



City of Karratha

Bushfire Risk Management Plan

2025 – 2030

Office of Bushfire Risk Management Bushfire Risk
Management (BRM Plan) endorsed **XX Month 20XX**

Local Government Council BRM Plan approval **XX
Month 20XX**

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Document control

Document name	City of Karratha BRM Plan	Current version	2.0
Document owner	CEO City of Karratha	Issue date	DD/MM/YYYY
Document location	<Add as required>	Next review date	DD/MM/YYYY

Document endorsements

This Bushfire Risk Management Plan has been endorsed by the Office of Bushfire Risk Management as consistent with the standards detailed in the *Guidelines for Preparing a Bushfire Risk Management Plan 2023*.

The approval of the Bushfire Risk Management Plan by the City of Karratha Council signifies support of the plan's implementation and commitment to working with risk owners to manage bushfire risk. Approval does not signify acceptance of responsibility for risk, treatments or outcomes on land that is not managed by the City of Karratha.

Local Government	Representative	Signature	Date
City of Karratha	Vanessa Subramoney, A/g Manager Regulatory Services		

Publication information

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Chapter 1 Introduction

1.1. Background

This Bushfire Risk Management (BRM) Plan provides contextual information to inform a structured approach to identifying, assessing, prioritising, monitoring and treating bushfire risk. The BRM Plan prepared by City of Karratha, encompasses all land within the City of Karratha and has been written on behalf of all stakeholders within that area. The BRM Plan is informed by consultation and communication with land and asset managers that has occurred throughout its development to ensure an informed and collaborative approach to managing bushfire risk.

The BRM plan has been prepared with due consideration of the requirements stated in the *Guidelines for Preparing a Bushfire Risk Management Plan* (the Guidelines) published by the Office of Bushfire Risk Management (OBRM) including the principles described in *ISO 31000:2018 Risk Management*.

1.2. Objective of the Bushfire Risk Management planning program

The BRM planning program supports local governments to reduce the threat posed by bushfire. The City of Karratha BRM Plan will contribute to achieving the objective of the BRM program by:

- Guiding and coordinating a cross-tenure, multi-stakeholder approach to BRM planning.
- Facilitating the effective use of the financial and physical resources available for BRM activities.
- Supporting integration between risk owners, strategic objectives and tactical outcomes.
- Documenting processes used to monitor and review the implementation of treatments to ensure risk is managed to an acceptable level.

1.3. Legislation, policy and standards

Legislation, policy and standards that were applied in the development of this BRM Plan can be found in the *Bushfire Risk Management Planning Handbook – Appendix 1 – Summary of Related Legislation, Policy and Guidelines*.

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

- *State Emergency Management Policy 2.5 Local Arrangements*
- *State Emergency Management Policy 3.2 – Emergency Management Risk Planning*
- *State Hazard Plan for Fire (State Hazard Plan Fire)*
- *State Planning Policy 3.7: Planning in Bushfire Prone Areas*
- *State Planning Policy 3.4: Natural Hazards and Disasters*
- *Guidelines for Planning in Bushfire Prone Areas (2021)*
- *Western Australian Emergency Risk Management Guidelines (Emergency Management WA 2005)*
- *A Guide to the Use of Pesticides in Western Australia (Dept. of Health 2010)*
- *Guidelines for Plantation Fire Protection (DFES 2011)*
- *Firebreak Location, Construction and Maintenance Guidelines (DFES)*
- *Bushfire Risk Management Planning – Guidelines for preparing a Bushfire Risk Management Plan (2023)*
- *AS/NZS ISO 31000:2018- Risk management – Principles and guidelines*
- *AS 3959-2018 Construction of buildings in bushfire-prone areas*
- *Building Protection Zone Standards (DFES)*
- *National Strategy for Disaster Resilience*
- *National Statement of Capability for Fire and Emergency Services (AFAC 2015)*
- *Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Dept. of Health 2007)*
- *Bushfire Risk Management Planning Handbook*
- *Bushfire Risk Management System (BRMS) User Guide*
- *City of Karratha Strategic Community Plan*
- *City of Karratha Local Recovery Plan*
- *Local Emergency Management Arrangements*
- *City of Karratha Delegations Register*
- *Policy CH-05 Staff and Volunteer Services*
- *Bush Fire Brigades Local Law 2018*
- *Policy TE-03 Maintenance of street trees, reserves and street verges adjoining residential*

Chapter 2 The risk management process

The BRM planning process is a cycle of understanding the context and assessing and treating risks (Figure 1). Each of these steps is informed by communication and consultation and supported by monitoring and review. The three products produced during the BRM planning process are the BRM Plan, Asset Risk Register and Treatment Schedule (Figure 1).

Further details on the guiding principles and process for the development of this plan can be found in Chapter 2 of the Guidelines.

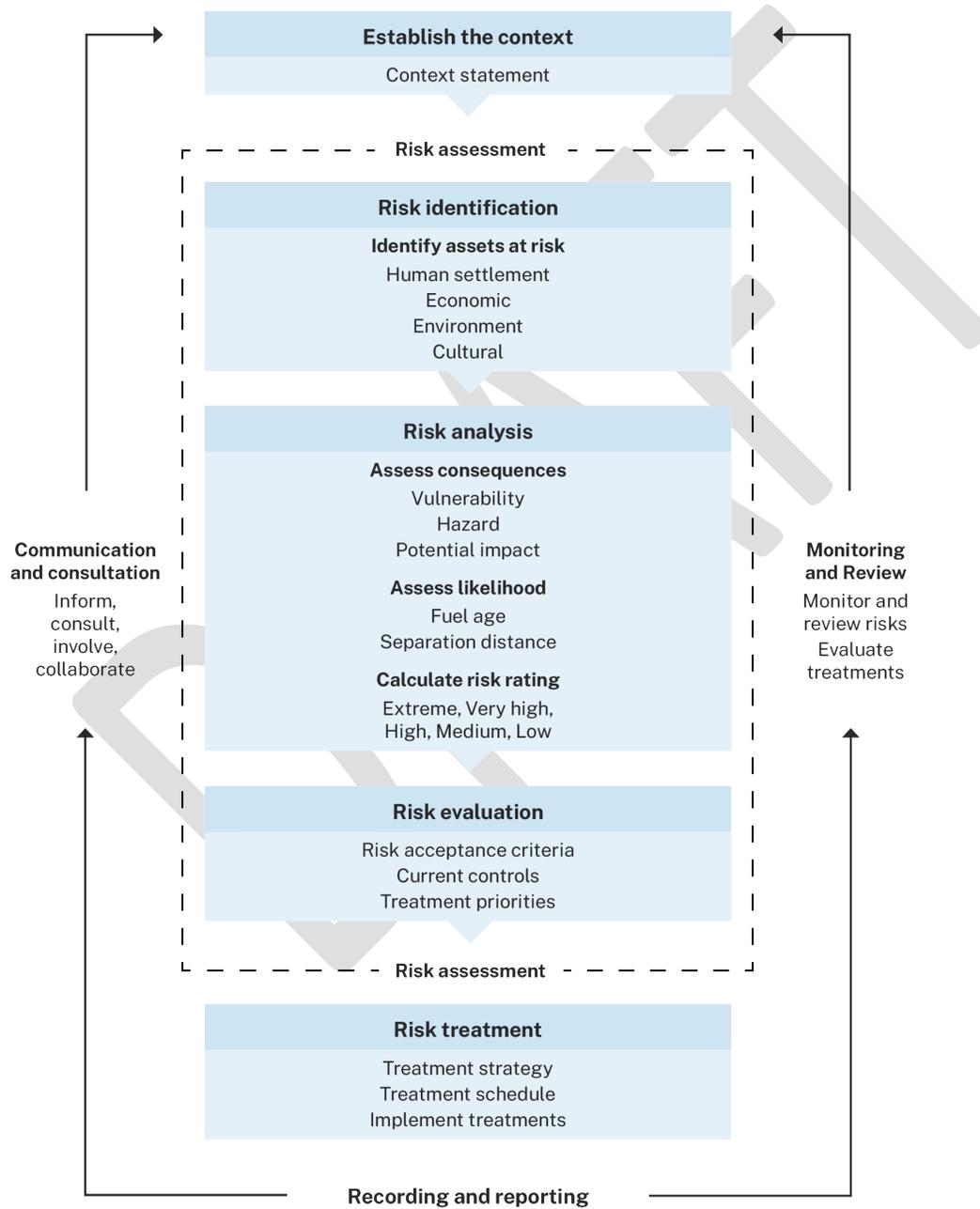


Figure 1. The Bushfire Risk Management planning process

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 in the Bushfire Risk Management (BRM) planning process

Stakeholder	Roles and responsibilities
Local government	<ul style="list-style-type: none"> • Custodian of the BRM Plan. • Coordinate the development and ongoing review of the BRM Plan. • Undertake bushfire risk assessment of local government area. • Submit the draft BRM Plan to OBRM for review and endorsement. • Develop and implement a Treatment Schedule for local government managed land. • Encourage risk owners to treat identified risks.
DFES	<ul style="list-style-type: none"> • Contribute to the development and implementation of the BRM Plan. • Facilitate involvement of state and federal government agencies in the BRM planning process. • Undertake treatments on Unmanaged Reserves and Unallocated Crown Land within gazetted town sites. • By agreement, implement treatment strategies for other land managers. • Endorse BRM Plans as consist with the Guidelines, BRM Program and dynamic risk environment. • Administer the Mitigation Activity Fund Grants Program.
Department of Biodiversity, Conservation and Attractions (DBCA)	<ul style="list-style-type: none"> • Contribute to the development of the BRM Plan. • Implement their treatment program on DBCA managed land. • Provide advice on environmental assets and appropriate treatment strategies for their protection.
Department of Planning, Lands and Heritage	<ul style="list-style-type: none"> • Identify managed assets. • Provide advice on management of Aboriginal Cultural Heritage.
Other State and Commonwealth Government agencies and public utilities	<ul style="list-style-type: none"> • Identify managed assets. • Provide advice on current risk treatment programs. • Contribute to the development of BRM Plans. • Undertake treatments on lands they manage.

Stakeholder	Roles and responsibilities
Corporations and private landowners	<ul style="list-style-type: none"> • Identify managed assets. • Provide advice on current risk treatment programs. • Undertake treatments on lands they manage.
Public Utilities	<ul style="list-style-type: none"> • Identify managed assets. • Provide advice on current risk treatment programs. • Undertake treatments on lands they manage

2.2. Communication and consultation

Communication and consultation are fundamental to the development, implementation and review of the BRM Plan. A Communication Plan describing communication with relevant stakeholders at each stage of the BRM planning process is at Appendix C. A record of engagement with stakeholders is maintained and is located in Appendix B of this plan.

Community responses from the City of Karratha annual community survey have also been considered. Although no specific questions within the survey relate to bushfire management there are multiple general responses which identify community concerns. It has been identified as an opportunity to gain specific feedback in future community surveys around bushfire risk management planning.

