



Department of
Environment and Conservation

PILBARA

REGIONAL FIRE MANAGEMENT PLAN

2008-2013



Photo: Nicki Warnock, DEC 2006

Document History

Custodian:

Don Boothey
Regional Fire Coordinator

Date of this Draft:

October 2008

Review Date:

October 2009

Endorsed by:

Regional Manager

Manager, Fire Management Services

Director Regional Services

*Fire Management Services
Managing Nature's Fires*

REGIONAL FIRE MANAGEMENT PLAN

Preface

This Regional Fire Management Plan presents guidance to fire managers on achieving the Departments policy objectives within the Pillara Region over the 5-year period 2008 to 2013. This plan is developed for use by regional fire managers and managers of other regional portfolios and will provide guidance in the determination of fire management works and priorities.

The plan is a dynamic document. It will be revised from time to time as new knowledge is developed from experience, research and adaptive management. The document will be formally reviewed within 5 years of publication.

Fire has been a natural element of the Australian landscape for millions of years. Along with other natural disturbances, such as drought, storms and geological changes, fire has shaped the Australian environment, its native plants and animals and the ecosystems that sustain them. Many species have developed specific mechanisms to survive and tolerate periodic fire. Some even depend on fire for regeneration and other critical life stages.

Aboriginal people have used fire for more than 40,000 years for spiritual reasons, heating, cooking and for clearing the country to enable easier access for hunting and to stimulate regrowth of native grasses to attract native grazing animals.

The contemporary fire environment in Western Australia is significantly different to the period prior to European settlement. There are now numerous fire vulnerable community assets embedded in a very fire-prone environment. While natural fires in the past once would run their course until it rained, the creation of towns and settlements, community infrastructure, farmlands and other developments has meant that today's community requires protection against the ravages of wildfires.

The role that fire plays in maintaining the biodiversity of the myriad of ecosystems across the State has also been affected by development. Historical fire regimes have changed in many parts of the State from the frequent, low intensity burning applied by Aboriginal people resulting in a fine grained mosaic of burnt patches, to a regime of less frequent and often higher intensity fire extending over larger areas and resulting in a coarse grain mosaic of fire footprints across the landscape.

The Department consists of a number of administrative Regions. Each Region is constituted by a number of Districts. Fire Management outcomes are provided through this Regional and District structure.

The Department's fire management is guided by Policy Statement 19 'Fire Management', which states:

The Department will manage prescribed fire and wildfires on lands managed by the Department to protect and promote the conservation of biodiversity and natural values whilst also providing for protection of human life and community assets. The Department will also promote fire

This Regional Fire Management Plan is the interpretation of the guidance contained in Policy Statement 19 for the Pillbara Region. It sets out the objectives, principles and approach for managing fire across the Region and within the Fire Management Areas that have been identified within the Region.

Fire management will be planned and implemented in partnership with other landowners and land managers, fire authorities and the community. The Department will implement an informed and balanced approach to risk management. A variety of fire regimes incorporating different frequency, intensity, season and scale will be applied at the landscape scale on lands for which the Department has a fire management responsibility.

management that protects biodiversity on lands not managed by the Department.

Introduction

The Region

Boundaries

✧ Determined by the DEC Pilbara Region administrative boundaries. In the west from Amherst Point north of Carnarvon following the Western Australian coast (including offshore islands) north to Wallal Downs. Tracking southern boundaries Broome, West Kimberley and Hall's Creek Shire boundaries to NT/WA border. South to Lake Macdonald then west to Amherst Point deviating south to include areas such as the Collier and Barlee Ranges.

Vegetation and Landform

✧ The region contains 12 IBRA sub regions with dominant features including:

- Offshore Islands
- Ranges
- Dune fields and sandplains
- Hummock grassland plains
- Lateritic uplands.

Climate and Weather

✧ Climate varies between semi-arid / semi-arid tropical to desert / semi-desert tropical. Rainfall varies between 200 – 600 mm per annum and is either summer, summer episodic, monsoonal or cyclonic. Winter rainfall occurs predictably in the far west coastal, and less predictably in the central Pilbara ranges.

Hydrology

✧ Several major river systems occur within the Region, including the Ashburton, Fortescue, DeGrey and Yule Rivers, plus numerous tributaries and minor river systems.

Social – Stakeholders

✧ Stakeholder composition consists of pastoral, mining, gas and petroleum industries, Indigenous and tourism interests.

Key land use/s, infrastructure, fire sensitive values, etc

✧ Pastoralism, mining, DEC and Indigenous managed land all have fire sensitive values within them. There are a number of towns, the larger of which are Exmouth, Tom Price, Newman, Karratha, Roebourne and Port Hedland. In addition to these formal towns there are tens of thousands of people living in Aboriginal out-camps and mining camps. Some camps are larger than small towns.

DEC Managed Lands

✧ DEC is responsible for the management of 3,703,301 Ha of lands vested in the WA Conservation Commission, and has responsibility for the management of pest animal, weeds and fuel reduction for 27,167,178 Ha of Unallocated Crown Lands within its boundary.

Regional Fire Management Objectives

Fire is a primary driver of ecological processes in the Pilbara Region. Fire has been present and mediated through human use in these landscapes for many thousands of years. The biota is generally adapted to, and in some cases, dependent upon fire for their persistence. Inappropriate fire regimes that are outside the adaptive range of the biota are a major threatening process to biodiversity values in the Region. Much of the Region is currently affected by fire regimes that have developed since the removal of Aboriginal people from these landscapes and the development of pastoralism and other industries and land uses. Desert areas were subject to fully traditional fire use by Aboriginal people within living memory (in some areas up until the early 1960's).

There are a number of key fire management objectives relevant to all the lands managed by the Department in the Region.

Fire Management Objectives

Funding and Resources

Objectives

- ✧ Pursue funding opportunities external to the department and consolidate internal finance distribution towards fire management.
- ✧ Establish a sustainable resourcing environment for the Pilbara regional fire program.

Strategies

- ✧ Define annual funding and resource requirements for the next five years.
- ✧ Ensure the requirements of the Region are reflected in the Departmental Risk to Resources model.

Success Criteria

- ✧ Finance and resources are sufficient to implement regional fire management program

Biodiversity

Objectives

- ✧ To minimise the extent and impact of unplanned fire on the biodiversity assets of DEC managed estate.
- ✧ To establish a temporal and spatial mosaic of fire occurrence that is in sympathy with the needs of the biota of each FMA.
- ✧ Minimise the risk or loss of sensitive or threatened taxa or communities.
- ✧ Maintain an appropriate balance of fire-maintained hummock grasslands and hummock grassland/woodland mosaics.
- ✧ Minimise the extent and density of exotic species of plants.

- ✧ Maintain vegetation cover sufficient to sustain ecological functions such as soil stability, nutrient cycling and hydrological function.

