Arnhem Regional Bushfire Management Plan

2022-23





RN DRY

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1.0	August 2022	Maggie Towers	Version 1.0
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Acronym	Full form
ALFA	Arnhem Land Fire Abatement Inc.
BFNT	Bushfires NT
DEPWS	Department of Environment, Parks & Water Security
JSA	Job Safety Analysis
KNP	Kakadu National Park
NTG	Northern Territory Government
SOP	Standard Operating Procedures
TNRM	Territory Natural Resource Management Limited



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Contents

1. Executive Summary	4
2. Regional Bushfires Committee Recommendations	6
3. Endorsement and Approval	7
4. Background	8
5. Land use	10
6. Purpose	11
7. Fire Management Objectives	12
8. Bushfire Risk Management	14
9. Regional Risk Register	15
9.1. The spread and inadequate management of gamba grass resulting in dangerously high fuel loads	15
9.2. Working in high risk environments	16
9.3. Climate Change	18
9.4. The consequence of fires impacting life, values and assets.	20
10. Controls and Actions to Reduce Risk – BFNT Operational Programs	21
11. Controls and Actions to Reduce Risk – Aboriginal Ranger Groups/ Parks Australia (Kakadu National Park) Operational Programs	22
12. Appendices	23
12.1. Appendix A - Planning, Review & Reporting	23
12.2. Appendix B - Fuel Hazard Management	23
12.3. Appendix C - Administration	24
12.4 Appendix D - Tools and Resources	25
12.5 Appendix E – DEPWS Risk Register	26



1. Executive Summary

The purpose of this plan is to support community wide fire management within the Arnhem Fire Management Zone in accordance with the *Bushfires Management Act 2016*. This fire management plan applies to the land and people within the Arnhem Fire Management Zone as of October 2022. It will be reviewed annually by the Arnhem Regional Bushfires Committee.

Arrangements for the management of fire in the region are based on risk management principles and guidelines that will direct and evaluate these activities.

The risks identified in the 2022-23 Arnhem Regional Bushfire Plan arise from meetings held in early 2022 with the Arnhem Regional Bushfires Committee.

Six issues were identified as posing a current or emerging risk to achieving regional bushfire management objectives and 4 of these were assessed to be high:

- 1. The spread and inadequate management of gamba grass resulting in dangerously high fuel loads.
- 2. The potentially hazardous nature of fire management activities in remote areas (e.g. helicopters, firefighting) increase chance of serious injury or death.
- 3. Fluctuating wet and dry seasons and climate change making fire management more challenging.
- 4. Fire impacting landholder and community values and assets.

Risk Rating	Risk	Detail
HIGH	The spread and inadequate management of gamba grass resulting in dangerously high fuel loads.	Gamba grass, Andropogon gayanus is a significant threat to the region. Gamba is a fire climax species (one that benefits from fire). When infested areas burn during dry conditions, flame heights can reach into canopies and create more intense than normal fire causing habitat alteration, loss of biodiversity and increases bushfire risk to life, property and culture. Currently there are only scattered and isolated infestations of gamba grass in the Arnhem region. Land managers and organisations are surveying for and treating gamba grass infestations before they flower in April and seed starts to fall in May. Territory Natural Resource Management (TNRM) has developed a Gamba Grass Plan to raise the profile of this threat to the region.



Arnhem Regional Bushfire Management Plan

Risk Rating	Risk	Detail
HIGH	The potentially hazardous nature of fire management activities in remote areas (e.g. helicopters, firefighting); increased chance of serious injury or death.	Working in remote areas is often challenging and inherently high risk when working outdoors and responding to uncontrolled bushfires. It is important that fire managers operating or working with machinery and equipment in remote locations are trained to recognise hazards, work safely and have training in first aid. A strong WH&S culture must be supported through policy and training.
HIGH	Fluctuating wet and dry seasons and climate change making fire management more challenging.	Climate change is a long-term change in global or regional climate patterns and conditions caused by increased level of greenhouse gases in the atmosphere, which in turn, result in more heat being trapped in the Earth's atmosphere. Many observed changes since the 1950s are unprecedented over decades to millennia. Bushfire conditions are now more dangerous than the past and the risk to life, property and environment has increased. The fire seasons are changing which impact when and how fire is managed through the landscape.
HIGH	Fire impacting landholder and community values and assets.	Poor management of fire can be an issue within the Arnhem region, namely due to cultural differences and understanding of the effect of fire when climactic conditions are considered more extreme (Hot, dry, windy). Late dry season wildfire poses a threat to life, property and biodiversity; it contradicts much of the work done in the early dry season by Ranger Groups whereby they are burning earlier to protect biodiversity, reduce carbon offsets (Carbon Abatement Program) and ensure communities and outstations are protected from wildfire. A research paper on the effects of smoke pollution/ poor air quality over the Darwin region was released in 2022 (Jones et. al., 2022). The drivers of exceedances in air quality reduction seem to correlate with the prevailing wind direction (SE) in the early dry season (May- June) and the proximity of a number of Savanna carbon projects. Discussions around this paper and measures to reduce the perceived impacts will need to be considered in future by the Committee.