Chapter 3 Establishing the context

Strategic and corporate framework

The City of Karratha ensures robust planning for the future through the Integrated Planning and Reporting Framework. This incorporates the following elements:

The Strategic Community Plan (2020 – 2030) is a forward looking planning document that provides a vision for the future of the local government area and outlines how the City and community will achieve that vision over the next 10 years. These are addressed through the following four themes:

Our Strategic Themes	Our Goals
Our Community Inclusive and Engaged	To activate safe, healthy and liveable communities
Our Economy Well Managed and Diversified	To attract diverse and sustainable business and employment opportunities
Our Environment Thriving and Sustainable	To protect our natural and built environment
Our Leadership Proactive and Accountable	To provide accessible, transparent and responsive leadership

**Strategic
Community
plan
(2020 –
2030)**

The BRM Plan is relevant to all four identified themes and will assist in achieving these goals. In the context of the BRM Plan this is specifically:

Our Community:

The BRM Plan is important in identifying key community factors that influence how emergency management is implemented within the City to improve community safety. Through the BRM Plan process it has been identified that an opportunity exists to form an advisory group on bushfire which will improve integration with the community.

Our Economy:

With a significant resource and agricultural industry locally, the BRM Plan is essential in identifying key stakeholders and responsibilities for bushfire management within the City of Karratha. Through identification of high-risk assets and treatment strategies, treatments can be developed and implemented to reduce risk of impact from bushfire.

Our Environment:

Fire plays a significant role in both enhancing and protecting environmental values. Identification and prioritisation of high risk assets through the BRM Plan process will improve collaboration when developing treatment strategies to consider environmental impacts.

Our Leadership:

The BRM Plan will improve partnerships and provide transparency around bushfire risk and actions being undertaken by both the City and other land managers to reduce bushfire risk.

**Operational Plan
(annual)**

The Operational Plan is a sub-plan of the corporate business plan and takes the shape of the annual budget. The operational plan sets out what Council intends to do in the short term (i.e. the current financial year) to address the community's needs. The plan details the projects and actions the City will deliver during the next year.

The resourcing strategies are an accumulation of plans outlining the City's capacity to sustainably deliver services and manage its assets over the next ten years. The resourcing strategies includes an asset management plan, a workforce plan and a long term financial plan. These plans determine the City's overall capacity, and how to sustainably manage its finances, the workforce, and the overall cost of community assets.

The implementation of the BRM Plan is the responsibility of the Development Services Directorate through the Cyclone and Bushfire Inspection Program. The Manager, Regulatory Services has carriage of the plan implementation and is responsible for maintenance and delivery of the plan.

This process is represented below:



Source: City of Karratha Corporate Business Plan 2020-2025

Figure 2: Integrated Planning and Reporting Framework

Local Government is normally responsible for the prevention of, planning for, management of and recovery from all, active scrub and bushfires outside gazetted fire districts (ie town sites), and are responsible for the management, training and control of Bushfire Brigades (BFB) within the local government boundary. It is important to note that this is not the case for City of Karratha.

An MOU was signed between the City of Karratha CEO and DFES Commissioner on the 18th June 2020 and remains current. This establishes management of Bush Fire Brigades (BFB) and Bushfire response, through the Chief Bushfire Control Officer (CBFCO). Bushfire prevention, preparedness and recovery functions remain with the City of Karratha. The DFES position of *District Officer Central Pilbara Coast*, is designated, pursuant to section 38A of the Bush Fires Act 1954, as the CBFCO for the City of Karratha.

The BRM Plan details these arrangements and will clarify responsibilities within the City of Karratha for emergency management. Mitigation activities on City of Karratha managed land are implemented through an annual works program. The BRM Plan will assist in identifying critical assets and priorities for treatment activities.

The Local Emergency Management Committee (LEMC) is identified as a key stakeholder for consultation around this plan and subsequent development of treatments. The Local Emergency Management Arrangements (LEMA) is an important document which provides detail for managing hazards within the City, which includes bushfire. This BRM Plan supports the LEMA, with the LEMC being a significant forum to guide review and implementation of the plan. Bushfire is not currently identified in the LEMA as a priority risk, however the arrangements apply to bushfire and the adoption of this BRM Plan will better integrate bushfire risk management into the broader emergency management arrangements of the City.

Land use and tenure

The City of Karratha, located in the Pilbara region of Western Australia and encompasses a total land area of 15,882 square kilometres. Located 1,535km north of Perth, the City of Karratha consists of six towns; Dampier, Karratha, Roebourne, Wickham, Point Samson and the historic village of Cossack, and is adjoined by the local government areas of Town of Port Hedland to the North and Shire of Ashburton to the South.

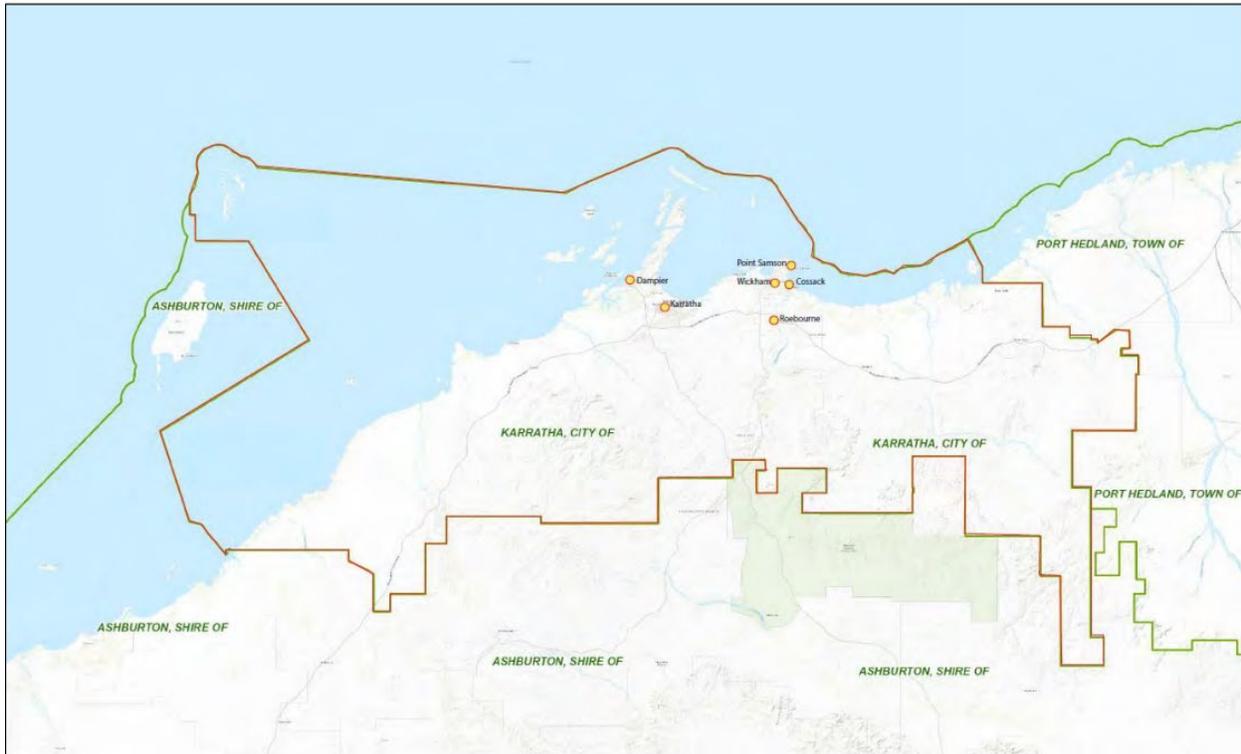


Figure 3: Map of LGA boundaries and major townsites within the City of Karratha (*City of Karratha Local Planning Strategy, 2020*).

Outside of these major townsites the predominant tenure is managed for pastoral and resource industry activities. The major transport routes in the City are the North West Coastal Highway and the private railway lines from Dampier to Tom Price and Wickham to Pannawonica. There are several remote aboriginal communities, industrial areas, mine sites and communications infrastructure that may be exposed to threat from bushfire. The remote nature of some of these sites is important to consider in terms of response capability and communications. This includes detection of bushfire and available strategies to inform and protect facilities or communities.

Table 2 – Summary of land management responsibilities within the City of Karratha (Source: City of Karratha)

Land Manager	Local Government Area (%)
Local Government	1%
Private	1%
Department of Biodiversity, Conservation and Attractions	7%
Other State Agencies	27%
Pastoral	64%
Total	100%

Source: City of Karratha

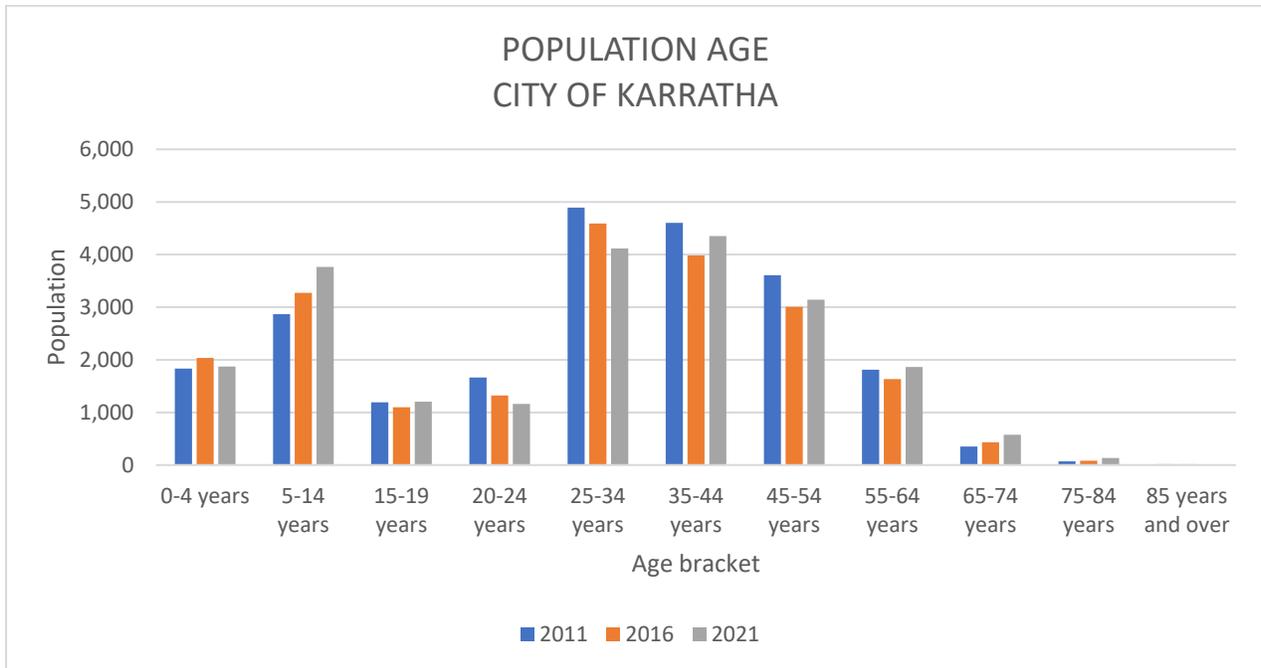
As shown in Table 2 pastoralists are the majority landowner in the City of Karratha outside of the main town centres. A number of state agencies are responsible for the other large portion of tenure. This highlights the importance of engagement and communication in understanding and managing bushfire risk in the region.

