



Uunguu Wunambal Gaambera



Wunambal Gaambera Aboriginal Corporation Fire Operations Manual

Field-test V 1.0

2013



DOCUMENT CONTROL

Project number:	WGAC12_01
File ref:	Biome5:Projects:Projects:WGAC12_01:Reports:Reviewed manuals June 13:Fire Operations Manual V-1.0.docx
Report by:	Dr Noel Preece

Date:	Revision Status:	Reviewed by:	Document distribution:
7 July 2012	V 0.11 – outline draft	Tom Vigilante	Tom Vigilante
27 Sept 2012	V 0.12 – revised draft	Tom Vigilante	Tom Vigilante
17 Dec 2012- June 2013	V 0.31	WG Healthy Country Team	
July 2013	V 0.41	Tom Vigilante	Tom Vigilante, WGAC Healthy Country Team
August 2013	Field Test Version 1.0	Tom Vigilante	Tom Vigilante, WGAC Healthy Country Team
October 2013	Field Test Version 1.0	Tom Vigilante	Tom Vigilante, WGAC Healthy Country Team

RELIANCE STATEMENT, USES & LIMITATIONS

This report is copyright and to be used only for its intended purpose by the intended recipient. It is not to be copied or used in any other way. The report may be relied upon for its intended purpose within the limits of the following disclaimer.

This work has been based on the information available at the time of the work. We do not take responsibility for errors and omissions due to incorrect information or information not available at the time of the work.

TABLE OF CONTENTS

1 Purpose of the Manual	1-1
1.1 Structure of the Operations Manual.....	1-4
2 Purpose and Reasons for Burning.....	2-1
2.1 Purpose of Fire Management	2-1
2.2 Fire Planning.....	2-1
<i>Wunambal Gaambera Fire Planning Calendar</i>	<i>2-3</i>
<i>General Structure of a fire management plan</i>	<i>2-5</i>
2.3 Burning for country, plants and animals.....	2-13
<i>Right way fire – what are the benefits?.....</i>	<i>2-15</i>
<i>Wrong way fire impacts on plants and animals in the Kimberley.....</i>	<i>2-16</i>
2.4 Savanna burning.....	2-17
<i>General Principles.....</i>	<i>2-17</i>
2.5 Wildfire fighting.....	2-21
3 Law and Legislation.....	3-1
3.1 Traditional Law of Wunambal Gaambera	3-1
3.2 Western Australian Legislation.....	3-1
<i>Responsibilities</i>	<i>3-1</i>
<i>Permits to burn.....</i>	<i>3-2</i>
4 Fire Safety	4-1
4.1 Risk Assessment and Job Safety Analysis.....	4-2
4.2 Safety.....	4-7
<i>Your approach to burning</i>	<i>4-7</i>
4.3 Safety procedures	4-7
<i>First Aid.....</i>	<i>4-7</i>
<i>Safety and Personal Protective Equipment (PPE).....</i>	<i>4-8</i>
<i>Communications and safety devices</i>	<i>4-9</i>
4.4 Field & Office Response Procedures.....	4-11
<i>Routine schedule</i>	<i>4-11</i>
<i>Emergency Procedures.....</i>	<i>4-11</i>
<i>Contacts for Schedules and Emergencies</i>	<i>4-12</i>
4.5 IN AN EMERGENCY in the field	4-13
5 Burning the bush	5-1
5.1 Operational Fire Plan.....	5-1
<i>Operational Control.....</i>	<i>5-2</i>
5.2 Aerial Control Burning.....	5-3
5.3 Aerial Ignition Operations	5-4
<i>Communications</i>	<i>5-5</i>
5.4 Preparation before the day of the fire	5-6
5.5 On the day of the fire.....	5-8
<i>Drug and Alcohol testing.....</i>	<i>5-11</i>
<i>Attitude.....</i>	<i>5-11</i>
<i>Casuals.....</i>	<i>5-11</i>
<i>Contingency planning.....</i>	<i>5-11</i>
6 Monitoring and review	6-12
6.1 Reporting.....	6-12
<i>iTracker Land Patrol Application.....</i>	<i>6-13</i>
6.2 Response and Revision - Updating the Operations Manual.....	6-16
7 Training and Skills	7-1
7.1 Fire units relevant to Kimberley Ranger Program training under new CLM training package (AHC10)	7-1

8	References.....	8-1
9	Appendices.....	9-1
9.1	Appendix 1 - Legislation.....	9-1
	<i>Bush Fires Act 1954</i>	9-1
	<i>Environmental Protection Act 1986</i>	9-2
9.2	APPENDIX 2 – Forms & Checklists.....	9-4

Acknowledgements

Wunambal Gaambera Aboriginal Corporation (WGAC) engaged Dr Noel Preece of Biome 5 Pty Ltd to prepare this manual. The manual benefitted from the assistance, advice and guidance of many people including Andy Peart, Anna Pickworth, Wil Bennett, Phil Palmer, Amanda Moncrief, Richard Tunnicliffe, Brad Bourke, Jarrad Holmes, Ed Hatherley, Rachel Partridge, Steve Sutton, Jeremy Russell-Smith, Andrew Edwards, Steve Winderlich, Mark Crumblin, Lizbet Fergoose, and David Whitelaw and Alistair Dermer of Bush Heritage Australia. The Wunambal Gaambera Healthy Country Team provided much advice and comment and guided me on their needs, and included Robert Warren, Neil Waina, Jason Adams, Bevan Stott and Tom Vigilante. I hope I haven't missed anyone. I trust also that the manual does justice to the information and advice received.

Robert Warren kindly supplied the cover photo and photos on PPE (the Team), burning the roadside and flame-thrower. Noel Preece supplied the photos of vegetation and patch fires: right way fire.

Funding for the project was provided by Bush Heritage Australia and the Federal Department of Sustainability, Environment, Water, Population and Communities.

Copyright Notice

© 2013 Wunambal Gaambera Aboriginal Corporation & Noel D. Preece

Preferred citation:

Preece, N.D. & Wunambal Gaambera Aboriginal Corporation (2013) *Fire Operations Manual*. Report to Wunambal Gaambera Aboriginal Corporation, Kalumburu, W.A.

The manual reproduces some material provided by a number of organisations, for which copyright is retained by the original copyright owner, and material for which copyright is held by Wunambal Gaambera Aboriginal Corporation.

The information contained in this manual has been carefully compiled from sources believed to be reliable, but no warranty, guarantee or representation is made by Wunambal Gaambera Aboriginal Corporation nor Biome5 Pty Ltd as to the accuracy of the information or its sufficiency or suitability for the application to which any individual user may wish to put it, and no responsibility is accepted for events or damages resulting from its use.

This document will be made freely available provided that it is properly attributed to Wunambal Gaambera Aboriginal Corporation.

1 PURPOSE OF THE MANUAL

RIGHT WAY FIRE

This Fire Operations Manual is for use on Wunambal Gaambera country in the north-west Kimberley region of Western Australia.

The Wunambal Gaambera Healthy Country Plan 2010-2020 is a plan for looking after our country and all the important things in it. Strategy 1 says 'continue and expand the fire management program with annual burns and by 2012 complete the Unguu Fire Management Plan consistent with carbon abatement opportunities'. This strategy helps to achieve the following objectives:

- Objective 2 By 2020 our country will still be healthy with no plants, animals, fish or birds or their habitats that are here today, being lost;
- Objective 3 By 2014 we will be looking after ten important cultural sites according to Wanjina Wunggurr Law, and by 2020 all culturally important sites will be looked after in this way;
- Objective 8 By 2015 we will be managing fire on Wunambal Gaambera Country; and
- Objective 10 By 2015 we will have figured out and started using ways to reduce the problems that climate change might have on our targets, us and Wunambal Gaambera Country, and ways to make sure our actions don't make carbon problems worse.

The Healthy Country Team is also developing a 10-year fire activity plan to outline how fire will be managed. It also develops annual operations plans to guide each year's work.

This operations manual will help to guide the implementation of the activity plan and annual operations plans. It aims to ensure that Unguu Land and Sea Management Rangers and traditional owners can manage fire safely and to a high and accredited standard. This includes having the appropriate levels of qualifications under state training requirements and under national accreditation. It means having the appropriate equipment, systems and OH&S procedures in place to carry out fire management.

This manual provides guidelines for Wunambal Gaambera Aboriginal Corporation (WGAC) and its Wunambal Gaambera Healthy Country Team to control fire. WGAC has the authority of Wunambal Gaambera people to implement the Healthy Country Plan. The WGHC Team includes the Healthy Country Manager, Unguu Rangers, nominated WGAC Directors and any Traditional Owners and staff working on Wunambal Gaambera country.

The Fire Operations Manual is part of Wunambal Gaambera Healthy Country planning objectives to undertake right way fire to Unguu (country – our living home) and limit wrong way fire.

The Healthy Country Plan objective is for Wunambal Gaambera people to be managing fire on Wunambal Gaambera Country by 2015.

The Manual provides guidelines for the Wunambal Gaambera Healthy Country Team and associated fire crews on:

- how to prepare for lighting and fighting fires in the region
- what permits and permissions are required
- procedures to follow
- safety

It is not a training manual, but is a tool to implement fire management and control operations, using the training and skills that fire crews have developed.

Safety first:

- for fire-lighters and fire-fighters
- local landholders
- tourists
- cattlemen

People need training, qualifications and experience under both traditional culture and national accreditation.

All people working with fire are expected to be trained and skilled in the correct safe procedures for the tasks they undertake.

People must have the appropriate equipment, systems and procedures to conduct fire operations.

The Manual includes the legal requirements established under both Western Australian law, and Traditional Wanjina Wungurr law of Wunambal Gaambera peoples.

Permits need to be obtained from Bush Fire Control Officers for the region.

The Operations Manual:

- provides structure and consistency to fire operations so that all needs are met
- makes sure that traditional and western laws are followed and that there is no inconsistency
- enables relevant views to be considered and expressed about fire management
- helps to plan for the allocation of resources and jobs
- brings together all important aspects of fire planning and management, including training
- provides an operations framework for individual plans for fire, so that all people working on fire go about their work in the proper way
- provides assurance to the relevant authorities and investors in Wunambal Gaambera country that money is being well spent and that fire is being planned and implemented properly
- provides a means of monitoring and evaluating the results of fire practices.

The manual has been written with minimal text, while attempting to address all the key aspects of fire operations, in order to reach a wide audience.

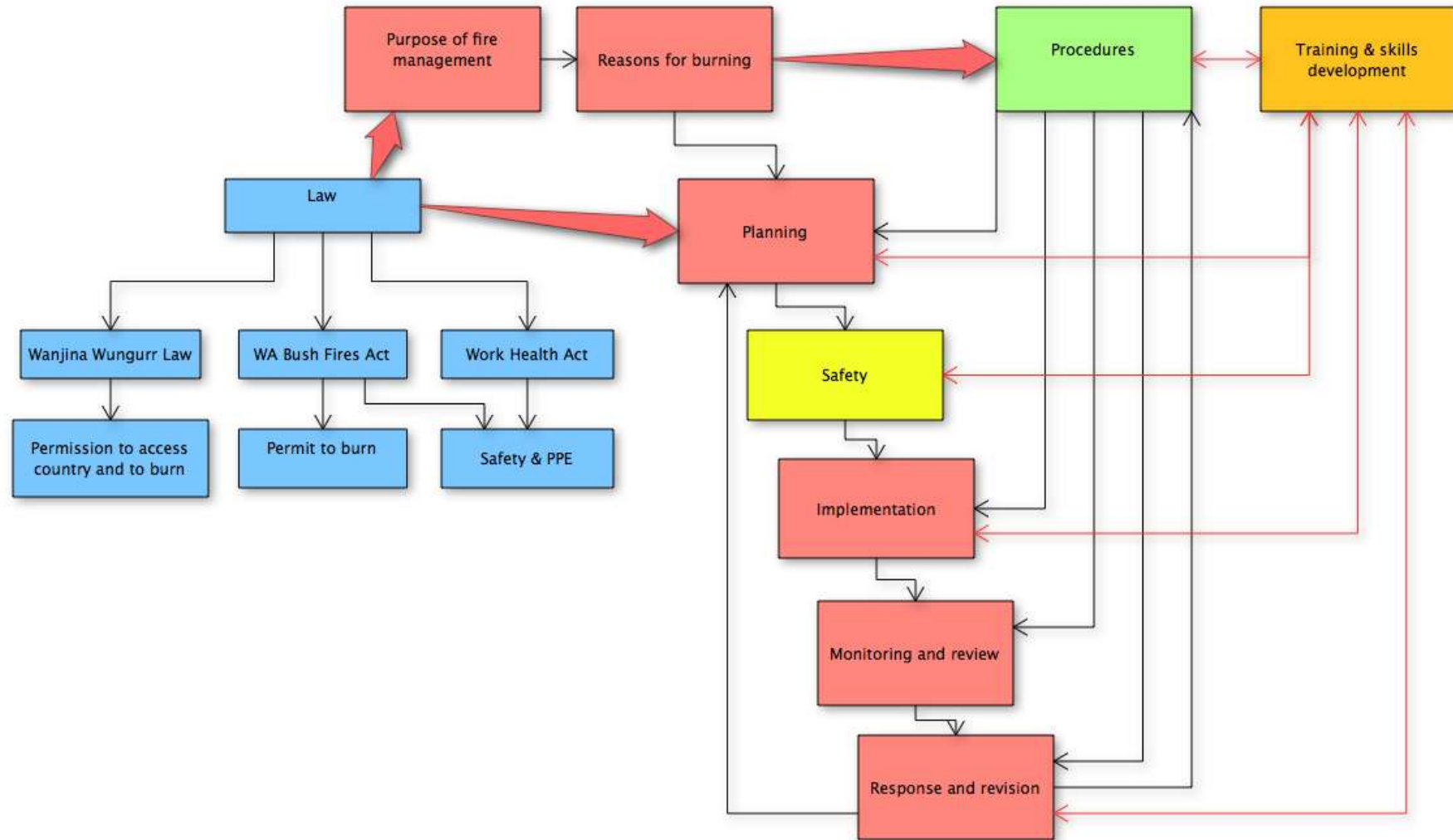
The manual does not replace the specialist manuals, procedures, laws, codes, rules and guidelines for the skills required to do the work.

A list of the key documents which were used to produce this manual is provided in the reference section.

The manual is meant to be a *living manual* to be used and revised as needs arise, and as better ways of doing things are identified.

Practice and experience will improve the manual and its usability.

1.1 Structure of the Operations Manual



2 PURPOSE AND REASONS FOR BURNING

2.1 Purpose of Fire Management

Wunambal Gaambera people have always managed country with fire:

- fire is a natural process
- fire maintains country and plants and animals if managed properly
- planned fire reduces the impacts and incidence of wildfire
- planned fire is better than mechanical firebreaks and slashing
- fires are under our control, rather than left to chance and weather.

Fire management fulfils several other purposes:

- fulfils traditional law obligations, including ceremony
- helps maintain cultural practices
- fulfils Western Australian Bush Fires law
- protects people, infrastructure and assets.

