of the Shire, which is connected through to large tracts of wilderness (Walpole-Nornalup National Park) within the Shires of Denmark and Manjimup. These areas are largely inaccessible wilderness zones, and bushfires can prove difficult to control. This, in conjunction with dense grasses in pasture areas adjacent to heavy fuels, makes this area very vulnerable to large scale bushfires. The western connectivity largely travels through to the Mt Barker town site, and given the prevalence of Westerly winds in this Shire, the threat from the western zone is not insignificant and will be the target for bushfire mitigation strategies.

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[43] Gilfillan, 2009).

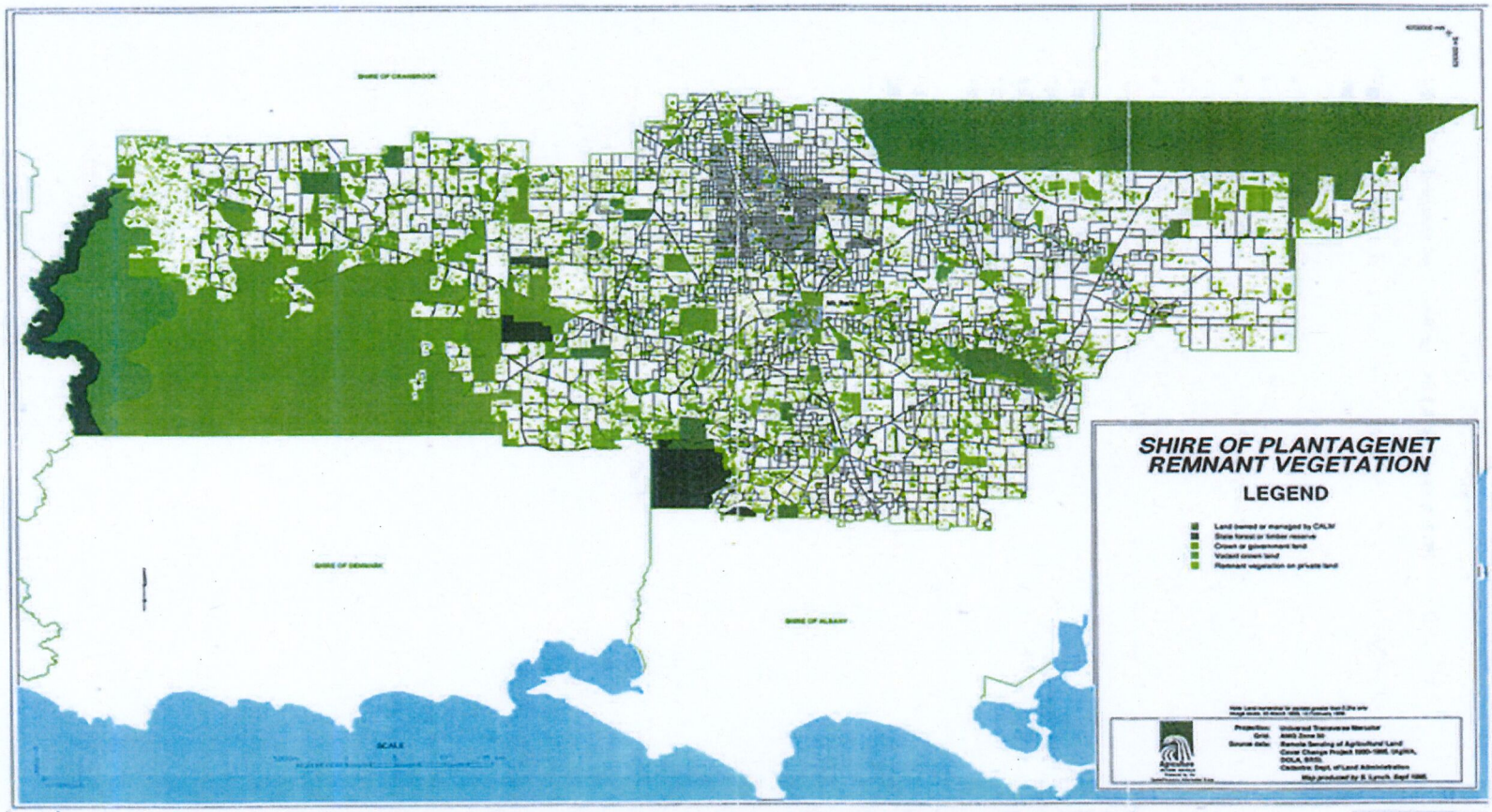
The Stirling and Porongurup Ranges house the other significant tracts of remnant vegetation within the Shire. These ranges are areas of high species diversity, with some 1517 species recorded in the Stirling Range and 700 in the Porongorup National Park.

The South Coast Natural Resource Management Strategy 2019-2024 provides the following description for the Shire of Plantagenet:

> *"The south coastal area is within one of the few global regions featuring exceptional concentrations of species and experiencing exceptional loss of habitat. The high level of biodiversity in the region is partially due to the bio-geographic complexity of the region and the geological and climate history. "*

The WA Herbarium has recorded over 2214 species of native plants from the Shire of Plantagenet. The most prolific genera are Acacia (81 species (spp.), Banksia (70 spp.), Eucalyptus (60 spp.) and Stylidium (57 spp.). Some of the areas containing the endangered species are located within the protected reserves and forest areas; however, some are located within private lands.

As of January 2021, there were 203 priority species and 1 presumed extinct species found throughout the Shire of Plantagenet (see Table 7). Where these species are deemed to be fire sensitive or fire dependent will be identified as part of the risk assessments for these assets that are recorded in BRMS and an appropriate treatment assigned.



* **Note.** Categories shown are as on the original map supplied by the Department of Agriculture for the 1999 Draft Rural Strategy. Although categories are difficult to distinguish, and in some cases land tenure is incorrect, the figure serves to illustrate the total extent of vegetation cover within the Shire.

FIGURE 9.

Source. Department of Agriculture as shown in *Shire of Plantagenet Draft Rural Strategy* (Ayton, Taylor & Burrell 1999)

Fig 24 Remnant Vegetation Shire of Plantagenet

Table 7- Conservation status species within the Shire of Plantagenet

Conservation Status	Species	Records
Non-Conservation Taxon	2010	10987
Presumed Extinct	1	2
Priority 1	6	29
Priority 2	44	195
Priority 3	52	255
Priority 4	59	455
Rare or Likely to become extinct	42	542
TOTAL	2214	12456

Vegetation response to fire is a consideration when planning mitigation activities. Human settlements are a priority for bushfire mitigation, but consideration is also given within the treatment planning phase to species that are sensitive to, or will not recover from changes to the established fire regime. Within the Shire of Plantagenet there is fire response data for 26% of the recorded species, 11.3% of species will be killed in fires resulting in 100% scorch and 14.7% will survive 100% scorch through seed bank survival, lignotuber re-sprout or epicormic growth. A summary of the number of species recorded in the Shire and their known response to fire is provided at Table 8.

A fire regime that is appropriate for the vegetation community and reflects the objectives for asset protection may be challenging to achieve in some locations, but where possible will ensure species health and diversity. Appropriate monitoring and fuel sampling of the individual vegetation communities will ensure biodiversity is maintained at current levels and a balance between community safety and the environment is maintained.

Table 8 - Species response to Fire within the Shire of Plantagenet44

Response to fire	Number of Species recorded *	% of species recorded
100% scorch kills, on plant seed storage	35	1.5
100% scorch kills, in soil seed storage	176	8
100% scorch kills, no seed storage	9	0.4
Survives 100% scorch, soil suckers	109	4.9
Survives 100% scorch, basal sprouts	107	4.8
Survives 100% scorch, epicormics	20	0.9
Survives 100% scorch, large apical bud	8	0.3
Killed by 100% scorch	29	1.4
Survives 100% scorch	8	0.3
Ferns and allies (spores)	2	0.1
Geophyte (Survives 100% scorch	68	3.4
No Data Available	1643	74
Total	2214	100

Fauna

Data sourced from DBCA's Nature Map records 1522 species of fauna from the Plantagenet area. Based on distribution data from DBCA, 53 species of threatened and priority fauna have been recorded or sighted throughout the Shire of Plantagenet.

The Quokka is an example of a fire threatened species that occur in the Shire of Plantagenet. These small marsupials are known to inhabit more mesic parts of the landscape, such as swamps and creeks that can support dense vegetation, where fire plays an important role in maintaining the habitat of this threatened species. Inappropriate fire regimes, including intense bushfires can threaten their populations. In the 2015 O'Sullivan bushfires, 100,00 hectares of known Quokka habitat was affected and thought to have reduced the suitable Quokka habitat by an area of 90%.

[44] Nature Map

Fire management for Quokka conservation is based on using prescribed burning to either protect healthy habitat and populations from bushfire, or to regenerate senescent habitat that is no longer occupied by Quokkas. Habitat protection burns are carried out in spring, when upland forest is sufficiently dry to burn and creeks and swamps are too moist to burn.

Using prescribed burning to reduce the risk of large-scale landscape fires also prevents tree hollows and larger trees from being affected, which are critical components of some threatened species' habitats.

Table 9 -Conservation Status of species within the Shire of Plantagenet45

Conservation Status	Species	Percentage of total species
Non-Conservation Taxon	1489	96
Other specialty protected Fauna	5	.4
Priority 2	2	.2
Priority 3	2	.2
Priority 4	7	.6
Protected under international agreement	7	.6
Rare or Likely to become extinct	30	2
TOTAL	1522	100

3.2.5 Bushfire Frequency and Causes of Ignition

Table 10 presents a summary of the causes of vegetation and agricultural fire ignitions within the Shire between 2009 and 2020. The major cause of ignition is from human activities, as is the case in many areas of Western Australia. Based on the fire ignitions recorded, 22% were burn offs/re-ignitions, 16% were suspicious and 13% started from lightning. In 18% of fires the cause was unreported by the attending brigade. Lightning storms provide a potential source of ignition for

[45] Nature Map

bushfires between October and March in most years.[46] However, ignitions are more frequent during the passage of dry lightning storms, with strong winds and no (or limited) accompanying rainfall.

There are two major highways that transect the Shire of Plantagenet, Muir Hwy, East/West and the Albany Highway, North/South. Both highways are heavy transport routes for both the general public and freight which contribute to fires occurring along these routes. In general more concentrated human activity contributes to more ignitions (and more reporting of ignitions) (See fig 26 & 27) Concentrated mitigation programs to reduce fuel through infrastructure corridors (Main Roads, Rail, Power) and awareness raising to the causes of bushfires and mitigation strategies in the community are important to the shire of Plantagenet to mitigate this cause of un planned fire in the landscape.

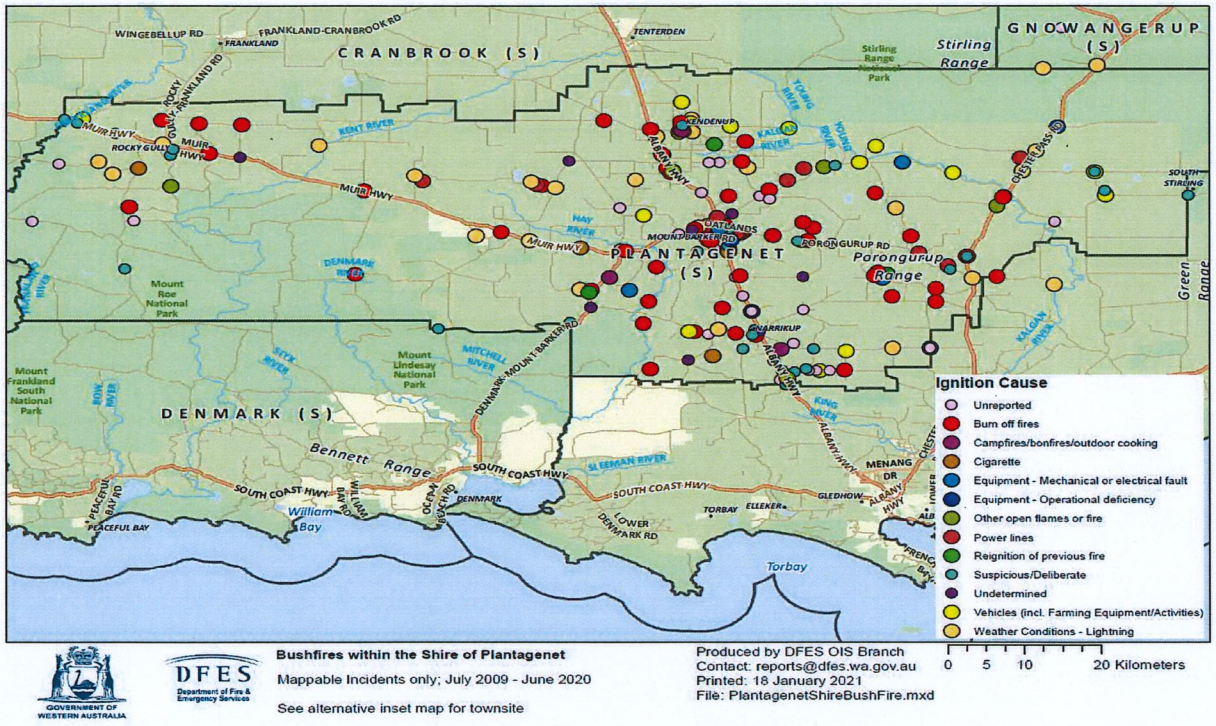


Fig 25- Bushfires within the Shire of Plantagenet[47]

[46] N. Burrow., L. McCaw (2013) 'Prescribed burning in southwestern Australian forests', The Ecological Society of America 11 (Online issue 1).