Community demographics and values

The City has a resident population of approximately 23,000 people with Karratha being the major centre, along with town sites of Dampier, Wickham, Point Samson and Roebourne. There are also three Aboriginal Communities being Weymul, Cheeditha and Mingullatharndo. The majority of the population lives within these town centres, however due to mining and pastoral activities within the region there are also numerous homesteads (and associated buildings) and mining industry workers camps which can house between 300 and 2500 persons each. It is the position of the City that workforce accommodation needs to be provided for through town based accommodation (DP10, 2019).

Karratha has a younger demographic when compared to the rest of regional Western Australia with over 50% of the population between the age of 25 to 49. The median age being 32 years, compared to the WA median age of 38. Only 3.5% of the population are aged over 65 (compared to the WA average 14%).

Figure 4 shows the distribution and change in age over three census years for the City. The total population has remained relatively stable over this period, with a shift in age brackets evident, particularly an increase in school aged children. The change in demographic is important to consider with regards to community consultation and education. An opportunity exists to further understand community values and attitude to fire with the implementation of this plan, which may aid in future engagement activity.



Source ABS, 2021

Figure 4: Population age distribution within City of Karratha (Source ABS, 2021)

Traditional owners comprise approximately 11% of the total population in the City of Karratha. These owners have a strong connection to the land and setting fire to the bush has been a traditional way to manage the land.

In the City of Karratha, 70% of households use English as the primary language in the home, with 20% of households reporting using a non-English language in the home. The ability for the community to understand key bushfire messaging is essential to understanding and mitigating bushfire risk and this must be considered in any public engagement or emergency messaging communications.

The predominant industry of employment is the resources sector, which is also demonstrated by a higher-than-average proportion of technician and trade worker occupations, which are synonymous with the resources industry. This workforce can be transient and has also required a number of short term worker accommodation facilities to be established within towns. This can present an increased risk to occupants who may have little knowledge of the surrounding area and an understanding of bushfire risk.

Cultural heritage

The City of Karratha has a rich history which is demonstrated by the range of significant sites present in the area.

Occupied by ancestors of the Ngarluma, Yindjibarndi, Martuthunia and Yaburara people, the City is home to the largest collection of indigenous rock art in the world with over 1 million individual images dating back more than 40,000 years. Potential impacts through disturbance of sites by bushfire mitigation or response activities must be identified and prevented. It is essential that

there is effective ongoing consultation with relevant aboriginal corporations with consideration of cultural values when determining bushfire risk and treatment strategies. Land managers and treatment owners have a responsibility to ensure that appropriate identification of Protected Areas or registered Aboriginal cultural heritage sites under the *Aboriginal Heritage Act 1972* through the DPLH online enquiry system (ACHIS) and by contacting DPLH.

Figure 5 shows the significant distribution of registered cultural sites within the City of Karratha, with over 1750 registered sites recorded. The vulnerability to bushfire or treatment works will vary per site and are too numerous to list in this plan.

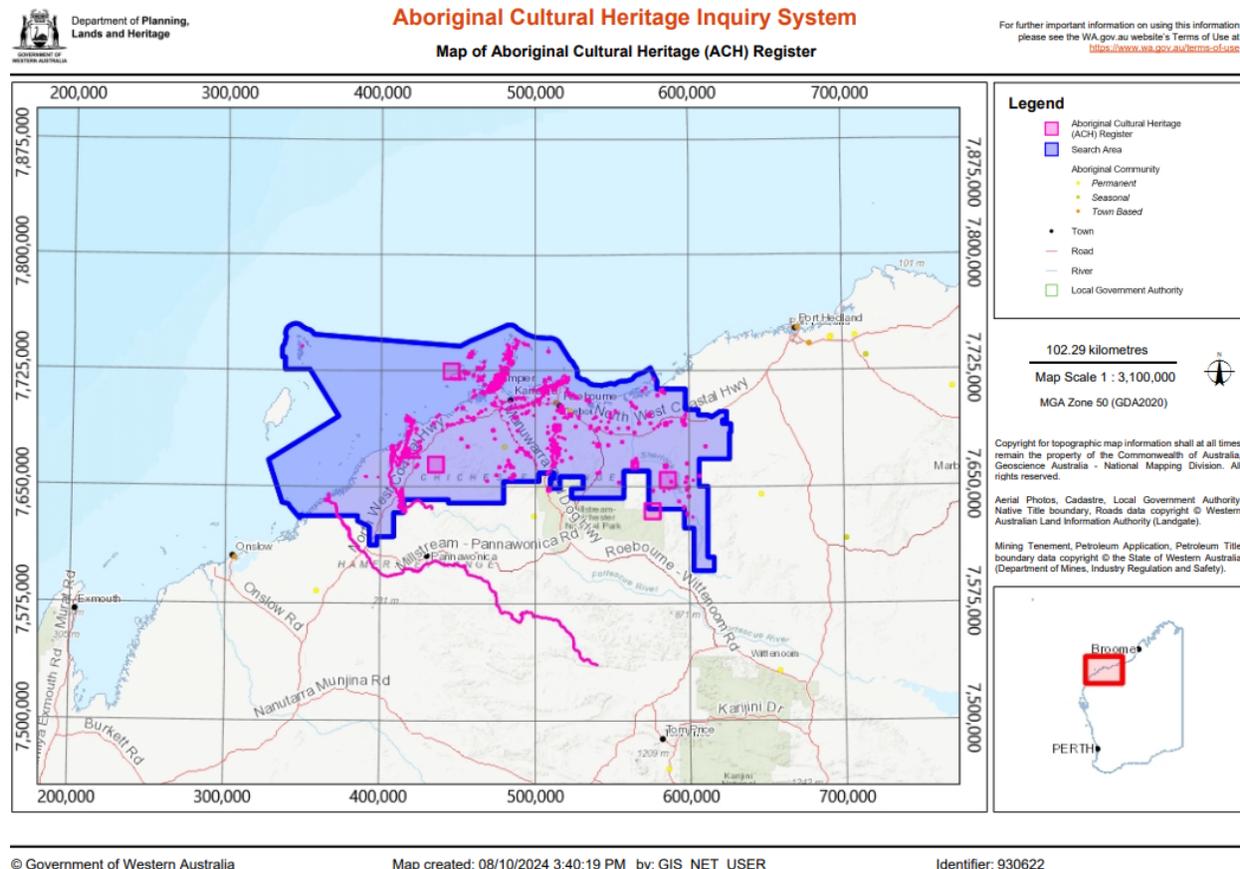


Figure 5: Map of Aboriginal cultural heritage register (DPLH, accessed October 2024)

The historical town of Cossack was established as a frontier settlement and retains a number of historical buildings which date back to the 1870's and provide an insight into life during that period. The City of Karratha maintains a local heritage register which provides further information.

Economic activities and industry

There is a significant resource and pastoral industry in the City of Karratha, with significant infrastructure and employment opportunities for the region and Western Australia.

Previously known only for its resource industry, the City of Karratha is fast developing into a popular regional destination, home to an increasingly diverse range of visitors and residents. Today, major attractions of the City include unparalleled access to the Indian Ocean via the Dampier Archipelago and Burrup Peninsula, an extensive calendar of annual sport and cultural events and a growing number of modern facilities and services.

The major arterial route for the region is the North West Coastal Highway. Any closure of the highway from a bush fire event causes major disruption to industry and the community. Given the potential impact there is a consideration of rapid response to bushfire that may impact the highway. Daily monitoring of satellite hotspot technology and prevailing weather conditions is integral for the decision making process to determine the appropriate level of response.

Karratha Airport is significant in terms of economic input to the region and supports tourism and workforce transport. It is the second busiest airport in Western Australia by passenger numbers and Regular Passenger Flights (RPT) annually. Consideration of smoke impacts to the airport operation are important when considering bushfire risk. The City also has four industrial ports and several significant areas of industrial land.

Impacts to industry as a result of bushfire vary depending on the location and type of industry affected. Overall though the key risk is temporary loss of production through shutdown or reduction of services. This is generally short duration disruption however given the scale of these operations and potential impact to support services this can have significant economic cost to both business and government.

The key vulnerabilities include:

- Access restrictions for staff through either direct impact to site or transport corridors from worker accommodation to sites
- Environmental impact such as smoke which may interact with local monitoring equipment such as suppression or clean air intakes for plant
- Direct damage through fire impact to buildings or infrastructure. If this occurs the impact may be of an extended duration and require recovery activities such as rebuilding
- Loss of pasture for grazing which may reduce available feed for stock. This may lead to reduced stocking rates or outsourcing of feed which will directly impact pastoral businesses
- Consequential impact to local economy of Karratha through reduced services (transport/accommodation) if industry is impacted

Mining, Energy and Resources:

Much of the workforce and business is focused on the export of minerals and energy, with iron ore and Liquefied Natural Gas (LNG) being the primary commodities mined, processed or exported from the City's ports.

Most of the heavy industry, of state and federal significance, is located around the Ports of Dampier and Cape Lambert, together with the Burrup Industrial area. A smaller port facility is located at Cape Preston which services a local mine (which includes power station, desalination plant and supporting services).

Larger operations in the mining industry have their own emergency response teams and fire appliances with a strong emphasis being placed on mitigation and the ability to respond to any unplanned event.

Many industrial sites maintain well defined boundaries and separation from vegetation through their design and access requirements. Industry specific fire protection requirements are also in place on many sites. One major source of impact to these sites is smoke and air quality, which can interact with on-site atmospheric clean air intakes or air quality monitoring, which may be linked to emergency response systems.

Utilities

Electricity is provided by both Horizon Power (Karratha, Roebourne and Pt Samson) and Rio Tinto (Dampier and Wickham). Distribution networks are located underground.

Water is provided by Water Corporation, with a network of storage, treatment facilities, tanks and pipe networks within the City.

Agriculture

Agriculture is a major land use within the City with seven major pastoral leases located within the City's boundaries. This encompasses a significant area, comprising 64% of the total land use (Table 2). There is very little infrastructure on these land parcels and the primary produce is beef cattle for live export markets. The pastoral managers have very good local knowledge of fire behaviour on their leases. They conduct prescribed burns on an annual basis to manage fuel loads and regenerate feed stocks. They are also the first responders to any bushfire event on their property.

Tourism

Between the months of May and September there is an influx of tourists to the region. They comprise mainly "Grey Nomad" caravaners and European backpackers. There is on average approximately 225,000 visitors to the City of Karratha on an annual basis. 80% of these visitors attend the City for business purposes with the remainder visiting for holiday or leisure.

Due to usually dry conditions all year round the City of Karratha has restricted burning season 365 days of the year. The City disseminates this information via its website, the Karratha Visitor Centre and also via its caretakers at the nature based camps. Visible messaging is important to inform visitors to the Pilbara of the restrictions because they are often visiting from southern regions where the fire season has concluded and fire safety may not be at the forefront of their minds.

