



SOFTWOOD PLANTATIONS DIVISION

# Fuel Management Plan

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# Document history

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Document title: SPD Fuel Management Plan	Version No.:1	Page 0 of 12	
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# Contents

<b>Scope of this Plan .....</b>	<b>0</b>
Objectives .....	1
<b>Compliance framework.....</b>	<b>1</b>
Why manage fuel?.....	2
<b>Fuel management strategies .....</b>	<b>3</b>
Prescribed burning .....	3
Hazard reduction burning.....	3
Silvicultural burning.....	3
Cultural burning .....	3
Grazing .....	4
Mechanical/ chemical treatments .....	4
<b>The hazard reduction burning schedule .....</b>	<b>4</b>
Assets vulnerable to fire.....	4
Constraints to hazard reduction burning.....	5
Hazard reduction fuel management zones.....	5
Hazard reduction target.....	5
Building the schedule.....	6
<b>Annual schedule of fuel management works .....</b>	<b>7</b>
<b>Planning and conducting prescribed burning .....</b>	<b>7</b>
Site specific plans.....	7
Implementing the prescribed burn.....	8
<b>Data capture, monitoring and reporting.....</b>	<b>9</b>

Document title: SPD Fuel Management Plan	Version No.:1	Page 0 of 12
Document ID: D00281289	Document owner: State Fire Manager	Issue date: May 2020
		Review date: May 2025

**WARNING: a printed copy of this document is uncontrolled. Verify this is the latest version prior to use by going to the intranet.**

Forestry Corporation of NSW (FCNSW) manages a significant estate of fire prone forests and plantations in NSW. Uncontrolled bushfires are a major and recurring threat to FCNSW business objectives, to communities living in or near forested landscapes, and to people whose livelihoods rely on forest and plantation resources. FCNSW is responsible for sustainably managing native forest ecosystems that have evolved with fire and require a range of different fire regimes to maintain their health, diversity and vitality. Accordingly, FCNSW recognises the need for a risk-based approach to fire management which gives appropriate protection to the range of social, economic and environmental values.

Fuel management is a key management activity undertaken by FCNSW to manage this risk. Fuel reduction through prescribed burning in native forest and grazing are the two main tools used to manage fuel loads, not only for bush fire risk mitigation but also as a means of maintaining ecological diversity and forest health. Prescribed burning is also carried out regularly as part of the silvicultural treatments undertaken to establish plantations and prepare areas for natural regeneration.

FCNSW recognises that fire has always been central to Aboriginal peoples' relationship to the land, that their use of fire is part of everyday life and is required to meet their spiritual obligations to care for country and serves a wide range of practical purposes. FCNSW acknowledges and respects the depth of knowledge Aboriginal communities have utilising fire in the landscape and understanding fires effects in forested and other ecosystems, including the important role fire plays in keeping landscapes healthy and productive. Accordingly, as a core principle of our fire management, FCNSW aims to engage with Aboriginal communities, and through building trust and transparency we seek to implement cultural burning programs which return communities to the bush and return bush resources to their communities.

FCNSW has developed this Fuel Management Plan to define the general principles and process of fuel management in State forests and freehold land owned by FCNSW, provide an overview of how the prescribed burning program has been developed and how cultural burning activities are integrated in FCNSW broader program of fuel reduction.

## Scope of this Plan

This plan provides the framework for fuel management in State forests and other land managed by Softwood Plantations Division (SPD). For the purposes of fire suppression, FCNSW is organised into Forest Protection Areas (FPAs) which are geographically based, while for day to day management, including fuel, areas are known as Management Areas (MAs).

The Division manages pine plantation around Tumut, Bathurst and Bombala, and three smaller areas near Walcha, Grafton and Moss Vale. SPD has responsibility for fuel management in these management areas. The plantations around Tumut, Moss Vale, Bathurst, Walcha and Bombala are primarily *Pinus radiata*, while Grafton's plantations are a mixture of other, more fire-tolerant species. The *P. radiata* estate is very susceptible to damage by fire.

For the Bombala, Walcha, and Grafton management areas, the native State forest around the plantation estate is the responsibility of Hardwood Forests Division (HFD).

Document title: SPD Fuel Management Plan	Version No.:	Page: 0 of 12	
Document ID :	Document owner: State Fire Manager	Issue date:	Review date:

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In terms of fuel management, this means that SPD are predominantly restricted to mechanical mitigation in and around the plantation estate, while HFD have fuel management responsibility. To learn more about these areas, refer to the HFD Fuel Management Plan.