Table 1. A summary of strategic regional bushfire risks identified by the Arnhem Regional Bushfires Committee. These risks are considered of most concern to the region in achieving strategic bushfire management objectives.



2. Regional Bushfires Committee Recommendations

Since 2006, developments in carbon abatement projects have provided an opportunity for landowners to engage in landscape scale fire management with many beneficial environmental and social outcomes. Today, the Arnhem region combines traditional knowledge and western science to produce leading edge fire management; harnessing science and technology while maintaining a strong network of cultural ties and co-operation across an immense area. The great success of this approach is driven by the depth and breadth of stakeholder consultation, shared objectives, and collaborative work efforts across boundaries, with formal monitoring, evaluation and reporting on outcomes. Consequently, most risks within the Arnhem region related directly to fire management are low to medium as a result of successful existing controls.

The risk register in Section 9 identifies a number of strategies (existing and potential controls) to manage the 4 highest risks. These include:

- Government commitment to stable climate by realising emissions reduction targets (Net zero by 2050) and supporting the public and private sector to achieve this through the NT Offsets Framework.
- 2. Developing climate change resiliency measures for Arnhem region fire managers.
- 3. Raise the profile of this risk to Arnhem Region by ensuring the risk is managed in the Weed Management Plan for Gamba Grass 2020-2030.
- 4. Increased understanding of roles and responsibilities of landowners, Ranger groups, other stakeholders and Government agencies (local, NT and Commonwealth.
- 5. ALFA, KNP, ranger groups and contractors to continue strengthening a safe work culture by training staff about high risk activities and reporting and implementing controls for incidents and near misses. This could be achieved through the development of work health and safety JSA's and SOP's for each Ranger group.



3. Endorsement and Approval

Prepared by BFNT	DATE:	03/10/2022
Submission to Regional Bushfire Committee for endorsement	DATE:	30/11/2022
Notice of endorsement to Executive Director BFNT	DATE:	12/12/2022
Public notice of Regional Bushfire Management Plan	DATE:	
Version valid until	DATE:	November 2023

Signed:

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Chairperson, Arnhem Regional Bushfire Committee

Brunn

Executive Director, Bushfires NT

DATE: 5/12/2022

DATE: 23/01/2023

RIFES NT

4. Background

The Northern Territory is large (1,355,235 km²) and sparsely populated (233,000 in 2021) with the majority of people living around Darwin and in a few larger rural centres. It spans climate zones and features vegetation communities from desert to tropical forests.

Across this spectrum, landowners are an essential part of the fire management process. Communication, co-operation and shared responsibility within the community, matched by a capacity to undertake self-protective measures, form the basis of successful fire management throughout the Northern Territory. Equally, this plan acknowledges the autonomy of land managers in harnessing fire as a tool to achieve their land management objectives, tempered by their responsibilities under the *Bushfires Management Act* and principles of good land stewardship.

The Arnhem Fire Management Zone encompasses a land area of approximately 126,057 km², which includes the Tiwi Islands (8,320 km²), Groote Eylandt (2,326 km²) and several smaller islands off the northern coast (Wessel, Crocodile and Warruwi Islands). The mainland area is approximately 115,400km² (Figure 1).

The population of the Arnhem region are based in larger centres and in smaller communities and homelands/ outstations throughout the region. Many people travel to and stay on their traditional country throughout the year for extended periods of time.



Figure 1: Location of the Arnhem Fire Management Zone within the Northern Territory.

The annual growth of flammable vegetation across a large and sparsely populated area and the changing nature of fire management in northern Australia suggest that the Arnhem Regional Bushfire Management Plan should be reviewed every 12 months.

This fire management plan applies to the land and people within the Arnhem Fire Management Zone as of November 2022. It will be reviewed annually by the Arnhem Regional Committee.

Regional plans are designed to:

- Identify and categorise risk at a regional level and
- Enable the optimal allocation of resources and specific controls in the risk management process.



Figures 2 and 3 below display where the regional plan aligns relative to other types of fire management planning in the NT. This document relates to tactical level planning.



Figure 2: Northern Territory Bushfire Management Framework



Figure 3: The Planning Perspective. Displaying the relative timeline, scale and detail of various fire management plans.





5. Land use

Table 2 - Summary of land use in the Arnhem Fire Management Zone

Tenure Types	Land uses
Communities	Remote communities
Aboriginal Land Trusts	Customary use
Aboriginal Ranger Groups	Carbon abatement projects
National Parks	Conservation, Carbon abatement projects
Timber Plantations	Pastoralism
Cattle grazing	Corridors (Road, Power, Water, Gas, Rivers)
Local Government Areas	Animal Harvesting (Feral and Native)
Land Councils	Mining (Exploration & Extraction)
Northern Territory Government Electorates	Tourism
Emergency Response Areas (around Jabiru & Nhulunbuy)	

Within the Arnhem Fire Management Zone (Figure A1) there are a range of land uses. The fire management objectives for each land use have been summarised in Table 3. This list is finite and aims at recognising all values as equally important. These will be updated as new land uses emerge and endorsed by the Regional Committee as a part of the annual review process.