In addition to various accommodation providers such as caravan parks, motels and short stay accommodation there are two main nature based campgrounds managed by the City of Karratha. Gnorrea Point and Cleareville provide remote camping experiences and are important to consider in the context of bushfire as they are remote from townsites.

Topography and landscape features

The major river system in the City is the Fortescue system which flows down from the Hamersley Ranges. Along many of the region's rivers are rock holes, gorges, grassy floodplains and wooded riparian areas.

The coastline is characterised by river deltas, extensive mangroves, wide tidal mudflats like the Roebourne plains and long sections of sandy beaches and rocky shorelines.

Inland areas consist of flat rocky plains that lead to the foothills of the mountain ranges. The majority of assets are situated on the flat plains of the area and topography is not considered to be a large driver of fire behaviour. The implications for bushfire risk management are that the areas of mountain ranges are difficult for vehicle access. The harsh uneven, rocky ground is hard on vehicles and vehicle access tracks are few and far between. The terrain and distances involved can make mitigation and response activities difficult, with rapid initial attack to keep fires small often not achievable.

Climate and weather

The City has a semi-arid climate that is characterised by high temperatures, low and variable rainfall and high evaporation. Between the months of October and April temperatures consistently exceed 32 degrees Celsius, with maximum temperature often reaching 40 degrees Celsius. In the winter months the average temperature falls to 25 degrees (figure 5).

The average rainfall is between 200mm to 350mm per year but can vary widely from year to year. Most of the rain falls in the summer months between December and March but can continue on through to June. This is followed by a pronounced dry period between August and November. The average yearly evaporation is about 2500mm per year (figure 5). This exceeds the average yearly rainfall and is consistent throughout the year. This evaporation rate leads to dry conditions predominantly all year round. As such the City has a 365 day restricted fire period. However, most significant bushfires occur in the hotter months from November to March.

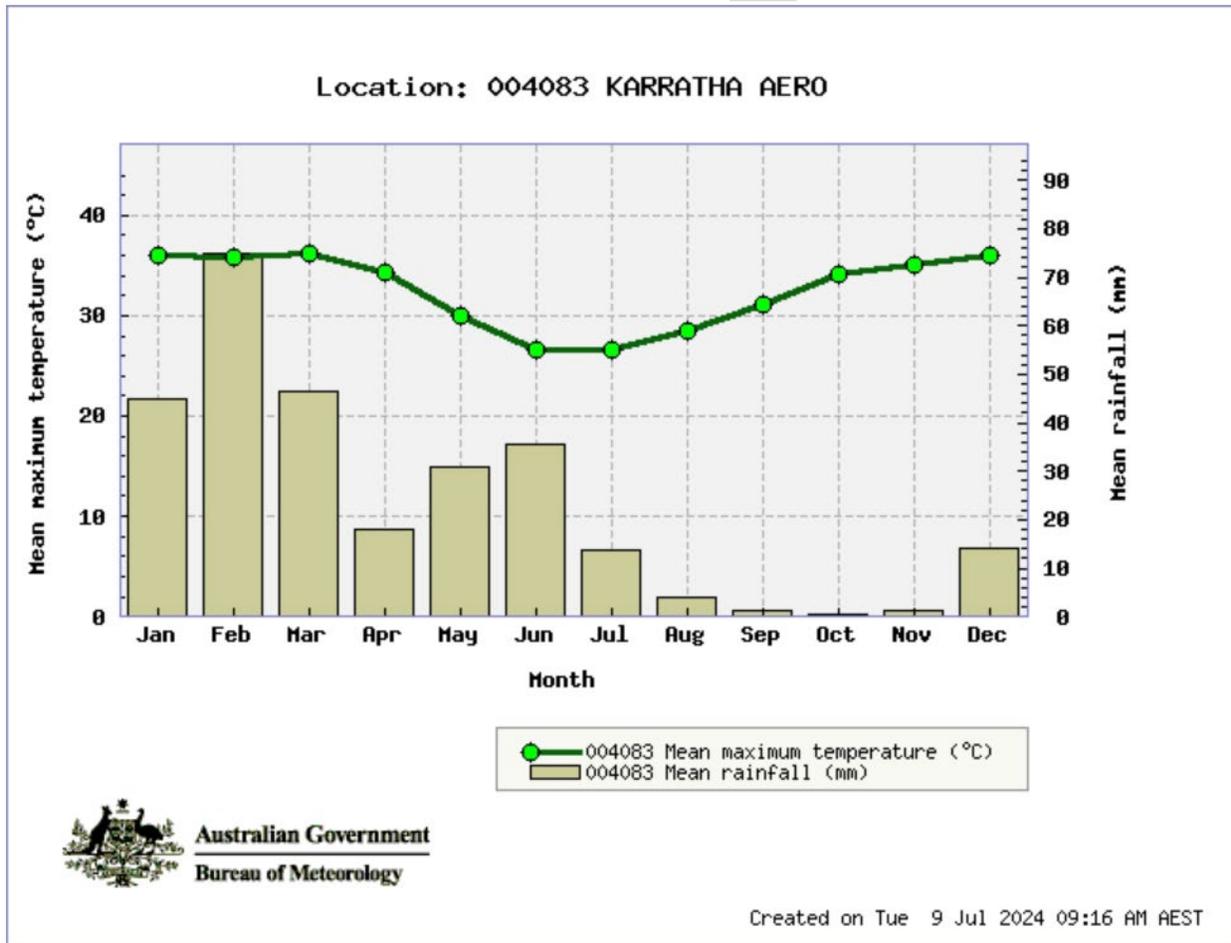


Figure 5 – Mean rainfall and temperature for Karratha aero weather station (BOM)

The predominant wind condition in the hotter bushfire prone months are hot westerly winds during the day that moderate during the evening and at times swing around to a north westerly breeze. During the middle of the year, when conditions are more suitable to mitigation activities such as prescribed burning, the wind direction tends to be more Easterly flow. Figure 6 shows the 9am and 3pm wind direction and speed averages for both November and July.

The City of Karratha also lies within the most cyclone prone area in Australia with three to four tropical cyclones expected every year during the cyclone season of November - April. This is

generally when most of the annual rainfall occurs as cyclones and tropical lows impact the coast.

The potential for fire conditions to occur throughout the year can restrict suitable windows for mitigation activities such as prescribed burning.

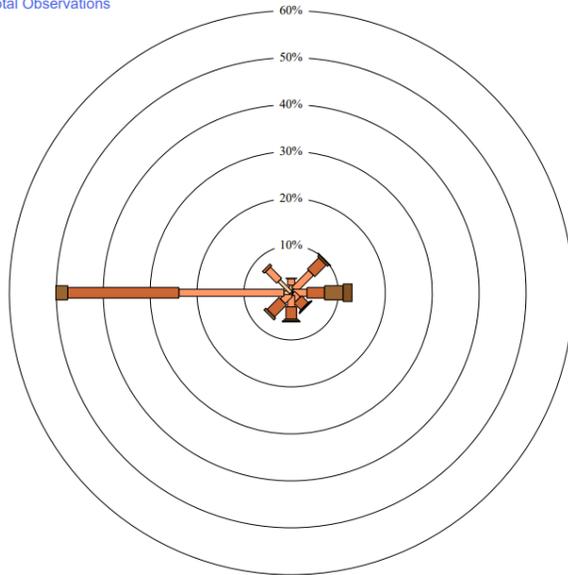
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Rose of Wind direction versus Wind speed in km/h
(04 Aug 1993 to 10 Aug 2024)

KARRATHA AERO

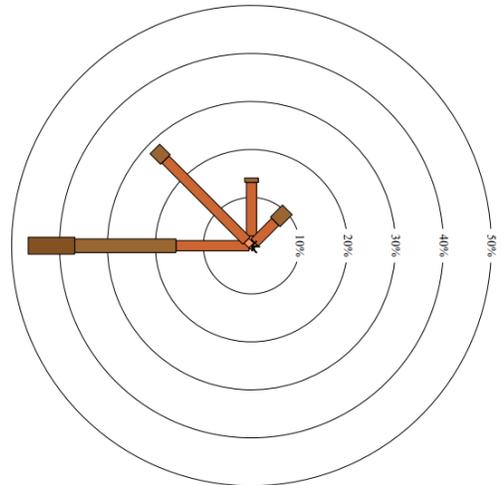
9 am Nov
915 Total Observations

Calm *



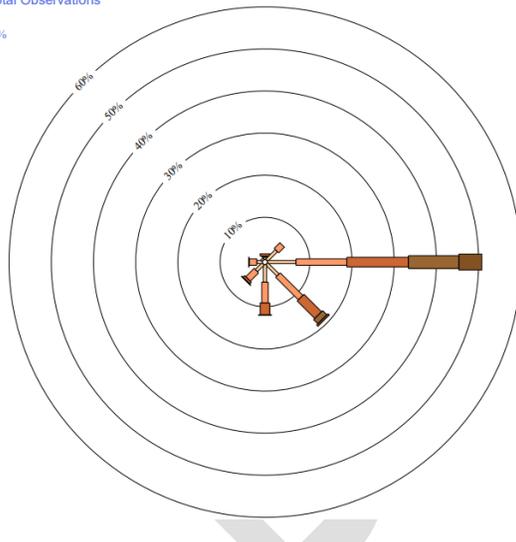
3 pm Nov
917 Total Observations

Calm *



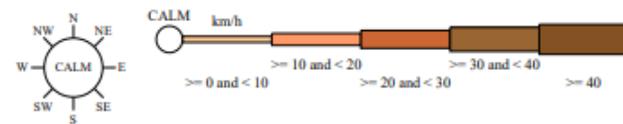
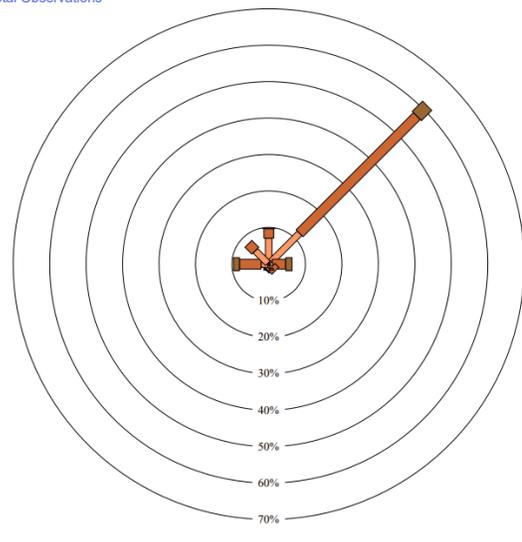
9 am Jul
940 Total Observations

Calm 3%



3 pm Jul
930 Total Observations

Calm *



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Figure 6: Karratha Aero Annual Wind direction vs Wind speed wind rose

Vegetation and fuel

The City of Karratha contains parts of only two Interim Biogeographic Regionalisation for Australia (IBRA) subregions (Roebourne and Chichester). The Chichester subregion comprises the northern section of the Pilbara Craton. Undulating Archaean granite and basalt plains include significant areas of basaltic ranges. Plains support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* (formerly *Triodia pungens*) hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges (DEC, 2003).