Strategies

- ✧ Develop and maintain a fire induced fuel age mosaic characterised by a grain size of less than approximately 2000 Ha.
- ✧ Establish an appropriate fire management regime on the Mount Bruce flats mulga communities, using data of Stephen van Leeuwen and Tony Start, applying an adaptive fire management approach.
- ✧ Ensure fire management is considered in integrated weed management programs, specifically for Parkinsonia, Mesquite, Date Palms and Buffel Grass.
- ✧ Develop a theoretically optimal model for time since fire distribution for major vegetation types.
- ✧ Develop an appropriate fire regime for Barrow Island to promote biodiversity values.

Success Criteria

- ✧ The frequency distribution for time since fire for the major vegetation communities conforms to theoretically optimal distribution.
- ✧ Fire sensitive or threatened taxa or communities are maintained or enhanced.
- ✧ The distribution and density of invasive exotic species is reduced.

Protection

Objectives

- ✧ To protect visitors to DEC managed estate from fire events.
- ✧ To protect built infrastructure, including indigenous and non-indigenous cultural heritage on DEC managed lands, from destructive impacts of planned and unplanned fire.
- ✧ Prevent damage to neighbouring values from wildfires emanating from DEC managed lands.
- ✧ Develop and maintain a Wildfire Risk Analysis (WRA) for each DEC Reserve.

Strategies

- ✧ Develop a priority list of reserves for which Wildfire Risk Analysis is required and complete WRAs for priority one areas by 2009.
- ✧ Develop a works program aimed at mitigating risk to life and property on all DEC managed lands.
- ✧ Work with industry in locations such as Barrow Island where there is a complex mix of fire sensitive infrastructure,

Success Criteria

- ✧ No injury or loss of life due to fire.
- ✧ No DEC or other infrastructure will be impacted by fire on DEC managed lands.

Knowledge

Objectives

- ✧ To develop new knowledge concerning fire and its effects by applying an adaptive management approach to fire management operations.
- ✧ Collect and collate indigenous and non-indigenous knowledge of fire and its application and effects.
- ✧ Develop criteria for establishing priorities in fire management to achieve biodiversity conservation and strategic fire protection.
- ✧ Establish and maintain a current fire history dataset at appropriate scales of resolution to allow effective fire management.
- ✧ Establish and maintain a current vegetation structure and composition model dataset over DEC managed lands.
- ✧ To develop a predictive model for fuel availability with respect to cumulative rainfall.
- ✧ Develop and maintain a regional dataset on other relevant spatial data.

Strategies

- ✧ Develop an accurate vegetation structure map of the Pillbara that approximates National Vegetation Information System (NVIS) IV.
- ✧ Identify fire sensitive flora and fauna including attributes/response to fire, that make the species/communities fire sensitive.
- ✧ Knowledge and practice disseminated to fire practitioners.
- ✧ Undertake operational research to determine the relationship with antecedent rainfall and fuel accumulation rates for the major fuel types within the FMAs.
- ✧ Establish and maintain a dataset of fire management access tracks for each reserve.
- ✧ In partnership with FMS develop a fire history dataset sourced from remote sensing.

Success Criteria

- ✧ Vegetation map prepared and maintained.
- ✧ Fire history mapping prepared and maintained, at appropriate scale.
- ✧ Fire sensitive biodiversity assets mapped and monitored.
- ✧ Model for fuel accumulation rates developed and implemented.
- ✧ Fire management access tracks database developed and maintained.

Community Engagement

Objectives

- ✧ Develop an informed and supportive partnership with stakeholders that are affected by, or whose management of adjacent lands may affect, DEC fire management outcomes.
- ✧ Develop collaborative fire management programs with adjacent pastoral leaseholders.
- ✧ Develop collaborative fire management programs with Traditional Owners.

Strategies

- ❖ Engage with stakeholder organisations.
- ❖ Engage with Traditional Owners.
- ❖ Host annual fire planning meeting with adjacent neighbours, in addition to opportunistic or direct consultation.
- ❖ Determine the resourcing requirements for effective community engagement.
- ❖ Host regular collaborative fire planning meetings with Traditional Owners.

Success Criteria

- ❖ Joint management fire operations are agreed to and executed with other land managers adjacent to DEC managed land.
- ❖ Attendance at public consultation meetings.
- ❖ Positive fire management outcomes with Traditional Owners and stakeholder groups.
- ❖ Adequate resourcing requirements for fire management are identified and addressed.

Fire Management Areas

The Pilbara Region can be divided into six (6) Fire Management Areas (FMA) based on the biogeography, climate, land use, fuel types and fire behaviour (Figure 1).

The boundaries of FMA's have significant congruence with the Interim Biodiversity Regions of Australia (IBRA) found in the Pilbara. DEC Pilbara regional boundaries are the confines of this plan. Within this region are 4 IBRA bioregions (12 IBRA sub regions).

In determining the boundaries of an FMA several criteria were considered:

✧ The vegetation and landform in relation to fire behaviour. Hummock grasslands differ within each IBRA subregion; however significant similarities in fire behaviour exist.

✧ The existing land use. Areas that are used for pastoralism may require different fire management than areas used primarily for nature conservation and areas of Aboriginal land may be managed for cultural or commercial outcomes.

✧ The influence of climate. Fuel loads of the arid interior are affected by irregular and scattered pulses of rainfall. Fuel loads of sub regions are to a certain degree dependant on rainfall events.

1. The six FMA's for the Pilbara Region are listed below:

Fire Management Area	Area of DEC land (ha)	Area of UCL (ha)	Total area (ha)
Carnarvon	369,647	134,683	2,457,103
Pilbara	1,491,249	3,698,546	17,821,310
Gascoyne	481,072	1,075,120	6,500,040
Sandy Desert	1,283,729	22,251,935	29,571,658
Islands	77,604	0	77,604
Burrup	0	6,894	6,894
Total	3,703,301	27,167,178	54,434,609

Errors and omissions accepted.