Fuel management in areas of State forest under crown lease are not considered within this plan due to the shared management responsibilities with leaseholders.

## OBJECTIVES

The objective of this plan is to:

- » Provide a set of guidelines for the strategic management of fuel on State forest and freehold land that FCNSW owns
- » Ensure that SPD meets its legal and other obligations for fuel management.
- » Describe the fuel management strategies used by FCNSW
- » Assess the risk for prescribed burning
- » Develop a three-year prescribed burn schedule for the Forest Protection Areas that SPD has fuel management responsibilities for.

## Compliance framework

This plan meets legal and other best practice standards and requirements for fuel management (Table 1). For a full list of legislation and other compliance obligations refer to FCNSW's [Compliance Register](#)

**Table 1 Where this Plan fits with FCNSW's legal and other requirements**

	Legislation	Regulatory Instruments	Policy/ Plans	Committees
<b>Commonwealth</b>	Environment Protection and Biodiversity Conservation Act 1999		National Bushfire Management Policy Statement for Forests and Rangelands	Australasian Fire & Emergency Service Authorities Council (AFAC) Forest Fire Management Group (FFMG)

Document title: SPD Fuel Management Plan	Version No.:	Page: 1 of 12
Document ID :	Document owner: State Fire Manager	Issue date: Review date:

**WARNING: a printed copy of this document is uncontrolled. Please verify this is the latest version prior to use by going to the intranet.**

	Legislation	Regulatory Instruments	Policy/ Plans	Committees
<b>State (NSW)</b>	Forestry Act 2012 No 96 Rural Fires Act 1997 No 65 Environmental Planning and Assessment Act 1979 No 203 Plantation and Reafforestation Act 1999 No 97	Integrated Forestry Operations Approvals (IFOAs) Bushfire Environmental Assessment Code Bushfire risk management plans Environmental Impact Assessment	Bush Fire Coordinating Committee Policies Guidelines for low intensity burning (RFS)	Bush Fire Coordinating Committee (BFCC) Bushfire Management Committees (BFMCs)
<b>FCNSW</b>			Forest management policy Fire management policy Fire Management Plan HFD Fuel Management Plan SFD Fuel Management Plan	

## WHY MANAGE FUEL?

FCNSW manages fuel across the estate primarily to mitigate the risk of bushfires while maintaining ecological diversity and forest health. Specifically, FCNSW has four primary goals when managing fuel in the forest estate. These are to

- i. protect human life and property from wildfires
- ii. protect critical infrastructure and public assets, including timber plantations, and other values
- iii. prevent the spread of wildfires from FCNSW estate, and
- iv. conserve and maintain ecological health and vitality at a landscape scale

To achieve these goals FCNSW implements a range of fuel management strategies including prescribed burning, grazing, mechanical and chemical treatments. These are discussed below (Fuel Management Strategies).

Document title: SPD Fuel Management Plan	Version No.:	Page: 2 of 12
Document ID :	Document owner: State Fire Manager	Issue date: Review date:

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## Fuel management strategies

The fuel management strategies used by FCNSW are consistent with the principles of ecologically sustainable forest management. Prescribed burning and grazing are the two primary ways fuel loads are reduced in State forests.

### PRESCRIBED BURNING

Prescribed burning is defined as the controlled application of fire under specified environmental conditions to a predetermined area, and at a time, intensity, and rate of spread required to attain planned resource-management objectives<sup>1</sup>. Prescribed burning is carried out on land managed by FCNSW to reduce the potential fire behaviour and impacts when bushfires occur or for specific silvicultural purposes. Importantly, prescribed burning can also be for spiritual, social and cultural purposes on country as part of Aboriginal people's relationship with the land.

While in many cases prescribed burning is an effective fuel reduction strategy there are forest types and land management units where prescribed burning is not appropriate. For example, prescribed burning for hazard reduction is not implemented in softwood plantations due to the risk of damage to the commercial crop due to its sensitivity to fire.

There are several types of prescribed burning utilised by FCNSW;

#### Hazard reduction burning

Hazard reduction burning is the primary type of prescribed burning carried out by FCNSW. The main purpose is to reduce fuels to protect assets and prevent the spread of wildfire while conserving and maintaining ecological health and vitality at a landscape scale. FCNSW aims to carry out hazard reduction burning at low intensities by burning under appropriate burn prescriptions and ignition patterns. Low intensity burning reduces the impact of fire on flora and fauna (and in many cases enhances ecosystem health) and fire at low intensity is easily controlled.