Figure A1: Land Use and Aboriginal Ranger Group Areas in the Arnhem Fire Management Region.

Figure A2: Interim Biogeographic Regionalisation for Australia bioregions, including rainfall variants in the Arnhem Fire Management Region.

6. Purpose

A Regional Bushfire Management Plan is established as a provision of the Bushfires Management Act 2016, section 78 as follows:

(1) The Executive Director may, by written notice:

(a) Direct Bushfires NT to prepare within a specified period, in consultation with the regional committee for a fire management zone, a draft regional bushfire management plan for the zone; and

(b) Specify matters to be addressed by the plan.

(2) As soon as practicable after preparing a draft regional bushfire management plan, Bushfires NT must submit it to the regional committee for endorsement.

(3) On endorsement by the regional committee, the plan has effect as a regional bushfire management plan for the fire management zone.

(4) As soon as practicable after endorsing a regional bushfire management plan, the regional committee must give written notice of the endorsement to the Executive Director.

(5) As soon as practicable after being given notice under subsection (4), the Executive Director must give public notice of the plan.



The purpose of this Plan is to support community wide fire management with the Arnhem Fire Management Zone, in line with the above provision. Of priority, the Plan aims to manage bushfire hazard by reducing the risk of its impact to assets and values within the region.

7. Fire Management Objectives

Land Use	Fire Management Objectives
Remote Communities	Safety - Protection of life and property.
Communities, Aboriginal	
outstations homesteads,	
work camps, tourist	Asset Protection - Utilise fire to protect assets.
accommodation.	Describe Management I have fifting to management in flow and former
Customary Use	Resource Management - Use of fire to manage native flora and fauna
	resources.
indigenous knowledge and	Access - Use of fire to remove vegetation and increase access to country
cultural practices.	
	<u>Protection</u> - Use of fire to protect sites of cultural significance from
	Hunting - Use of fire in hunting practices.
	Cultural Obligations - Manage fire according to traditional customs and
	beliefs.
Carbon Abatement	Safety - Protection of life and property.
Projects	
Managing fire in the	Biodiversity Enrichment - Use fire to increase species diversity or as
landscape.	protection around fire sensitive species.
	<u>Research Activity</u> - Provide an opportunity for researchers to observe the effect of different fire regimes in different vegetation communities.
	<u>Habitat Protection</u> - Manage fire to protect native plant and animal habitat.
	Exclusion - Exclude fire from specific areas to conserve natural features.
	<u>Cultural Protection</u> - Utilise fire in the practice and preservation of cultural heritage.
	Asset Protection - Utilise fire to protect assets.
Conservation	Biodiversity Enrichment - Use fire to increase species diversity or as
Managing natural	protection around fire sensitive species.
resources.	<u>Research Activity</u> - Provide an opportunity for researchers to observe the effect of different fire regimes in different vegetation communities.
	Habitat Protection - Manage fire to protect native plant and animal habitat.



Land Use	Fire Management Objectives
	Exclusion - Exclude fire from specific areas to conserve natural features.
	<u>Safety</u> - Manage fuel loads to ensure a safe environment in which people can live and work.
	Structural Asset Protection - Utilise fire to protect assets.
	Bushfire Suppression - Utilise fire as part of bushfire suppression practices.
	<u>Cultural Protection</u> - Utilise fire in the practice and preservation of cultural heritage.
	Weed Management - Use fire to manage weed burdens.
	Skills and Knowledge - Improve skills and knowledge in the application and management of fire associated with conservation.
Pastoralism Protect livelihoods and	Safety - Protection of life and property.
maintain protection of	Asset Protection - Utilise fire to protect assets.
	Weed Management - Use fire to manage weed incursion.
Corridors (Road, Power, Water, Cas, Piverine	Safety - Protection of life and property.
Corridors)	Asset Protection - Utilise fire to protect assets and infrastructure.
to protect essential	Weed Management - Use fire to manage weed incursion.
infrastructure and provide a buffer from fire for	
adjoining properties.	
Mining & Exploration Protect assets and	Safety - Protection of life and property.
infrastructure.	Asset Protection - Utilise fire to protect assets and infrastructure.
Tourism	Safety - Protection of life and property.
attraction areas.	Asset Protection - Utilise fire to protect assets and infrastructure.
	Exclusion - Exclude fire from specific areas to conserve natural features.

Table 3 - Land use and corresponding fire management objectives within the Arnhem Fire Management Zone. This list is not in prioritised order.





8. Bushfire Risk Management

The central component of the Arnhem Regional Bushfire Management Plan is the evaluation of regional scale risks by the regional committee. It examines risk to achieving bushfire management aims and objectives, existing controls and possible treatment actions to reduce the level of risk. The DEPWS Risk Matrix prioritises each risk as shown below (Table 3).

Specifically, the risk register:

- Records risks;
- Classifies them in terms of consequence and likelihood of occurring;
- Documents existing and potential controls / treatments to mitigate each risk;
- Identifies who is responsible for implementing those controls; and
- Suggests criterion by which to evaluate the efficacy of the control methods.