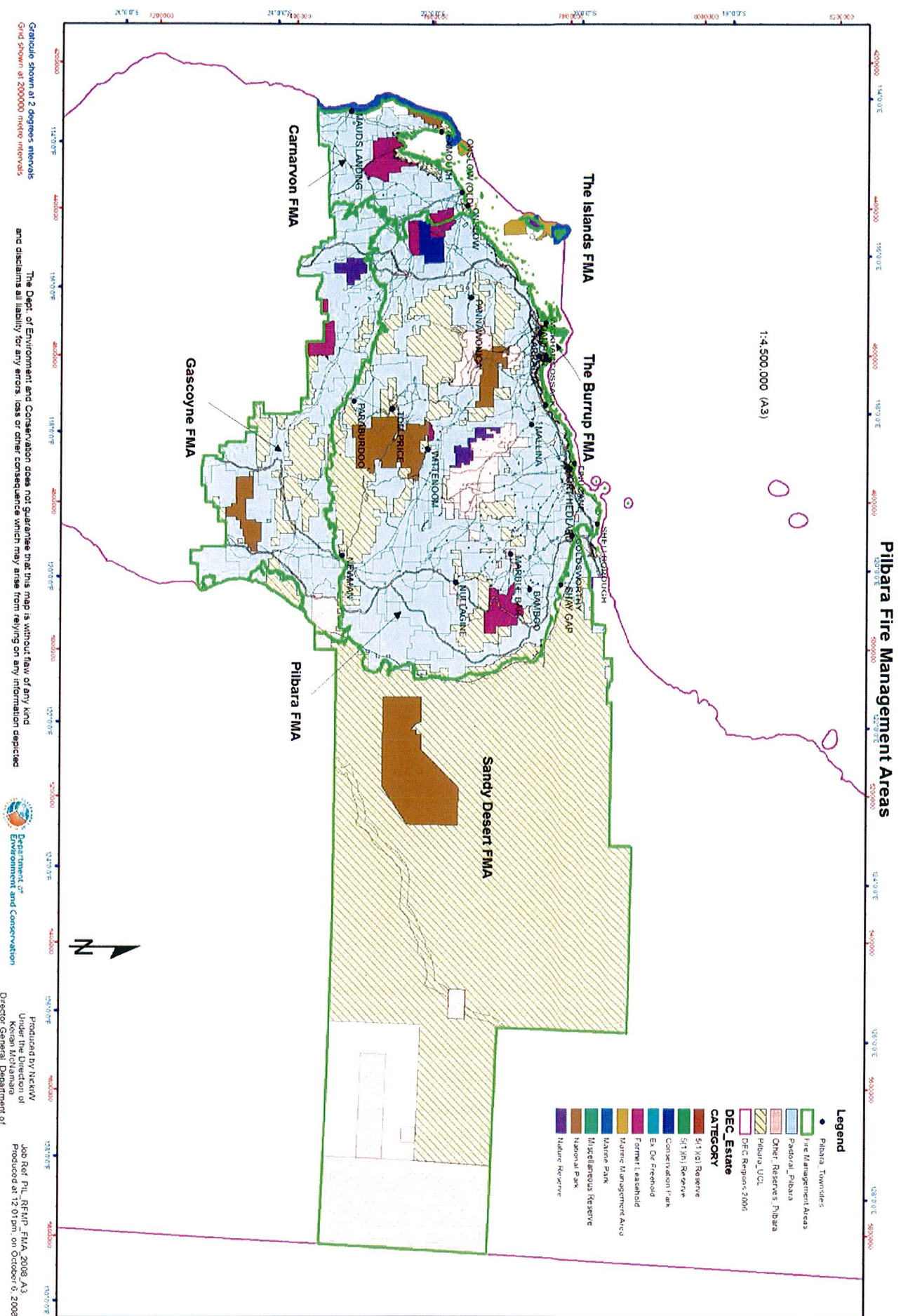


Figure 1: Map of Pilbara Fire Management Areas

Description

This fire management area includes the area of land which is covered by the Cape Range IBRA subregion. The primary land uses are grazing (native pastures), conservation, mining leases, large defence reserves and urban infrastructure. The climate is arid semi-desert to sub-tropical, with variable summer and winter rainfall. Cyclonic activity can be significant, and cyclonic systems may affect the coast and hinterland annually. The total area of this FMA is 2,457,103 ha of which 504,330 ha is managed by DEC for fire mitigation.

Key Vegetation Types – Fuel Model Description

A mosaic of saline alluvial plains with samphire and saltbush low shrublands, Bowgada low woodland on sandy ridges and plains, Snakewood scrub on clay flats and tree to shrub steppe over hummock grasslands on and between red sand dune fields. Limestone strata with *Acacia stuartii* or *A. bivenosa* shrub land outcrop in the north, where extensive tidal flats in sheltered embayment's support mangal.

The Cape Range and Giralia dune fields form the northern part of Carnarvon Basin, containing rugged tertiary limestone ranges and extensive areas of red aeolian dune field, Quaternary coastal beach dunes and mud flats. Community types include; *Acacia* shrublands over *Tridodia* on limestone, red dune fields, *Tridodia* hummock grasslands with sparse *Eucalyptus* trees and shrubs on the Cape Range, extensive hummock grasslands (*Tridodia*) on the Cape Range, and eastern dune-fields.

Fuel ages in excess of 12 to 15 years within the Cape Range can result in large, high intensity fire events.

Features of Special Interest

The FMA has several features of interest to conservation that may be affected by fire management decisions in the Pilbara:

- ✧ Karst environments
- ✧ Snakewood communities (*Acacia xiphophylla*)
- ✧ Firecracker communities (chenopod shrub-lands on highly erosive limestone soils)
- ✧ Cape Range occurrence of Millstream Palm (*Livistona alfredii*)
- ✧ Coastal plain buffel grass communities (fire exclusion)

Land Use Considerations for Fire Management

1. Biodiversity Conservation
The ecosystems in this FMA vary throughout the region in relation to fire carrying capacity. Much of the biota has adapted to fire, but species such as *Snakewood* are fire sensitive. Large scale intense fires are damaging to sustaining biodiversity.

2. Community Asset Protection
This FMA has a number of coastal towns and settlements (Exmouth, Coral Bay, Learmonth) neighbouring DEC managed lands. Major roads include; North West Coastal Highway, Exmouth Road, Burkett Road and Coral Bay Road. Utilities at risk

from fire include; Exmouth, Learmonth and Coral Bay bore-fields, Learmonth to Exmouth powerlines. Recreation use associated with the coast is seasonally high. Visitors to the area recreate along the entire western coast including permanent accommodation facilities, pastoral leases, crown lands and DEC managed land, and are at risk from wildfire. Feed for stock and station infrastructure (fencing, windmills, etc) may be at risk from wildfire. Fire may enter DEC managed land from adjacent pastoral leases and adjoining defence department bombing range.

Fire Management Objectives

- ✧ Protect life and property values.
- ✧ Complete a District Incident Response Plan covering all assets within the FMA.
- ✧ To better understand the biodiversity values of the Cape Range subregion and its interaction with fire.
- ✧ Create and maintain a spatial mosaic (< 2000 ha grain size) of fuel ages (time since fire) with inter-fire periods sufficient to maintain biodiversity on DEC managed estate and UCL.
- ✧ Create and maintain a strategic arrangement of low fuel fire management areas sufficient to provide protection to fire sensitive assets.

Strategies

- ✧ Annual updates of the District Incident Response Plan.
- ✧ Develop and maintain WRA spatial layers for the FMA.
- ✧ Plan and implement fire management program according to prescription, including collaborative fire management with neighbouring landholders and agencies.
- ✧ Maintain strategic access for fire management on DEC managed lands.
- ✧ Implement low fuel strategic buffers across the Cape Range National Park (east west).
- ✧ Implement fire induced fine grained mosaic within spinifex communities.
- ✧ Implement fuel management strategies within the UCL surrounding Exmouth town site.
- ✧ Plan to include 2015 pastoral lease acquisitions.