#### Silvicultural burning

FCNSW carries out prescribed burning for silvicultural purposes associated with the growing of forests in plantations. Silvicultural burning is the principal technique used to remove slash (windrow and broadacre burning) during plantation establishment to maximise the space available to plant trees. Silvicultural burning reduces fuel loads within these areas, providing fuel management benefits

#### Cultural burning

An integral part of FCNSW' prescribed burning is combining the use of traditional burning knowledge and practices with modern burning technologies and practices. HFD's Aboriginal Partnerships Team engages with local Aboriginal communities to integrate cultural burning practice across cultural lands. The Integration of cultural burning follows a five-step engagement process:

- i. FCNSW' Aboriginal Partnerships Team engagement with local community groups;

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<sup>1</sup> *Australasian Fire Authorities Council, 2012, Bushfire Glossary, p. 24*

Document title: SPD Fuel Management Plan	Version No.:	Page: 3 of 12	
Document ID :	Document owner: State Fire Manager	Issue date:	Review date:

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- ii. local community groups identify which members of their community will participate in cultural burning activities and require training (Cultural burning training by the community, and firefighter training by FCNSW)
- iii. relevant training (as above) is provided and local communities undertake cultural burn program planning in partnership with FCNSW;
- iv. ceremonial aspects of cultural burning are conducted; and
- v. cultural burning program implementation is implemented (ongoing).

## GRAZING

Grazing is an important element of SPD’s fuel reduction strategy with approximately 4 % of the total area of land managed by SPD grazed currently under permit (Table 4). Grazing provides a safe and economic method to reduce ground fuels and thereby reduce the intensity and rate of spread of wildfire. Agistment in State forest is sought after by graziers where sufficient pasture exists. These areas are made available under permit.

## MECHANICAL/ CHEMICAL TREATMENTS

Mechanical slashing and chemical treatment are primarily used to maintain low fuel levels on fire breaks on the edge, or within, plantation areas. These fire breaks are identified as Asset Protection Zones (APZ’s) in the Fuel Management Plan maps (Table 4).

Mechanical treatment is usually by slashing or trittering. Chemical treatments usually target woody weeds, maintaining grasses and low ground cover for soil protection.

Mechanical thinning, which uses harvesting machinery to reduce tree stocking and crown fuels, can also be used in strategic areas to mitigate the risk of fire, intensity and spread. This complements other measures aimed at reducing on-ground fuels such as collection of residue, slashing and chemical treatments.

## The hazard reduction burning schedule

Areas of forest managed by SPD where hazard reduction burning is proposed are identified through a risk assessment process consists of three steps;

- i. an assessment of fire vulnerable assets
- ii. constraints to hazard reduction burning
- iii. identification of Hazard Reduction Fuel Management Zones.

These steps are mapped as GIS layers and are used to form a three-year rolling hazard reduction burning schedule. Plantation re-establishment burns (i.e. broadacre and windrow burns) and cultural burns are not considered in this process.

## ASSETS VULNERABLE TO FIRE

FCNSW assess fire vulnerable assets in the landscape, identifying

- i. settlements/ townships adjoining State forest
- ii. softwood plantations
- iii. land tenure boundaries (State forest; National Park; Crown; private)
- iv. credible high-intensity fire paths to plantations via State forest.

Document title: SPD Fuel Management Plan		Version No.:	Page: 4 of 12
Document ID :	Document owner: State Fire Manager	Issue date:	Review date:

**WARNING: a printed copy of this document is uncontrolled. Please verify this is the latest version prior to use by going to the intranet.**



This is stored in the FCNSW spatial system GIS Layer: Assets at risk. Burn Category selection in the GISO Fuel\_Management\_Plan FeatureClass).

## CONSTRAINTS TO HAZARD REDUCTION BURNING

The second part of FCNSW' fire risk assessment differentiates between land and vegetation types that are treatable using hazard reduction burning and those that are non-treatable.

Areas that are not suitable for hazard reduction burning include the following categories;

- » The softwood plantation estate stocked areas
- » Land excluded from prescribed burning for environmental regulations
- » Fire sensitive forest types or ecological communities
- » Operational constraints such as neighbours, fencing/ assets not feasible to protect, no reliable burn boundaries, access issues etc

Non burnable areas may have fuel management options such as mechanical mitigation activities used to enhance prevention and preparedness. Grazing and burning may be a suitable option.

Areas of land managed by SPD that is available for burning are known as "treatable area". The actual area where prescribed burning occurs is usually less than the treatable area, to account for the mosaic pattern of many burns, as well as areas such as riparian zones.

Treatable and non-treatable areas are stored in a GIS Layer: Burnable and non-burnable areas.