2.2 Fire Planning

A fire management plan was identified in the Uunguu Wunambal Gaambera Healthy Country Plan. The plan is a way of deciding what has to be done to manage fire.

Important steps for fire planning:

Right people to decide

- why you want to burn
- where to burn
- who will do the burning
- when to burn.

The right people are important

- Traditional Owners
- Ranger staff of WGAC
- KLC
- DEC
- Wyndham-East Kimberley Shire
- Neighbours, pastoralists

Plan

- how you will go about the burning program,
- what outcomes you want,
- what people, tools and equipment you will need, and
- how you will keep a record of the burning.

You need to work out what needs to be written down, who will record the information, what maps are needed and so on.

Experts from other Ranger groups, organisations like DEC, and fire ecologists will also help.

You will need meetings to prepare for write-ups of ideas.

You will need to have large maps of Unguu so that people can identify places and how fire can be managed.

Fire management works all year round. The calendar shows when people must do their jobs.

Wunambal Gaambera Fire Planning Calendar

Wunambal Gaambera	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fire planning calendar	Wet Season			Early Dry			Late Dry			Early wet		
Fire Planning Workshop												
Map no-go areas	█											
Prepare Annual fire plan for WGAC Directors for approval	█											
Notify DEC, Neighbours, Wyndham-East Kimberley Shire		█										
Apply for Permit to Burn		█										
Pre-season preparation												
Training, Cert Courses	█											
Training – AIMSS	█											
Training – Aircraft Safety & Rairdance	█											
Prepare budgets and logistics	█											
Equipment maintenance - fire trailer, drip torches, pack sprays, O-rings etc	█			█								
Drills			*				*					
Risk Assessments												
	█	*	*	*	*	*	*	*	*	*	*	*
Coordinate with KLC and DEC		█										
Burns												
Rain stops - grass starts drying - flyovers to assess grass curing			█	█								
Cultural site protection, sensitive areas, around sandstone			█	█								
Dry season burns - foot, Quads, vehicles			█	█	█	█	█	█	█			
Aerial burns - L.A.M.E., Supervisor, Operator, Navigator			█	█	█	█	█	█	█			

Wunambal Gaambera	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fire planning calendar	Wet Season			Early Dry			Late Dry			Early wet		
Fire Walks												
Review fire outcomes - look for weak spots, need for additional burns, firebreaks etc												
Share information with neighbours												
Late hot burns												
Review suppression response procedures												
Suppress wildfires - contact Shire, FESA, DEC, Drysdale, Dunkeld, Police, Clinic												
Daily check of NAFI for hot spots and fire spread, weather checks												
Review and revise												
Monitoring & evaluation committee												
Information to Members												
Annual report												
NAFI, Fire report tool, fire scar map												
Review Workshop												
Logistics – end of year, fuel, equipment etc												

General Structure of a fire management plan

Section	Purpose
Aim	<p>What are you trying to do?</p> <ul style="list-style-type: none"> • Reduce impact of bushfires • Protect sacred sites • protect buildings, infrastructure • carbon outcomes <p>Right people, Right place, right time</p>
Objectives	<p>List achievable and measurable goals:</p> <ul style="list-style-type: none"> • Illustrate where values are located, e.g.: <ul style="list-style-type: none"> ○ sacred and cultural sites ○ rainforests, stands of food trees ○ creeks, waterholes ○ buildings, campsites ○ <p>Define and rank fire hazard areas</p> <p>Define how you will assess the effectiveness and impact of fire lighting and prevention</p>
Description of area	<p>Maps showing</p> <ul style="list-style-type: none"> • physical and cultural features • topography • climate • vegetation and fire fuel types • assets – buildings, campsites, fences, bores • access • water sources and water points • fire history from NAFI site
Fire Management Strategies	<p>Fuel management</p> <ul style="list-style-type: none"> • buildings and campsite areas • special areas – sacred sites, cultural sites, rainforests • creeklines and waterholes <p>Access and strategic fire breaks</p> <ul style="list-style-type: none"> • fire break locations such as roads and rocky bare hills <p>Burning blocks</p> <ul style="list-style-type: none"> • how will you plan to burn the country? • an example is shown below for Kakadu National Park prepared by Rangers from Kakadu • Fire breaks may be creeklines, rocky ridges, previous burnt areas <p>Timing calendar for</p> <ul style="list-style-type: none"> • planning • lighting fires

Section	Purpose
	<ul style="list-style-type: none"> • follow-up • review and revision •
Monitoring and evaluation	<p>How will you map the fires you lit and the wildfires to see how your fire program went?</p> <ul style="list-style-type: none"> • NAFI website image maps? • photopoints? • walk-around and GPS making notes? • fly-over? <p>How will you evaluate the program?</p> <ul style="list-style-type: none"> • revise the plan • revise methods • review practices

Adapted from (Bush Fire & Environmental Protection Branch 2007)

Fire history

The North Australian Fire Information website (NAFI) produces maps of fires of the Wunambal Gaambera country, from satellite images.

Print them out so that people can see how fires have travelled across country, and to plan for how to light management fires.

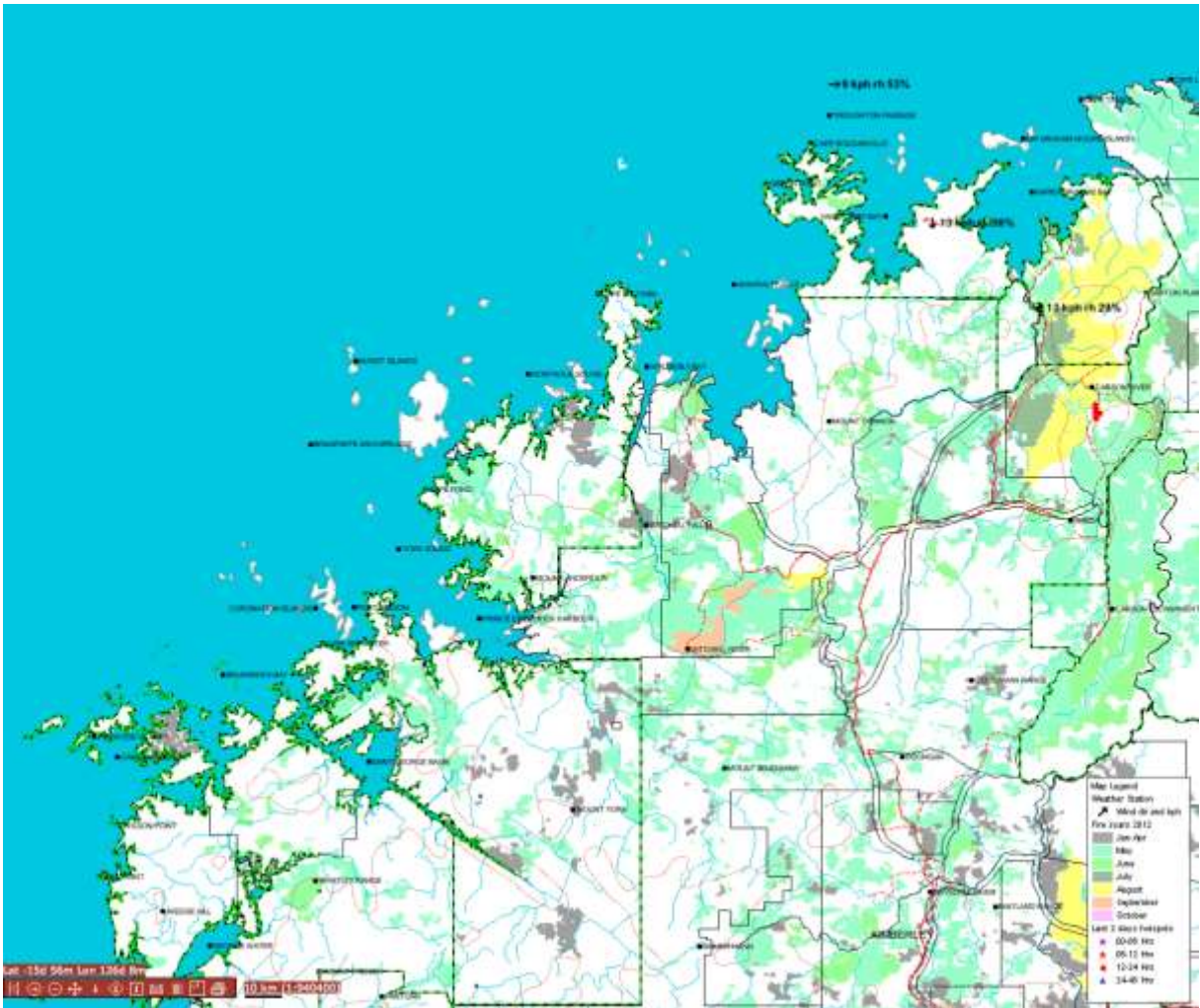


Figure 1. NAFI site image of 2012 fire scars for Wunambal Gaambera country

Locations and sites

Good planning:

- sacred sites mapped
- buildings, bores, yards and fences (and other built things) mapped
- areas needing special protection – such as cycads, food trees, rainforest patches, waterholes
- common fire paths so that fire buffers can be burnt to prevent wildfires spreading
- cleaning up country
- vegetation needing protection, and vegetation map

Fuel/Vegetation Types

The term ‘fuel’ is used to describe the vegetation that burns in a fire. Different vegetation types have different fuel characteristics and grow at different rates. There are three main landsystems in WG country, each supporting different vegetation types (Map).

Sand plain country usually supports open woodlands with a grass layer made up of speargrass (*Sarga timorensis*) and other grass types including spinifex. It usually requires

more than one year between fires to accumulate high fuel loads but can support annual late dry season fires.

Sandstone country is dominated by open woodland with spinifex (*Triodia* spp) which usually takes more than two years after fire to accumulate high fuel loads. Sandstone is often rugged and dissected for fires to move through. Many sandstone areas also support shrublands (heath) which have fire sensitive woody obligate seeder shrub species. Like cypress pine, these shrubs are killed by fire and can only grow back by seed not resprouting.

Volcanic hills support open woodland with mostly perennial grasses. These grasses support fires every year as they regrow each wet season.

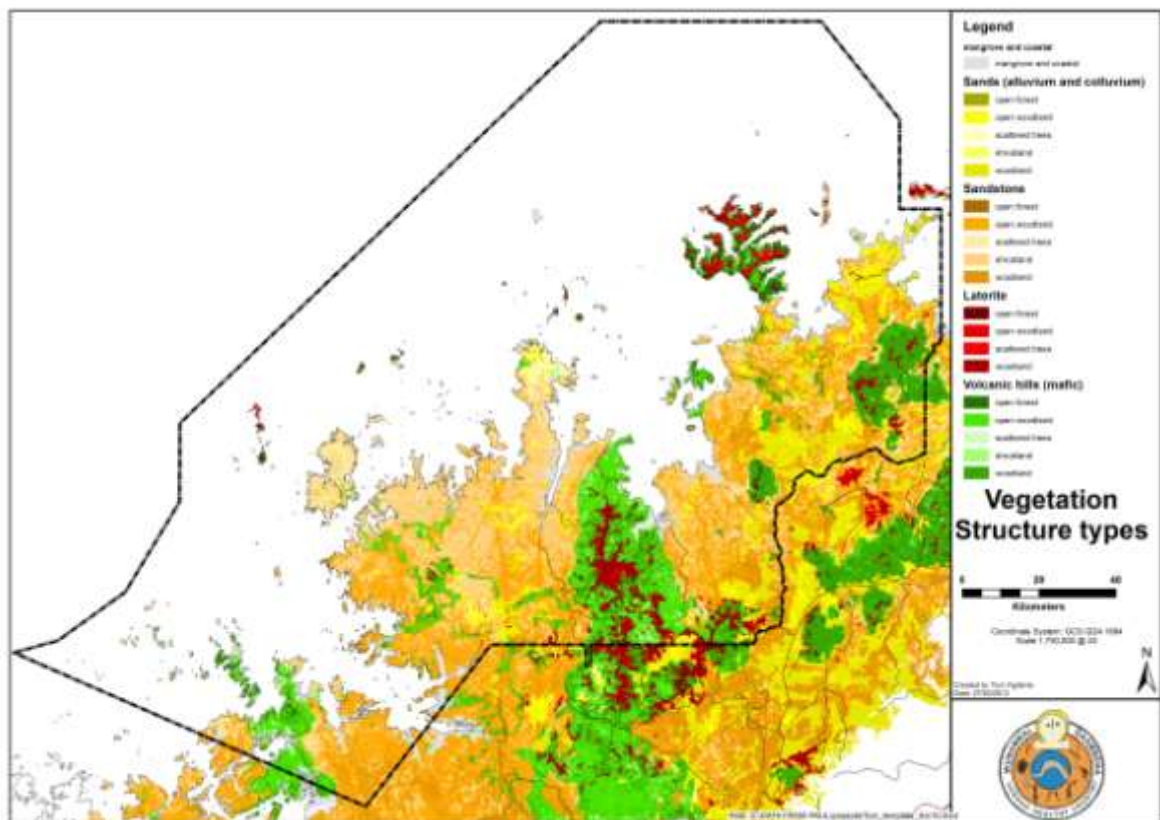


Figure 2. Vegetation of Wunambal Gaambera country

Mineral Earth Firebreaks

Fire breaks may be needed around buildings, bores and camps, to protect them and give a clean line to burn from to remove fuel.

Constructed firebreaks may need to be 6 to 10 metres wide. On the boundary in some places they may need to be wider.

Firebreak locations may need to be worked out with a fire control officer, so that only those that are needed are built.

Firebreaks should be located to:

- provide a mineral earth break or reduced fuel zone so that planned and unplanned fires do not enter or leave the area
- provide access to critical areas so that fire suppression activities can be undertaken

Details on how and where to construct firebreaks are given in the *Kimberley Bush Fire Guidelines* (Bush Fire & Environmental Protection Branch 2007).

Fuel Age Patch Mapping and Fuel Reduction Burning

The aim of fuel age patch mapping and fuel reduction burning is to identify large areas or patches of country of the same older fuel age which have a high risk of becoming a large wildfire. These large patches need to be broken up with patchy burns so they become a patchwork of different fuel ages with reduced wildfire risk.

Fuel age (years since last burnt) can be mapped with firescar data from NAFI, the North Australian Fire Information website: <http://www.firenorth.org.au/nafi2/>. It is also important to identify different fuel (grass) types as they will accumulate fuels at different rates. Spinifex on sandstone generally takes 2-3 years to accumulate to high fuel loads, speargrass can accumulate after one year without fire, while perennial grasses on volcanic hills can burn every year.

The limitation of fuel reduction burning method is that patchy burns in an area will reduce the risk of an area being burned by a late dry season fire but does not provide a barrier to late dry season wildfires moving through large stretches of country.