Success Criteria

- ✧ No loss of life and property values.
- ✧ Fuel modification, sufficient to protect town sites from wildfire, are in place adjacent to the communities of Exmouth, Coral Bay, Reef Retreat, Giralila and the Fish Farm.
- ✧ Wildfire is managed through mitigation works to minimise the area burnt.
- ✧ More than 10 - 20% of the area has fuel ages (been exposed to fire) greater than 10 years.
- ✧ District Incident Response Plan has been completed.
- ✧ Other landholders and agencies have been consulted and involved in development of fire management programs.

Relevant Conservation Estate

The following Conservation Reserves and proposed conservation reserves fall within this FMA:

1. Cape Range National Park
2. Giralua
3. Barlee Range
4. 2015 coastal acquisitions (future reserves)
5. Ningaloo Station (50% DEC owned)
6. Ningaloo Marine Park coastal strip (40 metres above mean high water)

Table i – FMA 1 – CARNARVON					
Vegetation type and indicator species	Fire management outcome	Prescribed fire regime	Wildfire response	Partnering considerations	Monitoring for fire management effectiveness
<i>Acacia shrub lands over Limestone</i>	Retention of shrublands.	Unknown.	Does not burn readily.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government, DOD and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Woodland over Spinifex Cape Range</i>	Management of fuels at a landscape scale.	Differential burning; * Fuel - Type/Age - Arrangement * Vegetation * Physical features. Patch size; <2000 ha's Identify combined fire percentage annually.	Crown decline can result from high intensity fire. Mosaic grain to course, reduced refugial retention, from high intensity fire. Where possible and feasible contain fire to smallest possible area.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government, DOD and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Dune Fields</i>	Management of fuels at a landscape scale.	Differential burning; * Fuel - Type/Age - Arrangement * Vegetation * Physical features. Patch size; <2000ha Identify combined fire percentage annually.	Where feasible contain to smallest area.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government, DOD and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Northwest Cape Coastal Plains – Grasses and Acacia shrub on sandplains</i>	Minimise impact of fire on buffel grass infestation and erosion	Fire suppression	Fire suppression	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, DOD and local government.	No fire greater than 5 ha.

Description

This fire management area includes the area of land which is covered by the Hamersley, Fortescue, Chichester and Roebourne IBRA subregions. Dominant land uses are grazing (native pastures), tourism, conservation, mining and urban infrastructure. The climate is semi-desert tropical, rainfall ranges from 300 - 500mm, usually in summer cyclonic or thunderstorm events. Winter rain is not uncommon in the south. The area of this FMA is 17,821,310 ha of which 5,189,795 ha is managed by DEC for fire mitigation.

Key Vegetation Types – Fuel Model Description

The Hamersley IBRA sub-region is characterised by mulga (*Acacia aneura*) woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Tridida* sp on skeletal soils of the ranges.

Fortescue IBRA sub-region is characterised by alluvial plains and river frontage, extensive salt marsh, mulga-bunch grass and short grass communities on alluvial plains in the east; deeply incised gorge systems in the western (lower) part of the drainage; river gum woodlands fringe the drainage lines. It contains the northern limit of mulga communities, an extensive calcrete aquifer (originating within a palaeo-drainage valley) feeds numerous permanent springs at Millstream in the central Fortescue, supporting large permanent wetlands with extensive stands of river gum, cadjeput (*Melaleuca* sp) and Millstream palm (*Livistona alfredii*) woodlands.

The Chichester sub-region 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 *Tridida* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges.

Uplands of the Roebourne sub-region are dominated by *Tridida* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Coastal lowlands comprise of samphire, *Sporobolus* and mangal on marine alluvial flats and river deltas. Resistant linear ranges of volcanic rock occur across the coastal plains, with exposures of granite.

Features of Significance

The FMA has several features of interest to conservation that may be affected by fire management decisions in the Pilbara:

- ✧ Gorges of Hamersley and Chichester Ranges contain extensive permanent spring-fed streams and pools. These contain relictual fauna including snails (*Bothriembryon* sp) and reptiles (*Lerista zietzi*), and low mobility species with restricted geographic ranges (landsnail *Camadenia* and *Quistachia* spp.). Fire sensitive flora includes *Callitris* pine, *Ficus*, *Terminalia*, snakewood etc.
- ✧ Mulga (*Acacia aneura*) communities are fire sensitive, particularly on mid and lower slopes, and contain fire sensitive fauna communities such as long lived, short range endemic invertebrates (e.g. *Bothriembryon* sp)

- ✧ An isolated population of Millstream palm (*Livistona affredii*), growing along Duck Creek over a shallow calcareate aquifer (not particularly fire sensitive).
- ✧ Grassland plains dominated by the perennial *Themeda* (kangaroo grass) and many annual herbs and grasses (Hamersley Station grass plain). Fire sensitivity unknown.
- ✧ Very isolated areas of mulga, in the extreme west of the sub-bioregion. No other biological information is available, as these communities have not been described.
- ✧ Mountain tops of the Hamersley Range contain a large number of restricted flora species. e.g. *Daviesia eremaea*, *Thysanotus manglesianus*, *Stenanthemum petraeum*, *Eriachne semiciliata*. Fire sensitivity is unknown.
- ✧ Vegetation associated with permanent spring systems are fire sensitive.
- ✧ Fortescue Marsh: An extensive, episodically inundated samphire marsh, approximately 100 km long and 10 km wide and surrounded by extensive fire sensitive mulga communities.
- ✧ Spectacled Hare-wallabies require long unburnt large spinifex clumps for shelter (Chichester Range sub-region). May also apply to other vertebrate fauna.

*Ngalya
Mulga*

Land Use Considerations for Fire Management

1. Biodiversity Conservation
The ecosystems in this FMA vary throughout the region in relation to flammability and fire response. Much of the biota has adapted to fire, but species such as Spectacled Hare-wallaby are still vulnerable to local extinction under an uncontrolled fire regime. Mulga communities require special consideration due to their fire sensitivity and will require more intensive fire management.
2. Community Asset Protection
Town sites, stations (~50), utility infrastructure, DEC infrastructure and tourism are all vulnerable to fire events.

Fire Management Objectives

- ✧ Protect life and property values.
- ✧ Improve knowledge on the biodiversity values of the Pilbara FMA and its interaction with fire.
- ✧ Create and maintain a spatial mosaic (< 2000 ha grain size) of fuel ages (time since fire) with inter fire periods sufficient to maintain biodiversity on DEC managed estate and UCL.
- ✧ Create and maintain a strategic arrangement of low fuel fire management areas sufficient to provide protection to fire sensitive assets.
- ✧ Establish a series of strategic buffers by fire management to limit the extent and spread of unplanned fire.
- ✧ Establish collaborative partnerships with the indigenous communities of the area to define and implement appropriate fire management outcomes.
- ✧ Complete a District Incident Response Plan covering all assets within the FMA.

Strategies

- ✧ Annual updates of the District Incident Response Plan.
- ✧ Develop and maintain WRA spatial layers for the FMA.