[47] DFES Risk, Capability and Analysis

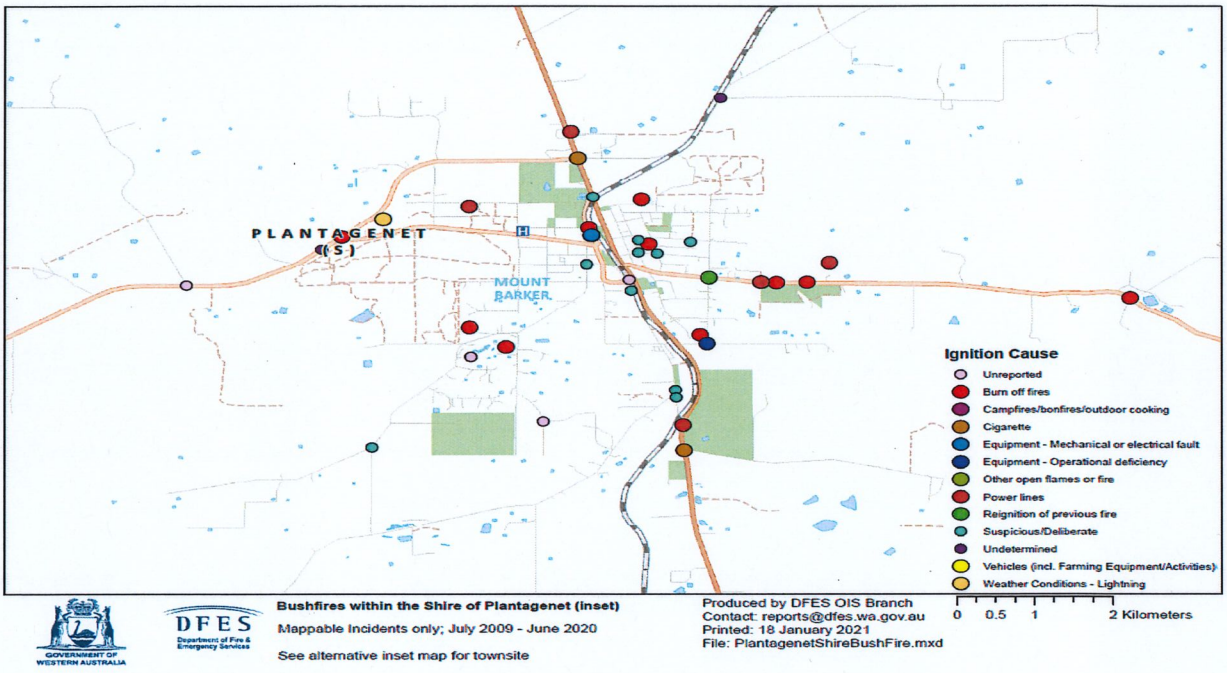


Fig 26 - Bushfires within the town of Plantagenet (inset)[48]

Table 10 - Summary of causes of ignition Shire of Plantagenet[49]

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	Total
Total Number of Bushfires:	**33**	**21**	**31**	**20**	**44**	**32**	**40**	**31**	**37**	**35**	**30**	**355**
Animal	1	0	0	0	0	0	0	0	0	0	0	1
Burn off fires	2	3	5	2	9	6	7	8	12	9	13	63
Campfires/bonfires/outdoor cooking	0	0	0	0	0	0	1	0	1	1	1	3
Cigarette	1	0	0	0	2	1	1	4	0	0	0	9
Electrical distribution Exc Power lines	0	0	2	0	0	0	0	0	0	0	0	2
Equipment - Mechanical or electrical fault	0	1	0	2	0	1	0	1	0	1	0	6
Equipment - Operational deficiency	0	0	0	2	0	0	0	0	0	0	0	2

[48] DFES Risk, Capability and Analysis
[49] DFES Risk, Capability and Analysis

Fireworks /Flares	0	0	0	0	0	1	0	0	0	0	0	1
Hot works (grinding, cutting, drilling etc..)	0	0	0	0	0	0	0	1	0	0	1	1
Improper Fuelling/Cleaning/storage/Use of Material ignited	0	0	0	0	2	0	0	0	0	0	0	2
Other open flames or fire	1	1	0	0	1	2	0	0	1	2	0	8
Power lines	2	0	0	2	1	2	2	1	2	1	1	13
Re-ignition of previous fire	1	1	2	0	0	1	1	4	1	0	0	11
Sleeping/Alcohol/Drugs/Physical -Mental impairment	0	0	0	0	0	0	1	0	0	0	0	1
Suspicious/Deliberate	5	2	3	2	16	3	4	2	12	6	3	55
Undetermined	2	3	3	2	2	1	2	0	0	4	0	19
Unreported	13	3	6	4	5	4	5	9	4	7	9	60
Vehicles (incl. Farming Equipment/Activities)	1	6	0	0	4	5	2	0	3	2	1	23
Weather Conditions - Lightning	4	1	10	4	2	5	14	1	1	2	1	44

As there are generally only a small number of days each year in which the FDI is above 50 (Severe – Catastrophic FDR) in the Shire of Plantagenet, there is some complacency within the community with respect to their perceptions of the bushfire risk and potential for large scale bushfires to impact the shire.

Due to pastured agricultural land being adjacent to, and intermixed with areas of heavily vegetated land, there is potential for large scale landscape fires to move rapidly; such as the December 2001 fire which ran from north of the Mt Barker town site, southwards through the town and reached as far as the sales yards in approximately 4.5 hours. The fire burnt approximately 1000ha, including areas in the centre of Mt Barker town site (See Figure 28). The estimated losses were in excess of $1 million, with 1 home, ancillary accommodation, 7 vehicles, 12 sheds, 100km of fencing, 600 head of stock, and farm equipment were lost in the event. The fire was thought be started from power lines clashing in high winds. The weather conditions on the day were conducive for a fast-moving fire, with the temperature reported as 41°C and 44km/hr winds. The estimated rate of spread for the fire was 15km/hr.

There were numerous fires occurring across the district at the same time, placing additional pressure on response resources. A fire at Two Peoples Bay had the potential to cut the water supply to Mt Barker, which would have further hampered efforts to control the fire.
Impacts from a fire of this size running through populated areas of the Mt Barker town site were numerous. Albany Highway was closed, blocking transport routes to and from Albany and impacting evacuation efforts. The Plantagenet Hospital and Nursing Home were evacuated and hundreds of people were relocated over the course of the fire.

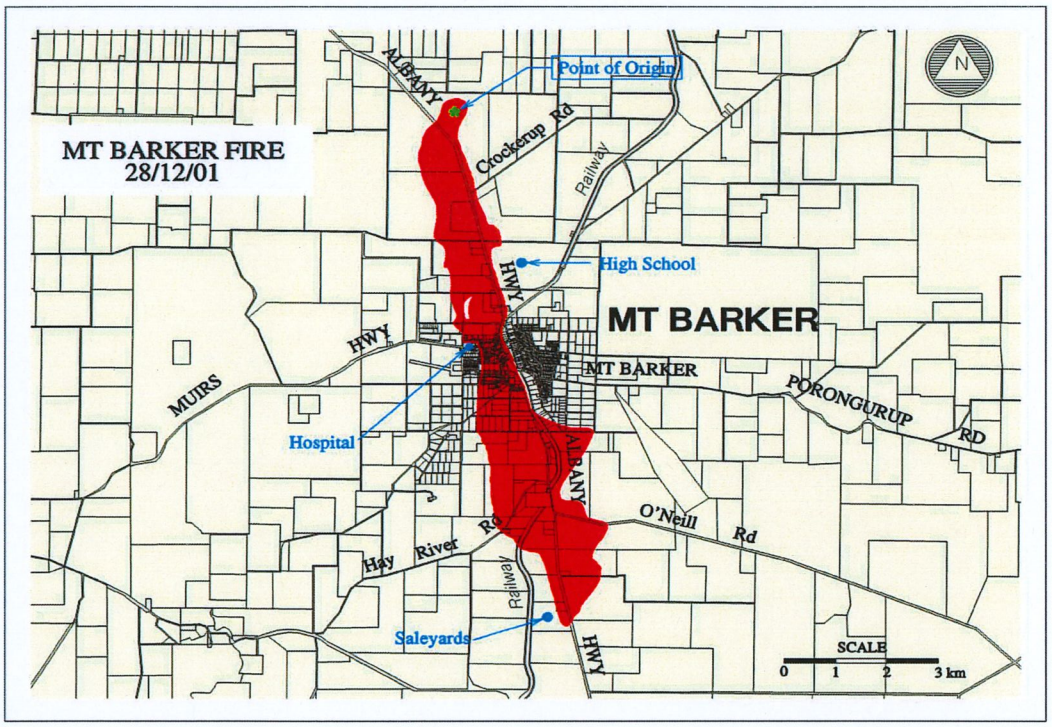


Fig 27 - Mt Barker Fire 2015

The Stirling Ranges have been the source of several large-scale fires that have impacted the surrounding communities. The most recent have been:

Pillenourup Track Fire (2018)
Occurred on the 24th of May from an escaped prescribed burn. The weather conditions at the time were unprecedented for that time of year. There were over 60 individual fires burning across the Great Southern region and resources were at capacity. The Pillenourup Track fire burnt through 15,000 hectares of national park and farmland over 5 days. Losses were mainly confined to fencing, livestock, flora and fauna.

Mondurup Peak Fire (2019)
Occurred on the 6th of December from a lightning strike in the Stirling Range National Park. The fire burnt out approximately 3700 hectares over 3 days. Losses were confined to the park with habitat and biodiversity values being the major loss. This fire was held to its individual cell which is unusual due to the difficulties this terrain and volatile vegetation poses to suppression activities. Early defensive lighting strategies were employed that halted the head fire run the following day. Collaboration between agencies and Local Government greatly assisted in the successful outcome of this fire

Mt Success Fire (2019)
Occurred on the 26th of December from a lightning strike within the Stirling Range National Park, it burnt through 37,000 hectares over 14 days and resources were stretched to contain it to the national park boundaries. Losses recorded were the ranger station, a house, vehicle, signage, track and road infrastructure, and biodiversity values (flora, fauna, habitat etc).

For the majority of landscape fires in the Stirling Ranges, lightning has been the primary cause of ignition.

The Porongurup National Park is also the site of major landscape fires, which can be difficult to contain to the park boundaries due to the terrain. In 2007, a fire started in the south west corner of the national park and moved rapidly, impacting the community and burning through 6,800 hectares, including most of the national park. Losses included houses, fencing, the Ironbark Winery, livestock, infrastructure and biodiversity values. The Porongurup town site was evacuated and one person received significant burns during the fire.