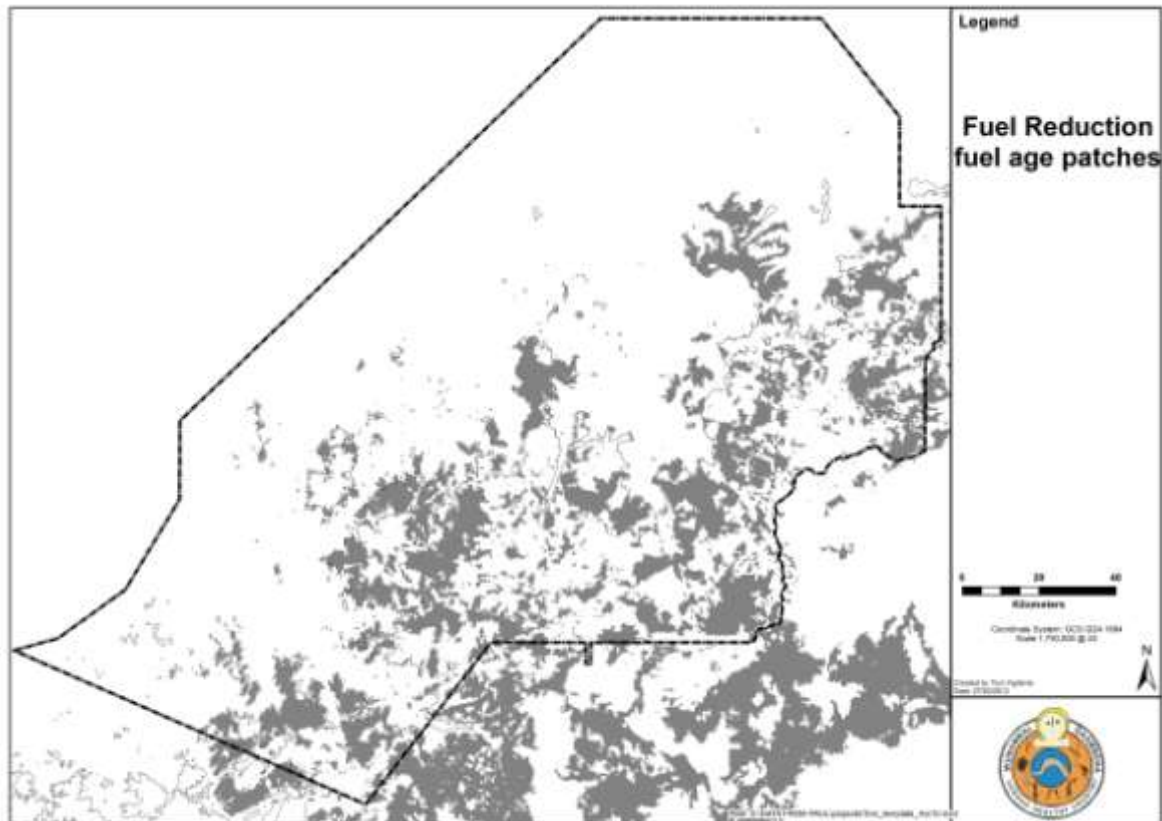


Figure 3. Fuel age mapping in Wunambal Gaambera country. Older patches of fuel are identified for different fuel (grass) types. Larger patches pose a higher risk of supporting large wildfires and need to be targeted for early burning.

Strategic Fire Control Blocks

Strategic Fire Control blocks aim to contain a late dry season fire within a firebreak made from strategic fire lines. These fire lines are usually created by aerial burning but can also be created with fire walks and roadside burning. Natural features like coastline and rivers also create barriers to fire. Strategic fire lines are created by flying along set routes over and over until there is a complete fire line. There are often weak points in fire lines where fires can get through.

Strategic fire control blocks are most useful at a large scale, making sure that one wildfire cannot burn the whole country. The limitation to strategic fire control blocks are that lightning storms can strike inside the control block and burns out the block.

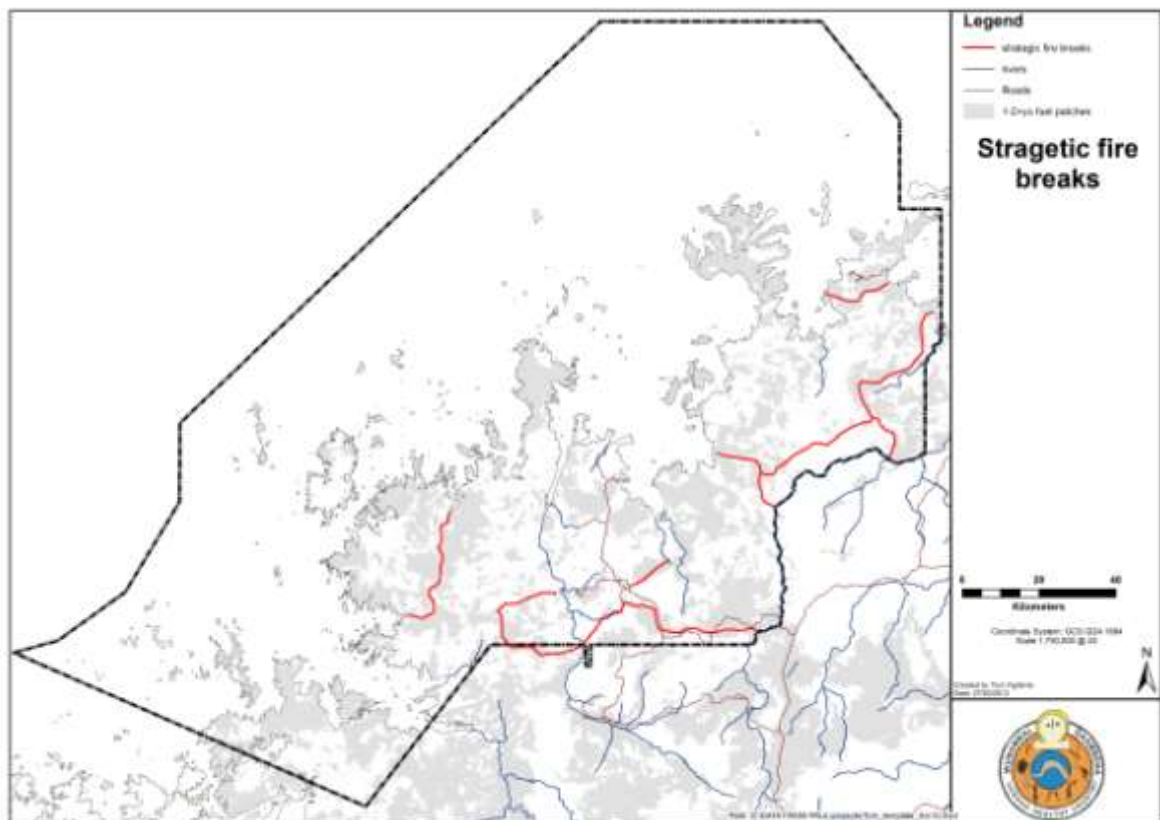


Figure 4. Strategic fire breaks or fire lines used to create fire control blocks.

Weak points can occur on the edges of burnt country where

- the gap is too narrow,
- the burnt area is too patchy,
- or the topography or vegetation allows for fire brands to carry for a distance.

The Annual Fire Operations Plan guides the annual burning plan for country.



Draft Annual Fire Operations Plan 2013*

A draft of this plan was prepared and presented at the fire operations planning workshop held at [Kalumburu](#) on 9 April 2013. Workshop outcomes have now been incorporated into this final plan.*

Purpose of the Plan*

- Outline annual fire operations to be undertaken by WGAC and partners on [Wunambal Gaambera](#) country*
- Obtain consent from Traditional Owners for fire operations and make sure their needs are met*
- Guide joint operations with partners (DEC and KLC)*
- Support fire permit application with Shire of Wyndham East Kimberley (Bushfires Act)*
- Support requests for suppression support with [Dept Fire & Emergency Services](#)*

Before undertaking burning*

Fire permits – send this plan to Shire of Wyndham EK and apply for a fire permit for the season*

Traditional Owner permission – make sure the right Traditional Owners are notified and involved in fire operations on country*

Notify neighbours of upcoming operations*

- **Communities** – [Kalumburu](#), [Kandiwal](#)*

2.3 Burning for country, plants and animals

For Wunambal Gaambera people, fire is one of the most important things people can use to look after and keep country healthy. Fire helps bush foods grow and makes new grass for animals. Burning at the wrong time is no good. Many plants need fire to grow again or cannot survive if there are too many hot fires. Right way fire makes plants flower and fruit at the right time.

Fire is medicine for the country and medicine for the people. Fire is also a signal that can tell people what is happening on country.

Fire has a spiritual importance in Wunambal Gaambera culture. Fire is used in smoking ceremonies and for spiritual ceremonies.

Wildfires are not the right types of fire and worry people as they happen in the hot season, burn lots of country and can damage cultural places and other parts of our Uunguu, our living home, like plants and animals.

The old way of lighting fires while walking is a respectful way of looking after country. Today, rangers also burn country that is hard to get to, by flying in helicopters and burning. Mixing the old and new ways is good for Uunguu.

If fire is not done in the right way in Wulo (rainforest) some tree and plant types die and the Wulo gets smaller. If fire is not done the right way, the Wulo can spread over the moree (savanna woodland) so there is less open country for aamba (kangaroos and wallabies).

Islands need right way fire as there are important cultural places that need to be looked after. The islands are also safe refuges for some animals so fire has to be done the right way to make sure they stay healthy.

Each family has a responsibility to do right way burning to keep their graa (their traditional part of country) clean and healthy.

Working with neighbours to do right way fire is important. Burning the right way and at the right time means there is less smoke which helps reduce climate change.

(adapted from Wunambal Gaambera Healthy Country Plan 2010-2020).

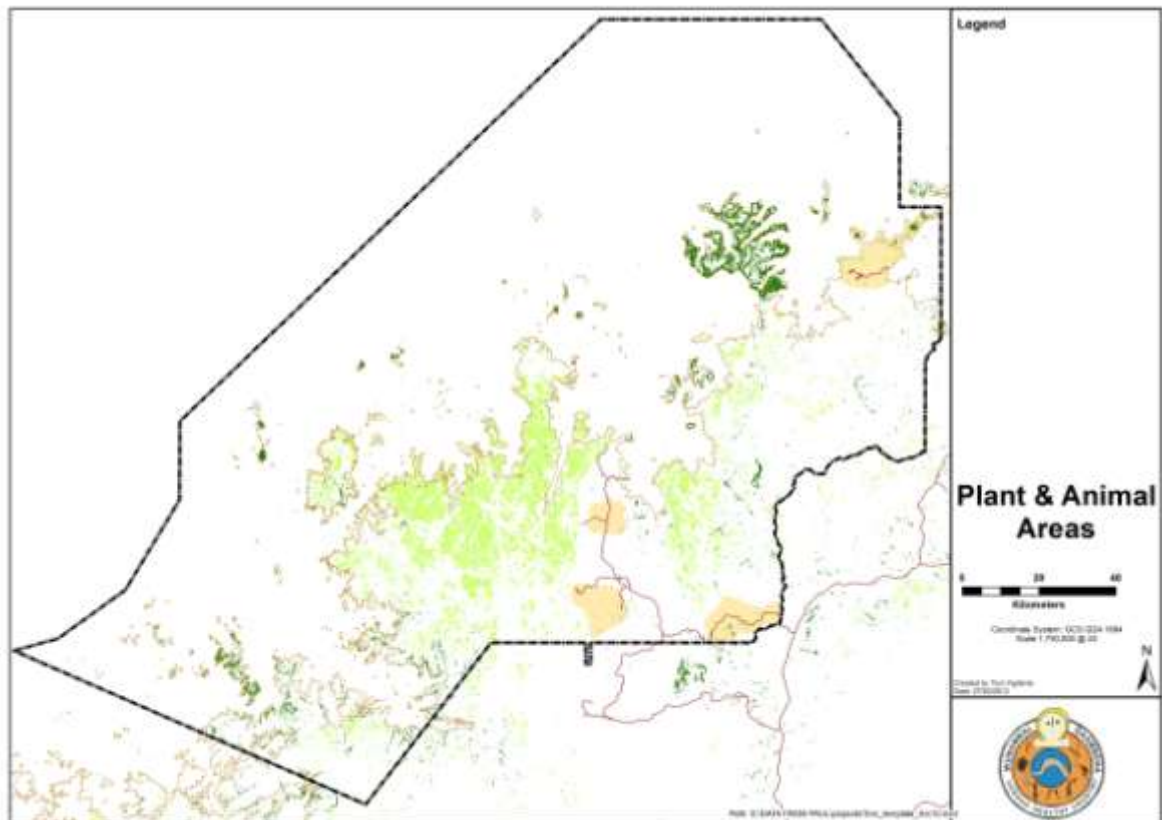


Figure 5. Some important animal and plant habitats that need to be managed by fire including rainforest patches (dark green), sandstone heathland (light green), and kangaroo, emu and fruit tree areas (light brown).

Right way fire – what are the benefits?

Right way fire means:

- controlled lighting of fires under specified environmental conditions
- to a predetermined area
- at the time, intensity, and rate of spread required to attain planned targets

Right way fire helps to:

- maintain healthy country targets
- reduce fuel loads so that hot fires are not as destructive or extensive
- clean up country



© Noel Preece

Right way fire involves:

- learning from last fire season
- planning
- patch burning to break up country
- right time
- right place
- right people
- assessing fuels
- using knowledge of fire behaviour
- forecasting and reading weather conditions
- monitoring the results of the burn

Adapted from DEC Prescribed burning guidelines
(<http://www.dec.wa.gov.au/content/category/49/865/1870/> accessed 28 June 2012)

Wrong way fire impacts on plants and animals in the Kimberley

Problems with wrong way fire – late dry season hot fires	
Plants and vegetation	
<ul style="list-style-type: none"> • <i>Moree</i> - Savanna woodlands and riparian vegetation 	Hot late dry season wildfires cause: <ul style="list-style-type: none"> • loss of shrubby mid-storey; • loss of nesting hollows in older trees; • loss of flower and fruit resources; • replacement of perennial grasses with fire-prone annual grasses; • loss of fine-grained habitat mosaic
<ul style="list-style-type: none"> • <i>Wumanggarr</i> - Sandstone vegetation, particularly heaths 	Shrubs which regenerate from seed alone are particularly vulnerable to frequent, extensive hot fires: <ul style="list-style-type: none"> • Small patches need 4-5 years between fires • some species such Cypress pine and wattles (<i>Acacias</i>) may require longer periods • fires need to be very patchy
<ul style="list-style-type: none"> • <i>Guru</i> - Cypress pine groves 	These long-lived trees are dying out in the north Kimberley due to frequent, hot late dry season fires – they need to live long enough to seed so that new plants can grow
<ul style="list-style-type: none"> • <i>Wulo</i> - Rainforest patches 	Severe impact in exposed sites
Animals	
<ul style="list-style-type: none"> • <i>Gundun</i> - small to medium mammals 	Because of changes to fires – some too hot and too big, and less patchy These animals are disappearing from country: <ul style="list-style-type: none"> • Northern Quoll • Brush-tailed Phascogale • Golden Bandicoot, Golden-backed Tree Rat • Pale Field-rat
<ul style="list-style-type: none"> • <i>Wirrirri</i> and <i>diigu</i> – seed-eating birds 	Changes in habitat conditions, including woody thickening due to lack of burning, and over- or selective grazing of grass resources <ul style="list-style-type: none"> • 11 species of seed-eating birds including Gouldian Finch and Partridge Pigeon

