SWAN REGION
REGIONAL FUEL MANAGEMENT PLAN

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

Document history

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Custodian

Department of Biodiversity, Conservation and Attractions, Parks and Wildlife Service
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1. Introduction

This regional fuel management plan (RFMP) assesses risks associated with bushfire in the Parks and Wildlife Service of the Department of Biodiversity, Conservation and Attractions' (the department) Swan Region to assist planning the department's fuel management program. It interprets the department's Bushfire Risk Management Framework into regional indicators of acceptable bushfire risk and recommends tactics by which these may be achieved. The annual comparison of the current landscape condition to the indicators will inform planning for fuel management in the region.

The RFMP addresses bushfire risk at a regional scale. Fire management requirements relating to Aboriginal sites, places and values, species, or populations of species are addressed separately in documents such as nature conservation strategies, local area management plans, species recovery plans, and individual burn prescriptions.

The RFMP considers the hazard posed by bushfire to people, communities, infrastructure, and the natural environment. It is underpinned by the principle that managing the fuel available to bushfire is the most efficient and effective way to reduce the impacts of unplanned bushfire. This plan should be read in conjunction with the department's Bushfire Risk Management Framework which further describes this principle and bushfire risk management criteria.

Targets in the RFMP apply to land managed by the department and the tactics proposed are restricted to prescribed burning and physical fuel management such as scrub rolling. Other key aspects of managing bushfire-related risk (including preparation for, response to and recovery from bushfire) are not within the RFMP scope.

The RFMP will be reviewed annually, and a comprehensive review undertaken at the end of its five-year life at the beginning of 2031. Any important new information that emerges between reviews will be incorporated immediately and the plan re-endorsed if those changes are significant.

2. Bushfire risk criteria

2.1. Bushfire risk management zones

A bushfire risk management zone (BRMZ) is an area with similar environmental variables, land use and cultural conditions and therefore a similar characteristic risk profile. It is an area within which fuel management activities are guided by a single set of bushfire risk indicators. Western Australia's BRMZs are defined and described in the department's Bushfire Risk Management Framework.

The department's Swan Region lies within the South West BRMZ.

2.2. Fire management areas

The department divides the land it manages into six fire management areas (FMAs) to guide bushfire risk assessment and fuel management planning. These areas are defined according to the primary purpose of fuel management in the area and described relative to their proximity to assets.

The department's indicators of acceptable bushfire risk (defined in the department's Bushfire Risk Management Framework) allow fuel management activities to be tailored according to the risk profile and the management purpose of the land, including designating areas where there are no targets due to the limited capacity or requirement to manage fuels. The settlement-hazard separation (SHS) and landscape risk reduction (LRR) categories are applied to the Swan Region.

Table 1: Fire management areas in the DBCA Swan Region. (Refer to the department's Bushfire Risk Management Framework for more information.)

Fire management area	Description
Settlement-hazard separation (SHS)	• An area of managed fuel adjacent to towns, subdivisions, and other areas of human settlement. • Management objective is to reduce the likelihood of direct flame contact, damaging intensities of radiant heat and ember attack from posing a threat to people. • Breadth of area considers the fuels, climate and topography of the area and the nature of the appropriate fuel management strategies. • Fuels are managed relatively intensively to minimise the likelihood of a bushfire being sustained and to facilitate fire suppression. • The use of fuel management to achieve other land management objectives is supported where it is complementary to the primary management intent.
Landscape risk reduction (LRR)	• Encompasses areas where the density or significance of infrastructure, economic activity or environmental assets necessitates fuel management at a landscape scale. • Fuel management will achieve a range of outcomes, including preventing the occurrence of large bushfires that may threaten life, damage infrastructure, cause financial or social impacts, degrade the natural environment, or threaten SHS or CIB fire management areas. • This is usually achieved by creating a mosaic of fuel ages to reduce the likelihood of fires igniting and spreading and provides greater opportunity for suppression.

The RFMP identifies where each FMA occurs in the region and details bushfire risk indicators for each fuel type within them. The effective management of bushfire risk in the Swan Region requires complementary activities in the FMAs including SHS and LRR. These areas have differing management intents, but do not represent a hierarchy of priorities for fuel management.