Tenterden Fire (2003)
The other significant fire event to impact the Shire was the 2003 Tenterden Fire. This fire occurred on the 27th of December and impacted the Shires of Cranbrook and Plantagenet. The fire stated to the north of the Tenterden town site and travelled rapidly to the south east. The cause was found to be clashing power lines.

The fire travelled 23km over 4 hours, into the Stirling Range National Park. Peak rates of spread were recorded at 20km per hour, during the four-hour period. It burnt through 10,000 hectares of land and caused an estimated $12 million of damage to fencing, livestock, farm commodities, houses, sheds and critical infrastructure. Tragically, two women lost their lives while trying to escape the fire. Community messaging has been targeted towards the importance of leaving early in the event of a bushfire threatening the area.

Management of incidents from a Local Government level have benefited from the learnings during this incident they include

- *LG Liaison officers appointed as part of the IMT*
- *Local Governments and Local Emergency Coordinators shall, through their Local Emergency Management Committees (LEMCs) ensure that evacuation centres are clearly identified in the community, and that responsibilities for activation and management are clearly understood through local planning.*
- *Under State Emergency Arrangements, Policy Statement 7, Local Governments shall maintain effective Local Emergency Management Committees to operate in parallel to the Hazard Management Agency at significant incidents.*
- *Management of any emergency requires someone in authority to assess the incident and then establish an effective management structure, i.e. An Incident Management Team.*
- *Training programs with rural volunteers, need to include references to changing farming practices, such as those detailed below:*
    - *Knowledge of interceptor banks,*
    - *Paddocks are not necessarily square with gates in the corner,*
    - *The increasing influence of land features such as creek crossings, salt flats and soft sand areas (especially relevant to dual-wheeled appliances),*
- *The need to manage the mop-up of pockets of native vegetation on farms and adjoining areas.In significant emergencies, it is essential Media Liaison Officers (MLOs) are quickly appointed as part of any IMT in order that accurate and timely information can be provided to the public.*
- *All Hazard Management Agencies (HMAs) need to establish incident management structures appropriate for the severity of the emergency, in order that appropriate liaison and communications processes are quickly in place.Compatible radio communication systems need to be put in place to ensure different agencies can effectively communicate with each other. Specifically in this situation, the recommendation states that VHF Radios (e.g. VHF hand held radios) be supplied to local WA Police Service in order to facilitate better communications during any future bush fire incidents*
- *The Shire of Cranbrook's BFB VHF radio communications repeater equipment be examined with a view to upgrading and carrying out any remedial works to a DFES*
- *Local Governments be encouraged to maintain clearly documented Radio Communications plans as part of their fire management strategies and have provision in planning for the failure of a repeater tower.*
- *Vehicle deficiencies are raised with DFES. During combat of the fire, the following equipment deficiencies were identified:*
- *Plastic fittings on fire trucks,*
- *Failure of air over electric, tank to pump valves through exposure to ash and dirt, and*
- *Dual wheeled appliance becoming bogged in soft sand in paddocks.*
- *These deficiencies shall be referred to the Fire Services Vehicle and Equipment Advisory Committee of DFES.*

- *That Department of Main Roads be advised that when planting roadside vegetation, consideration needs to be given to firefighting operations, allowing for periodic gaps in the vegetation which could be used as containment points during wildfire management.*
- *The issue of road closures must be discussed at the appropriate level to ensure roles and responsibilities of police, local governments and DFES, are clearly understood.*
- *The Cranbrook and Plantagenet Shires liaise with DFES to arrange additional community fire safety and bush firefighter training*
- *Initial damage assessments should be conducted with due cognizance of the victims' situation, and pending any insurance assessments.*
- *Local Governments be made aware of the need to have clearly documented Recovery Plans and the commitment to implement those plans as soon as possible during significant emergencies.*
- *That the Fire Services Vehicle and Equipment Advisory Committee, along with other regional input, re-appraise the equipment assigned to country bushfire brigades, in order that the equipment will closely align with their identified risk, ease of training, simplicity of maintenance and operations, and cost.*

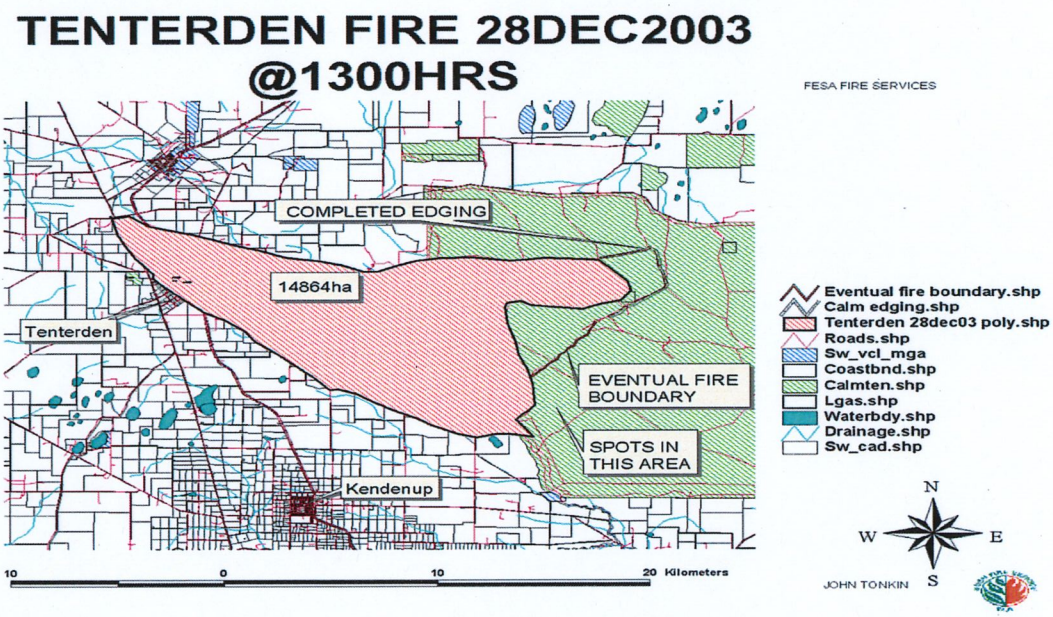


Fig 28 - Fire Shape - Tenterden Fire

3.2.6 Current Bushfire Risk Management Activities

Local Government Wide Controls are activities that reduce the overall bushfire risk within the Shire of Plantagenet. These types of activities are not linked to specific assets and are applied across all or part of the local government as part of normal business or due to legislative requirements. Some notable controls currently in place in Shire of Plantagenet are:

- Bush Fires Act 1954 Section 33 notices, including applicable fuel management requirements, firebreak standards and annual enforcement programs;
- Declaration and management of Prohibited Burn Times, Restricted Burn Times and Total Fire Bans for the local government;
- Public education campaigns and the use of 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;
- State-wide arson prevention programs developed in conjunction with WA Police and DFES;
- State planning framework and local planning schemes, implementation of appropriate land subdivision and building standards in line with DFES, Department of Planning and Building Commission policies and standards;
- Monitoring performance against the BRM Plan and reporting annually to the local government council and OBRM;
- Regular Bushfire Advisory committee meetings to review current practices;
- Quarterly Local Emergency Management group meetings consisting of representatives from Various emergency, essential services and infrastructure management; and

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

Roadside Fire Management

The Shire of Plantagenet has a robust internal process to assess applications from the public requesting to address high fuel loads within road reserves in the Shire of Plantagenet. This process ensures environmental and heritage values are adequately considered before fuel reduction activities are undertaken.

The WA Roadside Conservation Committee's (RCC) guidelines on roadside fire management states:

- roadside burning should not take place without the consent of the managing authority;
- local government authorities should adopt by-laws to control roadside burning;
- roadside burning should be planned as part of a total shire / area Fire Management Plan;
- only one side of a road should be burnt in any one year; *this will ensure habitat retention for associated fauna and also retention of some of the scenic values associated with the road;*
- when designing a Fire Management Plan, the two principles which must be kept in mind are the ecological management of vegetation and the abatement of fire hazard;

- no firebreaks should be permitted within the road reserve unless the width of the roadside vegetation strip is greater than 20m;
- a firebreak on any road reserve should be permitted only when, in the opinion of the road manager, one is necessary for the protection of the roadside vegetation. The road manager shall specify the maximum width to which the break may be constructed; and
- in the case of any dispute concerning roadside fire management, the Department of Fire and Emergency Services (DFES) should be called in to arbitrate.

Before any decision is made to burn a road verge, particularly if threatened flora is present, the proponent should be aware of all values present and the impact the fire will have. It is illegal to burn roadsides where threatened flora is present without written permission from the Minister for the Environment. Fire can also be particularly destructive to heritage sites of either Aboriginal or European origin.

More information about fire management in roadsides can be found in the RCC's publication, *Biodiversity Conservation and Fire in Road and Rail Reserves: Management Guidelines* (2011).

Map of Bushfire Prone Areas

The intent of the WA Government's Bushfire Prone Planning Policy is to implement effective risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure. The State Planning Policy 3.7 – Planning for Bushfire Prone Areas ensures bushfire risk is given due consideration in all future planning and development decisions. This policy does not apply retrospectively, however the BRM Plan can help address this risk for existing development and establishing an effective treatment plan to manage the broader landscape and any unacceptable community risks. The Shire of Plantagenet Bushfire Prone Areas are shown in Figures 31-35.

Broad-scale mapping of bushfire prone areas within the Shire of Plantagenet indicates that large parts of the district are bushfire prone. Bushfire Prone Areas are subject to increased planning and construction requirements provided for under the Planning and Development (Local Planning Scheme amendment) Regulations 2015. This includes areas mapped as bushfire prone in the population centres of Mt Barker, Porongurup, Kendenup, Rocky Gully and Narrikup.

Bushfire remains the highest natural hazard risk to the community from an emergency management perspective, followed by flood. The Shire is faced with an increased bushfire risk to people and property due to a drying climate, development in high fuel load areas (Urban Rural Interface), significant tourist numbers for a portion of the year, and increasing pressure on fire brigade volunteers to support fire mitigation and response requirements, along with the ageing volunteer demographic.