## HAZARD REDUCTION FUEL MANAGEMENT ZONES

This part of the fire risk assessment process identifies fire management zones, derived from local Bush Fire Risk Management Plans. Fire management zones indicate the fire risk and include treatments associated with each different zone. These are mapped in GIS Layer: Hazard reduction fuel management zone (GIS Layer: GISO Fuel\_Management\_Plan FeatureClass , Burn\_Category).

The different fire management zones are

- i. Asset Protection Zone (APZ)
- ii. Strategic Fire Advantage Zone (SFAZ)
- iii. Land Management Zone

## HAZARD REDUCTION TARGET

To determine the burnable area each year, FCNSW assess

- » Fire management zone (derived from the local Bush Fire Risk Management Plan)
- » vegetation type (FCNSW data)
- » minimum allowable return interval (Bush Fire Environmental Assessment Code)
- » time since last burn – either wildfire or planned

Document title: SPD Fuel Management Plan	Version No.:	Page: 5 of 12	
Document ID :	Document owner: State Fire Manager	Issue date:	Review date:

**WARNING: a printed copy of this document is uncontrolled. Please verify this is the latest version prior to use by going to the intranet.**

The current FCNSW minimum target for hazard reduction burning is set by the Rural Fire Service. Currently this is 22 000 ha per year for FCNSW, or approximately 3% of the burnable area of the FCSW estate.

The hazard reduction **target** (ha) for each of the mapped Zones is calculated by dividing the area of the Zone by the nominal/ average treatment cycle for each zone. The *minimum* return interval for each Zone is derived from the RFS Bush Fire Environmental Assessment Code. To allow for seasonal conditions, fire history, and uncertainty created by other variables, a five-year rolling average performance target is used, allowing targets to be reduced/ increased in any given year.

Fuel management zone	Treatment cycle (or return interval) (years)
Strategic Fire Advantage Zone	10
Land Management Zone	15

**Table 2 Rolling 5-year targets**

## BUILDING THE SCHEDULE

These hazard reduction burning targets are used when developing the rolling three-year Schedule for each Forest Protection Area (reviewed annually).

Where there is a need to prioritise fuel management burning (i.e. the allowable burnable area is greater than what can be achieved), Table 3 describes the broad level framework used by SPD to prioritise burns. In addition, proposed burns are planned and prioritised in consultation with local Bush Fire Management Committees and other stake holders, including neighbours.

Priority	Fuel Management Zone	FCNSW Burn Objective
1	APZ	Asset protection fuel management
2	SFAZ LMZ	Strategic fire advantage zone burning; and Windrow burning
3		Burning native forest areas part of known fire pathways to fire sensitive plantations
4		Fuel reduction burning undertaken adjacent to high risk plantation (areas of native forest adjacent to unthinned softwood plantation where there is crown closure – approximately 5 years of age)
5		Fuel reduction burning undertaken adjacent to low risk plantation protection (areas of native forest adjacent to softwood plantation that does not meet the definition of high risk)
6		Fuel reduction for ecological reasons
7		Fuel reduction for cultural reasons

**Table 3 Fuel management zone priorities**

Operational plans are derived from the Annual Schedule.

The Fire and Stewardship Manager in each management area is responsible for reviewing and updating the hazard reduction burning schedule.

Document title: SPD Fuel Management Plan	Version No.:	Page: 6 of 12
Document ID :	Document owner: State Fire Manager	Issue date:
		Review date:

**WARNING: a printed copy of this document is uncontrolled. Please verify this is the latest version prior to use by going to the intranet.**

## Annual schedule of fuel management works

This section defines the prioritised of Annual Fuel Management Schedule for Bathurst and Tumut management areas, including links to spatial data (GIS) showing where burning works are scheduled for the current year, as well as an 'outlook' schedule for a further 2 years. It defines the annual targets required to treat the forest estate within the defined intervals. These targets are used to develop an annual rolling three-year plan which will be accounted for in a 5-year rolling average.

This program complements FCNSW' commitments on Bushfire Management Committee Risk Plans.

Management Area	Snowy			Total
	Bathurst	Tumut	Bombala	
State forest	154 201	161 831	43 362	359 394
Burnable area	61 998	30 958	1 068	94 024
APZ		238	389	627
SFAZ	4 167	3 139	553	7 859
Annual target SFAZ	417	314	55	786
LMZ	59 631	27 815	515	87 961
Annual target of LMZ	3 975	1 855	34	5 864
Total annual burn target	4 392	2 169	90	6 651
Area grazed	570	12 949	2 224	15 743

Table 4 Burnable areas and maximum targets

## Planning and conducting prescribed burning

Planning prescribed burning in areas of forest managed by FCNSW requires site specific burn plans to be prepared. Burn prescriptions and ignition patterns are specified to ensure that prescribed burning meets management objectives.