Relevant Conservation Estate

The following Conservation Reserves and proposed conservation reserves fall within this FMA:

- ✧ Millstream-Chichester National Park
- ✧ Karijini National Park
- ✧ Meentheena Conservation Park
- ✧ Cane River, Mt Minnie
- ✧ Mungarooona Range Nature Reserve
- ✧ 2015 (Fortescue Marsh, Roebourne Plains, UCL) acquisitions. + others

Success Criteria

- ✧ No loss of life and property values.
- ✧ Fuel modification, sufficient to protect town sites and infrastructure from fire, are in place.
- ✧ Wildfire is managed through mitigation works to minimise the area burnt.
- ✧ More than 10 - 20% of the area has fuel ages (been exposed to fire) greater than 10 years.
- ✧ District Incident Response Plan has been completed.
- ✧ Other landholders and agencies have been consulted and involved in development of fire management programs.
- ✧ Resource requirements for community engagement are identified and appropriately funded.
- ✧ Communications plan is completed and implemented.

- ✧ Plan and implement fire management program according to prescription, including collaborative fire management with neighbouring landholders and agencies.
- ✧ Maintain strategic access for fire management on DEC managed lands.
- ✧ Implement low fuel buffers around DEC and other infrastructure.
- ✧ Plan and implement strategic buffers on DEC managed lands where appropriate.
- ✧ Implement fire induced fine grained mosaic within spinifex communities.
- ✧ Plan to include 2015 pastoral lease acquisitions.
- ✧ Develop and implement a communications plan to engage neighbours in a cooperative burning program.
- ✧ Identify resourcing requirements to implement fire management and associated activities.

Table ii – FMA 2 - PILBARA

<i>Vegetation type and indicator species</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Valley floor Mulga Woodland</i> <i>Elevated Mulga on Ranges</i>	Fire exclusion to allow regeneration	Occasional low intensity fuel reduction during winter. Low wind, high humidity. Local strategic buffers around high value mulgas.	Fire sensitive. Where feasible suppress fire threatening mulga.	Liaison with relevant stakeholders, e.g. Local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots * Fire management plots
<i>Slope Mulga communities</i>	Fire exclusion to allow regeneration	Occasional low intensity fuel reduction during winter. Low wind, high humidity. Local strategic buffers around high value mulgas.	Fire sensitive. Where feasible suppress fire threatening mulga.	Liaison with relevant stakeholders, e.g. Local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots * Fire management plots
<i>Eucalyptus woodlands on Ranges</i>	Management of fuels at a landscape scale.	Regular burning to create a mosaic of different fuel ages. Patch size, <2000ha	Crown decline can result from high intensity fire. Mosaic grain to course, reduced refugal retention, from high intensity fire. Where possible and feasible contain fire to smallest possible area.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots * Fire management plots
<i>Gorges and Callitris Breakaways</i>	Exclude from fire	Utilize existing natural fuel differential.	Fire sensitive. Suppression.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. ✧ Landsat

<i>Vegetation type and indicator species</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Permanent wetlands</i>	Exclude Manage surrounding fuels. Regeneration establishment and protection.	Manage fuels surrounding wetlands.	Suppression.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots
<i>Fortescue marsh</i>	Exclude Manage surrounding fuels. Regeneration establishment and protection.	Manage fuels surrounding fringing mulga communities on wetlands.	Where possible and feasible contain fire to smallest possible area.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots
<i>Volcanic Ranges Acacia shrub steppe plains</i>	Management of fuels at a landscape scale.	Regular burning to create a mosaic of different fuel ages. Patch size; <2000ha	Where possible and feasible contain fire to smallest possible area. Consideration to be given to allow fire to run.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Eucalyptus steppe on ranges</i>	Management of fuels at a landscape scale.	Regular burning to create a mosaic of different fuel ages. Patch size; <2000ha	Crown decline can result from high intensity fire. Mosaic grain to course, reduced refugal retention, from high intensity fire. Where possible and feasible contain fire to smallest possible area.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plot

<i>Vegetation type and indicator species</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Snakewood on cracking clays</i>	Exclude fire. Manage surrounding fuels. Regeneration establishment and protection. Utilise as strategic buffers.	Regular burning to create a mosaic of different fuel ages. Patch size; <1ha	Vulnerable Utilise existing natural fuel differentials.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots
<i>Coastal alluvial savannah plains</i>	Develop appropriate fire regime.	Adaptive management experimentation.	Provide assistance if requested	N/A	N/A
<i>Upland hummock grasslands</i> <i>Volcanic and granite lineal ranges</i>	Management of fuels at a landscape scale.	Regular burning to create a mosaic of different fuel ages. Patch size; <2000ha	Where possible and feasible contain fire to smallest possible area. Consideration to be given to allow fire to run.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots * Fire management plots
<i>Ephemeral drainage woodlands</i>	Management of fuels at a landscape scale.	Regular burning to create a mosaic of different fuel ages. Patch size; <2000ha	Crown decline can result from high intensity fire. Mosaic grain to course, reduced refugial retention, from high intensity fire. Where possible and feasible contain fire to smallest possible area.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat

Description

This fire management area includes the area of land which is covered by the Ashburton and Augustus IBRA subregions. Dominant land use is grazing (native pastures) and conservation reserves. Climate is arid (desert) climate with bimodal (winter and summer) rainfall, with tropical monsoon influences. The Area of this FMA is 6,500,040 ha of which 1,556,192 ha is managed by DEC for fire mitigation. Due to the rare occurrence of large wildfire events and inaccessible country, active fire management in this FMA is minimal.

Key Vegetation Types – Fuel Model Description

Mountainous range country divided by broad flat valleys, associated with Ashburton River. Mulga/snakewood low woodlands occur on shallow earthy loams over hardpan on the plains, and burn infrequently. Mulga scrub and *Eremophila* shrublands on the shallow stony loams of the ranges rarely burn. Low mixed shrublands on hills with other areas supporting large areas of *Triodia* burn intensely, but infrequently. Spinifex grasslands are most common in rocky uplands and local dune fields.

Rugged low Proterozoic sedimentary and granite ranges divided by broad flat valleys. Mulga woodland with *Triodia* occurs on shallow stony loams on rises burn rarely, while the shallow earthy loams over hardpan on the plains are covered by Mulga parkland which burns infrequently.

Features of Significance

The FMA has several features of interest to conservation that may be affected by fire management decisions in the Pillbara:

- ✧ Gorges of the Barlee Nature Reserve have permanent water and are protected from fire. These areas provide refuge sites for fire intolerant species.

Land Use Considerations for Fire Management

1. Biodiversity Conservation
There are very few biodiversity assets within this FMA. However, they include fire sensitive communities in gorge systems, mostly inaccessible.
2. Community Asset Protection
There are few community asset protection issues associated within this FMA.