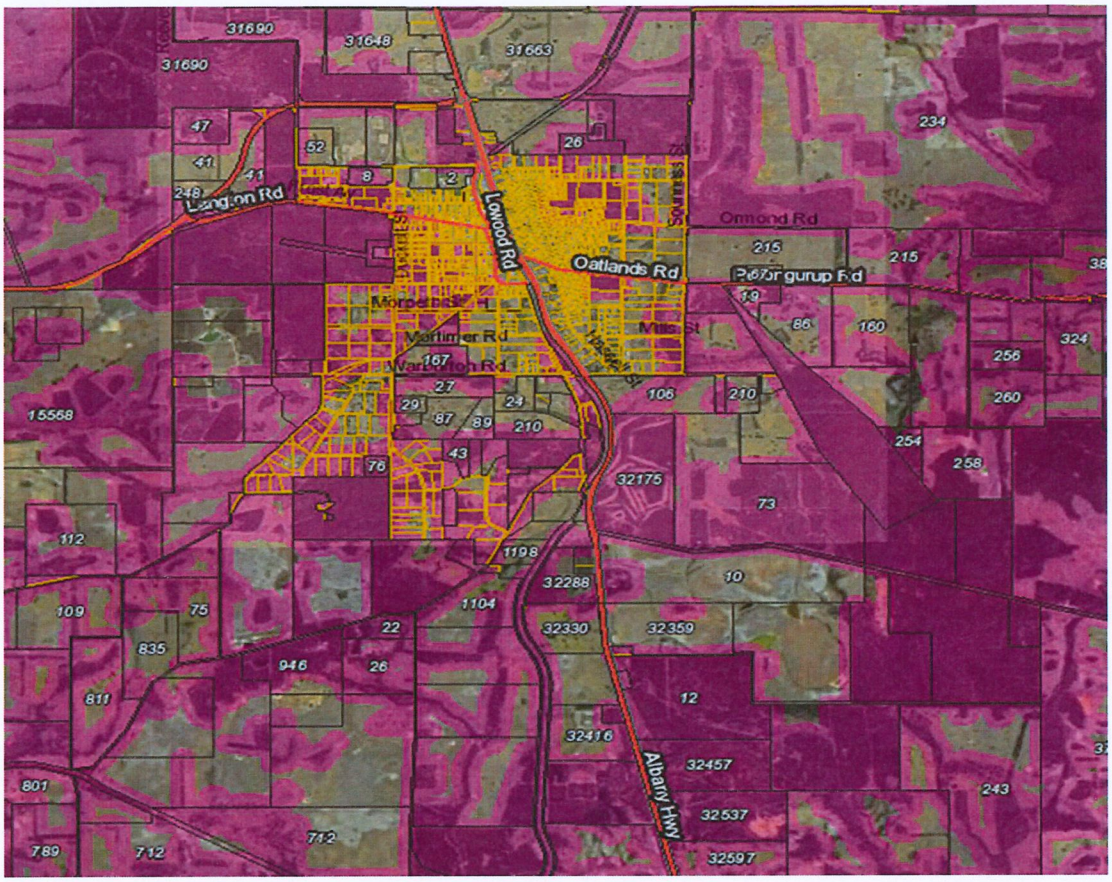


Fig 29 Bushfire Prone areas Mt Barker

Fig 30 Bushfire Prone areas Rocky Gully

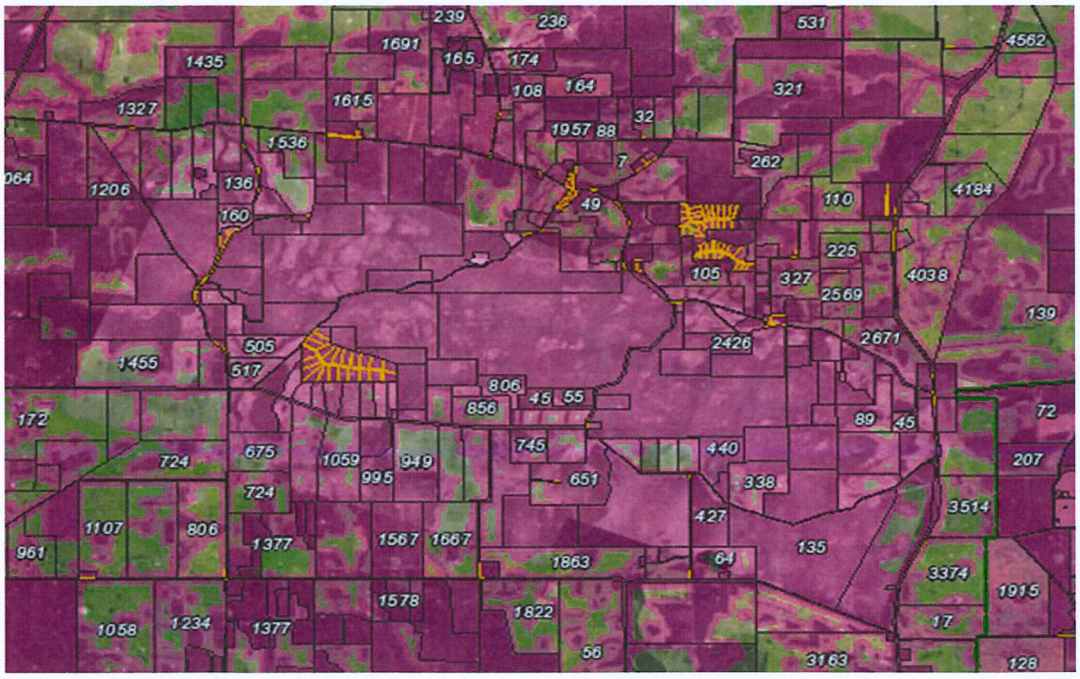


Fig 31 Bushfire Prone areas Porongurup

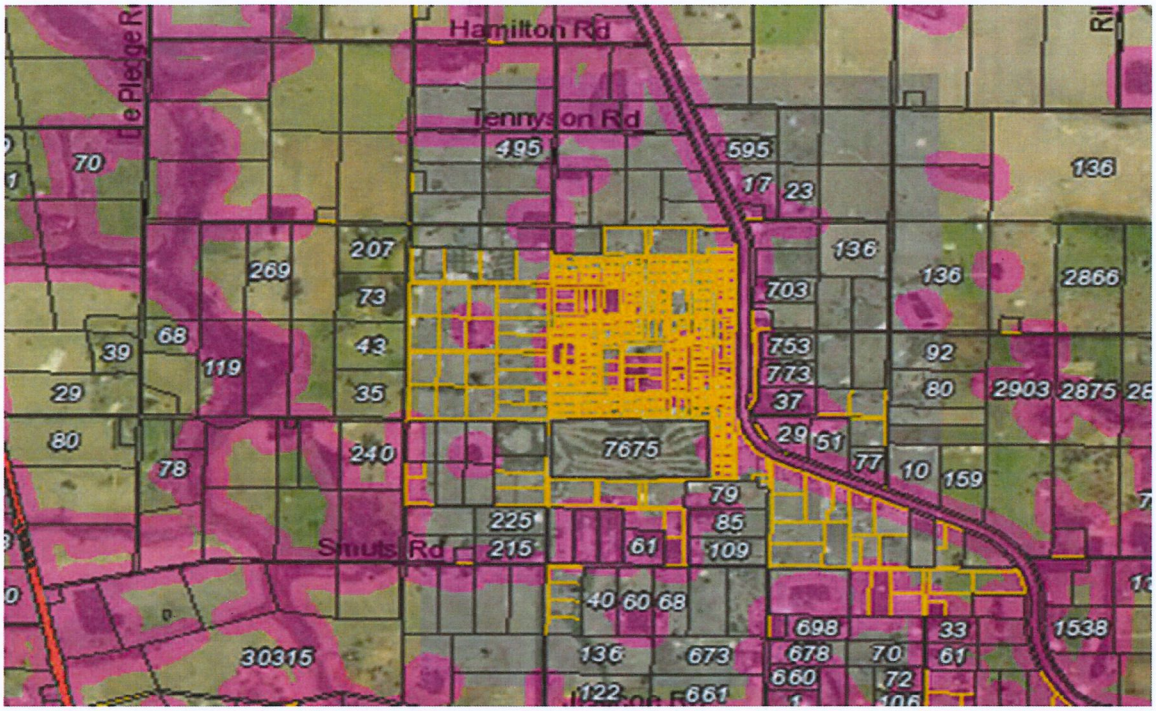


Fig 32 Bushfire Prone areas Kendenup

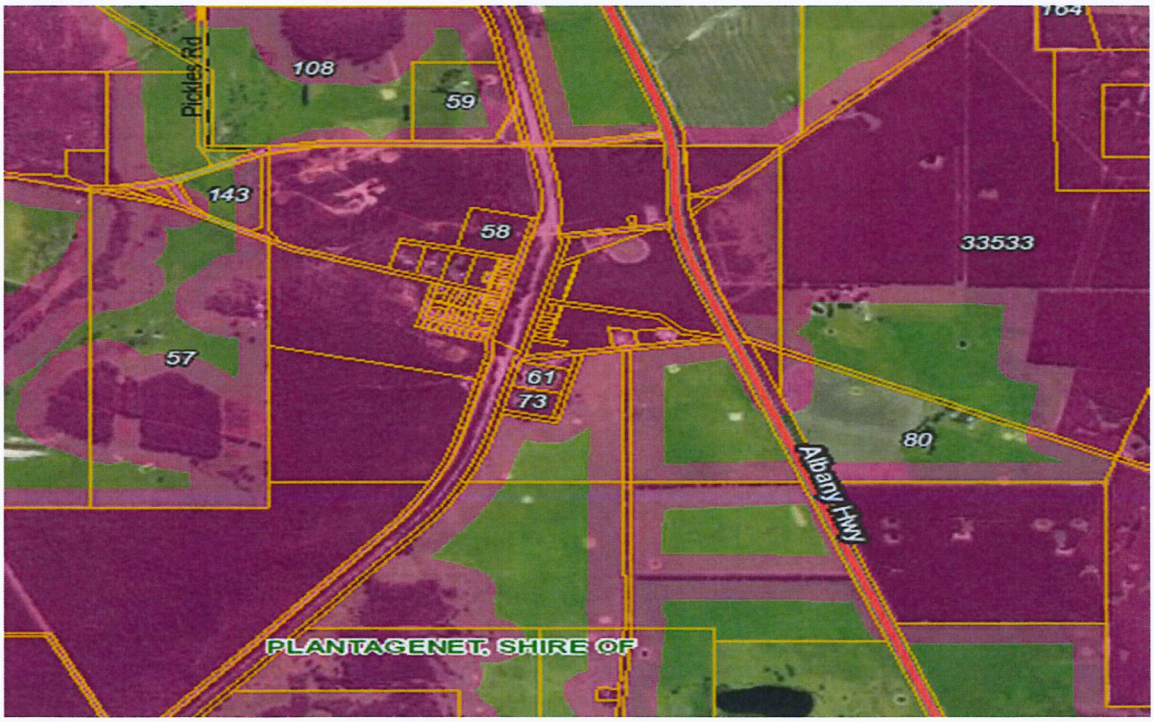


Fig 33 Bushfire Prone areas Narrikup

Volunteer Fire Brigades/additional resources

Bushfire response in the Shire of Plantagenet is wholly undertaken by volunteers.

There are 12 brigades within the Shire of Plantagenet comprising one Volunteer Fire and Rescue Service (VFRS) unit, which is coordinated by the Department of Fire and Emergency Services (DFES), and 11 Bush Fire Brigades coordinated by the Shire of Plantagenet. The Shire also employs a Community Emergency Services Manager (CESM) in conjunction with DFES to assist with the administration and coordination of these brigades.

The rate of volunteerism within the shire was 30.8% in the 2016 Census. This is significantly higher than the State average of 19%.[50] In line with the age demographic for the Shire, there are a significant number of volunteers who are over 50 years of age. This is of huge benefit to the community in the depth of local knowledge, confidence and connection around bushfire and response in the community, but is leading to issues with crew turnaround and longevity under some arduous conditions. There is a great willingness to pass on experience to the next generation of volunteers within the community. However, as with the state-wide trend there is a reduction in younger volunteers within the community. Methods of recruiting and retaining a younger demographic, whilst retaining the wealth of experience that already exists within our volunteer community are being explored and remain a challenge for those involved in the emergency management sector of the Shire.

The **Porongurup** Volunteer Bush Fire Brigade currently has three fire trucks two of which are to the north and one is located to the south of the Porongurup Range. The Department of Biodiversity Conservation and Attractions (DBCA), which manages the National Park, also has a range of firefighting appliances which can be brought in in case of fire and access to water bombers based in Albany. The timber companies also provide fire units.

Rocky Gully currently has a standpipe, Local Volunteer Bushfire Brigade shed and one fire truck.