2.3. Asset value

The department's Bushfire Risk Management Framework applies the National Emergency Risk Analysis Guidelines (NERAG) and the State Emergency Management Prevention and Mitigation Procedure (SEMPMP) to group and prioritise assets at risk from bushfire. These priorities are used to define FMAs and guide the planning of mitigation activities.

Table 2: Asset class categorisation and prioritisation used when assessing bushfire risk.

Asset class	Priority	Description
Settlements	1	Areas of higher population density and low resilience to bushfire: • settlements, towns, and subdivisions • recreation and camping sites with high fire-season visitation.
Dispersed population	2	Areas of low or transient population density and low resilience to bushfire: • individual dwellings • roads with high usage in fire-vulnerable areas • recreation and camping sites with moderate fire-season visitation.
Critical infrastructure	2	Locations where there is a considerable threat to critical infrastructure with State-level significance and no redundancy: • major highways and other primary distributors • major rail routes • major infrastructure associated with electricity generation • gas transmission pipelines • water supply and pipelines and associated pumps and pumping stations • major optical TELCO cables • major wastewater treatment sites.
Protected species and communities	2	Areas that are critical to the survival of a legislatively protected species or threatened ecological communities (TEC) with low resilience to fire.
Economic assets	3	Locations where bushfires may have a significant effect on the livelihood of individuals or community financial sustainability, such as: • farmland • infrastructure of local and/or regional significance • major industry e.g. mine sites, refineries, manufacturing plants • plantation timber resources • water supply catchments.
Other assets	3	Other significant built, natural, or cultural assets, such as: • infrastructure of local significance • significant ecological communities or species habitat • areas with specific fire regime requirements • fire vulnerable Aboriginal or European heritage sites.

2.4. Asset resilience

The likelihood that the potential consequences of a bushfire will be realised depends partly on the resilience of the asset to fire. It is difficult to model resilience given there are many variables that affect the outcome of a fire, however some considerations for determining the resilience of an asset are shown in Table 3 (settlements) and Table 4 (biodiversity assets).

Table 3: Factors affecting the resilience of settlements to bushfire. Some of these factors are also applicable to other built assets and recreation sites.

More resilient to fire →	Less resilient to fire
Interface community[1]	Intermix community[2]
Hardened urban area without vegetation	Vegetation exists within developed area
Multiple access routes	One access route
Access routes highly trafficable	Access routes have limited trafficability
Access routes protected by low fuel buffers	Access routes have adjacent vegetation
Surrounding vegetation is fragmented	Surrounding vegetation is continuous
Adequate refuge available (oval, beach etc.)	Little refuge available
Most residents are capable of self-evacuation	Large population of elderly, infirm or children
Local population well prepared for fire	Population has low level of preparedness
Adequate water supply	Limited water available for fire fighting
Most dwellings constructed of brick	Dwellings constructed of timber or fibro
Building APZs[3] well maintained	Building APZs poorly maintained
Permanent resident population	Campsite or tourist/transient population

[1] An interface community is where a clear demarcation exists between urban areas and native vegetation and bushland does not continue into the developed area.
[2] An intermix community is where structures occur throughout a bushland area without a clear demarcation between urban and bushland areas.
[3] Asset protection zone: a low-fuel area maintained around a building to increase the likelihood that it will survive a bushfire.

Table 4: Factors affecting the resilience of species, communities, and ecosystems to bushfire.

More resilient to fire →	Less resilient to fire
Key plant species are resprouters	Key plant species are obligate seeders
No other threatening processes occurring	Fire may exacerbate other threatening process
Species have short juvenile periods	Species have long juvenile periods
Species have wide distributions	Species have restricted distributions
Species have multiple populations	Species have few populations
Connections exist between populations	Populations are isolated
Fauna is more mobile	Fauna is less mobile
Fauna is adapted to persistence in refugia	Fauna has limited ability to persist in refugia
Fauna can utilise a variety of habitats	Fauna has specialised habitat requirements
Habitat re-establishes rapidly post-fire	Habitat slow to re-establish post-fire
Fauna has a broad diet or can vary diet post-fire	Fauna has specific dietary requirements
Fire has little effect on predation rate	Fauna vulnerable to post-fire predation
Fauna has high rate of population increase	Fauna has low rate of population increase

Asset resilience is combined with the asset class priority rating (Table 2) to provide a regional priority for each asset. This is done using the matrix in Table 5. The regional priority is recorded in Table 8 of the RFMP and will guide the programming of works to mitigate bushfire risk.

