Biodiversity Conservation Trust

Guide to the application of fire as a management tool

| April 2022

Disclaimer

The information in this document is general in nature and is intended as a guide only. The information is not designed to be, nor should it be, regarded as advice on bush fire risk mitigation, burn implementation (including legal requirements for implementing a burn) or hazard reduction activities, or any other advice.

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The BCT encourages landholders to obtain independent advice, including legal advice, that considers their specific circumstances prior to implementing a burn within their agreement area.

By accessing and using this guide, readers acknowledge that they are responsible for making their own assessment of the information and its relevance, and should verify all relevant representations, statements and information with their own independent and professional advisers.

Contents

Abbreviations

APZ	Asset protection zone
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCT	Biodiversity Conservation Trust
BSA	Biodiversity stewardship agreement
BSSAR	Biodiversity Stewardship Site Assessment Report
CA	Conservation agreement
Clean Air Regulation	*Protection of Environment Operations (Clean Air) Regulation 2010*
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
FRNSW	Fire and Rescue NSW
LLS Act	*Local Land Services Act 2013* (NSW)
PCT	Plant Community Type
PLC	Private land conservation
RF Act	*Rural Fires Act 1997* (NSW)
NSW RFS	New South Wales Rural Fire Service
TFD	Total Fund Deposit
WRA	Wildlife refuge agreement

Overview

Purpose of the guide

The purpose of this guide is to support the implementation of fire as a management action within private land conservation (PLC) agreements. The guide can be used by both landholders with existing agreements and those who are considering entering an agreement with the NSW Biodiversity Conservation Trust (BCT). The guide covers all agreement types: biodiversity stewardship agreements (BSAs), conservation agreements (CAs), wildlife refuge agreements (WRAs) and PLC agreements existing before the BCT was established in 2017.

This guide is to assist landholders to determine whether burning may be an appropriate management action to achieve Aboriginal cultural and/or ecological outcomes within their agreement area. Where this is found to be the case, the guide will assist the landholder to understand the process involved in planning and implementing burns on their property as a technique to achieve these outcomes. This guide has also been developed to:

- provide guidance for BCT staff and the relevant expert/s that will assist the landholder plan and implement burning as a management action,
- provide pathways for Aboriginal landholders to undertake cultural burning on their land,
- assist non-Aboriginal landholders to appropriately engage Aboriginal fire practitioners, and
- assist accredited assessors to prepare relevant documents for BSAs.

A glossary of terms used throughout the guide is provided in Appendix A.

The BCT supports the application of burning to achieve ecological, cultural and hazard reduction outcomes in vegetation communities that are adapted to fire. This guide does not endorse burning as a management action in all ecosystems or for all PLC agreements. In some circumstances, excluding fire is the best outcome for vegetation communities which are not adapted to fire.

The information in this document is general in nature and is intended as a guide only. It is not designed to be, nor should it be regarded as bush fire risk mitigation advice or advice on burn implementation.

As outlined in the Disclaimer, the BCT will not accept liability for any reliance on the content of this document. The BCT encourages landholders to obtain independent advice on insurance that considers their specific circumstances prior to implementing a burn within their agreement area.

Bush fire risk management

This guide does not provide advice on vegetation biomass control for bush fire risk management or hazard reduction activities.

The NSW Rural Fire Service (NSW RFS) is the lead agency for the prevention, mitigation, and suppression of fires in rural fire districts. This includes advice and support for bush fire risk management and the conduct of hazard reduction burning under the Bush Fire Environmental Assessment Code (the Code). Where burns are designed to achieve multiple objectives, they may be

planned and approved by the NSW RFS under the Code but should also consider the ecological and cultural objectives outlined in this guide.

It is recognised that some burns implemented for biodiversity or cultural outcomes may deliver additional outcomes, such as reducing bush fire hazard and the protection of assets. BCT also acknowledges that burns undertaken primarily for bush fire hazard reduction purposes may also provide ecological and/or cultural benefits. However, burning for cultural or ecological outcomes as outlined within this guide does not replace or perform the function of bush fire risk management.