Information used to develop the risk register was collected during the inaugural meeting with the Arnhem Regional Bushfires committee (May 2022). Regional scale risks were identified at these meetings and were grouped and tabulated (Figure 1). Table 3 shows the DEPWS risk matrix, under which risks were categorised and rated. For each risk a number of controls were suggested by both Regional Committee and Bushfires NT staff. Risks are prioritised and ordered by scale in the following section.

Any reviews of this plan should incorporate the principles and guidelines of risk management outlined in International Standard ISO 31000.

		Consequences				
		Insignificant	Minor	Moderate	Major	Severe
	Almost Certain	Medium	Medium	High	Extreme	Extreme
Ð	Likely	Medium	Medium	High	High	Extreme
kelihoo	Possible	Low	Medium	Medium	High	Extreme
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	High

Table 4 - DEPWS Risk Matrix



9. Regional Risk Register

9.1. The spread and inadequate management of gamba grass resulting in dangerously high fuel loads.

HIGH RISK: The spread and inadequate management of gamba grass resulting in dangerously high fuel loads.		
	The likelihood that it will occur was considered: POSSIBLE	
RISK RATING	The outcome of an occurrence was considered: MAJOR	
What level of threat does this risk present?	This risk was rated: HIGH	
CONTROLS IN PLACE NOW How this risk is currently managed	 Territory Natural Resource Management (TNRM) is working with groups and organisations across West Arnhem in a coordinated effort to stop the spread of gamba grass into Kakadu National Park and throughout Arnhem Land. The Weed Management branch (DEPWS) collaborated with TNRM to deliver gamba grass identification training to ranger groups in 2022, bringing in 13 NT ranger groups from the gamba eradication zone and surrounding islands in close proximity to Darwin. 	
POSSIBLE RISK TREATMENT ACTIONS Additional actions that should be applied to manage this risk	 Raise the profile of this risk for the Arnhem Region by ensuring the risk is managed in the Gamba Management Plan. NT Weeds Management Act (manage growth and spread). Bushfire Management Act 2016 (manage fuel). Increase understanding of roles and responsibilities of landowners, Ranger groups, other users and Government agencies (local, NT and Commonwealth). Increase community/ contractor/ tourist awareness and participation in gamba management. Support stakeholders to participate regional weed management meetings. Shared weed mapping protocols and data. 	
RISK OWNER	Aboriginal corporations	
Who is responsible for managing the risk?	Ranger organisations	



HIGH RISK: The spread and inadequate management of gamba grass resulting in dangerously high fuel loads.		
	• ALFA	
	Department of Environment, Parks and Water Security (Weeds Branch and Bushfires NT)	
	Kakadu National Park	
	Regional Councils	
	Landowners	
	Contractors	
	Tourism operators	
	Limited spread of existing grassy weed infestations.	
	 New recordings of weeds are reported and contained. 	
How will we know if we have managed this risk effectively?	Reduction in fire severity for areas with Gamba incursion.	
	Weed Management Plan Gamba Grass 2020-2030 goals and objectives are on track.	
DUE DATE	Applied review at and of year woods and fire meetings	
When should evaluation occur?	• Annual review at end of year weeds and fire meetings.	

9.2. Working in high risk environments

HIGH RISK: The potentially hazardous nature of fire management activities in remote areas (e.g helicopters, firefighting) increase chance of serious injury or death.		
RISK RATING What level of threat does this risk present?	 The likelihood that it will occur was considered: POSSIBLE The outcome of an occurrence was considered: MAJOR This risk was rated: HIGH 	
CONTROLS IN PLACE NOW How this risk is currently managed	 Customised program of fire management training and mentoring delivered in the region through the ALFA training project 2021-23. This involves the following units of competency: PUAFIR210 - Prevent Injury AHCFIR202 - Assist with planned burning (Available in 2023) PUAFIR017 - Work safely around aircraft 	



HIGH RISK: The potentially hazardous nature of fire management activities in remote areas (e.g helicopters, firefighting) increase chance of serious injury or		
death.		
	 PUAFIR007 - Operate ignition equipment PUAFIR204 - Respond to wildfire PUAFIR303 - Suppress wildfire (Available in 2023) KNP staff trained in the same units as described above. Undated safety policies within organisations 	
	Safety policies within organisations audited	
	 Develop culture of safety first. Daily tool box meetings. Adherence to use of PPF 	
	 Ensure inexperienced staff always paired with experienced staff 	
POSSIBLE RISK TREATMENT ACTIONS	 Training initiatives continue and are accessible to all fire managers. Limited uses of much billion and replacement with ATD (a where precisible) 	
Additional actions that should be applied to manage this risk	Limited use of quad bikes and replacement with ATVs where possible.	
	• Incendiary machine/ leaf blower/helicopter training.	
	Icketing for other machinery (e.g. front end loaders/ grader operator).	
	Formal process for reporting incidents and near misses.	
	Implementation of controls.	
	 Contractual agreements with air contractors require pilots to have >1000 hours. 	
	Aviation risk assessments	
	Ranger organisations.	
RISK OWNER	Contractors.	
Who is responsible for managing the risk?	Arnhem Land Fire Abatement (ALFA).KNP	
EVALUATION	Reduced number of accidents.	
How will we know if we have managed this risk	Reporting on near miss incidents.	
effectively?	Formal review of incidents took place.	