Narrikup Volunteer Bushfire Brigade has two appliances and a standpipe

Kendenup Has three fire trucks with hydrant service and standpipe

[50] Abs http://quickstats.censusdata.abs.gov.au

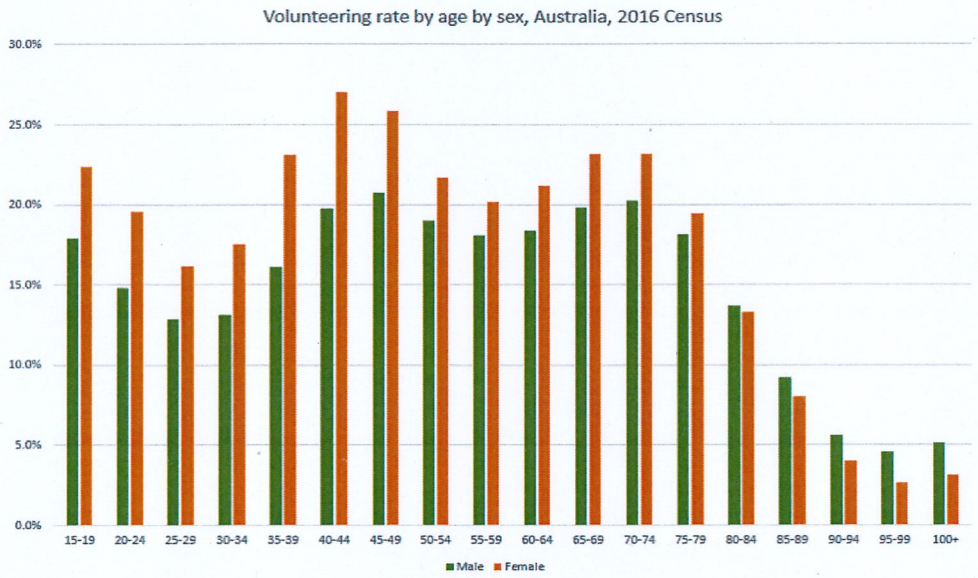


Fig 34 - Volunteering by age by sex, Australia

Table 11- Brigade and resource numbers

Brigade	Volunteers	Resources
Denbarker	23	2.4 Broadacre
Forest Hill	22	2.4 Broadacre
Kendenup/Mortigallup	60	3.4 /4.4 Broadacre/4.4 Broadacre
Middle Ward	48	2.4 Rural/2.4 Broadacre
Narpyn	42	2.4 Broadacre
Narrikup	39	2x 2.4 Broadacre
Perillup	23	2x 2.4 Broadacre
Porongurup	41	2x4.4 Broadacre / LT
Porongurup South	36	2.4 Broadacre
Rocky Gully	29	2.4 Broadacre
Woogenellup	32	4.4 Broadacre
Plantagenet VFRS	22	HSR, LT
Total	417	20

Through FIFWA, commercial plantation growers and managers actively participate in a Plantation Fire Co-operative. The purpose of this fire cooperative to date has been to

facilitate a coordinated approach to fire preparedness, mitigation and when necessary, suppression. Within this co-operative are minimum requirements and specifications for plantation companies' fire appliances that are agreed and updated yearly. This agreement involves the sharing of resources when fire threatens another company's assets. The industry also participates in staff training to ensure DFES requirements are met.

The Shire has entered into a Memorandum of understanding (MOU) with FIFWA to enable the forest industry to formally cooperate with state agencies and the local government to provide staff and equipment to carry out fire suppression on public and private land, in addition to their own independent bushfire control activities.

DBCA have significant tenure within the Shire managed by both the South Coast and Warren regions and as such are available to respond to bushfire events within the Shire on DBCA managed land. The agency is also available to offer support in the form of equipment and expertise, as required by the Shire.

Burning Restrictions

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 Shire of Plantagenet's Restricted and Prohibited Burning Times are as follows:

EASTERN ZONE	WESTERN ZONE
Restricted Burning Time 3 October to 14 November	**Restricted Burning Time** 2 November to 14 December
Prohibited Burning Time 15 November to 28 February and Good Friday	**Prohibited Burning Time** 15 December to 28 February and Good Friday
Restricted Burning Time 1 March to 30 April	**Restricted Burning Time** 1 March to 30 April

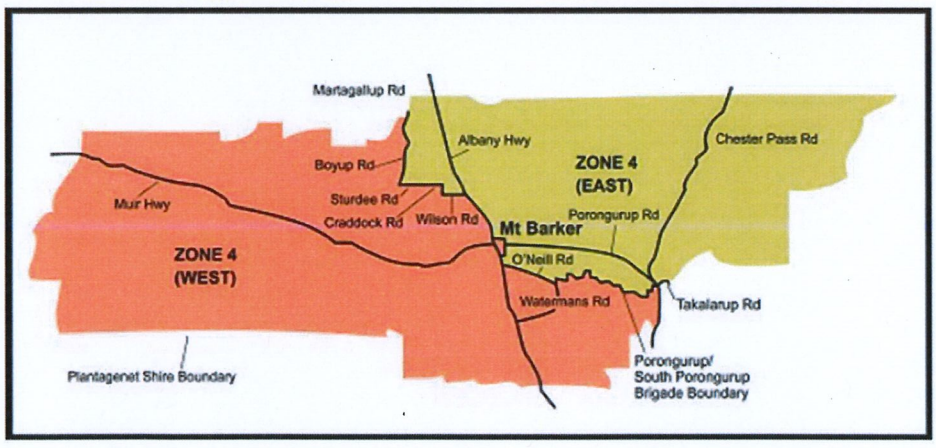


Fig 35 - Zones and burning restrictions within the Shire of Plantagenet

The Shire has the ability to vary these times depending on seasonal conditions. There is also a Harvest and Vehicle Movement Ban imposed by the Shire of Plantagenet on Christmas Day (25th December) each year. The Shire maintains a Harvest Ban Hotline, which enables residents to be informed, via SMS, when Harvest Bans have been applied and removed.

Bush Fires Act 1954 Section 33 Fire Management Notices

The Shire issues an annual firebreak notice in accordance with Section 33 of the *Bush Fires Act 1954*. Also included in the notice is information about burning permits, Restricted & Prohibited Burning Times and contact details for local Fire Control Officers & Radio Operators. This notice is sent to residents with their rates notice each year. The notice can also be found on the Shire's website. The intent of the Fire Control Notice is to ensure private property owners manage fire hazards and maintain Asset Protection Zones and fire breaks over the high threat period, so they do not contribute to the overall risk in the community and properties are accessible to responding personnel in the event of a fire.

Ranger Services generally have an additional employee over the compliance period to expedite the inspection process. Inspections are carried out on properties prior to the commencement of the time period nominated in the Notice and those property owners found not to comply are provided with further education on the measures that must be in place and their requirement to comply. Generally, this results in a high level of compliance throughout the Shire. If properties are still found to be non-compliant, then work will be carried out by the Shire and costs recovered from the property owner (as per Section 33).

Community Engagement Activities

In recent years there has been an increase in the use of social media to communicate bushfire alerts and warnings to the community and provide information about prevention and preparedness activities. The Shire and local residents make use of social media applications such as 'Facebook' and the Shire's website in order to keep the community informed.

Recently, the Shire of Plantagenet in conjunction with DFES has been proactive in supporting the community to implement the bushfire preparedness program - Bushfire Ready. This program is gaining momentum within the Shire and aims to improve personal bushfire preparedness at the household and neighbourhood level.

The Shire of Plantagenet was one of three Local governments to participate in the *"Bushfire Resilience in the Great Southern"* (BRIGS) Project. This project aimed to increase bushfire resilience within the identified communities by using Bushfire Attack Level contour mapping to show the potential impact of radiant heat on urban areas and the effect of proposed treatment programs. The

BRIGS Project also mapped potential bushfire scenarios to assist the local government in evacuation planning for the community.

The mapping and other project outputs were used to evaluate the effectiveness of the proposed treatments for the identified communities. This led to an increase in risk awareness, a deeper understanding of the importance of personal preparedness and a greater sense of the impacts of individual action and compliance with the fire control notice on reducing risk to the wider community.

At the conclusion of the project, the Shire of Plantagenet engaged a private consultant to run educational workshops for the community and shire staff on APZ standards, achieving a balance between preserving biodiversity and managing for fire protection, retrofitting buildings to reduce the impact of ember attack and overall landscape design. These sessions were well attended throughout the community.

Fire Working Groups and Management Programs

A number of State agencies implement annual works programs that contribute to bushfire risk management within the Shire. These include:

- DFES - UCL/UMR management program
- DBCA - Master Burn Program and UCL/UMR management program
- Water Corporation - Bushfire Risk Management Program and Plan
- Western Power - annual asset inspection and vegetation management program
- Department of Education - Memorandum of Understanding with DFES in regard to bushfire risk assessment and planning for schools in Bushfire Prone Areas
- Main Roads WA - Bridge Assessment and Maintenance Works Plan

There are three multi agency / stakeholder working groups operating within the Shire of Plantagenet aimed at improving the coordination of bushfire mitigation programs and activities. These groups are:

Porongurup Area Bushfire Mitigation Group – this group aims to provide a more holistic approach to bushfire mitigation in the broader Porongurup area, including the Porongurup National Park. Its Membership consists of:

- Poronguup brigade Fire Control Officers
- DBCA district fire control officer
- DBCA regional Manager
- DFES Area Officer
- Shire of Plantagenet Community Emergency Services Officer
- Friends of the Porongurups

- Mira Flora Residents
- Grape Growers Association

The Porongurup Group has improved communications between the various interest groups around the Porongurup improving the execution and effectiveness of mitigation strategies aimed at protecting the National Park and the Surrounding Community

Stirling Range Working Group –Focuses on management of the Stirling Range National Park and includes representation from the, Shires of Plantagenet, Cranbrook and Gnowangerup, the City of Albany, state agencies and the community.

Shire of Plantagenet Bushfire Mitigation Working Group - A new Shire wide group formed to support development and implementation of the BRM Plan and associated treatment schedule.

- Chief Bushfire Control Officer
- Manager Works and services
- Shire of Plantagenet Community Emergency services Manager
- Community members

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 and recorded in BRMS. Identified assets are categorised into the following categories and subcategories provided in Table 3.

Table 12 – Asset Categories and Subcategories

Asset Category	Asset Subcategories
Human Settlement	**Residential areas** Residential areas, including dwellings in rural areas and the rural-urban interface. **Places of temporary occupation** Commercial and industrial areas, mining sites or camps and other locations where people may work or gather. **Special risk and critical facilities** Locations and facilities where occupants may be especially vulnerable to bushfire for one or more of the following reasons: • Occupants may have limited knowledge about the impact of bushfires; • Occupants may have a reduced capacity to evaluate risk and respond adequately to bushfire event; • Occupants may be more vulnerable to stress and anxiety arising from a bushfire event or the effects of smoke; • There may be significant communication barriers with occupants; • Relocation and/or management of occupants may present unique challenges or difficulties, such as transportation, or providing alternative accommodation, healthcare or food supplies; or • Facilities that are critical to the community during a bushfire emergency.
Economic	**Agricultural** Areas under production, such as pasture, livestock, crops, viticulture, horticulture and associated infrastructure. **Commercial and industrial** Major industry, waste treatment plants, mines (economic interest), mills, processing and manufacturing facilities and cottage industry. **Critical infrastructure** Power lines and substations, water pumping stations, tanks/bores and pipelines, gas pipelines, telecommunications infrastructure, railways, bridges, port facilities and waste water treatments plants. **Tourist and recreational** Tourist attractions, day-use areas and recreational sites that generate significant

Asset Category	Asset Subcategories
	tourism and/or employment within the local area. These assets are different to tourist accommodation described as a Human Settlement Asset (see above). **Commercial forests and plantations** Plantations and production native forests. **Drinking water catchments** Land and infrastructure associated with drinking water catchments.
Environmental	**Protected** Flora, fauna and ecological communities that are listed as a: • Critically Endangered, Endangered or Vulnerable species under the Environmental Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act 1999) (including associated critical habitat); • Critically Endangered, Endangered or Vulnerable species under the Biodiversity Conservation Act 2016; • Critically Endangered, Endangered or Vulnerable ecological community under the EPBC Act 1999 (Cth); • Critically Endangered, Endangered or Vulnerable Threatened Ecological Community (TEC) endorsed by the Minister for Environment (WA); • Fauna protected under international conventions; and • Ramsar wetlands of international importance. **Priority** Flora, fauna and ecological communities that are a: • Priority species listed on the Priority Flora or Priority Fauna Lists held by DBCA (Priority 1-5). • Priority Ecological Community (PEC) (Priority 1-5); and • Wetlands of national or state importance. **Locally important** Species, populations, ecological communities or habitats that the local community or independent scientific experts consider important for the area and for which there is some scientific evidence that protection would be beneficial. Wetlands of local importance. Sites being used for scientific research.
Cultural	**Aboriginal heritage** Places of indigenous significance identified by the DPLH or the local community. **European heritage** Non-Indigenous heritage assets afforded legislative protection through identification by the National Trust, State Heritage List or Local Planning Scheme Heritage List.

Asset Category	Asset Subcategories
	Local heritage Assets identified in a Municipal Heritage Inventory or by the local community as being significant to local heritage. **Other** Other assets of cultural value to the local community, for example community halls, churches, clubs and recreation facilities.

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.

The Shire has elected not to append a copy of the Asset Risk Register to the BRM Plan due to the nature of the information and it being subject to change over time. Data and information relating to the BRM Plan will be maintained in BRMS and made available to key stakeholders via regular reporting processes.

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 Shire of Plantagenet 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.