Fire Management Objectives

- ✧ No loss to life or property.
- ✧ Improve knowledge on the biodiversity values of the Gascoyne FMA and its interaction with fire.
- ✧ Document and monitor fire history.
- ✧ Complete a District Incident Response Plan covering all assets within the FMA.

- ✧ Barlee Range Nature Reserve
- ✧ Wanna Conservation Park
- ✧ Collier Range National Park

FMA:

The following Conservation Reserves and proposed conservation reserves fall within this

Relevant Conservation Estate

- ✧ No loss of life and property values.
- ✧ More than 10 - 20% of the area has fuel ages (been exposed to fire) greater than 10 years.
- ✧ District Incident Response Plan has been completed.
- ✧ Other landholders and agencies have been consulted and involved in development of fire management programs.

Success Criteria

- ✧ Annual updates of the District Incident Response Plan.
- ✧ Develop and maintain WRA spatial layers for the FMA.
- ✧ Plan and implement fire management program according to prescription, including collaborative fire management with neighbouring landholders and agencies.
- ✧ Maintain strategic access for fire management on DEC managed lands.
- ✧ Implement low fuel buffers around DEC and other infrastructure.
- ✧ Plan and implement strategic buffers on DEC managed lands where appropriate.

Strategies

Table iii – FMA 3 – GASCOYNE					
<i>Vegetation type and indicator species</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Mulga/Snakewood hardpan plains Rangeland Mulga</i>	Regeneration establishment and protection	Determine an appropriate regime. Reviewed every 5 years.	Respond to requests.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Mixed shrublands</i>	Regeneration establishment and protection	Determine an appropriate regime. Reviewed every 5 years.	Respond to requests.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Mulga woodland alluvial Mulga hardpan</i>	Regeneration establishment and protection	Determine an appropriate regime. Reviewed every 5 years.	Respond to requests.	Liaison with relevant stakeholders, e.g. local Park Councils, adjoining stations, local government and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat * Pilbara biosurvey plots * Fire management plots

FMA 4 – SANDY DESERT

Description

This fire management area includes the area of land which is covered by the McLarty, Mackay, Trainor, Rudall, Lateritic Plains, Little and Great Sandy Desert IBRA subregions. Land use for this FMA is UCL and crown reserves, under determined Native Title. The subregion is arid tropical with summer rain and is influenced by monsoonal activity. Morning fogs are recorded during the dry season. The area of this FMA is 29,571,658 ha of which 23,535,664 ha is managed by DEC for fire mitigation.

Key Vegetation Types – Fuel Model Description (Including Fire Behaviour)

Extensive longitudinal dune fields and sand plains comprising open hummock grassland of *Tridalia* with scattered trees and shrubs of *Eucalyptus* and *Acacia* sp, burn frequently and intensely usually from natural ignitions. Gently undulating lateritised uplands support shrub steppe of *Acacia* over *Tridalia* hummock grass which burn less frequently due to low, discontinuous fuels. Extensive salt lake chains with samphire-*Melaleuca* low shrublands burn infrequently. Ranges throughout the Little Sandy Desert support hard spinifex shrublands and burn infrequently, but intensely from natural ignitions. Mulga parkland over *Tridalia* on lateritic "buckshot" plains, burn infrequently.

Features of Significance

The FMA has several features of interest to conservation that may be affected by fire management decisions in the Pilbara:

- ✧ Broad scale spinifex dominated communities which are advantaged by landscape scale mosaics with a grain size of less than 2000 ha.
- ✧ Contemporary grain sizes are significantly larger.
- ✧ Fire sensitive communities occur within residual sandstone ranges throughout the Little Sandy Desert (Carnarvon Range, McKay Range, etc).
- ✧ Some vertebrate species require large spinifex clumps for habitat (Spentacle Hare-wallaby, etc).

Land Use Considerations for Fire Management

1. Biodiversity Conservation

This FMA is largely held under determined Exclusive Possession Native Title. Fire management operations on these lands will require full collaboration with Native Title holders. There is a potential for culturally significant sites with possible fire sensitivities. Remote areas currently support a moderate level of tourism and mining.

2. Community Asset Protection

Several Indigenous communities (Parnngurr, Punmu, Kunawarrtji, Kiwirrkurra) exist within this FMA, all of which are vulnerable to fire. Depressed economic activity and isolation result in a low capacity to recover from impacts of fire. Indigenous communities represent a large potential source for fire management capacity within this FMA.

Fire Management Objectives

- ✧ Protect life and property values.
- ✧ Improve knowledge on the biodiversity values of the Sandy Desert FMA and its interaction with fire.
- ✧ Create and maintain a spatial mosaic (< 2000 ha grain size) of fuel ages (time since fire) with inter fire periods sufficient to maintain biodiversity on DEC managed estate and UCL.
- ✧ Create and maintain low fuel fire management areas surrounding fire sensitive assets.
- ✧ Establish a series of strategic buffers by fire management to limit the extent and spread of unplanned fire.
- ✧ Establish collaborative partnerships with the indigenous communities of the area to define and implement appropriate fire management outcomes.
- ✧ Complete a District Incident Response Plan covering all assets within the FMA.

Strategies

- ✧ Annual updates of the District Incident Response Plan.
- ✧ Develop and maintain WRA spatial layers for the FMA.
- ✧ Plan and implement fire management program according to prescription, in collaboration with Traditional Owner groups and communities.
- ✧ Maintain strategic access for fire management on DEC managed lands.
- ✧ Implement low fuel buffers around DEC and other infrastructure.
- ✧ Implement fire induced fine grained mosaic within spinifex communities utilising both aerial and on-ground ignition.
- ✧ Develop and implement a communications plan to engage Traditional Owners in a cooperative burning program.
- ✧ Identify resourcing requirements to implement fire management and associated activities.

Success Criteria

- ✧ No loss of life and property values.
- ✧ Fuel modification, sufficient to protect indigenous communities and infrastructure from fire, are in place.
- ✧ Ongoing and effective engagement occurs with Traditional Owner groups and communities.
- ✧ Average grain size is less than 2000ha.
- ✧ More than 10 - 20% of the area has fuel ages (been exposed to fire) greater than 10 years.
- ✧ District Incident Response Plan has been completed.
- ✧ Resource requirements for community engagement and involvement are identified and appropriately funded.
- ✧ Communications plan is completed and implemented.

Relevant Conservation Estate

The following Conservation Reserves and proposed conservation reserves fall within this FMA:

- ✧ Karlamilyi (Rudall River) National Park

Table iv – FMA 4 – SANDY DESERT

<i>Vegetation type and indicator species</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Open hummock grassland.</i> <i>Dune field</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Laterised upland</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Tree steppe</i> <i>Hummock grasslands</i> <i>Dune fields</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Acacia shrubs</i> <i>Over hummock grasses</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Buckshot plains</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat

<i>Vegetation type and indicator species</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Coolabah woodlands over bunch grasses</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Alluvial river gum</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat
<i>Hummock grasslands hills and plains</i>	Establish a mosaic with grain size of <2000ha.	Aerial or ground ignition, initially winter burning until mosaic partially established.	Where feasible contain to smallest area.	Liaison with indigenous Traditional Owners and mining industry.	Compartmentalisation of DEC estate and adjoining UCL. * Roads * Physical features Monitor on a landscape scale. * Landsat

FMA 5 – THE ISLANDS

Description

This fire management area covers the Islands off the coast of the Pilbara. Land use for this FMA includes recreation, conservation, petroleum lease, UCL and industrial land. The area is arid with mostly summer rain, and is influenced by monsoonal activity. The total area of this FMA is 77,604 ha all of which is managed by DEC for fire mitigation.