 HIGH RISK: The potentially hazardous nature of fire management activities in remote areas (e.g helicopters, firefighting) increase chance of serious injury or death.

 DUE DATE

 When should evaluation occur?

9.3. Climate Change

HIGH RISK: Fluctuating wet and dry seasons and climate change making fire management more challenging.		
	The likelihood that it will occur was considered: POSSIBLE	
RISK RATING	The outcome of an occurrence was considered: MAJOR	
What level of threat does this risk present?	This risk was rated: HIGH	
CONTROLS IN PLACE NOW How this risk is currently managed	• Adjust burning calendar based on seasons and have more than one option (e.g. stone country, woodland or riparian areas) depending on conditions on day of burn.	
POSSIBLE RISK TREATMENT ACTIONS Additional actions that should be applied to manage this risk	 Government commitment toward a stable climate by achieving emissions reduction targets (net zero by 2050) and supporting the public and private sector to achieve this through the NT Offsets Framework. Research into bushfire modelling under changed climate variables (how will fire behave and what happens if fuel hazard is not managed under these conditions). Territory fire management representative on National Bushfire Climate Change Resiliency committees. Cross- regional cooperation in response to natural weather events that affect fire response capacity. Adjust burning calendar based on seasons and have more than one option (e.g. stone country, woodland or riparian areas) depending on conditions on day of burn. Use of drones to fly over heavy timber fall following cyclones to assess fuel loads (often more grass). Allow sufficient time/resources to clear tracks after cyclones. Awareness that cyclones can spread weeds (e.g. mimosa/mission grass). Targeted aerial mitigation burning. Disaster relief funding (NTG & Federal Govt.) 	



HIGH RISK: Fluctuating wet and dry seasons and climate change making fire management more challenging.		
	 Develop documented alternative tactics to deliver fire management strategies with consideration to 'new' seasonal variability. 	
RISK OWNER Who is responsible for managing the risk?	 NT Government including DEPWS Climate Change unit. Industry. Australian Government including the Clean Energy Regulator, the Emissions Reduction Fund, the Bureau of Meteorology (BOM), The Department of the Environment and Energy, commitments to Kyoto Protocol (5% below 2000 levels by 2020 and the Paris Agreement 26-28% below 2005 levels by 2030). Aboriginal corporations. Ranger organisations. Community shire councils. 	
EVALUATION How will we know if we have managed this risk effectively?	 Organisations and communities throughout the Arnhem region are resilient, support each other and be resilient to weather anomalies and environmental change. Fire management is not adversely affected by weather anomalies across the region. Climate change resilience knowledge is frequently shared with fire managers. 	
When should evaluation occur?	Fire manager (ALFA) meetings and Regional Committee meetings.	



9.4. The consequence of fires impacting life, values and assets.

HIGH RISK: Late dry season fires impacting landholder and community values and assets.		
RISK RATING What level of threat does this risk present?	 The likelihood that it will occur was considered: POSSIBLE The outcome of an occurrence was considered: MAJOR This risk was rated: HIGH 	
CONTROLS IN PLACE NOW	 Extensive fire management programs delivered through Arnhem Land Fire Abatement (ALFA), a not-for-profit, entirely Aboriginal-owned carbon abatement business covering an area of over 80,000km². Extensive fire management program delivered in KNP and the Tiwi Islands. Proactive fire management planning and delivery (including prescribed burning and wildfire suppression). Ranger groups consult with Traditional Owners about where and how they want burning to happen in order to build cooperation, trust and understanding. Scientific evaluation being conducted into the effect(s) of smoke from savannah burning programs carried by prevailing winds impacting towns and communities. 	
POSSIBLE RISK TREATMENT ACTIONS Additional actions that should be applied to manage this risk	 Community education program established and targeted at areas with excessive late season wildfire origin. Focus education programs towards children and teenagers. Signage established in community indicating when to STOP BURNING / START BURNING. Whole of community involved in fire management on country to build trust, understanding, value, participation. Raise awareness of the potential effects of smoke from savanna burning affecting townships and cities- health, infrastructure, transport (airports). 	
RISK OWNER Who is responsible for managing the risk?	 Fire management program leaders. Bushfires NT, ALFA, KNP, Aboriginal Ranger Groups, Dept. Of Education, local council. 	
EVALUATION How will we know if we have managed this risk effectively?	 Reduction in late dry season wildfires started by people. Reduction of late season wildfire in areas recognised for excessive wildfire ignitions due to education programs established and targeted towards community members including school children. Improved and efficient suppression of late dry season wildfires. 	
DUE DATE When should evaluation occur?	 Annual outcomes presented and reviewed at Regional Committee meeting. Some of the data may be obtained from ALFA end of season meetings. 	



10. Controls and Actions to Reduce Risk – BFNT Operational Programs

Bushfires NT operational programs are designed to help reduce risk to life, property and the environment through strategic initiatives, enabling landowners to conduct best practice fire management on their property in a strategic manner. The following strategic programs are conducted throughout the Vernon Arafura, Savanna, Barkly and Alice Springs Fire Management Areas with the aim of educating and empowering landowners in achieving their chosen fire management objectives and reducing the risk of wildfire across multiple land tenures.