The percentage of assets within the local government in each asset category at the time of BRM Plan endorsement is shown in Table 13

Table 13 – Asset Category Proportions

Asset category	Proportion of identified assets
Human Settlement	74%
Economic	16%
Environmental	6%
Cultural	4%

4.3.1 Consequence Assessment

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

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

Consequence Rating – Human Settlement, Economic and Cultural Assets

The outcome or impact of a bushfire event on the asset, or a group of 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.

4.3.2 Likelihood Assessment

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

4.3.3 Assessment of Environmental Assets

Using available biological information and fire history data, environmental assets with a known minimum fire threshold were assessed to determine if they were at risk from

bushfire, within the five-year life of the BRM Plan. Environmental assets that would not be adversely impacted by bushfire within the five-year period have not been included and assessed in the BRM Plan. The negative impact of a fire on these assets (within the period of this BRM Plan) was determined to be minimal and may even be of benefit to the asset and surrounding habitat.

4.3.4 Local Government Asset Risk Summary

A risk profile for the local government is provided in Table 14. This table shows the proportion of assets at risk from bushfire in each risk category at the time the BRM Plan was endorsed.

Table 14 – Local Government Asset Risk Summary

Asset Category	Risk Rating				
	Low	Medium	High	Very High	Extreme
Human Settlement	*28*	*42*	*139*	*77*	*140*
Economic	*4*	*25*	*35*	*20*	*9*
Environmental	*0*	*0*	*0*	*35*	*0*
Cultural	*2*	*4*	*10*	*0*	*1*

5. Risk Evaluation

5.1 Evaluating Bushfire Risk

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

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

5.2 Risk Acceptability

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

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

Table 15 – Criteria for Acceptance of Risk and Course of Action

Risk Rating	Criteria for Acceptance of Risk	Course of Action
Extreme	Requires asset specific treatment strategies to be applied. Treatment action is required within 2 years of the plan being endorsed. It is unlikely that Local Government Wide Controls would be adequate to manage the risk. **Treatment plans to be explored and implemented. Highest level of authority notified.**	Routine controls are not enough to adequately manage the risk. Specific action(s) required in the first 2 years of the BRM Plan. Priorities will include: • Treatments that will have maximum benefit to multiple assets and critical infrastructure • Treatments that benefit vulnerable communities will be given priority. • Identification of partnerships with other agencies for strategic mitigation • Assets within the town site to be included on Fire Break inspection list • Communication with asset owners as per Communication Plan and focus on increasing understanding of the risk facing these assets and how they can reduce the risks. • Assets will be reviewed post treatment
Very High	Requires asset specific treatment strategies to be applied. Treatment action is required within 3 years of the plan being endorsed. It is unlikely that Local Government Wide Controls would be adequate to manage the risk. **Treatment action is required. Senior Shire officers and council notified.**	Specific action(s) required in the first 3 years of the BRM Plan. Priorities will include: • treatments that will have maximum benefit to multiple assets and critical infrastructure • Identification of partnerships with other agencies for strategic mitigation • Assets within the town site to be included on Fire Break inspection list • Communication with asset owners as per Communication Plan and focus on increasing understanding of the risk facing these assets • Assets will be reviewed post treatment

High	Asset specific treatment strategies will likely be required to adequately manage the risk. **Treatment action may be required.**	Routine controls are not enough to adequately manage the risk. Specific action is required within the life of the BRM Plan (5 years). Priorities will include: • Priorities will be made for treatments that will have maximum benefit to multiple assets and critical infrastructure. • Assets that fall adjacent to Extreme or Very High-risk assets • Treatments that benefit vulnerable communities will be given priority. • Identification of partnerships with other agencies for strategic mitigation. • Communication with asset owners as per Communication Plan and focus on increasing understanding of the risk facing these assets • Assets will be reviewed post treatment
Medium	Asset specific treatments are not required, but risk should be monitored. Local government wide controls should be sufficient to manage the risk If there is a change in the landscape / environment these assets may need to be reassessed more frequently. **Treatment action is not required, but risk must be monitored regularly**	Specific actions are not be required. Risk may be managed with routine controls and monitored periodically throughout the life of the BRM Plan.
Low	Asset specific treatments are not required, but risk should be monitored. Local government wide controls should be	Specific actions are not required. Risk will be managed with routine controls and monitored as required.

	sufficient to manage the risk If there is a change in the landscape / environment these assets may need to be reassessed more frequently. Treatment is not required.

5.3 Treatment Priorities

The treatment priority for each asset has been automatically assigned by BRMS and recorded in the Treatment Schedule, based on the asset's risk rating. Table 16 shows how consequence and likelihood combine to give the risk rating and subsequent treatment priority for an asset.

Table 16 – Treatment Priorities

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

6. Risk Treatment

The purpose of risk treatment is to reduce the likelihood of a bushfire occurring and/or the potential impact of a bushfire on the community, economy and environment. This is achieved by implementing treatments that modify the characteristics of the hazard, the community or the environment. There are many strategies available to treat bushfire risk. The treatment strategy (or combination of treatment strategies) selected will depend on the level of risk and the type of asset being treated. Not all treatment strategies will be suitable in every circumstance.

6.1 Local Government Wide Controls

Local government wide controls are activities that are non-asset specific, rather they reduce the overall bushfire risk within the local government.

The Local Government Wide Controls Table has been developed and attached at Appendix B. The Table identifies the current controls in place (see section 3.2.6 for detailed information on these), including any work planned to improve current controls, or implement new controls to better manage bushfire risk across the local government.

The following controls are currently in place across the Shire of Plantagenet:

- Bush Fires Act 1954 Section 33 notices, including applicable fuel management requirements, firebreak standards and annual enforcement programs;
- Declaration and management of burning restrictions, such as Total Fire Bans, Prohibited Burning Times, Restricted Burning Times and Harvest and Vehicle Movement Bans for the local government;
- Public education campaigns, including Shire community education programs, and the use of 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.;
- State-wide arson prevention programs developed in conjunction with WA Police and DFES;
- State planning framework and local planning schemes, implementation of appropriate land subdivision and building standards in line with DFES, Department of Planning and Building Commission policies and standards;
- Mitigation and annual works programs undertaken by the Shire of Plantagenet and other state agencies (see Appendix B for details)

6.2 Asset Specific Treatment Strategies

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

- **Fuel management**

Treatment reduces or modifies the bushfire fuel through manual, chemical and planned burning methods;

- **Ignition management**
  Treatment aims to reduce potential human and infrastructure sources of ignition in the landscape;
- **Preparedness**
  Treatments aim to improve access and water supply arrangements to assist firefighting operations;
- **Planning**
  Treatments focus on developing plans to improve the ability of firefighters and the community to respond to bushfire; and
- **Community Engagement**
  Treatments seek to build relationships, raise awareness and change the behavior of people exposed to bushfire risk.

6.3 Development of the Treatment Schedule

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

The treatment schedule will be developed in broad consultation with land owners and other stakeholders, including DFES and DBCA.

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

7 Monitoring and Review

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

7.1 Review

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

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

7.2 Monitoring

BRMS will be used to monitor the risk ratings for each asset identified in the BRM Plan and record the treatments implemented. Risk ratings are reviewed on a regular basis as described in Table 15 – Criteria for Acceptance of Risk and Course of Action. New assets will be added to the Asset Risk Register when they are identified.

7.3 Reporting

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

This reporting will Be delegated through the Executive Manager, Works and services.

Reporting on the progress of Mitigation works and the management of bushfire risk through the BRM plan to the Bushfire Advisory Committee (BFAC) Local Emergency Management Committee (LEMC) and other relevant working groups will be made by the Community Emergency Services Manager annually or more often as the need dictates

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 data being released to the public domain.

In order to actively encourage and support the implementation, monitoring and review of agreed actions the Shire of Plantagenet, 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 (BRMS) used to record the details of assets identified in the Bushfire Risk Management Plan (BRM Plan).
Asset Risk Register	A report produced within the BRMS that details the consequence, likelihood, risk rating and treatment priority for each asset identified in the BRM Plan.
Bushfire	Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective.
Bushfire Hazard	The hazard posed by the classified vegetation, based on the vegetation category, slope and separation distance.
Bushfire Risk Management Plan	A development related document that sets out short-, medium- and long-term bushfire risk management strategies for the life of a development.
Bushfire Risk	The chance of a bushfire igniting, spreading and causing damage to the community or the assets they value.
Bushfire Risk Management	A systematic process to coordinate, direct and control activities relating to bushfire risk with the aim of limiting the adverse effects of bushfire on the community.
Bushfire Risk	The chance of a bushfire igniting, spreading and causing damage to the community or the assets they value.
Consequence	The outcome or impact of a bushfire event.

Draft Bushfire Risk Management Plan	The finalised draft BRM Plan is submitted to the Office of Bushfire Risk Management (OBRM) for review. Once the OBRM review is complete, the BRM Plan is called the 'Final BRM Plan' and can be progressed to local government council for approval.
Geographic Information System (GIS)	A data base technology, linking any aspect of land-related information to its precise geographic location.
Land Owner	The owner of the land, as listed on the Certificate of Title; or leaser under a registered lease agreement; or other entity that has a vested responsibility to manage the land.
Likelihood	The chance of something occurring. In this instance, it is the potential of a bushfire igniting, spreading and impacting on an asset.
Locality	The officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns).
Map	The mapping component of the BRMS. Assets, treatments and other associated information is spatially identified, displayed and recorded within the Map.
Planning Area	A geographic area determined by the local government which is used to provide a suitable scale for risk assessment and stakeholder engagement.
Priority	See Treatment Priority.
Risk Acceptance	The informed decision to accept a risk, based on the knowledge gained during the risk assessment process.
Risk Analysis	The application of consequence and likelihood to an event in order to determine the level of risk.
Risk Assessment	The systematic process of identifying, analysing and evaluating risk.
Risk Evaluation	The process of comparing the outcomes of risk analysis to the risk criteria in order to determine whether a risk is acceptable or tolerable.
Risk Identification	The process of recognising, identifying and describing risks.
Risk Register	A component within the BRMS used to record, review and monitor risk assessmei and treatments associated with assets recorded in the BRM Plan.
Risk treatment	A process to select and implement appropriate measures undertaken to modify risk.

Rural	Any area where in residences and other developments are scattered and intermingled with forest, range, or farm land and native vegetation or cultivated crops.
Rural Urban Interface	The line or area where structures and other human development adjoin or overlap with undeveloped bushland.
Slope	The angle of the ground's surface measured from the horizontal.
Tenure Blind	An approach where multiple land parcels are to be considered as a whole, regardless of individual ownership or management arrangements.
Treatment	An activity undertaken to modify risk, for example a planned burn.
Treatment Objective	The specific aim to be achieved or action to be undertaken, in order to complete the treatment. Treatment objectives should be specific and measurable.
Treatment Manager	The organisation, or individual, responsible for all aspects of a treatment listed in the *Treatment Schedule* of the BRM Plan, including coordinating or undertaking work, monitoring, reviewing and reporting.
Treatment Planning Stage	The status or stage of a treatment as it progresses from proposal to implementation.
Treatment Priority	The order, importance or urgency for allocation of funding, resources and opportunity to treatments associated with a particular asset. The treatment priority is based on an asset's risk rating.
Treatment Schedule	A report produced within the BRMS that details the treatment priority of each asset identified in the BRM Plan and the treatments scheduled.
Treatment Strategy	The broad approach that will be used to modify risk, for example fuel management.
Treatment Type	The specific treatment activity that will be implemented to modify risk, for example a planned burn.
Vulnerability	The susceptibility of an asset to the impacts of bushfire.

9 Common Abbreviations

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

10 Appendices

Appendix A	Communication Strategy
Appendix B	Local Government Wide Controls Table
Appendix C	Definition of FFDI &GFDI

Shire of Plantagenet

Appendix A - Shire of Plantagenet Communication Strategy

Bushfire Risk Management Planning

COMMUNICATION STRATEGY

Document Control

Document Name	Bushfire Risk Management Plan Communications Strategy
Document Owner	Shire of Plantagenet , CEO
Document Location	
Current Version	1.1
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Related Documents

Title	Version	Date
Shire of Plantagenet Bushfire Risk Management Plan	1.1	19/02/2021

Amendment List

Version	Date	Author	Section

11 Introduction

A Bushfire Risk Management (BRM) Plan is a strategic document that outlines the approach to the identification, assessment and treatment of assets exposed to bushfire risk within the Shire of Plantagenet.