Off-shore islands are considered in the following groups; Dampier Archipelago, Barrow Island group, Montebello group, Lowendal group, islands of Exmouth Gulf, islands between Cape Preston and Onslow (as far west as Serrurier), islands between Cape Lambert and Hedland, islands off Poissonnier Point, and Bedout Island.

Over 200 offshore islands, with the majority of them situated within the Montebello and Dampier Archipelago. Islands exist off the North West coast stretching from Exmouth in the south to Port Hedland in the north, varying in size from islets up to 20,000 ha islands. Islands of the Dampier Archipelago are made up of a mixture of volcanic, limestone and sand island substrates, while the islands of the Montebello, Lowendal and Barrow groups are chiefly limestone and sand. The Passage islands and those to the east of Cape Lambert vary in substrate material, and include volcanic and limestone rocks, and sands. Island vegetation is dependant upon size and geology; larger rocky islands are mainly covered with *Tridalia*, while smaller sandy islands generally support typical Pilbara coastal vegetation. Barrow Island supports remnants of fauna once common on the mainland, and several species of threatened vertebrate have either been translocated onto islands, or are proposed for same in the near future. The islands contain important breeding sites for seabirds and four species of marine turtle. A small number of islands within this FMA have mining infrastructure (including Barrow, which contains significant petroleum industrial infrastructure), sites of historical significance, lighthouses, navigational infrastructure and buildings. Thirty three shacks exist on four islands within the Dampier Archipelago, managed under a license agreement with DEC. Islands range from lying up to 100km offshore, through to lying close enough to the mainland to be connected to the mainland by daily tidal variation.

Key Vegetation Types – Fuel Model Description

Tridalia communities will burn intensely under suitable conditions. Pilbara coastal vegetation will burn only under extreme conditions. Incidence of fire on islands is rare but may have significant impact on biodiversity values. Buffel grass infestations may greatly increase the flammability of coastal vegetation communities.

Features of Significance

The FMA has several features of interest to conservation that may be affected by fire management decisions in the Pilbara:

- ✧ Island environments are infrequently or rarely subject to fire.
- ✧ However, impacts on islands may be severe as the entire island may be affected by a single fire event. This compromises the resilience of island ecosystems.
- ✧ Islands with a high level of human interaction have an increased risk of ignition.
- ✧ Post fire studies indicate high levels of impact by grazing mammals on vegetation recovery.

Land Use Considerations for Fire Management

1. Biodiversity Conservation

Fire sensitive vegetation on larger islands, e.g. Dampier Archipelago, Barrow Island include: *Ficus*, *Brachychiton*, *Pittosporum* and *Terminalia* associated with rocky landforms. Large islands have *E. victrix* along ephemeral drainage lines. Islands of the Barrow and Montebello groups contain populations of threatened mammals and birds which may be vulnerable following major fire events. Many smaller islands have significant seabird nesting values which may be vulnerable to major fire events. Fire may encourage the spread of buffel grass, which threatens all island vegetation communities off the Pilbara coast.

2. Community Asset Protection

Some islands contain a significant level of infrastructure and house large numbers of employees on site. Managers of oil and gas production facilities are understandably nervous about any plan to introduce fire. Recreational facilities and amenity may be compromised by fire.

Fire Management Objectives

- ✧ Protect life and property values.
- ✧ Prescribed fire will be undertaken on some islands.
- ✧ Suppression activities will be undertaken on some islands (Chevron currently suppress all fire activity on Barrow Island).
- ✧ Improve knowledge on the biodiversity values of the Islands FMA and its interaction with fire.
- ✧ Establish collaborative partnerships with the industrial and recreational stakeholders targeted towards protection of stakeholder assets.
- ✧ Complete a District Incident Response Plan covering all assets within the FMA.

Barrow Island Fire Management Objectives

- ✧ Establish strategic fuel reduction buffers to prevent major wildfire affecting the entire island).
- ✧ Establish a fuel mosaic on Barrow Island with more than half the area with a fuel age of greater than 10 years.
- ✧ Suppression on Barrow Island will be undertaken by Chevron, DEC will assist if requested.
- ✧ Wildfire risk mitigation works surrounding infrastructure will be sufficient to protect the commercial development and life.
- ✧ Protect infrastructure from wildfire.
- ✧ Monitor ecosystem recovery and succession after fire.
- ✧ Develop an appropriate fire regime.

- Barrow Island Success Criteria**
- ❖ Collaborative fire management arrangements are established for Barrow Island with Chevron Australia.
 - ❖ Wildfire is managed through mitigation works to minimise the area burnt.
 - ❖ Key network of strategic tracks and firebreaks to allow access to undertake fire management operations on DEC managed lands are created and maintained.
 - ❖ An appropriate fire management regime is developed.
 - ❖ Strategic fuel reduction buffers are established and maintained on Barrow Island.

- Success Criteria**
- ❖ No loss of life and property values.
 - ❖ Annual licence audit is completed.
 - ❖ Information on fire history, vegetation composition and structure has been collated.
 - ❖ Fuel modification, sufficient to protect infrastructure from fire, are in place.
 - ❖ District Incident Response Plan has been completed.

- Barrow Island Strategies**
- ❖ Establish collaborative fire management arrangements for Barrow Island with Chevron Australia.
 - ❖ Investigate and apply prescribed fire opportunities.
 - ❖ Plan and implement fire management program according to prescription, including collaborative fire management with neighbouring landholders and agencies.
 - ❖ Implement appropriate fire induced fine grained mosaic within spinifex communities.

- Strategies**
- ❖ Annual updates of the District Incident Response Plan.
 - ❖ Develop and maintain WRA spatial layers for the FMA.
 - ❖ Implement low fuel buffers around DEC and other infrastructure (e.g. lighthouses, DEC huts, etc).
 - ❖ Ensure holders of licences for shacks comply with fire mitigation requirements of the licence.
 - ❖ Collate existing information on fire history, and vegetation composition and structure to enable future monitoring.
 - ❖ Establish and maintain fire monitoring study sites.
 - ❖ Develop and exercise island wildfire response arrangements.