For the Arnhem region, Bushfires NT provide more of a support role, specifically in the form of issuing permits to burn under the *Bushfires Management Act 2016* to Ranger groups and offering advice and guidance when needed.

• Small and Large Property Fire Management plans (Pastoral & peri-urban scale)

Property fire management plans are designed to cover off on a variety of fire management parameters for specific landholdings for consideration by the landowner. Fire history, fire frequency, climatic history (rainfall), annual actions and fire management objectives for the property are displayed in a simple one page format, for ease of reference for the landowner. These plans are developed in consultation with the landowner, encouraging accountability and enabling consideration of all aspects to consider when using fire as a management tool.

• Volunteer Bushfire Brigade prescribed burning programs

Volunteer Bushfire Brigades reduce risk of wildfire by conducting early dry season fire management through prescribed burning on individual properties, as well as on Vacant Crown Land (VCL) and road corridors within their Brigade Areas. These programs help to decrease the risk of wildfire for entire communities, as well as individual properties which may be susceptible to late dry season wildfire. Brigades assist landowners through the provision of specialist advice, assistance for landowners who need extra help and by conducting wildfire suppression late in the season to protect life, assets and the wider community. Brigade members can have a statutory authority through the provision of powers under the Bushfires Management Act 2016 as Fire Wardens, with some members being given the ability to write burn permits for landowners. All Brigade members who participate in prescribed burns and fire suppression activities are authorised to do so under the Act as Authorised Bushfire Volunteers.

• Roadside Mitigation Program

Bushfires NT work alongside the Department of Infrastructure, Planning and Logistics (DIPL) to reduce fuel loads and therefore lower the risk of human-enabled ignitions along road corridors. This program is aimed to ensure further protection of urban and peri-urban development, as well as rail corridors and vacant crown land. Often this program compliments strategic preparedness programs conducted by the NT Fire and Rescue Service to reduce wildfire risk across large swathes of land.

• Compliance and Enforcement

Bushfires NT has a dedicated Compliance unit who follow up on statutory requirements for landowners under the Bushfires Management Act 2016. This includes property visits, firebreak inspection and enforcement, investigative procedures/ follow up of suspicious fires and education initiatives (Fire Ready Week, vulnerable land holder assistance programs).

• Aerial Prescribed Burning (APB) Program

Bushfires NT operational staff work closely with landholders to initiate aerial burning to reduce fuel loads and create a mosaic style of fire scars to reduce the spread of wildfire. This program is also conducted on



vacant crown land where landholdings are too large to conduct an on ground prescribed burn and/ or to compliment on ground burning where required.

11. Controls and Actions to Reduce Risk – Aboriginal Ranger Groups/ Parks Australia (Kakadu National Park) Operational Programs

• Aerial Prescribed Burning (APB) Program

Ranger Groups within the Arnhem region work closely with Traditional Owners and stakeholders to initiate aerial burning to reduce fuel loads and create a mosaic style of fire scars to reduce the spread of wildfire. A map with fine-scale fire scar data is provided by the Darwin Centre for Bushfire Research (CDU) to all Ranger groups within the ALFA project area, including Kakadu National Park and Tiwi Resources (Tiwi Land and Sea Rangers) to be used in the planning process. Kakadu National Park Rangers conduct their own planning in-house, whilst similarly conducting face-to-face consultation with Traditional Owners and Landowners prior to the dry season.

Proposed strategic APB burn lines for an area being managed are created by the relevant Aboriginal Ranger Group for their management area at an ALFA pre-season fire meeting, which are held prior to the beginning of the burning season. Kakadu NP hold fire planning meetings before the burning season begins.

Face-to- face consultation is then carried out by each group where proposed burn lines are discussed and approved by Traditional Owners and relevant Landowners who have the final say. Adjustments are made during these discussions which are based on locations of culturally significant areas, protection or preservation of biodiversity hotspots, previous year's fire scar data and also in relation to the type of habitat and its recommended frequency of fire management. Landowners are able to take part in APB if they so wish, by accompanying the Ranger in charge of operating the incendiary machine on the flight and providing guidance in real time over their country. This is also a great opportunity for people to be able to visit their country if they haven't been able to do so for a period of time.

• On-Ground Burning Program

Similarly to the APB program, proposed routes and areas to burn on-ground are added to a map and presented to Traditional Owners and Landowners during the face-to-face consultation process. On-ground burning is used to burn smaller swathes of land, particularly around outstations, along roadsides and to protect sensitive cultural and bio- significant areas from late season wildfire (e.g. Rock art sites, *Allosyncarpia/* known fire sensitive flora and fauna populations; for Kakadu National Park, visitor areas on Park are also taken into account). Some Ranger groups organise annual community- wide bushwalks and fire camps, where members of a number of communities/ outstations can take part and benefit from exercising their cultural fire knowledge on country.