Vegetation types in the Roebourne subregion of the Pilbara bioregion, are described as grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pynrifolia* and *A. inaequilatera* on the coastal and sub-coastal plains. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas (DEC, 2003).

Arid grasses and shrubs are found widely over the region. Due to the variable rainfall, grasses are adapted to long periods of drought, with hummock grasses (spinifex) being the main type of grass prevalent. The coastal strip consists of grasslands and low open woodlands. Coastal flats have fringing mangroves scrub, whilst high shrub lands and low woodlands occur along major river valleys.

Hummock grasslands (which in WA are predominantly spinifex) are characterised by plants that grow in dense clumps. These species may form a substantial hummock or mound after several years. Hummock grasslands are particularly flammable as they increase in age due to a central dense core of dead material with all of the green material being carried on the outside of the plant. As the spinifex continues to grow and get bigger, the centre may die and collapse, leaving a living ring of vegetation. Over time, these rings may fragment, forming new, individual clumps.

Spinifex grasses are drought resistant perennials and generally grow 30–60 cm high and can be from 30–100 cm in diameter. The hummocks normally occupy 30–50% of the ground space, although, depending on age since last burn, the amount of ground covered with spinifex may be as low as 20% on rocky hills and as high as 100% in drainage lines. The area between the hummocks is usually bare but may contain soft grasses and herbs following rainfall.

Because of the scattered, hummocked nature of spinifex, the spread and behaviour of fire in spinifex is different to that in continuous fuels. Spinifex is normally a “discontinuous” fuel and fire is only able to move from one hummock to the next by direct flame contact. The spread of fire in spinifex depends on a number of factors, the most significant being:

- the distribution of the hummocks (the gap size between clumps)
- the size of the hummocks (fuel quantity)
- the moisture content of the fuel (fuel availability).
- the wind speed.

Spinifex fires are commonly wind driven, with the amount of groundcover and wind speeds are the most important factors affecting fire behaviour. For fire to spread between clumps the wind must be strong enough to extend the flames from one burning hummock, across bare ground and into the next hummock. There is very little lateral and virtually no back fire spread in spinifex.

The distribution of vegetation will have a significant effect on the rate of spread of a fire. The distribution of hummocks across a particular landscape is generally assumed to be reasonably uniform even though the amount of coverage may vary. The fuel load in spinifex is related directly to the amount of the ground’s surface covered by hummocks and the height of the spinifex.

After rain and in moister sites such as drainage lines, short lived grasses may fill the gap between spinifex clumps. The amount of this grass “infill” will have a significant effect on how a fire travels through spinifex. It will change the fuel profile from discontinuous to continuous which would allow fire to travel between clumps even under light winds.

The second most prominent vegetation type in the area is Roebourne Plains grass. Plains grass is a carpet coverage and dominates the flat low lying areas between the coast and the hills. It is usually well grazed by stock and doesn't exceed 100mm in height. As it is a continuous fuel a fire will spread even under light wind conditions. However, it does not burn with the intensity of spinifex and direct attack is more viable to extinguish.

The annual nature of the grass requires frequent treatments and fuel load and availability can be dependant on seasonal conditions, with significant growth following rain. Spinifex is not described as a vegetation type within AS3959, instead being grouped within the grassland classification. This may lead to inaccurate assessment of bushfire risk to assets within the Bushfire Risk Management system and considered when understanding identified risk and treatment schedules.

Important species and priority ecological communities

The City of Karratha is situated within one of Australia's top fifteen biodiversity hotspots (DEE 2017a). Known as the Hamersley-Pilbara hotspot, it provides habitat for threatened, endemic and fire sensitive species and communities. Habitats and the flora and fauna they support are diverse and are present from the Hamersley Ranges to the coastline, including the offshore islands. Although there are currently no listed Threatened Ecological Communities (TEC) or Threatened Flora under the federal Environmental Protection and Biodiversity Conservation Act (1999) or the Western Australian Biodiversity Conservation Act (2016), five Priority Ecological Communities (PEC) have been identified in the City (with spatial distribution by priority shown in figure 6). This includes Roebourne Plains Gilgai grasslands; Roebourne chenopod association; Wona Land System; Burrup Peninsula rock pile communities and the Horseflat Land System (City of Karratha, 2021). Although not statutory listings, PEC may identify communities where little is known, or they do not meet survey requirements under the Act. It is important that monitoring and identification of fire impacts to these communities is considered to ensure appropriate fire regimes are applied and any improved understanding of fire interaction is captured.

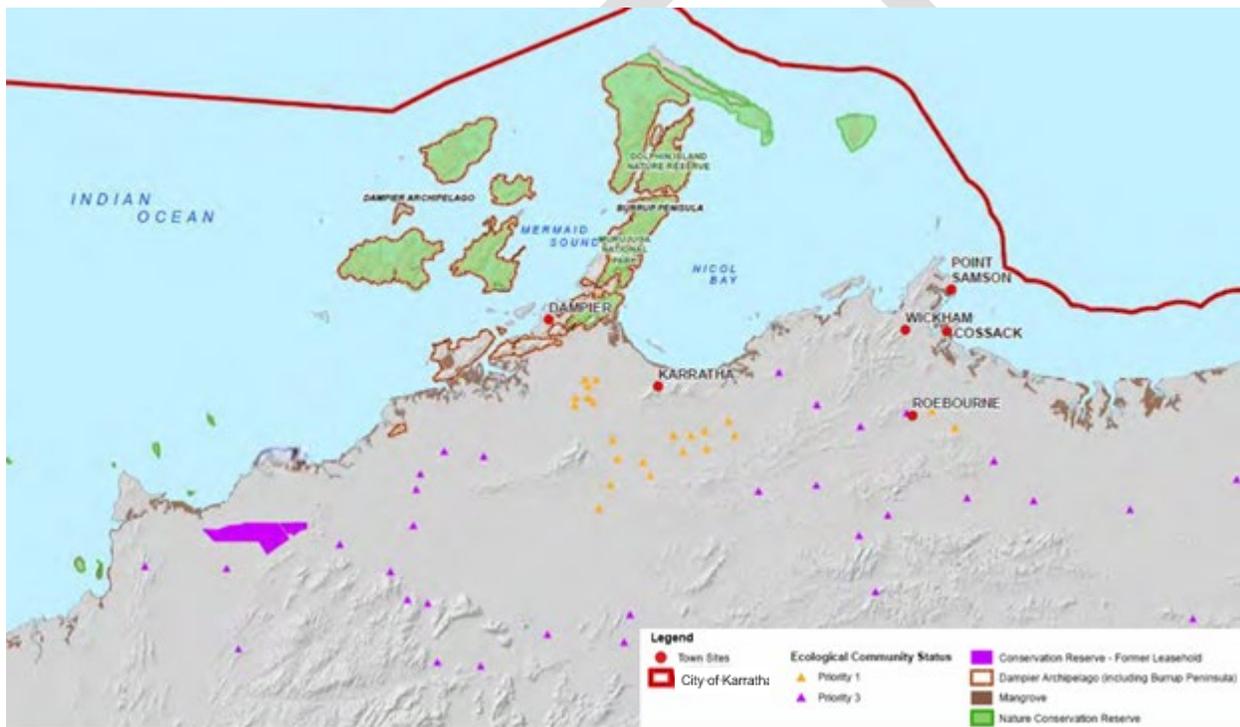


Figure 6: Recorded PEC in City of Karratha by priority (Source: City of Karratha Local Planning Strategy, 2021)

There is limited information on the impact of fire, particularly repeated fire, on individual Pilbara native flora, especially in the local area. It is known for example, that rockpile PECs harbour fire sensitive species that have been reduced in the landscape where rock protection from fire is not available. There are studies underway for Department of Biodiversity, Conservation and Attractions (DBCA) to study fire impacts on local flora which should be monitored for inclusion in future fire management planning.

This lack of information is an ongoing risk to environmental values, in particular how altered fire regimes may impact on the local biodiversity values. Ongoing monitoring of any fire management regime is important to review and adapt treatment schedules.

Table 3 – Known fire sensitive species which occur in the City of Karratha LGA (City of Karratha local biodiversity strategy - field survey results, 2019)

Species Intolerant to Fire*		
<i>Acacia coriacea</i>	<i>Acacia tenuissima</i>	<i>Alectryon oleifolius</i>
<i>Amyema</i> sp (mistletoe)	<i>Atriplex bunburyana</i>	<i>Brachychiton acuminatus</i>
<i>Capparis spinosa</i> (variable)	<i>Carissa lanceolata</i>	<i>Cynanchum viminale</i> subsp <i>australe</i>
<i>Dichrostachys spicata</i>	<i>Dodonea coriacea</i>	<i>Ehretia saligna</i>
<i>Enchylaeana tomentosa</i>	<i>Eragrostis eriopoda</i>	<i>Erythrina vespertilio</i>
<i>Ficus brachypoda</i>	<i>Flueggea virosa</i>	<i>Gymnanthera cunninghamii</i>
<i>Pittosporum phillyreoides</i>	<i>Ptilotus obovatus</i>	<i>Rhagodia eremaea</i>
<i>Rhagodia preissii</i> subsp <i>obovata</i>	<i>Terminalia supranitifolia</i>	Many Chenopod species (<i>Atriplex</i> <i>/ Scleroleana/Tecticornia.</i>)

The field survey (2019) identified eighteen plants of significance to Aboriginal people. Any areas to be cleared, burnt or impacted within the City of Karratha, should consider the presence of these culturally significant plants and the impact of fire or related treatments which may disturb the area.