This Communication Strategy accompanies the BRM Plan for the Shire of Plantagenet.

It documents the:

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

12 Communications Overview

12.1 Communication Objectives

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

1. Key stakeholders understand the purpose of the BRM Plan and their role in the BRM planning process.
2. Stakeholders who are essential to the BRM 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.
5. The community and other stakeholders engage with the BRM planning process and as a result are better informed about bushfire risk and understand their responsibilities to address bushfire risk on their own land.
6. Strengthen the Shire of Plantagenet Strategic Community Plan.

12.2 Communication Roles and Responsibilities

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

CEO, Shire of Plantagenet, is responsible for;

- Endorsement of the BRM Plan Communications Strategy
- Approving the release of BRMS data and reports

Executive Manager of Works and Services is responsible for;

- Internal communications with relevant parties within the local Government
  High level communication between the Shire and other State agencies as required

Community Emergency Service Manager (CESM), is responsible for;

- Operational-level communication between the Shire and the Department of Fire and Emergency Services.
- Internal communications with relevant parties within the local Government

12.3 Key Stakeholders for Communication

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

Stakeholder	Role or Interest	Level of impact of outcomes	Level of engagement
Shire of Plantagenet	Significant role in plan and treatment development, implementation and review. Responsible for treatments as a land owner/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. Endorsement of the draft BRM Plan	High	Inform, consult, involve and collaborate
Department of Biodiversity, Conservation and Attractions	Significant role in plan and treatment development, implementation and review. Responsible for treatments as a land owner/manager	High	Inform, consult, involve and collaborate
Stakeholder	Role or Interest	Level of impact of outcomes	Level of engagement
Main Roads WA	Role in plan and treatment development, implementation and	Medium	Inform, consult, involve and collaborate

	review. Responsible for treatments as a land owner/manager. Critical infrastructure interest.		
Telecommunications Providers	Role in plan and treatment development, implementation and review. Responsible for treatments as a land owner/manager. Critical infrastructure interest.	Medium	Inform, consult, involve and collaborate
Department of Planning land and Heritage, Land Corp & Landgate	Role in plan and treatment development, implementation and review	Medium	Inform, consult, involve and collaborate
Water Corporation & Department of Water	Role in plan and treatment development, implementation and review. Responsible for treatments as a land owner/manager. Critical infrastructure interest.	Medium	Inform, consult, involve and collaborate
Department of Education	Role in plan and treatment development, implementation and review. Responsible for treatments as a land owner/manager. Critical infrastructure interest.	Medium	Inform, consult, involve and collaborate
Private Land Owners	Role in plan and treatment development, implementation and review. May have responsibilities for treatments as land owners/managers	High	Inform, consult, involve and collaborate
Stakeholder	Role or Interest	Level of impact of outcomes	Level of engagement
Western Power	Role in plan and treatment development, implementation and review. Responsible for treatments as a	Medium	Inform, consult, involve and collaborate

	land owner/manager. Critical infrastructure interest.		
Arc Infrastructure	Role in plan and treatment development, implementation and review. Responsible for treatments as a land owner/manager. Critical infrastructure interest.	Medium	Inform, consult, involve and collaborate
Forest Industry Federation Western Australia (FIFWA)	Role in plan and treatment development, implementation and review. Responsible for treatments as a land owner/manager. Critical infrastructure interest.	Medium	Inform, consult, involve and collaborate
Chief Bushfire Control Officer	Significant role in plan and treatment development, implementation and review. Actively assist in risk identification and treatment works. Empower to actively engage with community and identify/treat risks	High	Inform, consult, involve and collaborate
Bushfire Brigades and other Emergency Services Volunteers	Significant role in plan and treatment development, implementation.. Assist in risk identification and planning treatment works.	Medium	Inform, consult, involve and collaborate
Bushfire Advisory Committee (BFAC)	Significant role in plan and treatment development, implementation and review. Assist in risk identification and treatment works.	High	Inform, consult, involve, collaborate
District Operations Advisory Committee (DOAC)	Role in plan development, implementation and review	Medium	Inform, consult, involve, collaborate

Local Emergency Management Committee (LEMC)	Role in plan development, implementation and review	High	Inform, involve and consult
Porongurup & Stirling Range fire working Group	Role in plan development, implementation and review	Medium	Inform, consult, involve, collaborate
Landcare, Local Community Conservation Groups	Role in plan and treatment development, implementation and review	Medium	Inform, involve and consult
Traditional Owners, Wagyl Kaip and southern Noongar Claimant group, South West Aboriginal Land and Sea Council & Department of Aboriginal Affairs	Role in plan and treatment development, implementation and review	Medium	Inform, involve and consult
Plantagenet Community	General interest in the BRM Plan and associated Treatment Schedule	Medium	Inform, involve and consult

13 Communications Log – Development of the BRM Plan and Treatment Schedule

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

Timing of communication	Stakeholders	Purpose	Summary	Communication Method	Lesson Identified	Follow up
Development of the BRM Plan						
2019-2021	Shire of Plantagenet CEO, Senior Leadership Team and Council	1 – 3 & 5	Inform and consult Confirm accountability and responsibilities Input into plan and treatments Confirm project objectives Project updates	Email Face to face meetings Presentation	Resource constraints could limit their ability to participate Lack of understanding	Project updates
2019-2021	Bushfire Advisory Committee (BFAC) and Regional Operations Advisory Committee (ROAC)	1 – 3 & 5	Provide an overview of the Shires involvement in BRM Planning process. Confirm project objectives	Email Face to face meetings Presentation	Stakeholders willingness to participate Lack of understanding	Project updates

			Input into plan and treatments Project updates			
2019-2021	Local Emergency Management Committee (LEMC)	1 – 3 & 5	Confirm project objectives Project updates	Email Face to face meetings Presentation	Stakeholders willingness to participate	Project updates
2019-2021	Chief Bushfire Control Officer (CBFCO), Bushfire Brigades, Brigade Captains	1 – 3 & 5	Inform and consult Confirm project objectives Input into plan and treatments Project updates Identify Risk and share information	Email Face to face meetings	Time constraints Lack of understanding	Project updates
2019-2021	Dept of Biodiversity, Conservation and Attractions	1 – 3 & 5	Inform and consult Confirm project objectives Project updates	Email Face to face meetings Telephone	Resource constraints could limit their ability to participate	Project updates
2019-2021	Stakeholders – Landowners / Land Managers	1 – 3 & 5	Inform and consult Confirm project objectives Input into plan and treatments Project updates	Email Face to face meeting Telephone Presentations Community Engagement activities	Level of interests and engagement in process Time constraints	Project updates

2019-2021	Dept of Fire and Emergency Services (DFES) – District/Regional Office	1 – 3 & 5	Input into plan Project updates Sharing information	Email Face to face meetings Telephone	Time constraints Response obligations	Project updates

Development of the Treatment Schedule

2021-Ongoing	Shire of Plantagenet CEO, Senior Leadership Team and Council	1 – 3 & 5	Reduction of fuel loads on shire managed lands Risks to community Action Plan Upgrade Strategic fire breaks Planned works identified	Email Face to face meeting Telephone Presentations	Government funding Time constraints LG budgeting constraints	Stay up to date with process improvements
2021-Ongoing	Chief Bushfire Control Officer (CBFCO), Bushfire Brigades, Brigade Captains	1 – 3 & 5	Confirm project and objectives Seek input into treatment plans and providing project updates Identify Risk and share information Availability of volunteers Planned works identified	Email Face to face meeting Telephone Presentations Community Engagement activities	Clarify misunderstandings and intentions of plan Confirm benefits-Preparation Ensure current information on the BRM Plan Project is available	Stay up to date with process improvements Availability of Volunteers
2021-Ongoing	Bushfire Advisory Committee (BFAC) and Regional Operations Advisory Committee (ROAC)	1 – 3 & 5	Confirm project and objectives Seek input into treatment plans and providing project updates	Email Face to face meeting Telephone Presentations	Clarify misunderstandings and intentions of plan Confirm benefits-Preparation	Stay up to date with process improvements

			Identify Risk and share information		Ensure current information on the BRM Plan Project is available	
2021-Ongoing	Stakeholders – Landowners / Land Managers	1 – 3 & 5	Confirm project and objectives Seek input into treatment plans and providing project updates Identify Risk and share information	Email Face to face meeting Telephone Presentations Community Engagement activities	Level of interests and engagement in process Time constraints	Feedback Highly engaged Treatments being completed Commitment to agreed controls
2021-Ongoing	Dept of Fire and Emergency Services (DFES) – District/Regional Office	1 – 3 & 5	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	Email Face to face meeting Telephone	Time constraints Response obligations Funding Availability	Compliance requirements
2021-Ongoing	Office of Bushfire Risk Management	1 – 3 & 5	Bushfire Risk Management System up to date with treatments	BRMS	Time constraints Response obligations	Compliance requirements

14 Communications Plan – Implementation and Review of the BRM Plan

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

Timing of communication	Stakeholders	Communication Objective(s)	Communication Method	Key Message or Purpose	Responsibility	Identified Risks to Communication	Strategy to Manage Risks	Monitoring and Evaluation Method
Implementation of the BRM Plan								

Life of Plan	Shire of Plantagenet CEO, Senior Leadership Team and Council	All (1 – 5)	Email Face to face meetings	Inform and consult Confirm accountabilities and responsibilities. Progress update Issues identification and action planning	CEO or Delegate	Time constraints Availability Lack of understanding Budget (for LG mitigation)	Planning and time management Clear purpose Targeted communication Regular updates	Feedback, Questions raised Level of support received
Life of Plan	Shire of Plantagenet Works and services	1 – 3 & 5	Email Face to face meetings	Reduction of fuel loads on LG managed land Upgrades to strategic firebreaks	CEO or Delegate	Poor organisation, Limited time, Not preparing Poor communication from stakeholders and LG on completion of works	Clarify misunderstandings and intentions of plan Plan communications Regular updates	Treatments applied Positive feedback received on treatment supplied Risk ratings reduced
Biannually or as required	LEMC, BFAC, ROAC, CBFCO, CAPTS	All (1 – 5)	Email Face to face meetings	Report on progress to plan Report issues/constraints	CEO or Delegate	Availability of volunteers Time 'Buy in' Lack of understanding	Collate data and report on success to plan Compliance to plan Keep informed	Feedback received Level of engagement Issues identified and addressed
As Required	Dept of Biodiversity, Conservation and Attractions	1 – 3 & 5	Email Face to face meetings Telephone	Confirmation of environmental assets Development of treatment options	CEO or Delegate	Resource constraints could limit their ability to participate Willingness to release 'confidential' data	Clarify misunderstandings and intentions of plan Provide undertakings re the	Level of engagement Environmental assets in BRMS

						re environmental assets	release of confidential data Restrict release of information and document in plan	
As Required	Stakeholders – Landowners / Land Managers	1 – 3 & 5	Face to face Presentations Community Engagement	Inform and consult Confirm accountability and responsibility Status and progress of plan Treatment status Gaps and issues to be addressed	CEO or Delegate	Availability Time Loss of commitment Access to treatment resources Funding	Planned sharing of information Negotiations conducted Communicate funding opportunities when available	Feedback Commitment to implement agreed controls Highly engaged Treatments being completed
As required	Stakeholders – Others	1 – 3 & 5	Face to face Presentations Community Engagement Telephone Email	Inform and consult Confirm accountability and responsibility Status and progress of plan Treatment status Gaps and issues to be addressed	CEO or Delegate	Availability Time Loss of commitment	Planned sharing of information Negotiations conducted Communicate funding opportunities when available	Feedback Commitment to implement agreed controls Highly engaged Treatments being completed
Annually or as required	DFES Regional Office	1-3	Face to face meetings Email Telephone	UCL/UMR Management Status and progress of plan Treatment status, gaps and issues to be addressed,	CEO or Delegate	Time Conflicting priorities	Schedule communication opportunities	Planned works identified Improvements identified and implemented Issues addressed