12. Appendices

12.1. Appendix A - Planning, Review & Reporting

i. Regional Bushfire Management Plan

The Regional Bushfire Management Plan identifies risks that may impede good fire management in the Arnhem region and makes provisions for their control.

ii. Arnhem Land Fire Abatement NT Limited (ALFA NT) Annual Integrated Fire Management Plan

A condition of the § 19 licences held by ALFA NT with the Northern Land Council (NLC), requires ALFA NT to provide an annual fire management plan in advance of the burning season. It must include specific detail of each activity proposed within the licence area.

iii. Individual Ranger Group Fire Management Plans

Each Ranger group has extensive land management plans which incorporate details of fire management. Those groups involved in the ALFA carbon abatement project, must also submit annual fire management plans to ALFA.

iv. Regional Planning (ALFA) Meetings

Each year in the early dry season, a large regional scale bushfire planning meeting is held. Upwards of 100 people attend, representing the nine Ranger groups involved in the Savanna Burning project as well as neighbouring pastoral properties and National Parks.

The meeting objective is to develop fire management plans for each Ranger group in conjunction with their neighbours. The sharing of maps and fire management work plans are an integral component. The meeting also provides opportunity to network, share knowledge and experience and discuss wider ranging land management topics.

Prior to and following the early season meeting, Ranger groups consult widely with landowners across their various estates to gain permission to burn specific areas.

Likewise, at the end of the fire season, these same groups attend a post season fire meeting to review the effectiveness of their fire management throughout the year and discuss "lessons learned" during the course of the season.

12.2. Appendix B - Fuel Hazard Management

i. Aerial Burning

Aerial burning is the most common method of large scale fire hazard reduction applied in the Arnhem region. It uses rotary wing aircraft to strategically reduce fuel loads and install burnt fire breaks. The great majority of aerial burning is conducted by land owners with small contributions from BFNT. A permit is required to undertake aerial burning at all times.



ii. Roadside Fuel Reduction

Land owners conduct roadside burning. The objective is to reduce fuel loads in strategic areas to decrease the risk of ignition and the potential for fires to carry across the landscape in the late dry season.

iii. Asset Protection

Landowners conduct asset protection around communities, outstations / homelands and culturally important sites. The objective is to protect these areas from unmanaged fire and also reduce the potential for fires to carry away from these areas in the late dry season.

iv. Bushfire Suppression

Fire suppression is a management response to unplanned fires. The range of fire suppression capacity and experience across the Arnhem region varies from high to low. Ranger groups are well known to work together during wildfire suppression campaigns, in order to reduce time spent actively suppressing wildfire and draining of personnel and resources.

12.3. Appendix C - Administration

i. Bushfires Management Act 2016

An Act to provide for the protection of life, property and the environment through the mitigation, management and suppression of bushfires, and for related purposes.

ii. Bushfires Council

The function of the Bushfires Council is to advise the Minister on measures to be taken to mitigate, manage and supress bushfires in the territory.

The minister must ensure that at least one member of each regional committee is appointed as a member of the Council.

iii. Regional Committee

The function of the Regional Bushfires Committee is:

- to make recommendations to the Bushfires Council on measures to be taken to mitigate, manage and supress bushfires in its fire management zone and;
- to endorse a regional bushfire management plan prepared by Bushfires NT for its fire management zone.

Typically, the committee will meet up to four times per year.



12.4 Appendix D - Tools and Resources

NAME	DETAIL	LINK
North Australia Fire Information	Provides information on up to date fire location, fire scar from this year and previous years and summaries of fire histories across the Northern Territory.	NAFI 3
NRM Infonet	NRM InfoNet uses the NAFI base map to generate reports threatened species, weed and pest species lists, fire frequency since 2000 and profiles of climate, vegetation and soils.	Infonet
Bureau of Meteorology	Provides weather data: 4 and 7 day forecasts, fire weather warning, current observations, past weather and outlooks. The dynamic user friendly Meteye provides in depth data in a map format.	BOM
Savanna Burning Methodology (SAVBAT)	A guide to the savanna burning methodology (For use in Carbon Project planning).	<u>Clean Energy</u> <u>Regulator</u>
Australian Fire Danger Rating System	National fire danger forecasting tool developed by state, territory and the Commonwealth Governments.	AFDRS
Long Paddock	Queensland Primary industries site that monitors pasture biomass, pasture growth over various periods of time, curing index and relative rainfall.	Long Paddock
LandSat and MODIS, Sentinel 2	Websites providing satellite images that are taken on a regular occurrence. The MODIS satellite provides a 250m pixel image daily; LandSat provides 25m pixels image every 14 days: Sentinel 2 provides 15m pixels image every 7 days.	NASA Worldview EOSDA
	This imagery allows us to analyse fire scar in greater detail than NAFI for evaluation purposes. GIS is an essential tool for utilising this information.	
IBRA Assessment	A regular assessment tool for during the fire season to judge fuel loads, mitigation efforts, response capability and previous history to assess whether geographical regions are above average, average or below average fire potential.	IBRA Assessment
	Feeds into Bushfires and Natural Hazards CRC working Group and the North Australian Fire Managers Forum databases.	
NR Maps	NR Maps is a NT Department of Natural Resources and Environment data visualiser for: Bushfires NT, Flora and Fauna, significant biodiversity areas, Parks and Reserves, Vegetation Resources, Land Resources, water inundation, Water Resources, Surface Water Drainage, Land Administration, Topographic Map Index, Mining Titles Register, Geology and Geophysics.	<u>NR Maps</u>
Secure NT	SecureNT brings together social media alerts and warnings from the Northern Territory Government emergency services and agencies. Members of the public can access information to prepare, respond and recover from all types of emergencies.	Secure NT