Table 5: Matrix for determining the regional priority of assets in each class. The asset class priority is shown in Table 2, and the asset resilience is set with guidance from the criteria in Table 3 and Table 4.

Asset class priority	Resilience		
	High	**Medium**	**Low**
1	3	2	1
2	4	3	2
3	5	4	3

2.5. Risk treatment strategies

The department applies two broad strategies for managing fuels to reduce bushfire risk:

1. Establishment and maintenance of low fuel areas close to assets or in strategic locations in order to interrupt a fire run. Low fuel areas may be established by prescribed burning or physical fuel modification.
2. Landscape-scale fuel management using prescribed burning to create a mosaic of fuel availability within which there is reduced potential for the development of large bushfires and increased opportunities for successful fire suppression.

These strategies are applied individually or in combination to achieve the fuel conditions required by the indicators of acceptable bushfire risk.

2.6. Tolerable fuel age

The tolerable fuel age is the maximum age at which fuel in an FMA is deemed to be in a managed state. It is defined as the age at which the fuel will burn with an intensity that is double the upper limit at which machine and tanker attack on the head fire is possible under 95th percentile fire danger index (FDI) weather conditions[4] (see Section 2.7). This is determined by using fuel accumulation and fire behaviour models for the appropriate fuel type. Where this period is unknown, an alternative figure of 1.5 times the minimum period required post-fire before the vegetation will again sustain a bushfire is used.

Table 6: Maximum intensity and rate of spread thresholds for head fire attack on a bushfire.

Machine and tanker attack possible	Intensity < 2000kW/m and/or ROS < 400m/hr in forest
	Intensity < 2000kW/m and/or ROS < 1000m/hr in shrubland
	Intensity < 5000kW/m and/or ROS < 6500m/hr in grassland

2.7. Weather conditions

When defining the range of each FMA and the tolerable age of fuels within it, the department's bushfire risk management criteria require the application of the conditions that produce the 95th percentile FDI in the area. Worse fire conditions than this would only be expected to occur approximately seven times per year.

The 95th percentile weather conditions have not been applied to the Swan Region RFMP. Weather conditions derived from the Bureau of Meteorology weather reanalysis project were not considered to accurately reflect extreme fire conditions in the region. This is likely due to there being only five years' data currently available from the weather reanalysis project. Weather variables considered to

[4] The intensity values for machine and tanker attack are doubled because the thresholds in Table 6 relate to head fire intensity, while the department's usual approach to a direct attack on a bushfire is to begin from the tail fire and work along the flank to the head. This means that most of the suppression effort is undertaken on parts of the fire exhibiting much lower fire intensity than the head fire. Flank fire intensity may be up to four times lower than head fire intensity, but a more conservative two-fold factor is used to set the risk indicators.

represent extreme fire weather conditions have been contributed by experienced DBCA fire staff. This will be reviewed as more data becomes available.

3. The Swan Region

The Swan Region is approximately 2.26 million hectares in size from Moore River in the north to Myalup in the south and extends over 100km inland. It includes the Perth metropolitan area, the major regional centre of Mandurah and many smaller towns. There are 48 local government authorities, 16 gazetted fire districts and three automatic response zones in the region.

3.1. Tenure and management arrangements

About 30 per cent of the land in the region is managed by the department; predominately state forest (21 per cent of the region) and national park (5.2 per cent). This estate occupies a significant proportion of the coastal plain north of Perth and on the Darling Plateau. In addition *to Conservation and Land Management Act 1984* (CALM Act) lands, regional parks account for a further one per cent and unallocated Crown land 2.8 per cent of the region.

The region is characterised by urban development, with the Perth metropolitan area and Mandurah dominating the coastal plain. On the outskirts of these cities are market gardens, dairies, vineyards, plantations and various other small scale agricultural pursuits. The northeast and east of the region support broadacre dryland agriculture, particularly wheat and sheep farming.

Forest is interspersed with urban areas along the Darling Scarp, with less populated areas used for timber harvesting, water catchment purposes and recreation. Mining is another significant land use with bauxite, gold mines and granite quarries on the Darling Plateau in the south of the region and sand mining at Gnangara in the north. Numerous industrial and commercial developments and state infrastructure assets are located within or adjacent to department managed lands.