				Continuous improvement, Information sharing, Identification of other planned works, Identification of funding opportunities				
As Required	OBRM	1,2	Written report	Continuous improvement Governance and compliance	CEO or Delegate	Time Conflicting priorities	Plan communication	Feedback received
Annually – ideally prior to fire season	Community	5	Newsletter Website Facebook	Continuous improvement	CEO or Delegate	Time Conflicting priorities	Plan communication	Feedback received

Review of the BRM Plan

Annually	Shire of Plantagenet CEO, Senior Leadership Team and Council	4, 5	Face to face meetings Email Telephone	Governance and compliance Review, monitoring and reporting to Council Status update Continuous improvement	CEO or Delegate	Poor reporting and recording of information	BRPC & BRMO to record data and information appropriately	Feedback received Planned works completed Reporting & Statistics Risk ratings reduced

5 Yearly (Shire, DFES and OBRM)	OBRM & LG Council	4, 5	Face to face meetings Email Telephone Written report	Governance and compliance Review, monitoring and reporting Future planning	CEO or Delegate	Poor reporting and recording of information Review not completed by OBRM	BRPC & BRMO to record data and information appropriately Endorsed by OBRM	Feedback received Planned works completed Reporting & Statistics Risk ratings reduced
Quarterly or as required	Shire of Plantagenet Works and Services	4, 5	Face to face meetings Email Telephone	Report on actions and status of BRM Plan Continuous improvement	CEO or Delegate	Time LG capacity Conflicting priorities	Plan communications Discuss with Shire Leadership Team	Feedback on work completed Risk ratings reduced Improvements identified and implemented
Biannually or as required	DFES Regional Office	4, 5	Face to face meetings	Report on actions and status of BRM Plan Continuous improvement UCL/UMR funding	CEO or Delegate	LG capacity Time Conflicting priorities	Plan communications	Feedback on work completed Risk ratings reduced Improvements identified and implemented
Annually	BFAC, ROAC, LEMC, CBFCO, Captains	4, 5	Face to face meetings Email Telephone Presentations	Report on actions and status of BRM Plan Continuous improvement	CEO or Delegate	LG capacity Time Conflicting priorities Buy in	Keep informed Share the wins	Feedback on work completed Risk ratings reduced Improvements identified and implemented
Every 2 years or as required	Stakeholders – Land Owners / Land Managers	4, 5	Face to face meetings Telephone Presentation	Status of treatments Success of treatments	CEO or Delegate	LG capacity Time Conflicting priorities Buy in Access to resources	Plan communication Target communication	Feedback on work completed Risk ratings reduced

			Community Engagement Survey	Continuous improvement			Planned and prepared	Improvements identified and implemented

Appendix B- Bushfire Risk Management Planning – Local Government-Wide Controls

Local Government-Wide Controls

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
1	BRM Plan Risk Analysis	Maintain and refine BRM Plan	Shire of Plantagenet	Landowners DFES irrespective of tenure	Treatment identification and planning for all very high and extreme risk assets within the Shire.
2	Shire of Plantagenet corporate business plan 2016/17-2020/2021	As per documented actions	Shire of Plantagenet	Community	As per section 3.1.1 of the Bushfire Risk Management Plan.
3	Shire of Plantagenet Bush Fire Notice and (*Bush Fires Act 1954*)	• Review annual Fire Control Notice • Publish annual Fire Control Notice • Inspection of Fire Access Tracks • Inspection for compliance to Fire Control Notice	Shire of Plantagenet	CBFCO, FCO, Captains, Ranger	Published Annually. Inspect local properties. 'Fire Access Track' has the same meaning as 'Fire Break', in the *Bush Fires Act 1954.*
4	Shire Prohibited and Restricted burning times and issuing of permits. (*Bush Fires Act 1954*)	Restricted and Prohibited Burning Times are used to prohibit burning or set the requirement that 'a	Shire of Plantagenet	CBFCO, Ranger, FCOs	Published Annually.

Control		Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
		permit to set fire to the bush' must be obtained.			
5	Harvest and Vehicle Movement Bans *(Bush Fires act 1954 Section 38A, and or Section 24C)*	The Shire of Plantagenet will impose the ban when the Chief Bush Fire Control Officer and Community Emergency Services Manager is of the opinion that the use of engines, vehicles, plant or machinery during the Restricted or Prohibited Burning Times is likely to cause a fire or contribute to the spread of a bushfire.	Shire of Plantagenet	CBFCO, FCO, Captains	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.
6	Local Emergency Management Arrangements (LEMA)	Emergency Management Plan for the Shire setting out the multi-agency response arrangements for natural hazards and other emergencies. Developed and reviewed by the Shire's Local Emergency Management Committee (LEMC)	Shire of Plantagenet	St John Ambulance WA Police DFES Dept. of Communities Education Dept Gt Southern DEMC Silver Chain	Annual review of emergency plans and arrangements. Outcomes of the BRM Plan, including relevant information discovered during its development, to be incorporated into the LEMA at next review.

Control		Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
				WA Country Health DBCA Mt Barker VFRS Mt Barker SES	
7	Local Planning Scheme No 3 (Including LPS1,2,3)	Requirement for new developments to complete a Bushfire Management Plan endorsed through the Dept of Fire and Emergency Services	Shire of Plantagenet	DFES	Where a Bushfire 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 Bushfire Management Plan.
8	Total Fire Bans	Restriction of activities that may cause or contribute to the spread of a bushfire	DFES	Shire of Plantagenet, CBFCO	A Total Fire Ban (TFB) is declared because of extreme weather conditions or when operational commitments are stretching firefighting resources. A TFB is declared by DFES following consultation with the Shire.
9	State Planning Policy 3.7	Planning in Bushfire Prone Areas	Department of Planning	WA Planning Commission Shire of Plantagenet	Ensures adequate consideration of bushfire protection elements at the development planning stage. Land developers are required to implement a Bushfire Management Plan to ensure risk is managed and other controls implemented and monitored.

Control		Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
10	State-wide Arson Prevention Program	Education and awareness campaigns run across the state for arson	WA Police DFES	Shire of Plantagenet	Participation as required. The Shire participates in campaigns for arson prevention. The LG assists in the promotion of Arson prevention campaigns
11	Bushfire Action Month	Public preparedness and education campaign	Department of Fire and Emergency Services	CBFCO, FCO, Rangers, volunteers	During Bushfire Action Month, brigades and community groups hold a number of events across the State, to increase householder preparedness ahead of the bushfire season. These events include street meets, property walk throughs and fire brigade open days where the community can speak to volunteer firefighters and Bushfire Ready Groups about how to prepare for bushfires.
12	Bushfire Campaign (My Bushfire Plan / How Fireproof is Your Plan?)	Bushfire awareness campaign / Community Engagement	DFES	DBCA, Western Power, LG, Chief FCO, Rangers	The key message of this campaign is about preparing for bushfires by having a plan. Resources include a website, factsheets, videos and an app that members of the community can use to develop, store and update their bushfire plan. www.mybushfireplan.wa.gov.au

Multi-Agency Risk Management and Mitigation Programs

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
1.	UCL / UMR Land Management	Mitigation programs conducted on lands owned by DPLH and managed by DFES and DBCA under respective MOUs.	DFES DBCA	DPLH	Annual funding is allocated to UCL/UMR land within gazetted boundary with priorities identified in consultation with stakeholders and managed through DFES Albany Regional office. DBCA manage UCL/UMR outside of gazetted town site boundaries under a similar arrangement.
2.	Water Corporation Bushfire Risk Management Plan	Great Southern Region Annual Works Plan. Water Corp assets are managed / maintained at the regional level. Each asset has a management plan referred to as a System Application and Product (SAP). * Watercorp has an agreement with DBCA for undertaking mitigation and land management activities on their estate. Works include fuel load management on water reserves	Water Corporation	Shire of Plantagenet, DBCA	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. 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. *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.
3.	Western Power annual asset inspection and vegetation	Western Power Bushfire Plan – inspection of network infrastructure and management of vegetation within infrastructure corridors.	Western Power		Annual vegetation management and asset inspections are completed to ensure risk is managed. Full asset inspections are completed every 4 years.

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
	management program				
4.	Department of Biodiversity, Conservation and Attractions – Master Burn Plan	DBCA have a 6-season burning program that is published on their website. Yearly plans are available.	DBCA	Shire of Plantagenet,	The plans can be accessed via their website, by sharing shape files (GIS) and are communicated at Local BFAC, ROAC and other various meetings.
5.	Dept of Education – DFES Memorandum of Understanding	Coordination of bushfire risk management activities	Department of Education DFES	Mt Barker Community College Kendenup Primary School	Mt Barker Community College is listed on the State Bushfire Zone Register and has been assessed as Low risk. An inspection of the school, in accordance with the Department of Education Bushfire Risk Strategy, is scheduled for 2021. If hazards are identified prior to the inspection dates these can be raised with the Department of Education Bushfire Risk Management Team for early attention.
6.	Dept of Education – Bushfire Plan – Mt Barker Community College	A plan designed to assist staff to prepare for a Total Fire Ban, catastrophic fire danger rating, or a bushfire.	Department of Education	DFES, Shire of Plantagenet	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.	Dept of Education – Bushfire Plan – Kendenup Primary School	A plan designed to assist staff to prepare for a Total Fire Ban, catastrophic fire danger rating, or a bushfire	Department of Education	DFES, Shire of Plantagenet	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.
8.	Main Roads WA Bridge assessment & maintenance works plan	As per MRWA Structures Inspection and Information Management Policy (2013). Ensure that all bridges, gantries, culverts and walls on the road	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

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
		network are kept in a safe condition with the most efficient use of resources.			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. MRWA bushfire risk assessment activities focus on timber and timber-hybrid bridges, and 24hr rest stops.
9.	Code of Practice for Timber Plantations in Western Australia	A fire management plan should be available for each plantation. The size of plantation compartments and firebreak specifications should comply with the *Bush Fires Act 1954,* DFES' Guidelines for Plantation Fire Protection and the Shire's firebreak notice	Forest Products Commission	DBCA	The purpose of this Code is to provide goals and guidelines to plantation managers so that plantation operations in Western Australia are conducted in a manner that is in accordance with accepted principles for good plantation management.
10.	Australian Rail Commission (ARC)	Bushfire Mitigation Plans	ARC	LG Community	Mitigation plans are developed for areas of ARC infrastructure that is deemed of High or above Risk ARC collaborate with the local government to achieve planned mitigation outcomes
11.	Pine Plantation Fire Management Plans	The Forest Product Commission (FPC) has implemented fire management plans for their plantations.	FPC	DBCA, LG, DFES	Minimum requirements and controls have been committed to within the Plan. These are communicated to/with LG and firebreak orders are complied with, for minimum standards of plantation design.

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
12.	Porongurup Fire working Group Stirling Range National Park Fire Working Group Plantagenet Mitigation Working group	Working groups consisting of agency, LG, Government, and intrest group representation	DBCA	LG DFES Community BFB	These groups have been formed to disseminate Mitigation plans for these areas and collaborate on the development of future Mitigation plans

Appendix C-Definition GFDI & FDI

The Grassland Fire Danger Index (GFDI) It is an index that describes the rate of spread of a grass fire (and therefore the difficulty of putting it out.) The index was developed in Australia and has been adapted for the Great Plains. It is based on a combination of the "greenness" of the grass, and various meteorological parameters. The higher the index, the faster a grass fire will spread. The weather parameters (listed in decreasing order of importance) are wind, wind gusts, relative humidity and temperature, however, the biggest single factor is "curing." Curing is a measure of how green or brown is the grass. The curing value of green grass is 0, and completely brown grass is 100. To spread rapidly, there has to be fuel, and completely cured grass is an excellent fuel. Conversely, green grass does not burn easily, regardless of wind or relative humidity. 51Harvest / vehicle movement bans are set using the GFDI.

Fire Danger Index (FDI). The FDI is a calculated using the degree of fuel curing, the air temperature, relative humidity, and wind speed for a given day

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 FDI 80 inputs are: Relative Humidity of 11%, Temperature of 41.8°C, Wind speed of 40.1 km/h and Drought factor of 9.

As per AS3959-2009. The higher the rating, the less chance of controlling a fire until weather conditions improve.

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[51] *www.weather.gov*