NAME	DETAIL	LINK
NT Fire and Rescue Service/ Bushfires NT Incident Map	The Northern Territory Fire Incident Map provides real-time information to the public regarding fire incidents across the Northern Territory.	<u>NT Incident</u> <u>Map</u>
NT Legislation Database	A database for all Northern Territory Legislative Assembly Legislation and Regulations.	<u>Legislation</u> <u>Database</u>
Google Earth	Google Earth is a 3D data visualiser which is either web or desktop based. The desktop version has basic mapping functions and can import other data such as hot spots or fire scars from NAFI.	<u>Google Earth</u>
Department of Environment Parks & Water Security	Provides information on Department Divisions including Bushfires NT, Weeds Branch, Rangelands, Flora and Fauna, Parks and Wildlife and Water Resources.	DEPWS Homepage
Weed Management Plan – Gamba Grass 2020 - 2030	Statutory document detailing the management of Gamba Grass in the Northern Territory.	<u>Gamba Grass</u> <u>Weed</u> <u>Management</u> <u>Plan</u>

12.5 Appendix E – DEPWS Risk Register

Likelihood Criteria

This table is used to estimate the likelihood of the risk occurring. It follows your estimate of the risk's impact on your objective(s) should the risk occur. To use this table, start at the top 'Rare' and ask yourself "how likely is the risk to occur?": using the rating and descriptions to guide your answer. If the answer is "yes"; then ask the same question for the next row down. When the answer is "no" the likelihood is that in the previous row.

NB: It is likely that the 'Time Period' scale will be appropriate in most assessments. However an alternative scale 'Incidence Rate' has been included, particularly for repetitive activities, and/or where the 'Time Period' scale does not provide a reasonable assessment.

Expected occurrence of risk		
Rating	Time Period	Incidence Rate
Rare	Likely to occur only every 20 years or more	< 1:10000
Unlikely	Likely to occur only every 5 - 20 years	1:1000 - 1:10000
Possible	Likely to occur only every 1 - 5 years	1:100 - 1:1000
Likely	Likely to occur at least annually	1:10 - 1:100
Almost Certain	Likely to occur at least monthly	> 1:10



Risk Tolerance Thresholds

Risk assessment also involves evaluating the risk. This is done by comparing the level of risk with the department's risk tolerance (or acceptability) thresholds. Each level of risk places certain obligations on the 'Risk Owner' to prudently manage the risk. The table below sets out the actions required and is designed to ensure that the majority of effort is focused on treating the risks which have the largest potential impact on the achievement of your objective(s).

Level of Risk	Action Required
Low	 RISK IS ACCEPTABLE Minimum annual assessment of risks recommended, as low level risks are identified. No specific treatment action required but consideration may be given to streamlining excessive or redundant controls. Manage through routine processes/procedures. Consider the implementation of additional controls, only if they are a clearly quantifiable cost benefit.
Medium	 RISK IS TOLERABLE Minimum annual assessment of risk required, as medium level risks are identified. Risk Treatment Plan is optional. Consider the implementation of any practicable controls that are cost effective in reducing the risk and planned within a reasonable timeframe.
High	 RISK REQUIRES ATTENTION (UNACCEPTABLE) Risk assessment data entered into the Risk Register. Risk Treatment Plan developed and implemented within 4 weeks of assessment. Risk treatment actions linked to the appropriate Business Plan to ensure reporting and monitoring and the allocation of resources (e.g. person, time and dollars). Treatment Actions - Status Report on Progress of Risk Treatment Action column updated in the Risk Register at a minimum by the 'Due Date'. Minimum quarterly re-assessment of risk required, or when causes change or treatment actions implemented - controls change. Regular (at least quarterly) ongoing performance monitoring by the Management Team overseeing the Risk Register. Quarterly report to the department's management body responsible for audit and risk management on the management of high and extreme risks - prepared by the department's Audit and Risk Management Secretariat.
Extreme	 RISK REQUIRES ATTENTION (UNACCEPTABLE) Risk assessment data entered into the Risk Register. Risk Treatment Plan developed and implemented within 4 weeks of assessment. Risk treatment actions linked to the appropriate Business Plan to ensure reporting and monitoring and the allocation of resources (e.g. person, time and dollars). Treatment Actions - Status Report on Progress of Risk Treatment Action column updated in the Risk Register at a minimum by the 'Due Date'. Minimum quarterly re-assessment of risk required, or when causes change or treatment actions implemented - controls change. Regular (at least quarterly) ongoing performance monitoring by the Management Team overseeing the Risk Register. Quarterly report to the department's management body responsible for audit and risk management on the management of high and extreme risks - prepared by the department's Audit and Risk Management Secretariat.