(adapted from Russell-Smith 2005)

2.4 Savanna burning

General Principles

Moree - Savanna grasslands

- *Moree* – savanna grasslands of the north Kimberley can burn often
- start burning early in the dry season
- burn at other times of the year for specific purposes – e.g. woody thickening may need a hot burn
- avoid applying the same fire frequency, interval, season and scale over large areas for long periods
- burn areas no more than once every 2 or 3 years
- avoid frequent burning or infrequent burning in same locations
- avoid allowing frequent large wildfires in same locations
- focus on areas of high conservation value
- aim for patchiness rather than complete burns

Wildfire reduction and asset protection

- manage fuel by early dry season and late wet season burns to 400 metres wide around buildings and structures
- reduce fuel around buildings to 100 metres away
- overlap strategic burn areas to reduce chance of wildfire spreading
- include some wet season burning for spear grass reduction

Carbon trading

- shift fires from late dry season (August onwards) to early dry season as much as possible

© Noel Preece



Neighbours and learning

- use all available knowledge including indigenous, scientific, and local
- consult and partner with neighbours
- learn from and adapt methods
- use tools including satellite images (NAFI) and flyovers for mapping and monitoring fire patches and fire history

Priorities

- focus on
 1. asset and people protection
 2. threatened species and communities
 3. fire sensitive species and communities
 4. the remaining biota

Special areas

Cypress pine

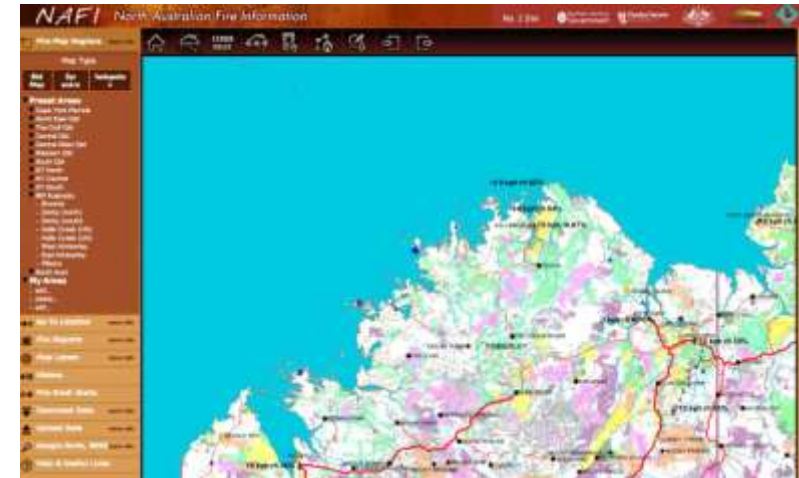
- protective burns around stands, especially on eastern flanks
- early in dry season April-May

Springs and waterholes

- protective burning around stands, especially areas where fire often comes from
- early burning, April-June

Rainforest patches

- protective burning around stands, especially on eastern flanks and downslope
- early burning April-June



Heath

- in small patches reduce fire frequency to 4 to 5 years or longer to help heath plants seed
- patch burn savanna and heath to protect heath

Weed control and fire

- plan weed control and fire plans together so that areas to be sprayed are not burnt first

Cultural sites

- where sites need protection, pull spinifex and other vegetation away from rock paintings and burial sites and then burn around them early in the dry season

(Sources: (DECWA 2010; Midgley & Tan 2006; NSW Rural Fire Service 2006; Palmer 2004; Russell-Smith 2005; Standards Australia 2009a, b).



© Robert Warren

Burning for Carbon

Wunambal Gaambera Aboriginal Corporation is preparing to register a project under the Carbon Farming Initiative to use the Savanna Burning methodology. Burning for carbon needs to be done in a particular way if the project aims to generate a return.

According to draft calculations for WG country (see matrix) area burnt in the early dry season needs to be kept below 45% and late dry season fires kept below 25% of total area burnt.

The methodology is also based on different fuel (grass) structure types. Some grass types in the country regrow faster than others. It is important to think about fuel types when burning for carbon.

		Area 8,183 sqkm																	
		EDS 20.30703 tC/sqkm									LDS 33.72051 tC/sqkm								
		Baseline: 80,720 tC																	
		Abatement Scenarios (tonnes of Carbon - tC)																	
		EDS (%burnt)																	
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	
LDS	0	80,720	72,412	64,103	55,795	47,486	39,177	30,869	22,560	14,251	5,943	-2,366	-10,674	-18,983	-27,292	-35,600	-43,909	-52,218	
(%burnt)	5	66,924	58,615	50,306	41,998	33,689	25,381	17,072	8,763	455	-7,854	-16,163	-24,471	-32,780	-41,088	-49,397	-57,706	-66,014	
	10	53,127	44,818	36,510	28,201	19,892	11,584	3,275	-5,033	-13,342	-21,651	-29,959	-38,268	-46,577	-54,885	-63,194	-71,502	-79,811	
	15	39,330	31,022	22,713	14,404	6,096	-2,213	-10,522	-18,830	-27,139	-35,447	-43,756	-52,065	-60,373	-68,682	-76,991	-85,299	-93,608	
	20	25,533	17,225	8,916	608	-7,701	-16,010	-24,318	-32,627	-40,936	-49,244	-57,553	-65,861	-74,170	-82,479	-90,787	-99,096	-107,405	
	25	11,737	3,428	-4,881	-13,189	-21,498	-29,806	-38,115	-46,424	-54,732	-63,041	-71,350	-79,658	-87,967	-96,275	-104,584	-112,893		
	30	-2,060	-10,369	-18,677	-26,986	-35,295	-43,603	-51,912	-60,220	-68,529	-76,838	-85,146	-93,455	-101,764	-110,072	-118,381			
	35	-15,857	-24,165	-32,474	-40,783	-49,091	-57,400	-65,709	-74,017	-82,326	-90,634	-98,943	-107,252	-115,560	-123,869				
	40	-29,654	-37,962	-46,271	-54,579	-62,888	-71,197	-79,505	-87,814	-96,123	-104,431	-112,740	-121,048	-129,357					
	45	-43,450	-51,759	-60,068	-68,376	-76,685	-84,993	-93,302	-101,611	-109,919	-118,228	-126,537	-134,845						
	50	-57,247	-65,556	-73,864	-82,173	-90,482	-98,790	-107,099	-115,407	-123,716	-132,025	-140,333							
	55	-71,044	-79,352	-87,661	-95,970	-104,278	-112,587	-120,896	-129,204	-137,513	-145,821								
	60	-84,841	-93,149	-101,458	-109,766	-118,075	-126,384	-134,692	-143,001	-151,310									
	65	-98,637	-106,946	-115,255	-123,563	-131,872	-140,180	-148,489	-156,798										
	70	-112,434	-120,743	-129,051	-137,360	-145,669	-153,977	-162,286											
	75	-126,231	-134,539	-142,848	-151,157	-159,465	-167,774												
	80	-140,028	-148,336	-156,645	-164,953	-173,262													
	85	-153,824	-162,133	-170,442	-178,750														
	90	-167,621	-175,930	-184,238															
	95	-181,418	-189,726																
	100	-195,215																	

Figure 6. Abatement scenarios for savanna burning in WG country. The area in green shows a positive return on operations while the area in red shows negative returns on fire operations.

2.5 Wildfire fighting

Burning country the right way helps to keep country healthy.

When country is not burnt early with lots of cool burns, then if a malgarra (wildfire) starts late in the dry season, it will be too hot and will burn large areas of country. When the flames are 'dancing mad' then the fire is too hot. So it is important to do burning the right way to look after country.

If fire is done the wrong way then the following things can happen:

- the area and number of wulo (rainforest) gets smaller
- the trees and grasses change in the country so there is less food for aamba (kangaroos and wallabies), jebarra (emu), diigu (birds) and gundun (bush mice) to eat
- some plants and trees such as guru (cypress pine) are killed or damaged
- animals that cannot move quickly or find a safe place such as gunanji (echidna, porcupine) and luu (snakes) get burnt and killed
- the homes, feeding and nesting places of some animals such as yilangal (scaly-tailed possum) and diigu (birds), such as the wirrirri (finches including Gouldian finch), are burnt
- weeds spread easier and quicker
- rock art sites are damaged
- buildings, fences and other assets are destroyed

(adapted from Wunambal Gaambera Healthy Country Plan 2010-2020).

Prescribed burning helps reduce the incidence, frequency and impacts of wildfires.

Burning country in small areas from the early dry season and throughout the dry season breaks up the country, making it harder for a wildfire to start and to spread.

Sometimes wildfires will start anyway and will burn across country, causing damage. Fire suppression is sometimes needed.

The risks with wildfire must be assessed before fighting a wildfire.

Fighting wildfires is dangerous and difficult.

If the weather is hot and windy, and the fire has grown to even a moderate size, it may be impossible to put out, especially in rugged and remote country.

Making good decisions when wildfires start will save lives and possibly save country, but action needs to be taken very quickly, or not at all.

If a wildfire has more than 20 minutes head start in very hot and windy conditions, there is little any people or teams can do.

Protecting lives and property needs great care, effort and equipment and people to do the work.

Detecting wildfires in remote country can be difficult, and only the smoke may be seen from a long way off. For these fires, unless access is very good, or a helicopter is available to view the fire, then there is probably not much that can be done.

Where wildfires start close to roads, there is more chance of fighting them early, before they get too big and hot.

If a wildfire does start and it's still small, the first thing to do is to contact the senior ranger or senior fire officer of the fire crew.

Do not try to fight a wildfire by yourself

You will need a crew, proper personal protective equipment (PPE), fire-fighting equipment, water and food.

You will need to act fast in the first couple of hours to stop the fire.

If you don't succeed in stopping the wildfire spreading in these first critical hours, then all you can do is to monitor and warn people of the fire heading their way until the weather changes, the wind drops, it gets cool, or it rains.

Fire equipment and appropriate use

- fire trailer and slip on unit
- backpack pump spray
- drip torch
- leaf blower
- longhead matches
- incendiary machine
- flame thrower

3 LAW AND LEGISLATION

3.1 Traditional Law of Wunambal Gaambera

Right way fire means burning done by the right Traditional Owners for the right country, the right way at the right time of year.

For Wunambal Gaambera people, only Traditional Owners are allowed to burn the gra (clan estate), unless they give their permission for others to burn the gra for them. This is why all families are represented at the annual fire planning workshop and why Traditional Owners from each family take part in the fire program.

There are three main seasons for burning for Wunambal Gaambera people:

- The first season is after the last rains of the wet season as the dry season is beginning and the grass is beginning to dry. This is a good time to burn sensitive places like cultural sites, old spinifex and around rainforest patches.
- The second season is in the dry season months when the southeast winds are blowing and the grass is dry. This burning is for cleaning up country; and
- The third season is at the end of the dry season before the first rains start. This is a hot fire used to clean up particular areas of country that are sick so the rain will come and bring back fresh growth. An example of this would be an area where the bushtucker trees are sick with disease and not producing any fruit.

3.2 Western Australian Legislation

Acts regulating fires in the region are the *Bush Fires Act*, the *Fire and Emergency Services Act*, and the *Fire Brigades Act*.

Other Acts which talk about fire are the *Environmental Protection Act*, and the *Conservation and Land Management Act*.

Responsibilities

At a bush fire the most senior officer takes control of a fire.

For most fires the senior Wunambal Gaambera person will be the Operations Officer who has obtained the permit.

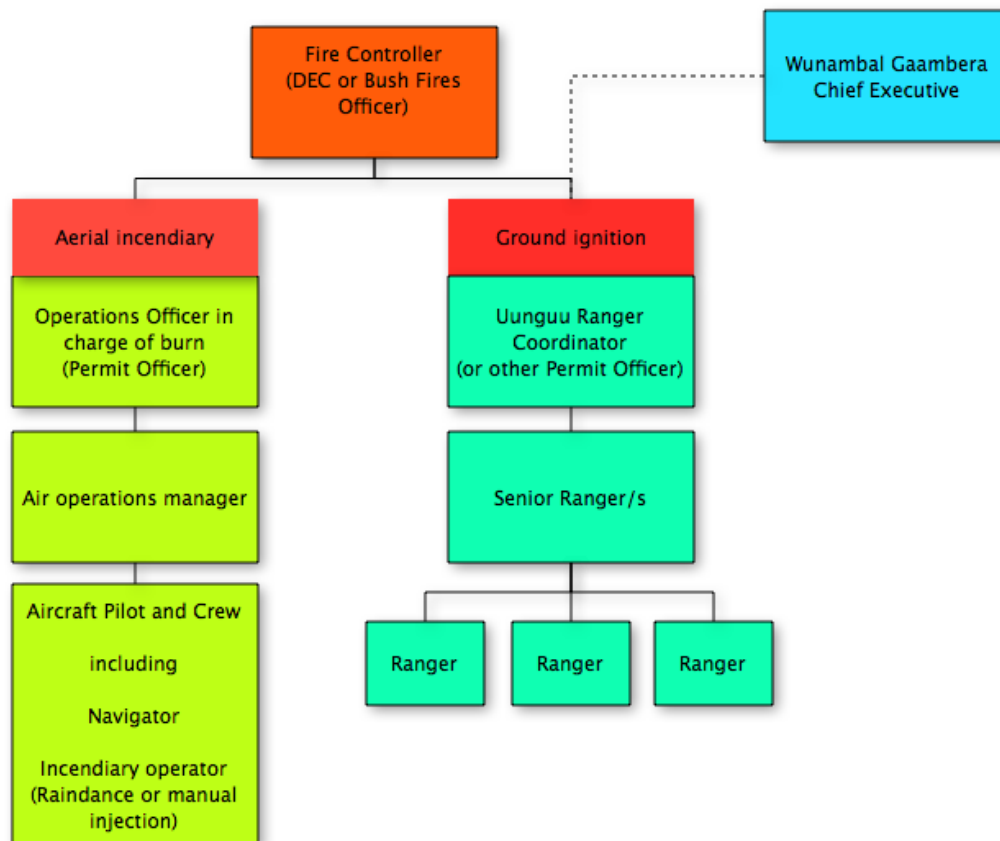


Figure 7. Possible chains of command in fire operations (adapted from AIIMS Incident Control System & Bush Fires Act and DFES guidelines).

For prescribed fires, the permit holder or most senior person would normally take control of the fire. If a fire gets out of control, or is a wildfire, or there are multiple fires, then an incident controller may be appointed. If an incident controller is appointed, they will decide who will take charge and what actions will be taken. In this case, a Permit Officer may be required to answer to an authorised DEC officer of Bush Fire Control Officer.

Permits to burn

Permits to burn are required from 1st April to 14 January, which is the dry season. Permits can be obtained from the Bush Fire Control Officer from the Wyndham-East Kimberley Shire.

The Bush Fire Control Officer may require the construction and maintenance of firebreaks before burning, and specify separation distances of buildings from fuels.

You must have:

- a plan for the fire
- minimum three people
- equipment (spray unit, rakehoes, backpacks, PPE)
- weather information
- backup contacts in case of something going wrong.

A copy of the supporting information that the fire control officer will need is shown below.