3.2. Climate and vegetation

The climate of the region is Mediterranean with cool, wet winters and hot, dry summers. Rainfall increases immediately east of the Darling Scarp and decreases west to east across the plateau. Rainfall also decreases from south to north across the region. Temperatures are most extreme in inland areas and milder towards the coast.

Remnant vegetation in the northern Perth basin is dominated by *Banksia* woodland with *Acacia* and melaleuca shrublands fringing the coast, marri and rivergum woodlands along water courses and melaleuca thickets around wetlands. Between the Swan and Harvey estuaries, jarrah, marri and tuart woodlands are dominant.

On the Darling Plateau, jarrah and marri dominate as medium forests in the high rainfall zone south of the Avon River and as woodlands in association with wandoo on more marginal land and where thin soils limit water availability. Granite outcrops provide diverse habitat opportunities and often support biota and communities that are not found in the surrounding landscape.

The far north of the region takes in the southern extent of kwongan shrublands and is characterised by species of dense, low shrubland. Significant areas to the north of Perth are devoted to raising plantation timber, particularly *Pinus pinaster* and *Pinus radiata*. York gum woodland occurs in the east of the region's agricultural area.

3.3. Fire management considerations

The Swan Region is the most densely developed part of the State and much of the vegetation managed by the department is close to community assets. The region also features major arterial roads and rail lines and power, water and gas infrastructure that service millions of residents. These factors make the mitigation of bushfire risk to the community particularly important in this region.

The region features several high visitation recreation sites, camping sites and trails in fire prone locations. The water catchments that service the Perth metropolitan area are also important natural areas that require fire management, while active mining and post-mining rehabilitation complicate fuel management in some areas.

Arson and accidental ignitions are the dominant cause of fires on the coastal plain. These fires tend to be frequent and relatively small, but inevitably occur near developed areas. Lightning is a common source of ignitions on the Darling Plateau, where fires tend to be larger, due to the more extensive areas of native vegetation.

Pine plantations to the north of Perth are both an asset requiring protection from unplanned fire and a potential source of fuel. They experience frequent ignitions, usually because of arson, the dumping of rubbish and stolen cars or recreational vehicle use.

The region also contains vegetation communities that are greatly reduced in extent and subject to ongoing threats, particularly on the Swan Coastal Plain and in the Avon Wheatbelt bioregion, as well as species and communities with high conservation value.

A variety of lodged, registered and unregistered Aboriginal heritage sites and cultural landscapes exist in the region which can be adversely impacted by bushfire and prescribed burning activities. To achieve appropriate fire management planning and operational outcomes the department will undertake thorough assessment of Aboriginal culture as part of its burn planning process and, where possible, develop and implement strategies to protect cultural values.

3.4. Key fuel management strategies

The primary objective of the department's fire management in the Swan Region is to protect human life (people and communities) and important community infrastructure. The department also aims to manage fire in a way that promotes ecosystem health and avoids compounding the effects of other threatening processes.

To achieve these objectives, the department:

- uses prescribed burning to maintain a landscape-scale mosaic of fuel age and structure to inhibit the spread of bushfires, create opportunities for successful fire suppression, and maintain adequate habitat linkages to support biota
- uses prescribed burning to maintain a mosaic of fuel age and structure within reserves to reduce bushfire risk to and from surrounding lands and to support ecosystem resilience
- uses prescribed burning or other forms of fuel management to maintain areas of low-fuel adjacent to private property and important infrastructure
- applies prescribed fire to the landscape with consideration of ecosystems and the requirements of important species and ecological communities.

Fuel management strategies applied across the Swan Region focus on the application of prescribed burning at a landscape scale as well as within small-medium sized reserves to reduce bushfire risk to life and property, while promoting positive ecological outcomes.

In the Perth Hills District, the focus is on landscape-scale fuel management through the application of prescribed fire including the peri-urban interfaces. Fire return intervals are often more frequent than those listed in the Bushfire Risk Management Framework (Table 15) to achieve a fine scale mosaic of fuel age.

In the Swan Coastal District, the focus is also on landscape-scale risk reduction as well as the management of fuels within small, isolated reserves located throughout the urban and peri-urban areas. Prescribed burning programs within the district are focused on the Gnangara to Yanchep pine plantations in winter (and the maintenance of plantation fuel types to reduce risk to surrounding assets) and across the remainder of the district in autumn and spring. Within pine plantations, the district aims to prescribe burn each compartment every two to three years in order to reduce the potential fire intensity, suppression difficulty and potential for damage of bushfires.