### SITE SPECIFIC PLANS

All prescribed burns will have an approved operational plan prior to burning. These plans are site specific and prepared in accordance with the FCNSW Prescribed Burn template. Safety and environmental considerations and potential impacts on other stakeholders are assessed as part of the planning process (due diligence). Operational plans include:

- » burn objectives and prescriptions
- » an operational map
- » environmental approvals
- » burn area details
- » resources required
- » standards to be met
- » checks and notifications to be undertaken
- » authorisations to be obtained and
- » post burn appraisals to be conducted.

Document title: SPD Fuel Management Plan	Version No.:	Page: 7 of 12
Document ID :	Document owner: State Fire Manager	Issue date: Review date:

**WARNING: a printed copy of this document is uncontrolled. Please verify this is the latest version prior to use by going to the intranet.**

SPD conducts prescribed burning under one of four environmental approval pathways. These are:

- i. burning for site preparation as permitted under a Bushfire Hazard Reduction Certificate (BFHRC) issued pursuant to the Rural Fires Act.
- ii. burning under the Bushfire Environmental Assessment Code (BFEAC)
- iii. burning under an Environmental Impact Assessment (EIA)

The template considers environmental values (Implementing the prescribed burn), as well as other considerations

There is no requirement for plantation silvicultural burns to be entered into the RFS system, although these burns must be entered in ICON as a planned event, prior to and during, plantation re-establishment burning operations.

## IMPLEMENTING THE PRESCRIBED BURN

Prescribed burns are implemented within burn prescriptions and lighting guidelines to ensure the potential impacts of fire are managed, fire is easily controlled and remains within identified control lines. Prescriptions for prescribed burning vary between management areas, accounting for variances in geography, vegetation types and climate (refer to Table 5). These prescriptions may be adjusted to meet local variations in fuels, fuel moisture, slope, aspect and weather conditions or to achieve a desired outcome.

Lighting patterns are critical to ensuring burning meets the burn plan objectives. Test burns are required prior to implementing a prescribed burn. These areas where hazard reduction is undertaken are mapped (GIS Layer: Hazard reduction (Mobile GISM HRBPoly for current. GISO HazardReduction for Historic and other adgency HR).

The burn Supervisor may decide to proceed with a burn outside of prescription but does so with consent of the Burn Incident Controller. Any changes to the plan or prescriptions should be captured in the Burn IAP and documented.

Burning in Asset Protection Zones (APZ) and Strategic Fire Advantage (SFA) Zones will be consistent with [Standards for low intensity bush fire reduction burning](#) issued by the NSW Rural Fire Service (RFS).

Fire parameters	Target	
	Tumut	Bathurst
BKDI	<100	<80
Dry bulb temp. (°C)	<25	<25
Relative humidity (%)	>40	>40
Windspeed (km/ h)	<15 if dry bulb >15 <20 if dry bulb <15	<30
Fuel Moisture Content (%)	>12	12-14
Head fire Rate of Spread (m/ min)	<2.0	<3.0
Forest Fire Danger Index (FDI)	<10	<10

Table 5 Burn prescriptions for SPD MAs

Document title: SPD Fuel Management Plan	Version No.:	Page: 8 of 12
Document ID :	Document owner: State Fire Manager	Issue date:
		Review date:

**WARNING: a printed copy of this document is uncontrolled. Please verify this is the latest version prior to use by going to the intranet.**

## Data capture, monitoring and reporting

The following data is stored on FCNSW corporate GIS layers:

- i. an assessment of fire vulnerable assets
- ii. constraints to hazard reduction burning
- iii. identification of Hazard Reduction Fuel Management Zones
- iv. three-year rolling hazard reduction burn schedule
- v. hazard reduction burns.

Area figures for hazard reduction burning (both proposed and completed) are reported annually to the State Fire Manager, Fire Branch. Area figures for hazard reduction burning are reported annually to the Senior Manager Stewardship and Senior Manager Western. These figures are accounted for in FCNSW' Sustainability Report.

Document title: SPD Fuel Management Plan	Version No.:	Page: 9 of 12
Document ID :	Document owner: State Fire Manager	Issue date: Review date:

**WARNING: a printed copy of this document is uncontrolled. Please verify this is the latest version prior to use by going to the intranet.**