The application will need to be completed by someone in authority, and be accompanied by a map of the proposed burning areas.

Fire Permit – Supporting Information

The following supporting information, along with a map of the proposed area to be burnt, is required before a Fire Permit can be issued.

Has the Local Area FCO been contacted regarding this burn? If so, who did you speak to and when? _____

Please outline the area to be burnt. _____

Rationale – why burn this area? _____

When was this area last burnt? _____

What fire control measures will be in place? _____

Signed _____ Dated _____

Figure 8. Copy of application for Permit under Bush Fires Act

Send the permit application to the bush fire control officer at the Shire of Wyndham East Kimberley, or the Fire Warden (currently John Koyers at Drysdale River Station), well before you plan to burn.

Give yourselves a couple of weeks or a month so that the fire control officer can consider the application and sign the permit in time.

Phone him when you send it, so that he is aware that it's coming and can you can talk about what you need and what he will need.

The bush fire control officer may require at least a supervisor's course certificate for the fire supervisors.

You may need to demonstrate that each member of the fire crew has been trained in fire operations. The training could be the FESA courses, which are run periodically, or the Certificate Courses for Cert II, Cert III or Cert IV – see last section.

Each member of the team will probably need to have completed at least the *AHCFIR201A Assist with prescribed burning* unit of Cert II.

Training is discussed in Section 6.

The permit looks like this:

PERMIT: 10869

PERMIT TO SET FIRE TO THE BUSH

Subject to the provisions of the *Bush Fires Act 1954*, and the regulations made thereunder and to the due observance and performance of the conditions endorsed on this permit including the provisions of section 18 of the said Act permission is hereby granted to

M

of

to set fire to the bush on locations

on the following date/s 20

Note — This permit is not valid during a declared prohibited burning time and is issued subject to the provisions of section 46 of the *Bush Fires Act* and may be revoked or suspended by a bush fire control officer if, in his opinion, the fire, if lit, would become a source of danger.

A bush fire control officer is not compelled to inspect an area to be burnt before issuing a permit to burn. The onus lies on the person not only to comply with the provision of the *Bush Fires Act*, but also to ensure there is no danger of the fire escaping. The issue of this permit in no way affects that responsibility.

Plan and any special conditions to be observed:—

Action required by permit holder prior to lighting (in addition to reverse)-	Permit issuer to ✓ tick if applicable
Notify DEC office ph:	
In attendance throughout burn until completely extinguished:	
Hose (running water)	
Knapsacks (indicate No.)	
Fire Appliance - (specify 600 litre slip-on, 2.4 or other)	
Grader or Tractor and Plough	
Personnel Required - Minimum 3 or indicate number if more required	✓
A firebreak of metres completely surrounding area to be burnt	
Notify the Local Government in whose district this permit relates of the intention to burn (see over) Reg 15B (2)-(5)	✓
Notify the owner or occupier of all land adjoining land to which this permit relates (see over) Reg 15B (2)-(5)	✓
Wind strength less than (indicate in km/h):	
Wind direction:	
Not to be lit before hours or after hours.	
Other conditions:	

Dated this day of 20

Signed

Bush Fire Control Officer

***NOTE: THIS PERMIT IS NOT VALID ON DAYS OF FORECAST
CATASTROPHIC, EXTREME, SEVERE OR VERY HIGH DANGER.***

IMPORTANT: SEE OVER FOR CONDITIONS AND YOUR OBLIGATIONS.

Figure 9. Copy of Fire Permit

Permit-holders have to comply with the conditions of the permit. This may include firebreak preparation and other requirements. Normally the Permit holder will be the Unguu Ranger Coordinator, or the Senior Ranger.

The Permit Holder must report to a Bush Fire Control Officer if a fire escapes from the area covered by the permit. This report must be immediate or as soon as possible, and a full report must be provided within 24 hours of the fire being extinguished.

4 FIRE SAFETY

Fire Safety is about looking after yourself and each other.

Fires can turn on you and deserve respect.

Equipment used in fires can cause injuries.

It is vital that safety is a part of the culture around fires, not an add-on, and that all team members respect safety.

Just wearing safety gear is not the first step, but essential for fire safety.



© Robert Warren

You must wear personal protective equipment for safety, but when planning to light or fight a fire, look first to eliminate hazards and dangers from the area.

Steps to reducing risks

Control	Examples of Action
<i>Eliminate</i>	keep up-wind of the fire instead of fighting the fire head-on, or don't go up a hill ahead of a fire
<i>Substitute</i>	use water from a fire unit instead of a rakehoe to clean an edge, if possible
<i>Isolation</i>	keep people away from the fire if not crew
<i>Engineering controls</i>	use a rake-hoe to clean a burning log on the ground instead of your hands, even with gloves
<i>Administrative controls</i>	change work practices, re-organise the work
<i>Personal Protective Equipment</i>	always wear suitable protective clothing around bush fires

Always think safety

4.1 Risk Assessment and Job Safety Analysis

Each time you burn, you need to assess the risks and make sure that you have taken all the necessary steps.

Do this each time you prepare to do an activity like fire-lighting or fire-fighting. Some examples of possible activities and hazards are shown below.

Possible activities and hazards

Activities – examples	Hazards - examples
Driving to the fire site	Driving too fast Driving through smoke Crashing into another vehicle Rolling the vehicle Driving into a tree
Lighting a fire	Getting burnt by the fire Getting killed by the fire Getting smoke in your eyes Killing someone else by lighting the fire Inhaling too much smoke Fire escapes and burns more than wanted Fire burns into someone else's country
Cutting a fire break with rakehoes	Hitting someone accidentally with a rakehoe Hitting yourself with the rakehoe Getting blisters Flicking sand in someone's eyes with a rakehoe
Lighting fire with a drip torch	Burning yourself Dripping fuel onto yourself Rubbing fuel into your eyes
Carrying drinking water	Running out of water causing thirst Carrying water - fatigue Irrational and dangerous behaviour because of dehydration Reduced judgement as a result of dehydration
Putting out a fire which jumps a line	Getting burnt Getting ash in your eyes Inhaling smoke Getting smoke in your eyes Hitting someone accidentally with a fire-beater
Walking to and from a fire	Getting lost Tripping and falling Twisting your ankle or knee Getting caught in front of a fire
Operating a fire fighting unit	Spilling petrol Causing a fire Getting caught in moving parts Burning your hand on hot exhaust Getting hit by a car because fire unit noise muffled the sound
Fighting a wildfire	Fighting a wildfire head-on Fighting a fire up a hill Heat exposure Smoke inhalation Loss of visibility Getting burnt

In the Job Safety Analysis Worksheet are two columns asking what level of risk goes with the tasks you have identified in the JSA. These risk levels can vary with different situations.

Use the risk tables below to estimate the consequences of something happening and the likelihood of it happening.

Consequence risk rankings (following AS/NZS 31000)

Descriptor	Example detail description
Insignificant	No injuries, low financial costs
Minor	First aid treatment, medium financial costs
Moderate	Medical treatment required, damage to property, high financial costs
Major	Extensive injuries, major damage to others' property, major financial cost
Catastrophic	Death of yourself or crew, death of someone else, huge financial cost

Likelihood risk rankings

Descriptor	Description
Almost certain	Is expected to occur in most circumstances
Likely	Will probably occur in most circumstances
Possible	Might occur at some time
Unlikely	Could occur at some time
Rare	May occur only in exceptional circumstances

Risk levels have to be applied to each of the identified risks, both before you take action to reduce the risk, and after you take action. In other words, what is the worst that could happen if you did not take action to prevent or reduce the risks? How can you reduce the risks, and how likely is the hazard after you take the preventative action?

Risk analysis matrix – level of risk (following AS/NZS 31000)

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophe
Almost certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Possible	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

Risk Management Actions

Risk Level	Management action
Extreme	STOP – consult supervisor - senior management decisions, contingency plans, external authorities involved
High	Senior planning & action, specific management actions required, external advice may be sought
Moderate	Expert planning & management, exceedance of accepted standards
Low	Good planning & management, accepted standards

A Job Safety Analysis Worksheet (JSA) is shown below as an example of what to think about.

Example of Job Safety Analysis Worksheet – part complete

Wunambal Gaambera Aboriginal Corporation		Date: 19 th Nov 12			
Fire crew members names:					
Activity: burning around ranger station					
Approved by					
Activity	Hazards	Risk level before controls	Risk control measures	Risk level after controls	Who is responsible?
Get crew together	Less than 3 Unfit Under influence Bad attitude	Extreme	Get 3 or don't go Teamwork Stand down Stand down Stand down	Low	Coordinator/Senior Ranger/Individuals
Packing car/vehicle - checklist	Hurt back falling off roof-rack	moderate	Lift properly Get assistance to lift Use lifting device		
Driving to Ranger station	Car accident getting bogged run out of fuel				
Check firebreak & other assets	Damage to property or people				
Fill fire-fighting unit and get gear	Hurt back, injuries fuel spill smoking around fuel lose trailer inadequate communication gear failure				
Light fire	Hurt or kill Damage property				

The next image shows the steps to follow in assessing risks.

Job Safety Analysis Worksheet

Wunambal Gaambera Aboriginal Corporation Date: 19 November 2012
 Fire crew members names: Freddy Kruger, Amy Winehouse, Slim Duzby
 Activity: Fight at Mitchell Falls
 Approved by: Rob Warren

Activity	Risk level before controls	Risk control measures	Risk level after controls	Who is responsible
Fighting the wildfire	extreme	Fight from flanks of fire	high	Senior Ranger
Fighting a fire up a hill	extreme	Fight downhill from fire	moderate	R

Consequence risk rankings (following AS/NZS 31000)

Descriptor	Example detail description
Insignificant	No injuries, low financial costs
Minor	First aid treatment, medium financial costs
Moderate	Medical treatment required, damage to property, high financial costs
Major	Extensive injuries, loss of abilities, major damage to others' property, major financial cost
Catastrophic	Death of yourself or crew, death of someone else, huge financial cost

Risk Level	Management action
Extreme	STOP - consult supervisor - senior management decisions, contingency planning, additional resources
High	Senior planning & action, specific management actions required, external advice may be sought
Moderate	Expert planning & management, exceeds standards
Low	Good planning & management, accepted

Start here

Finish here

Getting burnt	high	Keep distance from flames; wear
---------------	------	---------------------------------

Likelihood risk rankings

Descriptor	Description
Almost certain	Is expected to occur in most circumstances
Likely	Will probably occur in most circumstances
Possible	Might occur at some time
Unlikely	Could occur at some time
Rare	May occur only in exceptional circumstances

Level of risk (following AS/NZS 31000)

Likelihood	Consequence level of risk (following AS/NZS 31000)				
	Insignificant	Minor	Moderate	Major	Catastrophe
Almost certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Possible	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

After you have done the JSA at the beginning of the season or activity, write up the risks you have identified into a checklist and use this checklist each time you do the activity.

Right way fire – planned burning - An example of a check list

Activities	Hazards	Controls	Check
Driving to the fire site	Driving too fast Driving through smoke Crashing into another vehicle Rolling the vehicle Driving into a tree	Drive according to conditions	
Lighting a fire	Getting burnt by the fire Getting killed by the fire	Work at a safe distance from the fire	
	Getting smoke in your eyes	Work from windward side of fire	
	Killing someone else by lighting the fire	Name team members to watch and keep them in sight in a safe position	
	Inhaling too much smoke	Work from windward side of fire	
	Fire escapes and burns more than wanted Fire burns into someone else's country	Burn according to conditions Plan your firebreaks before burning	
Cutting a fire break with rakehoes	Hitting someone accidentally with a rakehoe	Work at a safe distance from other fire crew	
	Hitting yourself with the rakehoe	Handle tools carefully Carry first aid kit	
	Getting blisters	Use work gloves	
	Flicking sand in someone's eyes with a rakehoe	Handle tools carefully	
Lighting fire with a drip torch	Burning yourself	Light fire with proper tool in good condition	
	Splashing fuel onto yourself	Handle fuel carefully	
	Rubbing fuel into your eyes	Wash hands after handling fuel	
Carrying drinking water	Running out of water causing thirst	Carry enough water (4 Litres per day)	
	Carrying water - fatigue	Carry what you need, get additional water transported by vehicle	
	Irrational and dangerous behaviour because of dehydration	Watch your crew members for signs of dehydration and fatigue	

4.2 Safety

Your approach to burning

Plan carefully each time you burn or fight a fire. Responsibility for life and property and for traditional country is yours and your team's.

The permit to burn requires that you have a plan, and map of where you want to burn, have all the necessary equipment and are prepared in every way for the fires you light.

Your fire may be intended to be a cool or light control burn, but all fires have the potential to become dangerous in some circumstances. A simple change in wind, or a heavier fuel load may lead to unintended consequences, including injury and death.

Consequences may include:

- negative reactions from neighbours
- negative reactions from the public
- excessive heat and damage to trees, fruit trees, and wildlife
- increased risk of fire escapes
- damage to lives and property.

4.3 Safety procedures

Safety starts during planning and ends when the fire is completely out.

First Aid

At least one person in a crew should be trained in First Aid.

Carry field first aid kit.