Burns conducted without proper guidance, consultation, planning, resources and experience may negatively impact biodiversity and cultural values, regardless of their intent. For guidance on implementing hazard reduction activities in a manner consistent with a PLC agreement, and how to consider bush fire hazard reduction in the design of agreement areas, see fact sheets available on the BCT website or contact the BCT.

Figure 1 Agreement landholder Steve Haslam on his property Quoll Headquarters in Northern Inland NSW after a bushfire in 2018 (Source: Harriet Ampt)

Background

Fire and Australia's flora and fauna

Fire has been part of the Australian landscape for millions of years, with our changing climate influencing both fire activity and changes to vegetation over time (Gill et al 2002, Kershaw et al 2002). Fire is integral to many Australian ecosystems, to which native species and communities have become adapted, and in some cases dependent, over tens of millions of years (Gill, 1975). Conversely, other plant communities such as those that occur in cooler or wetter ecosystems that are less exposed to fire may take longer to recover from, or be significantly changed by repeated fire (Clarke et al, 2015).

The use of fire as a management tool by Aboriginal people has shaped Australia's landscape for tens of thousands of years. Fire is used to shape the location and extent of ecosystems, and also to maintain these systems (see many examples in *Fire Country* (Steffensen 2020) and *Flammable Australia* (Bradstock et al 2012)). It is recognised that Australia's flora and fauna has co-evolved with the use of fire by Aboriginal people, with many species evolving adaptations in response to historical burn regimes.

The burn regime refers to the frequency (or burn interval), intensity (how hot the fire burns), the seasonality (time of the year) and patchiness of fire in an area (DPE 2022).

Understanding historical fire regimes of an area and the response of flora and fauna can inform planning for fire management for cultural and/or ecological outcomes.

Due to the dynamic and variable nature of fire across the landscape, many Australian plant species have evolved biological features that allow individual plants to survive fire. These biological features may include thick bark or protected reproductive structures deep (commonly known as epicormic growth) within the trunk, limbs, or base (Lawes et al 2011, Burrows et al 2002). Some Australian plants have even evolved a dependence on fire for reproduction, requiring fire or smoke to stimulate flowering, or the release and/or germination of seeds (Lamont et al 2019, Gill 1981). Some longer-lived resprouting species also need fire to replenish growth (Knuckey et al 2016).

Figure 2 Epicormic shoots are a recovery response following damage or stress. This epicormic growth was photographed after the 2019/20 bushfires at PLC agreement site Oxygen Farm (Source: Harriet Ampt)

Many plant species that are killed by fire will regenerate from seed that is stored in the soil or protected in the canopy, once conditions are suitable. However not all Australian plants are adapted to fire. The most fire-sensitive species are those plants that are both killed by fire and do not have a seed bank. These species can only recolonise a burnt area from local unburnt areas (refugia). In highly fragmented landscapes, such refugia may not always exist (Clarke et al 2015, Gill 1981, Gill & Allan 2008).

Young plants, even those of fire-adapted species, are particularly vulnerable to higher frequency fire as they may be destroyed before they reach maturity, flower, and produce seed (Gill 1975). A succession of frequent fires may reduce the resilience of a plant community by preventing the seed bank from building up, or even eliminate species that have not had a chance to produce enough seed before the next fire (Gill 1981, Gill & Allan 2008).

Many animal species are also susceptible to fire, being killed directly, or through the loss of habitat and food resources. High frequency fire is listed as a Key Threatening Process under the *NSW Biodiversity Conservation Act 2016* (BC Act) (NSW Scientific Committee 2020), affecting many threatened birds and mammals in NSW for its capacity to disrupt lifecycle processes and impact vegetation structure and composition. Some animals are able to avoid fire through the ability to flee, or by taking cover underground or beneath structures such as bark, large logs, and tree hollows (Pausas 2019, Robinson et al. 2013). However, hot, high intensity fires can ultimately destroy these habitat features (Parnaby et al 2010). Many animal (and plant) species must maintain their populations by recolonising burnt areas from local unburnt refugia, however these may be limited in highly modified landscapes (Keith et al 2002a, Whelan et al 2002).