Table 4: Plants of importance for Aboriginal People in Karratha (Source: City of Karratha local biodiversity strategy - field survey results, 2019)

Species*	Common / Ngarluma name ¹	Use
<i>Acacia coriacea</i>	Wirewood/Bardawurru	Bark – ash and tobacco chewed as a stimulant
<i>Acacia inaequilatera</i>	Camel bush/Garrany	Medicine tree
<i>Acacia pyrifolia</i>	Kanji bush/Ganyji	Food (seed and gum)
<i>Acacia xiphophylla</i> ,	Snakewood/Marruwa	Best wood for cooking
<i>Corymbia hamersleyana</i>	Hamersley bloodwood/Barlgarringu	Very important medicine currently and widely used. Also galls supply bush tucker.
<i>Cyperus bulbosus</i>	Wild onion/Ngarlgu	Favourite food
<i>Capparis spinosa</i>	Capper bush/Bajirla	Fruit
<i>Eucalyptus camaldulensis</i>	River red gum/Wirrangkura	Wild honey
<i>Eucalyptus victrix</i>	Smooth barked coolabah/Yamarrara	Bark prized – best one for mixing with chewing tobacco for stimulant. Also valued for lerp (energy food)
<i>Grevillea pyramidalis</i>	Northern grevillea/Jiingu	Medicine plant and important woman's plant
<i>Hakea lorea</i>	Honey hakea/Garrayin	Energy food (nectar)
<i>Ipomoea costata</i>	Yam/Mada	Food - source of carbohydrates

Species*	Common / Ngarluma name ¹	Use
<i>Lepidium platypetalum</i>	Mustard plant/"wild mustard"	Food (when other is scarce) but sought after for mustard flavoring of the flowers and buds
<i>Melaleuca argentea</i>	River paperbark/Tharlgu	Wild honey (and previously water) and for serving bush food
<i>Santalum lanceolatum</i>	Northern sandalwood/Wild plum/Burdardu	Fruits – bush plum
<i>Solanum diversiflorum</i>	Bush tomato/Garlumbu	Fruits – sought after food
<i>Stemodia grossa</i>	Vicks plant/Minyjagarra	Important medicine plant
<i>Triodia epactia</i>	Gummy spinifex/Mina	Resin still used to burn off evil spirits and as glue
<p>*Only plants specifically singled out of the many used for medicine, food and culture have been listed here</p> <p>1. From Wanggalil – Juluwarlu Aboriginal Corporation</p>		

Historical bushfire occurrence

During the warmer months from October to March numerous fires are instigated by dry lightning strikes. These are more often located in the southern inland section of the City boundary and often burn themselves out in remote inaccessible areas without any action required.

As can be seen below (figure 7) fire is common across the region, with landscape scale fires being a regular occurrence, particularly in the remote areas. Suppression is usually limited in these areas due to minimal risk to people or assets. Remote monitoring of these fires and implementation of defensive strategies aimed at protection of infrastructure, as opposed to containment of fires may be utilised.



Figure 7: Fire history records showing year last burnt (NAFI, captured August 2024).

Deliberate ignitions are the primary cause of bushfire in the area, with almost 50% of all bushfires in the past 4 years being classified as such. Natural causes such as lightning accounts for approximately 10%.

Bushfire response is typically direct attack in and around townsites and are contained to small areas through rapid response. Larger scale fires occur in more remote areas of the City of Karratha and the response focused on monitoring, provision of warnings and information and identifying key assets which may require action to protect. Use of remote sensing is an important tool in monitoring fire spread, along with communication with affected stakeholders.

Table 5: Reported Bushfire (vegetation fires of any size) cause within City of Karratha between 2020 – 2024. (Source: Local Government DFES report pack, August 7 2024)

Ignition Cause	2020/2021	2021/22	2022/23	2023/24	
Burn off fires	0	1	0	1	1%
Campfires/bonfires/outdoor cooking	0	3	0	1	1%
Children misadventure	1	3	0	2	2%
Cigarette	4	11	3	6	7%
Electrical distribution (excl. power lines)	0	1	0	0	0%
Equipment - Mechanical or electrical fault	0	0	1	1	1%
Fireworks/flares	1	1	0	0	1%
Hot works (grinding, cutting, drilling etc..)	0	1	3	3	2%
Human Error (Left on, knock over, unattended etc.)	1	2	6	2	3%
Improper Fuelling/Cleaning/Storage/Use of material ignited	1	0	1	0	1%
Indoor Appliances - cause unknown	0	0	0	1	0%
Other open flames or fire	1	2	2	1	2%
Power lines	1	5	0	3	3%
Reignition of previous fire	0	3	1	1	1%
Sleeping/Alcohol/Drugs/Physical-Mental impairment	0	1	1	0	1%
Suspicious/Deliberate	24	65	26	61	49%
Undetermined	1	16	7	11	10%
Unreported	1	5	3	11	6%
Vehicles (incl. Farming Equipment/Activities)	1	0	1	1	1%
Weather Conditions - Lightning	0	10	11	10	9%
Weather Conditions (High winds, natural combustion etc. Excludes Lightning)	1	2	2	3	2%

Current bushfire risk management controls

There are a range of current controls in place within the City of Karratha to manage bushfire risk. The main controls are described below and a list of Local Government Wide Controls for reducing bushfire risk in City of Karratha is provided at Appendix B.

Bushfire risk identification and assessment

This BRM Plan, in conjunction with the Bushfire Risk Management System (BRMS) are key in identification of assets vulnerable to bushfire, prioritisation of risks and development of treatment schedules.

It is proposed to establish the Bushfire Advisory Committee (S67 of BF Act 1954) or equivalent committee as determined by the City, with one function being to engage with key stakeholders to ensure updating and maintenance of BRMS data such as risk assessment and treatment information by the City of Karratha.

Bush Fires Act 1954 Section 33 Fire Mitigation Notice

The City issues a S33 Fire Mitigation Notice to all residents and landowners, requiring a range of fire mitigation and preparedness works including firebreaks, clearing of dead flammable material, and maintenance of asset protection zones, to be completed by 1st November and maintained year-round.

Firebreak inspections are completed during the compliance period. Non-compliance may lead to completion of works and expenses recovered from the owner. Additional penalties may be imposed for non-compliance.

Australian Fire Danger Rating System and public messaging

The Australian Fire Danger Rating System (AFDRS) has been in place since 2022 and is used to describe the potential danger level if a fire was to start. Fire Danger Ratings are displayed on public signage and media, with ratings corresponding to key messages and in some cases triggers to take certain actions.

Restricted burning periods

Due to potential fire risk all year the City maintains a restricted burning period. Permits are issued by City of Karratha Ranger Services team.

Total Fire Ban and restrictions on activities

A Total Fire Ban (TFB) is declared on days when fires are most likely to threaten lives and property. This is because of predicted extreme fire weather or when there are already widespread fires and firefighting resources are stretched. DFES will issue a TFB and make this information available to the public through various media sources, including the Emergency WA website (www.emergency.wa.gov.au).

Table 6: Number of TFB declared annually (Source: Local Government DFES report pack, August 7 2024)

PILBARA	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Shire of Ashburton	11	10	3	19	9	14
Shire of East Pilbara	12	10	9	16	0	3
Shire of Exmouth	4	2	3	9	2	10
City of Karratha	7	9	2	16	23	22
Town of Port Hedland	11	6	9	13	11	7

Local Government planning and building approvals

State planning framework (including State Planning Policy 3.7) 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 (includes Fire Management Plans and BAL Assessments and compliance with these).

Emergency Management Framework

The *State Emergency Management Plan* and the *State Hazard Plan for Fire* provides arrangements for the management of fire in Western Australia and contains information on fire prevention, preparedness, response and initial recovery. In the City of Karratha, An MOU is in place between the City of Karratha and DFES, with DFES responsible for managing all brigades and maintaining all bushfire response activities otherwise held by the City.

Resourcing

There are six volunteer units that provide combat response to bushfire incidents, along with other response, support and community engagement capabilities.

Units¹ include Light Tankers (LT), Urban Pumper, and Tankers 2.4R, 3.4U and 4.4R

- Karratha Volunteer Fire and Rescue Service (VFRS)
 - o 1 x LT, 1 x Urban Pumper-
 - o Additional LT and 2.4R for the High Threat Period
- Roebourne Volunteer Fire and Rescue Service (VFRS)
 - o 1 x LT, 1 x 3.4U
- Wickam Volunteer Fire and Rescue Service (VFRS)
 - o 1 x LT, 1 x 3.4U
- Dampier Volunteer Fire and Rescue Service (VFRS)
 - o 1 x LT, 1 x HSR
- Pt Samson Bush Fire Brigade (BFB)
 - o 1 x 1.4
- Nickol Bay Bush Fire Brigade (BFB)
 - o 1 x LT, 1 x 3.4U-
 - o Additional LT and 4.4R for the High Threat Period

With consideration to challenges in retaining volunteers the transient population of the area these units are well served by community volunteers and equipment. Active brigade members range from 12-26 for each unit (DFES, 2024), with additional members also providing support roles. Volunteers are always needed and recruitment remains essential. Current members enable all units to provide appropriate response coverage. Additional resources are also provided during the High Threat Period (HTP) from the DFES State Operational Support Fleet, as indicated above, with an additional LT managed by the DFES Karratha Regional Office. If required resources may be sourced from outside the region to assist in protracted or larger incidents, with resources located in City of Karratha also having ability to assist other Regions if requested.

Department of Biodiversity, Conservation and Attractions (DBCA) are the controlling agency for fire on land they manage and provide a response capability from Karratha, Millstream National Park and Karijini National Park.

Major industries such as resources also maintain an emergency response and preparedness capability and includes equipped light tankers and urban tankers for bushfire operations.

Community engagement activities

DFES coordinate VFRS school education incursions, Emergency Services Open Days and are actively involved in local events including the annual FeNaCING Festival. This provides opportunity to promote emergency awareness to the community.

¹ <https://www.dfes.wa.gov.au/about-us/operational-fleet>

Fuel Management

Management of fuels is an effective treatment for reducing bushfire risk at a landscape level. There are several agencies and private land managers who undertake prescribed burning activities or mechanical works to manage fuel. This includes:

- City of Karratha undertake reserve management activities to manage fuel, primarily through chemical and mechanical works. This includes MRWA verges. Treatments of significance to assets are captured on BRMS.
- DFES – under an MOU with Department of Planning, Lands and Heritage (DPLH) manage prevention activities on Unallocated Crown Land (UCL) or Unmanaged Reserves (UMR) within designated townsites within the City of Karratha local government authority.
- DBCA maintains a fuel reduction program for land within their responsibility. This is guided by a regional fuel management plan and implemented as an annual prescribed burning program. This includes UCL/UMR outside of gazetted townsites.
- Water Corporation Bushfire Risk Mitigation Program (Water Corporation sites assessed by Water Corporation staff).
- Pastoralists undertake a range of land management activities including planned burning for vegetation management and asset protection.

Chapter 4 Asset identification and risk assessment

Assets at risk from bushfire in the City of Karratha are recorded in the *Asset Risk Register* in the BRMS. Assets are divided into four categories: human settlement, economic, climate, and cultural. Each asset has been assigned a bushfire risk rating between low and extreme based on the risk assessment methodology described in the guidelines and handbook for bushfire risk management planning (DFES).

4.1. Local government asset risk profile

A summary of the risks assessed in the City of Karratha is shown in Table 7. This table shows the proportion of assets at risk from bushfire in each risk category at the time the BRM Plan was endorsed. This table was correct at the time of publication but may become outdated as risks are treated or additional risks are identified and assessed. A report may be generated from the BRMS to provide the most current risk profile.

Table 7 – Local Government Asset Risk Summary

Asset Category	Risk Rating				
	Low	Medium	High	Very High	Extreme
Human Settlement	45%	15%	12%	12%	4%
Economic	2%	5%	3%	0%	0%
Environmental	0%	0%	0%	0%	0%
Cultural	1%	0%	1%	0%	0%

Chapter 5 Risk evaluation

5.1. Risk acceptance criteria

The acceptable level of risk for each asset category is shown in Table 8. A risk that is assessed as exceeding these limits will be considered for treatment.

Table 8 – Risk acceptance criteria for bushfire risk in City of Karratha.