The application of prescribed burning is not appropriate or practical in some reserves within the region and other forms of physical fuel management may be more appropriate. Examples of these locations are reserves with high conservation value and low resilience to fire, vegetation types that may not burn under prescribed burning conditions and small or linear reserves. The maintenance of appropriate landscape scale fuel mosaics is important to address fuel age distribution across the landscape and reduce risk to these important reserves and surrounding assets.

4. Swan Region risk criteria

The Swan Region lies within the South West BRMZ. The indicators of acceptable bushfire risk are based upon the fuel and fire behaviour characteristics of *Banksia* woodland, sandplain shrubland and pine plantations on the coastal plain and dry eucalypt (jarrah-marri) forest on the Darling Plateau which have been broadly grouped across the region.

Table 7: Summary of bushfire risk criteria for the Swan Region.

Fuel type	***Banksia* woodland**	**Sandplain shrublands**	***P. pinaster* plantations**	**Dry eucalypt forest**
Fuel accumulation and fire behaviour models	Forest fire behaviour tables (Redbook) with wind ratios adjusted to reflect Banksia communities[5]	Anderson shrubland model	Forest fire behaviour tables (Redbook) adjusted for pine	Dry eucalypt forest fire model (Vesta).
Weather parameters applied	Location: Perth Temperature: 40°C Relative humidity: 20% Wind speed: 30km/h	Location: Perth Temperature: 40°C Relative humidity: 20% Wind speed: 30km/h	Location: Perth Temperature: 40°C Relative humidity: 20% Wind speed: 30km/h	Location: Bickley Temperature: 35°C Relative humidity: 22% Wind speed: 25km/h
Tolerable fuel age	9 years	9 years	3 years	6 years for areas > 800mm rainfall 8 years for areas < 800mm rainfall 11 years after replanting for mine site rehabilitation
Settlement-hazard separation (SHS)	1km surrounding settlements	1km surrounding settlements	500m surrounding settlements	5km surrounding settlements
Landscape risk reduction (LRR)	Remainder of South West BRMZ	Remainder of South West BRMZ	Remainder of South West BRMZ	Remainder of South West BRMZ

Minor fuel types:

- Small areas of semi-arid woodland will be treated as dry eucalypt fuel type.
- Small areas of thicket vegetation will be treated as *Banksia* woodland where they occur within *Banksia* woodland fuel type and dry eucalypt where they occur within dry eucalypt fuel type.

[5] There is no formal fire behaviour model for *Banksia* woodlands. As such, the predictions of fuel accumulation, flammability and fire behaviour have largely been based on expert judgement. Experienced fire personnel within the Swan Coastal District consider that the forest fire behaviour tables (Redbook) provide sufficiently accurate predictions of fire behaviour in *Banksia* woodland.

5. Asset categorisation and prioritisation

The following table applies the department's bushfire risk criteria to identify and prioritise assets in the Swan Region, establishing where each FMA applies. Table 9 then provides the indicators of acceptable bushfire risk for these areas.

Table 8: Asset categorisation and prioritisation for the Swan Region.