Always think safety

Safety and Personal Protective Equipment (PPE)



The right clothing and equipment are essential – image from Robert Warren, Unguu Ranger Coordinator

Wear:

- natural fibres
- long-sleeved cotton/nomex hi-viz shirts
- long trousers, jeans or overalls
- sturdy leather lace-up boots, not elastic sides
- wool or cotton socks
- hats or helmets
- cotton or leather gloves
- eye protection
- water carrier

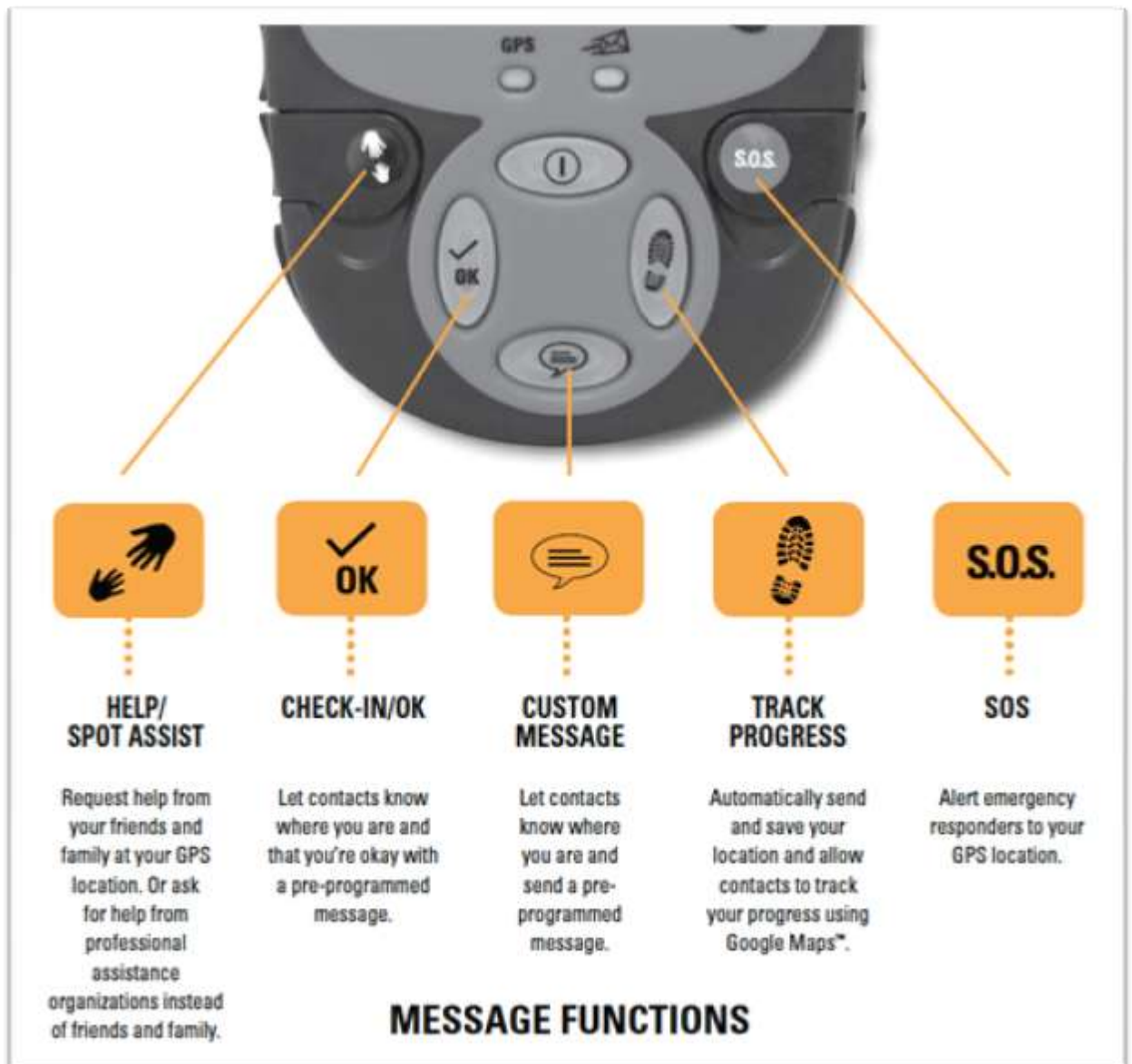
Some of you have tough leathery feet because you walk everywhere barefoot. But, if you are lighting fires under a Permit from the bush fire control officer, you will have to wear boots because even tough leathery feet will burn in fires and on hot coals. It's a safety issue!

Planning must identify areas where there are public risks.

Always think safety

Communications and safety devices

The fire crew must maintain contact and communications with WGAC every day at a fixed time. To do this, the crew can use the Spot Satellite GPS Messenger, Satellite phone, two-way VHF radio or messenger.



Every crew member must be able to demonstrate that they can use the SPOT Messenger device properly.

The SPOT device must be set up and tested before you go into the field. A **profile** needs to be set up on the SPOT website <http://au.findmespot.com/en> for contacts while you are in the field.

The profile includes the information below:

Profile	
Check-in/OK	
To:	robert.warren@klc.org.au
	tom.vigilante@bushheritage.org.au
	+61 419 259 868 (Robert Warren)
	+61 427 163 080 (Tom Vigilante)
Message to send	Check-in – All OK here and on schedule
Help	
To:	robert.warren@klc.org.au
	tom.vigilante@bushheritage.org.au
	+61 419 259 868 (Robert Warren)
	+61 427 163 080 (Tom Vigilante)
Message to send	Having trouble but not dangerous nor life-threatening. If you don't hear again for 24 hrs, activate Emergency procedures
Custom Message	
To:	robert.warren@klc.org.au
	tom.vigilante@bushheritage.org.au
	+61 419 259 868 (Robert Warren)
	+61 427 163 080 (Tom Vigilante)
Message to send	Have been delayed, but don't worry as otherwise OK
SOS	
Primary Emergency Contact	Secondary Emergency Contact
Bevan Stott	Ed Hatherley

Radios

Radio station or unit	Channel
Base radio	
DEC	WAERN –DEC – WA Emergency Radio Network – High-band VHF
	Dual band with CB UHF
WG has	VHF in vehicles and hand-held
Marine & Emergency	16
WG operations	13
WG private channel	'P'

Satellite phones

A Satellite Phone must be carried by crews when in areas not covered by cell-phone coverage, and in remote areas. The phone must have an open account, and not pre-paid, which could expire or be used up when in the field.

The phone must have contact numbers pre-coded into it.

Every crew member must be able to demonstrate that they can use the phone properly.

4.4 Field & Office Response Procedures

Routine schedule

- A routine or normal schedule call will be made by the field crew every day between 0700 and 0800 hrs.
- The WGAC office manager will normally take that call, unless otherwise arranged in advance.
- If all is OK, the office manager must record this in the Field Schedule book, including time of call, location and what they are doing.
- If there is a problem, the office manager must contact the next senior person who will take appropriate action. The office manager will record the details in the Field Schedule book.
- If there is an emergency, the office manager must trigger Emergency Procedures.

Emergency Procedures

If the crew calls an emergency, the office manager or next senior officer must contact the people in the contact list below, in the order that they are listed.

The office manager must record this in the Field Schedule book, including time of call, location and what they are doing.

The office manager must record all contact details, who was contacted, what time, and what action they took.

The office manager must remain available for contact by the crew and Emergency personnel until stood down or after the emergency is over.

Contacts for Schedules and Emergencies

Name	Organisation	Number	Email
Kalumburu			
WG Satellite Phone	Wunambal Gaambera crew	8707 7639 6769 (calls and sms)	
Tom Vigilante	WGAC	0427 163 080 (mobile) Sat phone - 8707 7639 6769 (calls and sms)	tom.vigilante@bushheritage.org.au
Robert Warren – Ranger Coordinator	WGAC		robert.warren@klc.org.au
Neil Waina - Head Ranger	WGAC		neil.waina@klc.org.au
Bevan Stott	WGAC	0428 681 406	bstott@bigpond.net.au
	Kalumburu Police	(08) 9161 4777	
	Wunambal Gaambera Ranger Office	(08) 9161 4205 Sat ph: 8816 214 68994	
	Kalumburu Clinic	(08) 9161 4335	kalumburu.clinic@health.wa.gov.au
Mitchell Plateau			
Kandiwal Community - Cathy, Ambrose, Alex or Gregory Catherine Goonack Home	WGAC	(08) 9161 4405 (08) 9161 4077 (fax) (08) 9191 7882	
DEC Ranger Station - Lindsay and John		(08) 9161 4172	
Truscott-Mungulalu			
	Truscott Airbase	(08) 9161 4558	
	Gaambemirri Ranger Camp	(08) 9161 4572 (08) 9161 4558 (fax)	

4.5 IN AN EMERGENCY in the field

- Stop work
- Check for Danger Signs
- Turn off all equipment so that it does not cause problems
- Check that all people are present and OK
- If anyone is in trouble, contact the emergency contact using SPOT or Satellite phone
- Do not attempt to walk out unless you are fully equipped to walk and all people are fit for the walk
- Do not leave anyone alone
- Do not send anyone alone for help.

5 BURNING THE BUSH

5.1 Operational Fire Plan

An operational plan is needed for both aerial incendiary operations and for ground operations. This is developed from the Wunambal Gaambera Healthy Country Plan and the Annual Fire Operations Plan, and must be done before operations. It is a simpler summary of proposed actions for the days of the proposed fires.

The Operational Fire Plan will be for a period of days or weeks at most. The maps and documents must be filed into one file for future reference.

Reporting on the results of the fires lit will be according to the Operational Fire Plan.

The operational fire plan should include:

- A description of the area to be treated and the fuel characteristics
- Operational objectives, burn prescriptions and strategies
- Equipment and personnel required
- Notifications and signage required
- Reporting protocols
- Communications Plan
- Ground safety
- Weather information both current and forecast
- A map showing:
 - areas to be burnt and areas to remain unburnt
 - proposed drop lines,
 - flight line directions,
 - number of runs,
 - adjoining or otherwise affected landholders,
 - controls required to contain the burn,
 - aircraft landing and supply sites,
 - safe refuge areas and withdrawal routes.

The operational plan must be approved by the Chief Executive Officer before operations commence. These guidelines were adapted from the AFAC Aerial Ignition Operations Guideline (2012).

Operational Control

Control of all fire operations must be strict.

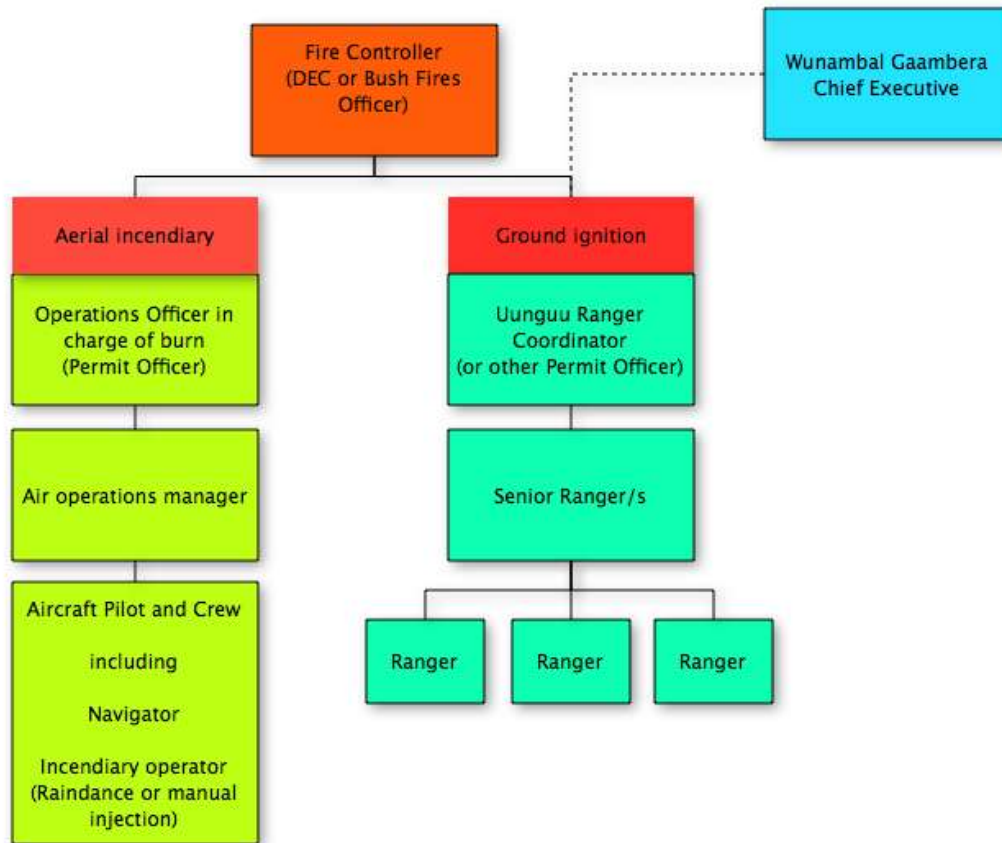


Figure 10. Fire command structure

In joint operations cultural leadership for the operation operates alongside operational responsibility.

During an aerial burning operation in a DEC aircraft a Traditional Owner has responsibility for saying when a fire is lit in a place or not.

5.2 Aerial Control Burning

For aerial incendiary operations, rules are more strict than for ground operations. Wunambal Gaambera staff who have appropriate training can assume control of an aerial burning operation. Burning Operations Supervisor (or Operations Officer in charge of burn) requirements include:

- Incendiary Machine Operator (IMO) – has completed a Department Environment & Conservation (DEC) IMO Training Course in the year of conducting the aerial burning;
- Has 3 years experience in conducting aerial burning with a Raindance Machine; and/or
- Permission from KLC Executive with advice from Senior Project Officer, North Kimberley Fire Abatement Project (in writing)
 - (from KLC Aerial Burning Operations Manual Draft v1.1 , 2013).

The rules and laws on aerial burning operations are provided in the KLC *Aerial Burning Operations Manual* (Draft v1.1, 2013). More detailed rules and laws are provided in the *AFAC Aerial Ignition Operations Guideline 2012*. The rules are detailed and complicated but must be followed to ensure the safety of the people flying and the aircraft, and people on the ground.

All aircraft used for aerial control burning on Wunambal Gaambera country will have to comply with these laws and rules.

Helicopters are most likely to be used on Wunambal Gaambera country for aerial lighting of fires. Guidelines for using helicopters are provided below.

Helicopter Use Procedures

The procedures below are to help staff use choppers efficiently and to help the pilot manage their time (especially in the busiest months of April to July).

- Timetable bookings into **3 hour runs** of either **morning, afternoon or all day**.
- Bookings can be made for other times if necessary by booking for specific times.
- Cancel bookings with at **least 24 hours notice**. Last minute cancellations ok if absolutely necessary.
- If all day booking try to keep **lunch or breaks to a minimum** (definitely not more than 1 hour!)
- **Be ready to go** when chopper arrives (including **a flight plan and all equipment required**). The pilot has left from Jabiru to arrive at your booking on time so make sure you are on time.
- If changing over staff flying make sure **2nd group is also ready to go** when chopper returns.
- Have a flight plan for your time in the chopper. It is a very expensive machine and needs to be used efficiently. If the purpose of your flight is burning the flight plan should be part of your fire plan.
- Respect all instructions given by pilot while in and around helicopter.
- If taking lots of gear talk to the pilot about how much and what kind of gear you have and have it **packed well**.
- Ensure that you follow the procedure for SAR times.

These procedures were developed for Kakadu National Park, by staff in Report on The Kakadu National Park Stone Country Burning Program 2008; reprinted with permission.

Figure 11. Helicopter use procedures

The pilot is responsible for the safe operation of the aircraft at all times, and remains in command at all times during aerial incendiary operations.

5.3 Aerial Ignition Operations

Aerial ignition may be conducted using hand-injected capsules, or a Raindance R2 Aerial Incendiary Machine. Both require special training which is not within the scope of this manual.

Steps involved with aerial ignition operations include:

- Fire Controller (or Incident Controller) makes sure that the area to be burnt is clear of people, stock and equipment before burning starts
- Pilot will fly over the area to check
- Operations Officer (Permit Officer) will fully brief the pilot and crew on all matters to do with the fire before any operation
- This includes an emergency brief and full functional check of equipment prior to flight
- All people and pilots involved with aerial burn will have correct PPE
- *Lighting should be conducted in a pattern which at all times permits a fire free escape route for aircraft and crew if the aircraft is forced to land*

- Navigator will monitor fire spread and direct Incendiary Operator to alter capsule spacing as needed
- Navigator may ask Pilot to alter aircraft speed
- Capsule spacing will be determined by fire plan including rate of spread, desired intensity, and patchiness
- Where possible, lighting will start downwind of burn area and work upwind so that target area is not covered in smoke
- Lighting patterns should normally follow contours and work from higher to lower ground
- Ignition spacing needs to be watched to make sure fires are not too close and hot
- Sometimes intense quick burns may be needed
- Ignitions need to be close enough together to burn out as needed on the day
- Pilots must make sure that Visual Flight Rating and visual contact with the ground is maintained at all times
- Pilots and machine operators must make sure that ignitions occur only within the burn area and must stop dropping in time to allow for burnout before reaching the boundary
- Debrief at end of each mission to assess the operation and fix procedures if needed.