Figure 3 Banksia is an example of a fire adapted species. Banksia seed pods open during or following fire, which disperses seeds onto the ground. (Source: Michael Van Ewijk / DPE)

Aboriginal land management and Traditional Ecological Knowledge

Aboriginal people have co-existed with the environment for tens of thousands of years. During this time, traditional knowledge systems were developed and continue to be used to pass on skills, values and knowledge about protecting and managing country to support biodiversity and resource management. Aboriginal people use this traditional ecological knowledge combined with cultural protocol, to inform how they interact with country, including land management practices. The use of fire, often referred to as cultural burning, is one component of Aboriginal land management.

Aboriginal land management informed by traditional ecological knowledge is being increasingly recognised by Government[1] and a key aim of this guide is to enable continuation of cultural practices, follow cultural protocols and the use of traditional ecological knowledge on country.

Cultural burning will have multiple aims and objectives centred around respecting and increasing the health of Country. This may include but is not limited to:

- spiritual objectives, health and wellbeing (healthy country – healthy people)
- cultural resilience
- traditional practices and use objectives
- ecological outcomes
- cultural species management

[1] See the Victorian Traditional Owner Cultural Fire Strategy and the Gumbaynggirr Good Koala Country Plan.

- cultural resource management.

These objectives are different to hazard reduction burning where the primary purpose is to reduce or manage vegetation fuel (biomass) that can carry a bush fire. Burning to manage biomass can still protect country, however it must consider and achieve important spiritual and cultural objectives to be considered a cultural burn. Whether a burn is considered a cultural burn, and how this is realised is determined by Aboriginal people on Country.

It is important to understand that cultural burning objectives, methodology and implementation are also different to those of ecological burning. Ecological burning follows government frameworks and policies, whereas cultural burning reflects lore and cultural protocol (Standley, 2019). Ecological burns are focused on outcomes for a specific ecosystem or species, compared to the various inter-relationships which cultural burning considers (see table 2.1 in Standley for comparisons of drivers between different burn types).

This guide demonstrates how BCT is continuing to improve its commitment to enabling Aboriginal land management by Aboriginal landholders and assisting non-Aboriginal landholders engage Aboriginal Fire Practitioners. One purpose of the BC Act is to enable the improvement, sharing and use of traditional ecological knowledge. Consistent with this purpose, where an agreement area is currently managed by Aboriginal landholders and cultural burning is an existing land management practice, the agreement will reflect existing cultural practices. In addition, this guide assists BCT in implementing the recommendations of the Royal Commission into National Natural Disaster Arrangements, and the NSW Bush fire Inquiry in response to the 2019-2020 Black Summer bush fires. As per recommendation 18.1 of the Royal Commission, the BCT is committed to engage with Traditional Owners to explore the relationships between Aboriginal land and fire management and natural disaster resilience.

The BCT recognises the challenges in inserting traditional ecological knowledge and cultural practices into an already defined regulatory framework for fire management. This document has been developed to support Aboriginal people to navigate through the planning and approval process and enable Aboriginal people to continue cultural practices on their land.

Cultural burning

Aboriginal people use many techniques in fire and species management. A key feature of cultural burning is that it utilises ‘cool’ slow moving, low flame height, controlled fire on a local scale and creates a mosaic of burnt and unburnt areas (Commonwealth of Australia 2020). Over time, this creates vegetation patches of different ages which helps to maintain biodiversity across the broader landscape (Keith et al 2002b). This technique also allows refugia areas for animals to move out of the path of fire and provides food and habitat immediately after a fire.

The removal of Aboriginal led fire regimes and ongoing impacts of colonisation impacted the fire regimes across Australia (Gill, 1975). There was a marked increase in fire intensity in the last 200 years, with fire activity in more recent times decreased due to active suppression and landscape fragmentation (Mooney et al 2011, Morgan et al. 2020).

Aboriginal fire practice of mosaic burning over varying time scales is known to have increased species richness in some areas (Burrows et al 2020). In some cases, Aboriginal small-scale mosaic burning may have allowed more fire-sensitive species and vegetation communities to persist in some areas

that historically would have received greater intensity burns (see examples in Evans and Russell-Smith, 2020).