Relevant Conservation Estate

The following Conservation Reserves and proposed conservation reserves fall within this FMA:

- ✧ Muiron Islands
- ✧ Serrurier Islands
- ✧ Thevenard Island NR
- ✧ Weld Island NR
- ✧ Barrow Island NR
- ✧ Montebello Islands Conservation Park
- ✧ Lowendal Island NR
- ✧ North Sandy Island NR
- ✧ Great Sandy Island NR
- ✧ Dampier Archipelago Islands NR
- ✧ Ronsard Island
- ✧ Little Turtle Island
- ✧ North Turtle Island
- ✧ Bedout Island
- ✧ Exmouth Gulf Islands
- ✧ Tent Island NR

Table v – FMA 5 – ISLANDS

<i>Island Group</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Other Islands</i>	Fire exclusion	Nil	Respond if feasible.	Nil	Utilise high resolution remote sensing.
<i>Dampier Archipelago</i>	Fire exclusion to majority of small islands. Consideration should be given on larger islands for proactive fire management (Dolphin, Enderby, Rosemary and the East and West Lewis Islands)	To be determined	Minimise hectares burnt and protect infrastructure if feasible.	Liaison with shack licence holders.	Utilise high resolution remote sensing.
<i>Barrow Island</i>	Develop an appropriate fire regime.	Strategic buffers	Assistance required as requested.	Liaisons with occupiers.	Utilise high resolution remote sensing. In addition data to be captured on GIS shared with Chevron.

FMA 6 – BURRUP PENINSULA

Description

This fire management area covers the Burrup Peninsula. Land use for this FMA includes a significant level of infrastructure, Dampier Town Site and houses large numbers of employees on site. Iron ore, salt and oil and gas production make this a very significant area for Western Australia's economy. The area is arid with episodic summer rain and is influenced by monsoonal activity. The total area of this FMA is 6,894 ha all of which will be managed by DEC for fire mitigation.

The proposed conservation zone of the Burrup contains very poor vehicle access. Although apparently broken up by large areas of bare rock, spinifex fuels are in fact nearly continuous, and in the past, under heavy fuel conditions, they will burn almost completely.

Industrial and residential infrastructure is relatively well protected by low fuel areas and roads. Poor access however means that fire suppression activities in the proposed conservation zone are difficult or impossible. Rock art has a high value (as evidenced by the recent listing of this area under National Heritage), which is directly compromised by extreme fire behaviour (intense fire will exfoliate exposed boulders – many engraving sites are already damaged).

The Burrup Peninsula is effectively an island. Connection to the mainland is now along a series of road and rail causeways, and the bunds associated with the salt farm. This island nature of the Burrup indicates a vulnerability of the fauna and flora to severe fire incidents.

Key Vegetation Types – Fuel Model Description

Triodia communities will burn intensely under suitable conditions. Pillbara coastal vegetation will burn only under extreme conditions. Incidence of fire on the Burrup Peninsula is rare but may have significant impact on biodiversity values, due to the almost complete burning of available fuels within the proposed conservation zone, and the island nature of the FMA. Buffel grass infestations may greatly increase the flammability of coastal vegetation communities.

Features of Significance

The FMA has several features of interest to conservation that may be affected by fire management decisions in the Pillbara:

- ✧ 6000 people per day drive through the Burrup Peninsula, and day use and camping recreation are commonplace. Being close to towns, rowdy elements are often present, increasing the risk of accidental or deliberate ignition.
- ✧ Engraved rock art (petroglyphs) is susceptible to damage by extreme fire behaviour (cracking and exfoliation of rocks).

Land Use Considerations for Fire Management

1. Biodiversity Conservation

Fire may encourage the spread of buffel grass, which threatens vegetation communities of the Pilbara coast. Due to the island nature of the peninsula, the ability of the biota to recover following intense fire activity may be compromised.

2. Community Asset Protection

The Burrup contains a significant level of infrastructure, and houses large numbers of employees on site. Managers of oil and gas production facilities are understandably nervous about any plan to introduce fire. Many employees and contractors use the main road to the Woodside facility – this is vegetated on both sides of the road by increasingly dense spinifex fuels. Smoke and flames over the road pose a significant hazard to road users. Recreational facilities and amenity may be compromised by fire.

Fire Management Objectives

- ◇ Protect life and property values.
- ◇ Prescribed fire will be undertaken on UCL.
- ◇ Improve knowledge on the biodiversity values of the area and its interaction with fire.
- ◇ Establish collaborative partnerships with the industrial and recreational stakeholders targeted towards protection of stakeholder assets.
- ◇ Suppression on the Burrup will be undertaken based on consideration of access, likely effectiveness, values at risk, existing commitments, prevailing weather conditions, potential impact of suppression operations and post fire impacts on biodiversity values and risk to personnel.
- ◇ Complete a District Incident Response Plan covering all assets within the FMA.
- ◇ Establish strategic fuel reduction buffers to prevent major wildfire affecting the entire area.
- ◇ Wildfire risk mitigation works surrounding infrastructure will be sufficient to protect the commercial development and life.
- ◇ Protect infrastructure from wildfire.
- ◇ Monitor ecosystem recovery and succession after fire.
- ◇ Develop an appropriate fire regime.

Strategies

- ◇ Annual updates of the District Incident Response Plan.
- ◇ Develop and maintain WRA spatial layers for the FMA.
- ◇ Implement low fuel buffers around infrastructure.
- ◇ Collate existing information on fire history, and vegetation composition and structure to enable future monitoring.
- ◇ Establish and maintain fire monitoring study sites.
- ◇ Develop and exercise wildfire response arrangements.
- ◇ Investigate and apply prescribed fire opportunities.
- ◇ Plan and implement fire management program according to prescription, including collaborative fire management with neighbouring landholders and agencies.
- ◇ Implement appropriate fire induced fine grained mosaic within spinifex communities.
- ◇ Develop and implement a communications plan to engage neighbours in a cooperative wildfire risk mitigation program.

Relevant Conservation Estate

The following Conservation Reserves and proposed conservation reserves fall within this FMA:

- ✧ Burrup Peninsula Proposed Murujuga National Park

Success Criteria

- ✧ No loss of life and property values.
- ✧ Information on fire history, vegetation composition and structure has been collated.
- ✧ Fuel modification, sufficient to protect infrastructure from fire, are in place.
- ✧ District Incident Response Plan has been completed.
- ✧ Wildfire is managed through mitigation works to minimise the area burnt.
- ✧ Key network of strategic tracks and firebreaks to allow access to undertake fire management operations are created and maintained.
- ✧ An appropriate fire management regime is developed.
- ✧ Strategic fuel reduction buffers are established and maintained.

Table vi – FMA 6 – Burrup Peninsula

<i>Island Group</i>	<i>Fire management outcome</i>	<i>Prescribed fire regime</i>	<i>Wildfire response</i>	<i>Partnering considerations</i>	<i>Monitoring for fire management effectiveness</i>
<i>Burrup Peninsula</i>	Develop an appropriate fire regime.	Strategic buffers	Minimise hectares burnt and protect infrastructure and rock art if feasible. Consideration should be given to direct attack via helicopter.	Liaison with industry, local government and Murujga Aboriginal Corporation.	Utilise high resolution remote sensing.