Fire management area	Asset class	Asset description and occurrences	Resilience	Rationale
Regional priority 1				
SHS	Settlements	Urban development on the western edge of the Darling Scarp including densely populated urban areas, semi-rural sub-divisions, farmhouses, and isolated dwellings.	Low	Highly flammable forest fuels along the urban-forest interface. Fire vulnerable dwellings and community assets within intermix communities. Surrounding vegetation continuous in nature. Restricted access and limited refuge.
		The towns of Wooroloo, Chidlow, Parkerville, Mundaring, Glen Forest, Kalamunda, Pickering Brook, Kelmscott, Bedfordale, Jarrahdale and Dwellingup.	Low	Intermix communities amongst highly flammable forest fuels. Surrounding vegetation continuous. Restricted access and limited refuge. Fire vulnerable dwellings and community assets. Fires originating in department-managed reserves have potential to spread and impact on towns.
		Isolated coastal developments such as Yanchep, Two Rocks, Guilderton, Seabird, Preston Beach and Ledge Point.	Low	Highly flammable coastal vegetation and frequent strong summer winds. Intermix communities with lower density development. Limited access routes amongst continual vegetation. Population may need assistance or be tourists or transient.
		The urban development at Ellenbrook east of the pine plantations in Gnangara.	Low	Significant volatile fuel source proximal to urban development. High ignition risk due to arson, vehicle fires and accidental escapes. Ellenbrook is an interface community with multiple access routes and adequate refuge.
		Recreation sites and associated recreational infrastructure in Lane Poole Reserve, John Forrest National Park, Avon Valley National Park, Walyunga National Park, Yalgorup National Park and Yanchep National Park.	Low	Forest setting and limited egress and refuge. Visitors may require assistance, tourists, or transient individuals. High visitation during fire season.
Regional priority 2				
LRR	Critical infrastructure	Mitchell Freeway, Kwinana Freeway, Indian Ocean Drive, Brand Highway, Great Northern Highway, Great Eastern Highway, Brookton Highway, South West Highway, Albany Highway, Pinjarra-Williams Road, Toodyay Road, Great Southern Highway and Forrest Highways and Butler to Mandurah Railway.	Low–moderate	Transportation corridors connect Perth to the remainder of the state and country. Road closures may cause delay however the likelihood of significant financial impost or far-reaching community inconvenience is minimised by the prevalence of alternative transportation routes within the region.
		Pinjar power station, high voltage power lines, Goldfields water pipeline, Australian International Gravitational Observatory, Boddington to Forrestfield Transmission Line.	Low–moderate	Infrastructure is located within or adjacent to department-managed land. The department's fire management activities should have minimal impact on these structures where high voltage power transmission lines are constructed of steel and follow cleared easements. However, they may arc in heavy bushfire smoke causing disruptions to power transmission. Much of the Boddington to Forrestfield Line is constructed of timber poles. Fire impacting on power distribution lines may cause inconvenience for individual dwellings or communities but should not have far reaching implications.
		Perth to Kalgoorlie railway.	Moderate-low	Any disruption to freight transport causes significant financial impost

Fire management area	Asset class	Asset description and occurrences	Resilience	Rationale
		Reservoirs of Wungong Dam, Serpentine Dam, Canning Dam, Lake Banksiadale, South Dandalup Dam, Victoria Reservoir and Mundaring Weir and associated reservoir protection areas.	Moderate-low	Minimal infrastructure. Access may be restricted following bushfire. Water quality issues may be an issue.
	Dispersed population	Bibbulmum Track, Munda Biddi Trail and associated infrastructure (e.g., shelters) Yanchep National Park trails.	Moderate	The proximity of these tracks and trails to Perth means they are heavily utilised. Fire vulnerable huts and campsites may be occupied at the time of fire. Yanchep National Park trails are heavily utilised in the summer.
		Bindoon, Wundowie and Boddington	Low	Towns are surrounded by agricultural land containing seasonally high grass fuels, scrub or forest fuels which abut department-managed reserves. Fires originating in department-managed reserves have potential to spread and impact on towns.
		Mundijong, Serpentine, Keysbrook, North Dandalup, Waroona, Hamel, Lake Clifton and Preston Beach	Low	Proximity of town sites to Hamel state forest, Myalup state forest and Yalgorup National Park. Fires originating in department-managed reserves have potential to spread and impact on towns.
Regional priority 3				
LRR	Economic assets	Farmland predominantly located in the north, north-east, east, south-east and south of the region	Moderate	Individual or small groups of dwellings and associated farming infrastructure. Fires originating in department-managed reserves have potential to spread and impact on dwellings or infrastructure.
		Plantations between Lexia and Wilbinga	Low	Significant volatile fuel source proximal to various assets. High ignition risk due to arson, vehicle fires and accidental escapes. Pine plantation is both an asset to be protected from fire and a significant source of fuel for fire.
		Hardwood and softwood plantations	Moderate-low	Volatile fuel source proximal to various assets. Both an asset to be protected from fire and a significant source of fuel for fire.
		Mine sites of Mt Saddleback, Jarrahdale, Willowdale, Huntly and Boddington	Moderate-low	Mine sites and associated infrastructure within forested areas.
		The ore conveyor that runs from Mt Saddleback mine to the refinery at Worsley and conveyor that runs from Huntly to Pinjarra	Low-moderate	Infrastructure is located within or adjacent to department-managed land. Fire damage to the line can cause significant damage to the infrastructure, as well as having significant economic impacts due to shutting down of the asset.
Regional priority 4				
LRR	Other assets	Various day use sites which feature facilities such as picnic areas, boardwalks, lookouts, interpretive shelters, shade shelters and playgrounds	Medium	Due to good egress and ample refuge, there is not likely to be a threat to human life in the event of fire. Damage to property is likely to be minimal due to the proximity of firefighting resources, availability of water, access and vegetation structure.
		Departmental work centres (Dwellingup, Jarrahdale) located in intermix communities, fire towers (Walyunga, Bickley Observatory, Pinjar and Mt Solus) and communication repeater stations (Moore River, Shire View Hill, Smiths Mill Hill, Canning Mills, Mt Dale, Serpentine, Mt Solus, Turner Hill, Mt Wells and Mt Saddleback)	Low-moderate	Fire could compromise departments capabilities in relation to land management, in particular fire management.
		Alternative communication available should a repeater station or tower be damaged by bushfire.		