Figure 4 Cultural burn at Valley Arm, a property with a biodiversity stewardship agreement. BCT was invited to attend this pilot project in 2020 involving the training of 33 students from nine Aboriginal Land Councils in the use of traditional cultural burning practices (Source:Coral Latella)

Advocacy by cultural fire knowledge holders, Aboriginal Elders including Dr George and Dr Musgrave (Kuku Thaypan Elders) and Indigenous-led organisations such as the *Firesticks Alliance* are changing the perception around fire and helping to publicise the continuation of cultural burning throughout Australia (see Standley, 2019 and Steffenson, 2020). Burning as an Aboriginal land management technique occurs Australia wide, with over 130 projects implementing fire management (Australian Government: National Indigenous Australians Agency). The many benefits of Aboriginal-led cultural burns have been well documented. In some cases, cultural burning is returning fire to country where burns had not occurred since European settlement (Neale et al 2019). The extensive traditional ecological knowledge held by Aboriginal peoples, combined with cultural values and protocol is being increasingly recognised and applied to current fire management practices in numerous areas across Australia (see Kimberly Land Council, 2022).

Fire for ecological outcomes

The application of burning as a conservation management tool on private land is challenging. As such, the use of fire is much less commonly applied than other conservation management actions such as pest and weed control (Halliday et al 2012). There are many species where there is limited or no literature on their fire dependency and response. As high fire frequency is a Key Threatening Process under the BC Act and there are varied risks associated with burning, there is a tendency towards excluding fire from the landscape.

In fragmented landscapes, bush fires can be particularly detrimental to biodiversity, as there is higher risk that species will be lost when whole patches are burned without nearby unburnt areas or refugia being left that can assist recolonisation. Additionally, burnt ecosystem fragments are more susceptible

to invasion by weeds and pest animals (Keith et al 2002b). Burning that creates a mosaic of vegetation of different ages and condition can help maintain biodiversity across the broader landscape and leave unburnt patches as animal refugia and seed sources (Keith et al 2002a). In this way, cultural mosaic burning can help maintain diversity in the age and structure of plant communities and help prevent or mitigate the effects of large catastrophic bush fires.

While there are risks to re-introducing fire in situations where the response to fire is unknown or uncertain, there is a growing body of information that can support decision-making associated with burning to manage these risks. When using fire for managing biodiversity, the following considerations are recommended and supported by this guide:

- Set explicit conservation goals
- Set targets which enable flexible burn implementation time frames, allowing site conditions such as drought to be taken into consideration
- Follow the precautionary principle
- Promote variability in fire regimes across space and time (also considering unplanned fires).
- Undertake monitoring before and after a burn to enable adaptive management
- Undertake a broad risk assessment which considers risk to ecological, cultural and built assets
- Focus on groups of species most sensitive to fire (by considering key life-history attributes) to ensure their long-term survival.
  (Keith et al 2002b, Gill et al 2002).

Could burning be an appropriate management action for my agreement?

Burning within an existing agreement

If you hold an existing agreement with the BCT, you will need to review your agreement to understand how burning is addressed. In some circumstances, burning may be a required management action, a recommended management action, enabled (i.e. not explicitly prohibited), or not allowed within your agreement.

If you are unsure whether burning is a management action or permitted within your agreement, please contact the BCT for advice.

Deciding if burning is appropriate for your agreement area

Where burning is enabled within your agreement, BCT will work with you to ensure that fire management achieves agreement objectives. This may be:

- excluding fire
- continuing an existing burn regime; or
- re-introducing an appropriate burn regime.

The decision tree in Figure 5 will help you determine whether the primary aim of burning within the agreement area is supported by this guide. If the primary aim of the burn is supported, and there are no immediate factors preventing the safe implementation of a burn, then burning may be an appropriate ecological or cultural management action for your agreement.

More information on each of the decision tree steps is outlined below.

Figure 5 *Decision tree to determine if implementing a burn is an appropriate management action within a PLC agreement*

a. Why do I want to burn?