(Adapted from AFAC Aerial Ignition Operations)

Communications

- Ground-to-air communication schedules must be pre-planned.
- Radio communications between the Operations Officer and aircraft must be established before the operation starts.
- During any Aerial Ignition Operation, the aircraft conducting the operation shall have radio communications with the Operations Officer at all times during the ignition operation.
- No communications should take place with the helicopter while it is hovering, landing, taking off, or during loading operations. At these times, the pilot's concentration must not be disturbed unless there is significant cause to alert them to other issues.
- Aircraft conducting Aerial Ignition Operations must have an aeronautical VHF Communications system.
- Aircraft should be equipped with fully independently controlled audio switching facilities serving the pilot, co-pilot and operator, and which provide transmit and receive access without changing headsets or helmets to Agency transceivers.
- Helicopters should be equipped with a siren to warn people on the ground of danger
- Communications between ground crew and pilot, designated fuelling, mixing and loading areas, and marked escape routes are essential to the conduct of all Aerial Ignition Operations.

(Adapted from AFAC Aerial Ignition Operations)

5.4 Preparation before the day of the fire

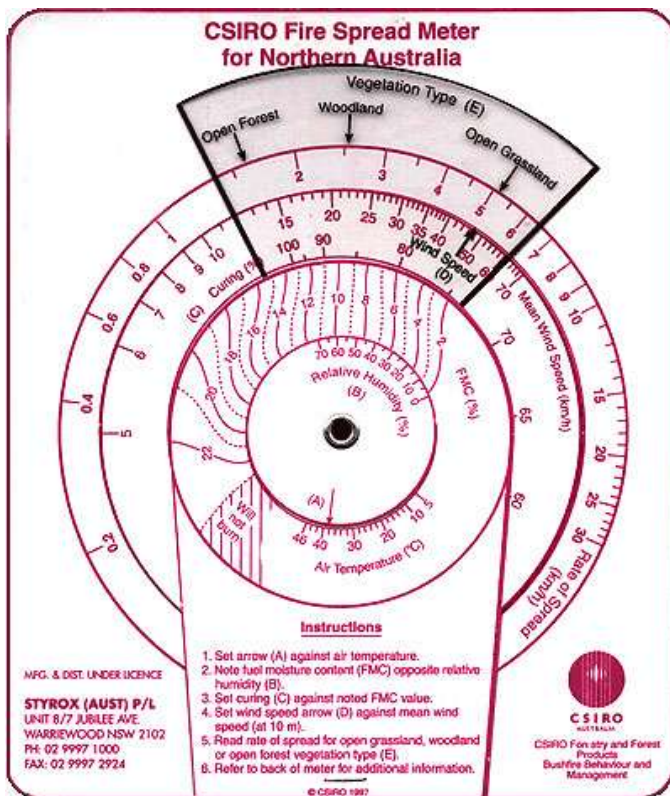
You will need to check that all is ready for the next day:

Table 2. Checklist before the day of the fire

Action	Responsible person	Check
obtain a permit to burn from the Bush Fire Control Officer		
review the fire management plan for the area		
make sure all necessary equipment and people are available and in good working order		
provide each crew leader with a copy of the burning plan and map		
familiarise each person with the burning plan and the area to be burnt		
identify and discuss significant features, such as steep slopes, high fuel areas, creeks, rocky areas and water sources		
never send people into dangerous places such as steep slopes, areas of high fuel or difficult access or areas where fires are burning below them		
display warning signs where required under the permit		
contact neighbours to inform of plan to burn		
conduct early preparation such as edge burning to reduce the chance of fires escaping control lines, if this is part of your fire management plan		
conduct a Risk Assessment for the burn		
obtain the latest weather forecast for the day of the burn		
fly or drive the areas to be burnt a few days before to check the condition of the grasses		
check that all PPE, food, water, communications, first aid kits are present and in good condition		
check that fuel for aircraft is supplied and in the right location		

Weather and fuels determine how the fire will burn and whether it will do what you want it to do.

CSIRO Fire Spread Meter for Northern Australia, and Grassland Fire Danger Meters should be used to determine the fire danger index and the potential rate of spread of the fire. The Fire Spread Meter is shown below. Both have to be used to obtain a good understanding of what the fire is likely to do if you light it.



Two guide books are available to determine the condition of the grasses by sight - *Kimberley grass curing guide* and the *North Australian Grassland Curing Guide*. Both could be used to compare the condition of the grasses.

5.5 On the day of the fire

On the day of the burn:

Table 3. Checklist on the day of the fire

Action	Responsible person	Check
1. make sure the right people are available to do the work, and that permissions have been obtained from the right TOs		
2. print out the Permit and check that you have done everything required		
3. print out the fire plan for the area for the day		
4. dress ready for the fire with all PPE		
5. make sure all necessary equipment and people are available and in good working order		
6. <i>Zero tolerance of alcohol - if fire crew members are intoxicated at all, they are to be stood down before going to the fire</i>		
7. contact neighbours to inform of plan to burn		
8. obtain the latest weather forecast for the day of the burn from the Bureau of Meteorology (BOM) and NAFI sites		
9. obtain local weather readings using a Kestrel Weather Meter		
10. determine the fire danger using the Grassland Fire Danger Meter and the Fire Spread Meter for Northern Australia		
11. consider any potential wind changes and the possible effects on fire behaviour		
12. verify that the contact people for emergencies are on stand-by		
13. check the area thoroughly on the day of the burn to make sure no-one other than fire crew are in the burn area		
14. make sure all crew members know the escape routes, fall-back areas and assembly points		
15. give clear and concise instructions at all times and ensure the chain-of-command is well-defined in the briefing and made known to all crew members		
16. ensure regular contact with all crew members during the fire, and account for each member – where they are, what they are doing, how they are feeling		
17. maintain communication between leaders and crew members at all times		
18. make sure you have the proper protective equipment		
19. make sure everyone has access to unlimited supplies of water and energy drinks		
20. Record your notes on the checklist – provided below and in the Appendix		

Always think safety

If flying:

1. obtain safety briefing from pilot
2. check the contract and conditions of operation with the pilot
3. check SAR arrangements

The fire crew must keep records of the fire crew, conditions and locations on the day of the fire.

Table 4. Records on day of fire

Item	Names and notes
Fire location and name	
Date	
Fire Crew present	1. Crew Leader Name:
	2.
	3.
	4.
	5.
	6.
	7.
	8
Notify DEC officer	Name: Date:
Equipment	Check:
Hose	
Knapsack	
Fire appliance (600 L slip on, other)	
Grader, tractor or plough	
Drinking water	
Notify local government	Name: Date:
Notify local landowners (if required)	Name: Date:
Wind strength	
Wind Direction	
Temperature	
Relative humidity	
Degree of curing of grass	
Calculated rate of spread	
Calculated fire danger	
Time of lighting	
Signed	
Name	
Date	

Drug and Alcohol testing

People under the influence of drugs or alcohol will not be permitted to work on any fire activity.

People may be tested routinely or on the spot.

Supervisors will stand people down immediately if they are intoxicated, and they will not be paid for the days they are stood down.

Aerial incendiary operators must have zero alcohol and zero drugs in their bodies. They will also be tested and stood down immediately.

Attitude

Fire lighting and fire fighting are serious activities which require a very positive attitude. A bad attitude can cause injuries and even death. Everyone can have bad days, but a bad attitude on the day of a fire *will not be tolerated*.

If a supervisor feels that someone with a bad attitude is a risk to the fire activity, he may stand that person down, *without question*, because the safety of the team is in the hands of the supervisor.

If there is a disagreement about the stand-down, it will be dealt with *after the fire event* by a meeting of people elected by the Board of Directors to resolve the dispute.

Communications and teamwork are essential.

Casuals

Casual and volunteers on fire crews must be assessed by the senior officer for fitness and ability. If they are not fit or able, then they will not be accepted.

They must follow all rules and procedures that other crew members must follow.

Casuals and volunteers are always under the authority of senior person and must obey commands.

They must accept liability for their involvement.

All volunteers and casuals are subject to Work Safety & Health obligations and duties as if they were employed.

Contingency planning

A fire activity may be called off at short notice for a variety of reasons.

- the weather may not be right, or changes quickly
- a Job Safety Analysis (JSA) shows an unacceptable level of risk
- someone may be absent or sick, so there are not the minimum 3 people on the team
- equipment breakdowns may affect the safety and efficiency of the planned fire

- cultural reasons
- there may be other problems

Aerial incendiary burning is particularly risky, so planned aerial burns may be called off at short notice as well. Reasons may be:

- lack of trained personnel
- incorrect PPE
- equipment failure
- air sickness of an operator or observer
- JSA shows an unacceptable level of risk
- there is a chance of people in the burn area
- an operator does not show up, so there are not enough crew.

If a job is cancelled at short notice, the supervisor will prepare a report for the CEO.

6 MONITORING AND REVIEW

After each fire and at the end of the fire season it is essential to review the successes and failures.

Monitoring includes checking how successful the fires were at achieving the goals set in the fire plan. It may include fly-overs. NAFI provides a useful means to monitoring fires.

Review means that all your activities and successes and mistakes are reviewed, so that corrections can be made where necessary.

6.1 Reporting

Reporting is a part of the operations and planning process. The Annual Fire Operations Plan guides the overall planning, and reporting will be to the Operational Fire Plan and the Job Safety Analysis for the season.

Reporting of the results of the fires will be in accordance with the Operational Fire Plan and should include:

Operational Fire Plan	Action
JSA (Job Safety Analysis)	Attach completed JSA to report
A description of the area burnt	Map the areas burnt
Operational objectives, burn prescriptions and strategies	Did you meet the objectives? If not, what happened?
Equipment and personnel	Attach the checklists Table 2. Checklist before the day of the fire Table 3. Checklist on the day of the fire
Notifications and signage required	Where were the signs placed?

	Who was notified and when? Attach: Table 2. Checklist before the day of the fire
Reporting protocols	This report. Report to Bush Fire Control Officer if the fire escaped the Permit area.
Communications Plan	Table 2. Checklist before the day of the fire
Ground safety	Table 3. Records on day of fire
Weather information both current and forecast	Table 3. Records on day of fire
A map showing:	
<ul style="list-style-type: none"> • areas burnt and areas to remain unburnt 	<p style="text-align: center;">Attach map</p> <p>(Table 2: Checklist before the day of the fire)</p>
<ul style="list-style-type: none"> • actual drop lines, 	
<ul style="list-style-type: none"> • flight line directions, 	
<ul style="list-style-type: none"> • number of runs, 	
<ul style="list-style-type: none"> • adjoining or otherwise affected landholders, 	
<ul style="list-style-type: none"> • controls used to contain the burn, 	
<ul style="list-style-type: none"> • aircraft landing and supply sites, 	
<ul style="list-style-type: none"> • safe refuge areas and withdrawal routes. 	

The report is made up of the plans you proposed, and the results. A lot of the reporting will be done with iTracker, and the rest is with the checklists and maps.






iTracker Land Patrol Application


























We normally use iTracker in the following ways:

- To record fire operations from a vehicle – GPS track and start burning, pause, stop burning
- Record fire operations during a fire walk
- Record aerial burning track and incendiary drops

iTracker screen grabs are shown below. The information recorded in iTracker has to be downloaded to a computer in the office so that the reporting can be finished.

Events	
Fire	
Weeds	
Feral Animals	
Water	
Biodiversity	
Cultural Sites	
Visitor Management	
AQIS Activites	
Fence Check	
Field Map	
Other Event	?
Finish Patrol	
	

Fire	Reason for Burning
Controlled Burning	<input type="checkbox"/> Access to Country
Fire Survey	<input type="checkbox"/> Cultural Reasons
Fire Fighting	<input type="checkbox"/> Firebreaks / Buffers
	<input type="checkbox"/> Reduce Fuel Loads
	<input type="checkbox"/> Hunting
	<input type="checkbox"/> Infrastructure Protection
	<input type="checkbox"/> Protect Camp / Town
	<input type="checkbox"/> Traditional Owner Request
	<input type="checkbox"/> Plant Regeneration/Bush Tucker
	<input type="checkbox"/> Other (Enter Text Below)
	Tap to Edit
	
Weather Conditions	Wind Direction
Temperature (degrees) 0.0	<input type="checkbox"/> North
Humidity (%) 0.0	<input type="checkbox"/> East
Curing Rate (%) 0.0	<input type="checkbox"/> South
Wind Speed (Km/h) 0.0	<input type="checkbox"/> West
Wind Gust (Km/h) 0.0	<input type="checkbox"/> North East
Actual Dew Point 0.0	<input type="checkbox"/> North West
	<input type="checkbox"/> South East
	<input type="checkbox"/> South West
	
	

Aerial or Ground	Travel Method
Aerial	<input type="checkbox"/> Vehicle 
Ground	<input type="checkbox"/> Quad Bike 
	<input type="checkbox"/> Walk 
	<input type="checkbox"/> Other
	Tap to Edit
   	   
Burn Method	Burning
<input type="checkbox"/> Drip Torch 	Pause
<input type="checkbox"/> Matches 	Field Map 
<input type="checkbox"/> Incendiary 	Record Something Else
<input type="checkbox"/> Other	Take a photo 
	Finished Burning 
Tap to Edit	
   	   

Presence of smoke?	Air Temperature (degrees)				
No smoke	32.				
A little bit	<table border="1"> <tr> <td>7</td><td>8</td><td>9</td><td>C</td> </tr> </table>	7	8	9	C
7	8	9	C		
A lot of smoke	<table border="1"> <tr> <td>4</td><td>5</td><td>6</td><td><</td> </tr> </table>	4	5	6	<
4	5	6	<		
	<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>.</td> </tr> </table>	1	2	3	.
1	2	3	.		
	<table border="1"> <tr> <td>0</td><td>+/-</td> </tr> </table>	0	+/-		
0	+/-				
					
How is the visibility overall?	Observers				
Excellent	FRONT Left Observer				
Very good	Tap to Edit				
Fair	BACK Left Observer				
Poor	Tap to Edit				
	BACK Right Observer				
	Tap to Edit				
	Recorder				
	Tap to Edit				
					

6.2 Response and Revision - Updating the Operations Manual

The manual has been designed to be updated in sections. Many small things change over time, and the manual should change with each of these changes without having to re-write the whole manual.

The monitoring and review steps will help guide you in the responses to the last fire season and what revisions need to be made to the Operations Manual.

7 TRAINING AND SKILLS

Bush Firefighter courses are delivered and assessed locally by qualified trainers and assessors and are aligned with the following National Public Safety Training Package units of competency. The Australasian Fire and Emergency Service Authorities Council (AFAC) provides some of the course relevant to firefighting and emergency operations in land management and wildfire firefighting.

7.1 Fire units relevant to Kimberley Ranger Program training under new CLM training package (AHC10)

Note – trainees at each level can take at least two units from one level above or below or from another training package.