	Asset category			
	Human settlement	Economic	Environmental	Cultural
Acceptable risk level	High	High	High	High

Risks below the acceptable level do not require treatment during the life of this BRM Plan. They will be managed by routine Local Government Wide Controls and monitored to detect any increase in their risk rating.

5.2. Treatment priorities

The treatment priority for each asset is automatically assigned by BRMS, based on the asset’s risk rating. Table 9 shows how consequence and likelihood combine to give the risk rating and subsequent treatment priority for an asset. The treatment priority assigned in BRMS will help inform decision making for risk acceptability and development of the Treatment Strategy and schedule.

Table 9 – Treatment priorities

		Consequence			
		Minor	Moderate	Major	Catastrophic
Likelihood	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)

Chapter 6 Risk treatment

The purpose of risk treatment is to reduce the potential impact of 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 to make bushfires less likely or less harmful.

6.1. Treatment Strategy

The Treatment Strategy describes the overall approach to managing bushfire risk in the medium to long term in City of Karratha. The strategy is shaped by factors such as the distribution of risk in the landscape, the community's values and objectives, stakeholders' mitigation programs and constraints on treatment options. The Treatment Strategy helps guide the development of integrated annual treatment schedules.

There are a range of treatment options available which may be applied in the City of Karratha. The type of treatment applied will depend on the type of asset, level of risk and suitability for application such as resource availability or implementation constraints.

With much of the bushfire hazard being annual grassland or shrub fuels the key treatments identified in this plan, in addition to LG wide controls, are included in Table 10 below. Consideration of local cultural and environmental values is considered through the operational planning phase which follows the treatment strategy.

Table 10 – Treatment options utilised in City of Karratha

Treatments		Purpose
Fuel Management	Planned Burning	To reduce fuel across landscape scale areas. Includes management of UCL/National Park and other large land management areas.
	Mechanical Works	Slashing or removal of vegetation fuel
	Chemical Works	Spraying to remove vegetation
Ignition Management	Power lines – vegetation management	Provide separation between power lines and vegetation fuel
Preparedness	Firebreaks	Provide access and fuel separation from assets
	Firefighting appliances	Provide suitable response capability across the landscape in line with identified areas of risk or special requirements
Community Engagement	Absentee landowner engagement activity	Improve compliance of absentee landowners with BF Act (S33) requirements

It is identified that isolated assets or those located on urban fringes are most vulnerable to bushfire. There are also identified areas of vegetation within townsites that may pose a risk to residential areas, due to the annual nature of the grass vegetation there, if not managed in an ongoing basis. This is predominantly drainage reserves which are common throughout urban areas. In many instances this is a seasonal issue when after rainfall significant grass growth can occur. The City of Karratha maintains a contracted service to manage this fuel as required. These areas are usually small or isolated, with fires expected to be of short duration and small areas. It is noted that the vegetation growth can increase the appearance of being a threat to a higher degree than may be warranted.

6.2. Treatment Schedule

The Treatment Schedule is a list of bushfire risk treatments recorded in the BRMS. It is developed with regard to the outcome of the risk assessment process and Treatment Strategy and in consultation with stakeholders.

A treatment schedule for the City of Karratha covering the 2024/2025 financial year has been entered to BRMS. This is a live document and will be regularly updated throughout the life of the BRM Plan. This will be an ongoing consultation process with the land managers to determine ability to implement, operational considerations not identified at this strategic level and agreement on suitability of treatments.

Land managers are responsible for implementing agreed treatments on their own land. This includes any costs associated with the treatment and obtaining the relevant approvals, permits or licences to undertake an activity. Where agreed, another agency may manage a treatment on behalf of a land manager.

To be effective the treatment schedule in BRMS needs to be reviewed regularly through local planning processes and updated to reflect changes in planned treatments or outcomes of treatments to guide risk assessment.

Chapter 7 Monitoring and review

Monitoring and review processes are in place to ensure that the BRM Plan remains current and considers the best available information.

7.1. Monitoring and review

City of Karratha will monitor the BRM Plan and BRMS data to identify any need for change. The Plan and BRMS data will be reviewed at least every two years to ensure they continue to reflect the local context, assets at risk, level of risk and treatment priorities.

7.2. Reporting

The City of Karratha CEO or their delegate will provide to OBRM the outcomes of biennial reviews of the BRM Plan. This is required to maintain OBRM endorsement of the Plan.

The City of Karratha will contribute information about their BRM Program to the annual OBRM *Fuel Management Activity Report*.

Glossary

Asset	Something 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 risk register	A component within the Bushfire Risk Management System (BRMS) used to record 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 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.
Landowner	The owner of the land, as listed on the Certificate of Title; or leaser under a registered lease agreement; or other entity that has a vested responsibility to manage the land.
Likelihood	The chance of something occurring. In this instance, it is the potential of a bushfire igniting, spreading and impacting on an asset.
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 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 treatment	A process to select and implement appropriate measures undertaken to modify risk.

Systemic risk	The impacts of bushfire on the interconnected systems and networks that support community function. It is a product of the disruption caused by fire to the community and its effects may be felt far from the direct impacts of the fire in both time and space.
Treatment objective	The aim to be achieved by the treatment. Treatment objectives should be specific and measurable.
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 general approach that will be taken to managing bushfire risk, in consideration of the local government context and objectives.
Treatment type	The specific treatment activity that will be implemented to modify risk, for example a planned burn.

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Common abbreviations

AFAC	Australasian Fire and Emergency Services Authorities Council
BFAC	Bush Fire Advisory Committee
BFB	Bushfire Brigade
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
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

Appendices

Appendix A Local Government Wide Controls

Appendix B Communication Plan

Appendix C Annual Review Checklist

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Appendix A – Local government wide controls

Control		Action or activity description	Lead agency	Other stakeholder(s)	Notes and comments
Ref #	What is the control in place?	What is the name of the specific action or activity?	Who is the agency responsible for implementation of the control?	Are there any other key stakeholders who contribute to the success of the control?	Provide a brief description of the action or activity, such as community education campaigns, including its contribution to bushfire risk management in the local government, target areas, key timeframes and any work being undertaken to improve the control.
01	BRM Planning - Risk Analysis	BRMS extreme risks priority for treatment Maintain and refine BRM Plan	City of Karratha	All	Treatments identified in BRMS that are not acceptable without additional controls.
02	Legislation - City of Karratha Fire Mitigation Notice. (Bushfires Act 1954 S.33)	Annual Fire Break Notice: - Reviewed - Published - Inspections in accordance with notice City of Karratha Restricted Burn period	City of Karratha	N/A	Notice reviewed and published annually with supporting information on City of Karratha public website. Inspections to be completed each year Level of non-compliance to inform the BRM Plan context and vulnerability assessment (human settlement assets). Includes requirements for mining/power infrastructure/water infrastructure/rail infrastructure/explosives/flammable materials. Establish KPI for compliance and assess against compliance records to understand effectiveness of control.
03	Ignition management through restrictions to specific activities and increased public awareness	Total Fire Bans AFDRS Permits	City of Karratha DFES		
04	State Emergency Management Framework	LEMC Local Emergency Management Plan Local Recovery Plan	State Emergency Management Committee (SEMC)	City of Karratha DFES	Local Government to ensure LEMP for emergency management in the district are prepared.
05	Land Use Planning	State Planning Policy 3.7 – Planning in Bushfire Prone Areas Planning approvals	City of Karratha	DFES DPLH	Foundation for the implementation of effective, risk-based land use planning and development. The City aligns its planning policies and standards to SPP 3.7 Need to ensure agreed treatments are captured within the BRMS through a process involving relevant sections of the City of Karratha. Consider future review of designated bushfire prone areas to reflect areas of low fuel or subsequent development.

Control		Action or activity description	Lead agency	Other stakeholder(s)	Notes and comments
06	Public preparedness and education campaigns	Are you ready campaign	City of Karratha DFES		
07	DFES – Bushfire Risk Mitigation Schools	All schools within areas declared bushfire prone are individually assessed. Risk treatment plan is developed and signed off and DoE appoints contractors to undertake agreed work.	Department of Education (DoE)	DFES	
08	Water Corporation Bushfire Mitigation Program	Bushfire Risk Mitigation Program focused on reducing bushfire risk to offsite assets from fuel loads on its tenure.	Water Corporation	City of Karratha DFES	Sites shown in BRMS and none identified as extreme risk.
09	Preparedness	Annual meeting with key landholders to present updated version of City of Karratha Fire management Plan and discuss treatments.	City of Karratha	Horizon power Rio Tinto Woodside Yara Aboriginal Corporations Pastoralists DFES	Conduct this meeting before fire season so all parties aware of capabilities and responsibilities It is intended this is facilitated within the proposed creation of a BFAC for City of Karratha.
10	Fuel Management	DFES UCL/UMR land management	DFES	DPLH	DFES manage input of risk assessments into BRMS and undertaking work on behalf of DPLH
11	Fuel Management	Asset monitoring and maintenance	Horizon Power		Quarterly checks of sites and maintenance of vegetation within and around boundaries. Annual maintenance of vegetation under transmission lines Distribution lines underground
12	Fuel Management	City of Karratha mitigation works (Works Plan)	City of Karratha		City of Karratha policy TE03 identifies maintenance of verges and reserves adjoining residential areas. Significant areas or directly associated with assets will be mapped in BRMS. Additional areas such as verges are available from City of Karratha.

Control		Action or activity description	Lead agency	Other stakeholder(s)	Notes and comments
13	Fuel Management	Department of Biodiversity, Conservation and Attractions (DBCA) Annual Burn Plans	DBCA	DPLH DFES City of Karratha Aboriginal Corporations	UCL/UMR outside of townsites
14	Community Engagement	DFES Community Engagement Initiatives/programs, Monthly themes	DFES	City of Karratha	
15	Prevention	Community Safety Plan	City of Karratha	DFES WAPOL	Community Safety Plan to be developed in 2024/2025 financial year to take into consideration the main cause of bushfires are suspicious/deliberate and in the 2023/2024 financial year accounted for 51% (n=61) of all ignition causes.
16	Response	Satellite Hotspot Monitoring	DFES DBCA	City of Karratha Pastoralists	Daily monitoring of NAFI and Aurora website to allow early intervention if required

Appendix B – Communication Plan

This Communication Plan supports the development, implementation and review of the City of Karratha Bushfire Risk Management (BRM) Plan. It should document the:

1. Communication objectives.
2. Roles and responsibilities.
3. Key stakeholders engaged in the development of the BRM Plan and Treatment Schedule.
4. 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.

Communication objectives

The communication objectives for the development, implementation and review of the BRM Plan for the City of Karratha 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.

Roles and responsibilities

City of Karratha is responsible for the development, implementation and review of the Communication Plan. Key stakeholders support the local government by participating the Communication Plan as appropriate. An overview of communication roles and responsibilities follows:

List the roles (not names) and their communication responsibilities.

- CEO City of Karratha is responsible for requesting OBRM endorse the BRM Plan.
- Manager, Marketing and Communications, City of Karratha is responsible for communication of the BRM Plan to the community.
- Emergency Management and Ranger Services Coordinator, City of Karratha is responsible for communication between the local government and the Department of Fire and Emergency Services.