Fire management area	Asset class	Asset description and occurrences	Resilience	Rationale
		Gingin Gravity Discovery Centre and Bickley observatory	Moderate	Infrastructure is surrounded by department-managed lands and is vulnerable to fire impact. Assets are relatively small within the landscape and have good access and egress.
	Protected species and communities	Major waterways and other mythological and ceremonial sites	Moderate	Assets could be damaged by high intensity fire impact, or by fire suppression operations.
		Threatened or rare communities negatively impacted by inappropriate fire regimes	Low	

6. Indicators of acceptable bushfire risk

Bushfire risk is maintained at an acceptable level in the Swan Region if fuels are managed to the condition described in the below table. The current landscape condition will be compared to these indicators at least annually and the outcomes of that comparison used to inform the development of the annual fuel management program.

Table 9: Summary of indicators of acceptable bushfire risk in the Swan Region.

Fire management area	**Fuel type**	**Location**	**Target**
Settlement-hazard separation (SHS)	Dry eucalypt forest	5km surrounding settlements	60% of fuel less than threshold intensity
	Sandplain shrubland *Banksia* woodland	1km surrounding settlements	
	P. pinaster plantation	500m surrounding settlements	
Landscape risk reduction (LRR)	Dry eucalypt forest	Remainder of South West BRMZ	45% of fuel less than threshold intensity
	Banksia woodland *P. pinaster* plantation Sandplain shrubland	Remainder of South West BRMZ	30% of fuel less than threshold intensity

7. Spatial data

The descriptions of asset locations and FMA extents in Tables 8 and 9 are depicted spatially in a geodatabase that supports this RFMP. These data form the basis for comparison of the current landscape condition against the department's indicators of acceptable bushfire risk. This comparison will be conducted annually, at a minimum, and used to inform the fuel management program planning process. The master copy of the geodatabase is maintained in-house by the department's Regional Leader, Fire Management, with a copy provided to Fire Management Services Branch (FMSB) information officers to facilitate corporate reporting.

8. Monitoring and review

This plan will be regularly monitored and reviewed to ensure content remains accurate and up to date. The plan will be endorsed annually by the content custodian prior to being used in the burn program planning process.

FMSB will advise the Swan Regional Manager of any changes to the department's Bushfire Risk Management Framework that will need to be reflected in the RFMP.

The Regional Manager, or their delegate, will review the regional context statement, regional risk criteria and asset categorisation and prioritisation annually (at a minimum). The most important aspect of this review is confirmation that Table 8 continues to represent a comprehensive and accurate catalogue of the assets in the region requiring protection from bushfire. Any changes to Table 8 will also be reflected in the accompanying spatial data, including the mapping of FMA extents.

The spatial data that supports the RFMP will be reviewed at least annually to capture any changes in the distribution of assets, fuel, or department-managed tenure. Updated datasets will be provided to FMSB whenever any changes are made.

9. Knowledge gaps

The department's risk criteria and indicators of acceptable risk were developed using the best available science, practitioner judgement and supporting data. These inputs will be monitored by the department to ensure that the RFMP continues to reflect industry best-practice. It is expected that ongoing adjustment to the settings will be required as the State's social, political and natural environments change, better data become available, or knowledge of bushfire risk management is refined or improved. The framework will also be updated to incorporate the findings of any relevant research or adaptive management, and as new models are developed and refined.

Department of **Biodiversity, Conservation and Attractions**

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