Units focused on responding to wildfire are in italics and red font

Arrows → show prerequisites specified for units. Note – there is a chance trainers will waive **Suppress Wildfire** as a prerequisite for the Cert IV units if trainees have evidence of completing DEC fire training. This is yet to be firmed up.

Available fire units:

	Cert II	Cert III	Cert IV	Diploma
Units listed for AHC10	Basic fire awareness AHC FIR201A Assist with prescribed burning PUA FIR204B Respond to wildfire <i>(also listed for Cert III)</i>	PUA FIR303B Suppress wildfire <i>(also listed for Cert IV)</i>	PUA FIR407B Conduct prescribed burning	AHC ILM509A Plan burning activities for natural and cultural resource management
Units available from other Training Packages	PUA FIR201B Prevent injury		PUA FIR406B Develop prescribed burning plans	MSS015001A Measure and report carbon footprint

Suggested pattern for ranger training (assumes **DEC Fire Training** can substitute for **Suppress Wildfire**):

Cert II	Cert III	Cert IV
AHC FIR201A Assist with prescribed burning [DEC Fire Training]	PUA FIR407B Conduct prescribed burning	PUA FIR406B Develop prescribed burning plans (Optional – add one or two Diploma level fire units as listed above.)

Fire fighting operations may require *PUA40301 Certificate IV in Public Safety (Firefighting Supervision)*.

Special courses may be required for some activities. These include: *PUAFIR408B Plan aircraft operations* and training in the use and operation of the Raindance aerial incendiary machine.

8 REFERENCES

Reference Documents

<i>Title</i>	<i>Author</i>	<i>Date</i>
Aerial Ignition Operations	Australasian Fire & Emergency Service Authorities Council	Sept 2012
Australian Aerial Firefighting Operator's Manual	National Aerial Firefighting Centre	June 2011
Code of Practice for Fire Management	Dept of Environment and Conservation	May 2008
Fire Operations Guidelines 2011-12	Dept of Environment and Conservation	Nov 2011
Kimberley Bush Fire Burning Guidelines and Firebreak Locations, Construction and Maintenance Guidelines	Bush Fire & Environmental Protection Branch	July 2007
Fire Management in the Kimberley and other Rangeland Regions of Western Australia	Environment Protection Authority	Dec 2006
First Aid in the Workplace – Code of Practice	Safe Work Australia	July 2012
How to Manage Work Health and Safety Risks – Code of Practice	Safe Work Australia	Dec 2011
Managing the Risks of Plant in the Workplace – Code of Practice	Safe Work Australia	July 2012
Managing the Work Environment and Facilities – Code of Practice	Safe Work Australia	Dec 2011
Prepare. Act. Survive. Your Guide to Preparing for and Surviving the Bushfire Season	Fire & Emergency Services Authority, WA	Sept 2011
Kimberley Grasslands Field Curing Guide	Meg Flavelle, KRFMP, FESA, Dept Ag WA, National Heritage Trust	2002
Fire Management Manual 2011-2012 – Policy & Procedures for Fire Management	Office of Environment & Heritage NSW, NSW National Parks & Wildlife Service	July 2011
Raindance R2 Aerial Incendiary Machine Operations Manual	Raindance Systems	n.d.
Fire Management Operational Manual	Cuong Tran, SEQ Fire and Biodiversity Consortium	Jan 2002
Operations Manual for Aerial Burning, Draft v1.1 2013	Kimberley Land Council and Associated Groups	June 2013

In-text References

Bush Fire & Environmental Protection Branch 2007. Kimberley Bush Fire Burning Guidelines and Firebreak Location, Construction and Maintenance Guidelines. Fire and Emergency Services Authority of Western Australia, Perth.

DECWA. 2008. A guide to burning under the Native Vegetation clearing provisions Environmental Protection Act 1986. Page 7. Department of Environment and Conservation, Perth

DECWA. 2009. A guide to the exemptions and regulations for clearing native vegetation under Part V of the Environmental Protection Act 1986. Page 27. Department of Environment and Conservation, Perth

DECWA. 2010. Principles of fire management in savanna landscapes of the Kimberley. <http://www.dec.wa.gov.au/content/view/3480/1875/>; accessed 20 June 2012.

- Midgley, S., and Z. Tan. 2006. A methodology for determining minimum separation distance between a structure and bushfire hazard. Bushfire Conference 2006 - 6–9 June 2006: Life In A Fire-Prone Environment: Translating Science Into Practice, Brisbane.
- NSW Rural Fire Service. 2006. Planning for Bush Fire Protection. A Guide for Councils, Planners, Fire Authorities and Developers. Page 80. NSW Rural Fire Service, Sydney.
- Palmer, C. 2004. Pastoral Property Fire Management Practices and Kimberley Grasslands Curing, Chapter 2. Page 22 in KRFMP Management Committee, editor. Sustainable Fire Management for the Kimberley Region of Western Australia. Report of the Kimberley Regional Fire Management Project. (Natural Heritage Trust Project No. 013005E). Natural Heritage Trust.
- Russell-Smith, J. 2005. Fire in the Kimberley and Inland Regions of WA— Issues Paper. Environmental Protection Authority, Perth.
- Standards Australia. 2009a. AS 3959—2009 Construction of buildings in bushfire-prone areas. Page 125. Standards Australia.
- Standards Australia. 2009b. HB 330-2009 Living in bushfire-prone areas. Page 77. Standards Australia.

9 APPENDICES

9.1 Appendix 1 - Legislation

Bush Fires Act 1954

The controlling legislation relating to bushfires in Western Australia is the *Bush Fires Act 1954*. The Act enables the issuance of permits to light fires and legislates for the prevention of fires, including fire breaks and other obligations. Aspects of the Act which relate directly to Wunambal Gaambera country are summarised below. This summary is not complete, and must not be relied on without full reference to the legislation.

- The *Bush Fires Act 1954* allows for declaration of prohibited burning times (Sn.17) and restricted burning times (Sn.18). Permits to burn the bush are not available during prohibited burning times, and permits are required during restricted burning times, if any person wishes to burn the bush. Exemptions to the prohibited burning times may be sought under S. 17(4) if burning may be required. During prohibited burning times, a land owner or occupier may light fires to protect property, subject to a permit and conditions issued by a bush fire control officer (Sn.23);
- At present, there is no *prohibited burning time* over the Shire of Wyndham-East Kimberley (WA Government Gazette No. 016, 3 February 2012, p614, which revoked the original declaration of 1995);
- A *restricted burning time* over the Shire of Wyndham-East Kimberley is current from 1 April to 14 January each year (GG 016, 3 February 2012, p619).;
- A permit to burn anywhere in the Wunambal Gaambera country is required therefore from 1 April to 14 January, which is in effect the prescribed burning season;
- Permits are issued by bush fire control officers appointed by local government, under Sn. 18 of the Act; and
- Total fire bans may be imposed over any part of the state (Sn.22A), which cancels any permits issued for that period and area.

Control of prescribed fires lit under the conditions of a permit is the responsibility of the permit-holder, and must be reported if the fire escapes control (*Bush Fires Regulations 1954*, Reg. 22). Various conditions apply:

- The permits and the Regulations stipulate conditions which must be met by the permit-holder, including notification to adjacent landholders and to bush fire control officers (Reg. 15), and suitable preparation to prevent the escape of fire, including having present at the fire at least **three** able-bodied persons;
- Applications for permits must be made not more than 28 days and not less than 4 days prior to the proposed burning time (Reg.15B);
- A permit must be produced to an authorised officer on request if fire has been lit (Sn. 24B)

Any fire can become subject to control by a bush fire control officer or a bush fire liaison officer. The Act determines the authority hierarchy, as follows:

- Any person appointed under Sn. 12 of the Act, by the Chief Executive Officer as a bush fire liaison officer (formerly bush fire warden) under section 20 of the *Fire and Emergency Services Act 1998* may take control of all other fire officers in the event of a bush fire on local government and conservation lands (Sn.13);
- Bush fire liaison, bush fire control, authorised CALM officers and officers and members of a bush fire brigade may direct activities during a period of fire (Sn.14B) and enter any lands at any time (Sn. 14) for relevant purposes;
- Local government may appoint bush fire control officers (Sn.38); and
- A bush fire control officer is conferred a number of special powers and may take charge of a bush fire brigade (Sn.39), except in a townsite in an area which has been declared a fire district under the *Fire Brigades Act 1942* (Sn.39 *Bush Fires Act*).

The occupier of any land is required to take all possible measures to extinguish a bush fire on his own land if it is not part of burning operations being undertaken in accordance with Act, and must notify the nearest available bush fire control officer or bush fire brigade officer of the existence and locality of the fire (Sn. 28).

The *Bush Fires Act* affects operations including:

- tractors and engines must be in sound and efficient condition if they are used during prohibited and restricted burning times (Sn.27);
- during a total fire ban, the use of vehicles, plant and equipment is prohibited except in the case of immediate and serious risks, and if the vehicle is a fire fighting vehicle, as defined (Sn. 22C);
- It is an offence to light a fire which is likely to injure or damage a person or property, and carries an offence of imprisonment (Sn.32);
- Local government may require the construction of a fire break (Sn.33); and
- Local government may establish and maintain bushfire brigades (Sn.38).

Exemptions to a number of the sections of the Act and Regulations can be obtained in certain circumstances prescribed by the Act and Regulations.

Environmental Protection Act 1986

The Guide to Burning (DECWA 2008) states:

In general, any burning approved or required by the relevant authority such as the Minister for Fire and Emergency Services, FESA, Bush Fires Board or Local Government, or done by the Department of Environment and Conservation as part of its functions under the *Conservation and Land Management Act 1984*, does not require a clearing permit under the *Environmental Protection Act 1986*. (p4).

Exemptions to the *Environmental Protection Act* include the right to burn if a permit has been issued under the *Bush Fires Act* (DECWA 2009). Schedule 6 of the Environmental Protection Act provides exemptions from the requirements to obtain a clearing permit. These exemptions include:

Clearing that is done —
(a) as permitted under section 17(5); or

- (b) in accordance with a permit obtained under section 18; or
- (c) in accordance with an exemption granted under section 22C; or
- (d) under section 22(2), 23, 26A, 39(1)(d) or 44(1)(c); or
- (e) as authorised by a proclamation under section 26 of the *Bush Fires Act 1954*.

The *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* further modify the exemption provisions to allow clearing by fire outside the prohibited and restricted burning times. The Guide to exemptions and regulations (DECWA 2009) summarise these exemptions as follows:

<p>Regulation 5, Item 3 Clearing for fire hazard reduction</p> <p>Clearing must be done by or with the authority of:</p> <p>The owner of the land on which the clearing is to take place.</p>	<p>Clearing that is fire hazard reduction burning if the clearing is –</p> <p>(a) to occur outside the prohibited or restricted burning times declared under the <i>Bush Fires Act 1954</i> for the zone in which the clearing is to take place; and</p> <p>(b) done in such a way as to minimise long term damage to the environmental values of the vegetation.</p>	<p>This exemption allows for fire hazard reduction burning outside of the prohibited or restricted periods.</p> <p>“Fire hazard reduction burning” means burning or partial burning of vegetation to reduce the risk of injury or damage to persons and property from an uncontrolled fire in vegetation.</p> <p>The clearing must be done in a way that minimises long term damage to the environmental values of the vegetation. Environmental value is defined in section 3 of the EP Act and means a beneficial use; or an ecosystem health condition. Both beneficial use and ecosystem health condition are also defined in section 3.</p> <p>Whilst having regard to safety issues, care should be taken not to carry out fire hazard reduction burning so frequently that it will reduce or prevent the ability of the vegetation to recover. Care should also be taken, for example, to prevent burning from spreading to a neighbouring property. DEC has prepared a guideline to assist in understanding requirements to prevent long term damage to vegetation which is available at DEC’s</p>
--	---	--

9.2 APPENDIX 2 – Forms & Checklists

Job Safety Analysis Worksheet

Wunambal Gaambera Aboriginal Corporation			Date:		
Fire crew members names:					
Activity					
Approved by					
Activity	Hazards	Risk level before controls	Risk control measures	Risk level after controls	Who is responsible

Checklist before the day of the fire

Action	Check
obtain a permit to burn from the Bush Fire Control Officer	
review the fire management plan for the area	
make sure all necessary equipment and people are available and in good working order	
provide each crew leader with a copy of the burning plan and map	
familiarise each person with the burning plan and the area to be burnt	
identify and discuss significant features, such as steep slopes, high fuel areas, creeks, rocky areas and water sources	
never send people into dangerous places such as steep slopes, areas of high fuel or difficult access or areas where fires are burning below them	
display warning signs where required under the permit	
contact neighbours to inform of plan to burn	
conduct early preparation such as edge burning to reduce the chance of fires escaping control lines, if this is part of your fire management plan	
conduct a Risk Assessment for the burn	
obtain the latest weather forecast for the day of the burn	
fly or drive the areas to be burnt a few days before to check the condition of the grasses	
check that all PPE, food, water, communications, first aid kits are present and in good condition	
check that fuel for aircraft is supplied and in the right location	
check that fuel for aircraft is supplied and in the right location	

Checklist on the day of the fire

Action	Check
21. make sure the right people are available to do the work, and that permissions have been obtained from the right TOs	
22. print out the Permit and check that you have done everything required	
23. print out the fire plan for the area for the day	
24. dress ready for the fire with all PPE	
25. make sure all necessary equipment and people are available and in good working order	
26. <i>Zero tolerance of alcohol - if fire crew members are intoxicated at all, they are to be stood down before going to the fire</i>	
27. contact neighbours to inform of plan to burn	
28. obtain the latest weather forecast for the day of the burn from the Bureau of Meteorology (BOM) and NAFI sites	
29. obtain local weather readings using a Kestrel Weather Meter	
30. determine the fire danger using the Grassland Fire Danger Meter and the Fire Spread Meter for Northern Australia	
31. consider any potential wind changes and the possible effects on fire behaviour	
32. verify that the contact people for emergencies are on stand-by	
33. check the area thoroughly on the day of the burn to make sure no-one other than fire crew are in the burn area	
34. make sure all crew members know the escape routes, fall-back areas and assembly points	
35. give clear and concise instructions at all times and ensure the chain-of-command is well-defined in the briefing and made known to all crew members	
36. ensure regular contact with all crew members during the fire, and account for each member – where they are, what they are doing, how they are feeling	
37. maintain communication between leaders and crew members at all times	
38. make sure you have the proper protective equipment	
39. make sure everyone has access to unlimited supplies of water and energy drinks	
40. Record your notes on the checklist – provided below and in the Appendix	

Records on day of fire	
Item	Names and notes
Fire location and name	
Date	
Fire Crew present	1. Crew Leader Name:
	2.
	3.
	4.
	5.
	6.
	7.
	8
Notify DEC officer	Name: Date:
Equipment	Check:
Hose	
Knapsack	
Fire appliance (600 L slip on, other)	
Grader, tractor or plough	
Drinking water	
Notify local government	Name: Date:
Notify local landowners (if required)	Name: Date:
Wind strength	
Wind Direction	
Temperature	
Relative humidity	
Degree of curing of grass	
Calculated rate of spread	
Calculated fire danger	
Time of lighting	
Signed	
Name	
Date	