Key stakeholders for communication

The following table identifies key stakeholders in BRM planning process, its 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
Who is the stakeholder? Consider government agencies, interest groups and service providers.	What is their role or interest that makes them a stakeholder? Consider if they are an asset owner, landowner or manager, treatment manager or interested party.	Consider how the implementation of the BRM Plan will impact each stakeholder and then assign them a rating of High, Medium or Low.	What level of engagement is necessary for the stakeholder? Inform, consult, involve, collaborate or empower?
Government agencies	Land Managers / Coordinators of BRMP Identify Valued Assets	High	Collaborate
Utilities	Critical Infrastructure / Treatment strategies Identify valued assets	High	Involve
Industry	Large resources sector with responsibility for mitigation of owned assets. Critical Infrastructure / Treatment strategies Identify valued assets	High	Involve
Pastoralists	Land managers of large portion of land within City of Karratha. Critical Infrastructure / Treatment strategies Identify valued assets	Medium	Involve
Traditional owners	Concerned Land Managers / Impact on cultural values / Identify Valued assets	High	Involve
Private landholders	Concerned / Bushfire ready / treatments &	Medium	Consult

	education Identify Valued assets		
Tourism	Critical Infrastructure / Treatment strategies Identify valued assets	Medium	Consult
Interest Groups	Awareness of BRMP, Consultation and expert advice Identify valued assets	Medium	Consult

Communications log

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						
When did this communication occur?	Who was the stakeholder or target audience?	What was the purpose of the communication?	What topics were discussed?	What communication method did you use?	Were there any issues or lessons identified?	Was there any follow up required?
8 March 2024	Community survey	General feedback on council services	Forum for open feedback	Online survey	Rubbish and vegetation on City managed tenure, community housing and unmaintained properties	No - noted for information and considered in LG wide risk assessment.
22 July 2024	DFES	To understand roles and responsibilities in BRMS and current treatment works	UCL/UMR management BRMP process	Meeting	Clarification of local arrangements for response and UCL preparedness Opportunity to bring stakeholders together more regularly	No
24 July 2024	City of Karratha	Clarify internal mechanisms for bushfire management and treatments	Planning (SPP3.7) S33 notices and compliance	Meeting	Opportunity to bring stakeholders	No

Timing of communication	Stakeholders	Purpose	Summary	Communication method	Lesson Identified	Follow up
					together more regularly	
7 August 2024	LEMC	Announce BRM Plan review	General introduction for information. Invitation to provide any insights to project lead.	Meeting	No	No
12 September 2024	Murujuga Aboriginal Corporation	General introduction for information and confirm assets and current mitigation activities	Identification of general treatment approach and joint management approach with DBCA.	Meeting	No	No
13 September 2024	Horizon Power	General introduction for information and confirm assets and current mitigation activities	Internal management process to maintain infrastructure regularly.	Meeting	Updated LG wide controls	No
13 September 2024	Yara	General introduction for information and confirm assets and current mitigation activities	Discussion around future development and firebreak responsibility outside fence	Meeting	Maintain communication between multiple parties	Confirm firebreak work outside fence line – who is responsible?
19 September 2024	Rio Tinto	General introduction for information and confirm assets and current mitigation activities	Discussion around Wickham townsite mitigation	Meeting	Maintain communication between multiple parties	No
20 September 2024	Woodside	General introduction for information and confirm assets and current mitigation activities	Discussion around mitigation measures and preparedness on Burup Peninsula.	Meeting	Maintain communication between multiple parties	No

Timing of communication	Stakeholders	Purpose	Summary	Communication method	Lesson Identified	Follow up
Development of the Treatment Schedule						
12 September 2024	DFES	Confirm known treatments and activities. Captured input from other groups through existing discussions and planning already in progress.	Captured cross tenure activities known (planned and future works identified)	Meeting	Mapping inconsistencies, opportunity for funding, questions over tenure (UCL), joint approach to treatments (Rio etc.)	Confirm UCL tenure in Dampier

Communication Plan

This Communication Plan outlines the key communication initiatives that will be undertaken during the implementation 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
What is the timeframe or date for this communication?	Who is the stakeholder(s) or target audience?	Which communication objective(s) does this activity support or achieve?	How are you communicating (e.g. email, meetings) and how often? What resources are required?	What is the key message or purpose that needs to be understood?	Who is responsible for planning and undertaking the communication activity?	What could reduce the effectiveness of the communication?	What will be done to reduce the likelihood of this happening?	How will you know if your communication was successful?
2024-2028	Internal City of Karratha – CEO, EM Liaison, Community engagement team, Council	All (1-5)	Emails/meetings during initial consultation and annual updates	Implementation of BRM Plan	EM Liaison	LG capacity Clarity of language and intent Budget (for LG mitigation)	Planning and time management Clear purpose and responsibilities Targeted communication Regular updates	Feedback, questions raised Level of support received
2024-2028	DFES	All (1-5)	Emails/meetings during initial consultation and annual updates	Implementation of BRM Plan UCL/UMR management and status Treatment status and issues to be addressed Identification of other planned works Funding opportunities	EM Liaison	Lack of resource commitment Unclear or lack of communication	Share resources to achieve satisfactory mitigation outcomes	Successful identification and application of remedial works

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
2024-2028	OBRM	All (1-5)	Email and hard copy correspondence	To receive feedback and final approval of plan before presenting to Council	EM Liaison	Time constraints lack of understanding for any required modifications	Clear direction and acknowledgment of improvements to plan	Endorsement of plan from Council
2024-2028	DBCA	All (1-5)	Emails/meetings during initial consultation and annual updates	Joint approach to fuel management Commitment to treatments Environmental assets consideration	EM Liaison	Resource constraints Unclear objectives	Regular communication between DBCA and CoK staff	High level of cooperation and communication between FCOs and DBCA fire managers
2024-2028	DPLH	All (1-5)	Emails/meetings during initial consultation	Inform of the BRMP process Identify assets Identify existing and proposed treatments.	EM Liaison	Resource constraints Unclear objectives	Regular communication	High level of cooperation and communication between FCOs and DBCA fire managers
2024-2028	Local traditional owner groups	All (1-5)	Emails/meetings during initial consultation and as required.	Inform of the BRMP process Identify assets Identify existing and proposed treatments.	EM Liaison	Resource constraints Unclear objectives	Provide clarity of expectations	Engaged in communication

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
2024-2028	Private landholders and community	5	Public messaging as required. Feedback on draft plan through LG communications team.	Inform of the BRMP process Identify assets Identify existing and proposed treatments.	EM Liaison	Time constraints, lack of cooperation from private landowners	Sound time management practices	High completion rate of treatments
2024-2028	Department of Education	All (1-5)	Emails/meetings during initial consultation.	Inform of the BRMP process Identify assets Identify existing and proposed treatments.	EM Liaison	Lack of buy in from managers Resource constraints Unclear objectives	Thorough explanation of benefits of mitigation and preparedness	High level of compliance and preparedness
2024-2028	Local industry including mining operations	All (1-5)	Emails/meetings during initial consultation.	Inform of the BRMP process Identify assets Identify existing and proposed treatments.	EM Liaison	Lack of buy in from managers Resource constraints Unclear objectives	Thorough explanation of benefits of mitigation and preparedness	High level of compliance and preparedness
2024-2028	Pastoralists	All (1-5)	Emails/conversation during initial consultation	Inform of the BRMP process Identify assets	EM Liaison	Lack of buy in from land managers Resource constraints Unclear objectives	Thorough explanation of benefits of mitigation and preparedness	High level of compliance and preparedness

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
				Identify existing and proposed treatments.				
2024-2028	Horizon Power	All (1-5)	Emails/conversation during initial consultation	<p>Inform of the BRMP process</p> <p>Identify assets</p> <p>Identify existing and proposed treatments.</p>	EM Liaison	<p>Lack of buy in from organisation</p> <p>Resource constraints</p> <p>Unclear objectives</p>	Thorough explanation of benefits of mitigation and preparedness	High level of compliance and preparedness
2024-2028	Water Corp	All (1-5)	Emails/conversation during initial consultation	<p>Inform of the BRMP process</p> <p>Identify assets</p> <p>Identify existing and proposed treatments.</p>	EM Liaison	<p>Lack of buy in from organisation</p> <p>Resource constraints</p> <p>Unclear objectives</p>	Thorough explanation of benefits of mitigation and preparedness	High level of compliance and preparedness
2024-2028	LEMC	All (1-5)	Present plan at meeting for review out of session. Standing agenda item to discuss implementation and feedback where required.	<p>Engaged in process of BRM Plan</p> <p>Identify risk and share information</p>	LEMC Chair	<p>Schedule of meetings doesn't meet project timeline</p> <p>Understanding of plan implementation</p>	Invite plan owner to present or provide report as required	Meeting agenda and minutes capture positive collaboration

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
				Informed of implementation Share with networks				
2024-2028	BFAC (proposed)	All (1-5)	Regular updates and request information at each BFAC. Present plan at meeting for review and input out of session. Standing agenda item to discuss implementation and feedback where required.	Engaged in process of BRM Plan Identify assets and treatments. Informed of implementation Share with networks	EM Liaison/BFAC chair (proposed)	Not currently functioning but plan in 2024 to create BFAC (or similar group outside BF act) with linkage to LEMC – if not created then will not meet intent Time constraints Schedule of meetings doesn't meet project timeline Lack of planning Availability of Volunteers	Explain value/benefits of input into plan Identify meeting schedule	Created and functioning committee Engaged Buy in for BMR Plan process
2024-2028	Local tourism representatives	All (1-5)	Emails/conversation during initial consultation	Share with networks Identify key risks	EM Liaison	Unclear objectives	Provide clear communication on role of tourism industry in communicating key messaging	Engaged

Appendix C – Biennial review checklist

Correspondence

- Cover letter from local government Chief Executive Officer or delegate to Director OBRM with this form completed and attached.
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Bushfire Risk Management Plan

- | | |
|-------------|---|
| Chapter 1 | <input type="checkbox"/> BRM Plan objectives remain relevant. |
| Chapter 3 | <input type="checkbox"/> Content of the context statement reflects current factors affecting bushfire hazard and bushfire risk to the community, economy and environment. |
| Chapter 4-7 | <input type="checkbox"/> Figures and tables have been updated to reflect current data in Bushfire Risk Management System (BRMS). |
| Chapter 6 | <input type="checkbox"/> Treatment Strategy remains reflective of community values and strategic priorities. |
| Appendix B | <input type="checkbox"/> Local government wide controls includes current treatment programs in local government area. |
| Appendix C | <input type="checkbox"/> Communication Plan has been updated to include planned stakeholder engagement and communication activities for the next planning period. |
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Bushfire Risk Management System

- All assets identified in the Local Government area have been mapped and risk assessed in BRMS.
 - All assets have had a risk reassessment completed in the last 2 years.
 - The treatment schedule includes planned treatments for at least the next 12 months.
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