As outlined in the decision tree, the primary aim for burning within an agreement area may be to:

- undertake Aboriginal Cultural Practices,
- protect or support specific ecological outcomes and/or meet objectives of your agreement
- manage bush fire risk without any defined cultural or ecological outcomes.

Further information on each of these aims is provided below.

In some cases, a burn may achieve more than one aim. For example, a primary ecological aim may be achieved by reducing biomass and has a secondary outcome of managing bush fire risk. To determine whether this guide applies, use the primary aim for the burn to work through the decision tree.

Undertake Aboriginal Cultural Practices

This guide supports burning where the primary aim is to undertake cultural fire practices by Aboriginal people. Burning country as an Aboriginal Cultural Practice is supported by the BCT.

The BCT recognises that Aboriginal landholders may have continuing cultural fire practices or are seeking re-introduction of cultural fire practices in an agreement area. If an agreement area is currently managed by Aboriginal landholders, the terms of your agreement will reflect the existing cultural practices.

BCT encourages non-Aboriginal landholders to consider Aboriginal fire practitioners to plan or conduct burning, such as the Firesticks Alliance and/or other cultural burn certified practitioners. Where this occurs, it is important to recognise Aboriginal fire practitioners will lead this process and that the traditional ecological knowledge that supports the burn is the intellectual property of the Aboriginal community.

Where an Aboriginal fire practitioner is approached by a non-Aboriginal landholder for the sole purpose of managing bush fire risk, the BCT recognises that this can be undertaken in a culturally informed manner. However, as the sole outcome is for hazard reduction, this guide will not apply. The burn will need to be consistent with the terms of your agreement as per the Bush Fire Environmental Assessment Code. See BCT fact sheets for more information.

In some circumstances, burning will need to consider specific objectives and threatened species that are identified in your agreement. The BCT will work with Aboriginal fire practitioners so that they are aware of these sensitivities and where appropriate, build these into their burn planning (see stage 3 and stage 5 of this guide).

Protect or support ecological outcomes and/or meet objectives of your agreement

This guide supports burning where the primary aim is to protect or support ecological outcomes and/or meet objectives of your agreement.

Landholders establish agreements to protect and conserve biodiversity values present on their land. Each agreement outlines the activities and management actions to conserve the site's biodiversity values.

The overall objective of burning within an agreement area should be to maintain or improve ecosystem composition, structure, and function. This may be to assist with weed control as part of ecosystem restoration; or to restore or maintain a mosaic of differing vegetation age classes within the management area. Burning and targeted monitoring can be used as a management tool to achieve this.

If you are unsure if proposed burns support the biodiversity conservation objectives of your agreement, you are encouraged to work with BCT (or an accredited assessor in the case of a BSA).

Is burning proposed to be used for the purpose of hazard reduction without any defined cultural or ecological outcomes?

Burning for the sole purpose of hazard reduction is outside the scope of this guide.

BCT recognises that as a landholder you are responsible for managing your bush fire risk. Hazard reduction activities may need to occur from time to time and may be requested by the local or regional fire management authority. If you wish to undertake hazard reduction activities within an agreement area, you are encouraged to contact your NSW RFS district office or Fire and Rescue NSW (FRNSW), and review BCT fact sheets for further information.

b. Could burning be an appropriate tool to support biodiversity and/or cultural outcomes within my agreement area?

Where the primary aim of the burn is supported by this guide, the next step in the decision tree is to determine if burning is an appropriate tool to support the biodiversity and/or cultural outcomes. This may be the case where:

- burning supports continuation and/or re-commencement of Aboriginal cultural practices; and/or
- vegetation formations in your agreement area have historically experienced fire[2].

The use of fire as a land management tool for conservation outcomes will not be suitable for all agreements, and in some circumstances may only be suitable for a portion of an agreement.

The BCT will not support burning in the vegetation formations which can be negatively impacted by fire, such as:

- rainforest[2]
- alpine complex
- estuarine and saline wetland[2]
- some freshwater wetlands[3].

The presence of fire sensitive vegetation formations may mean that burning is to be excluded from all or parts of the agreement area. In some circumstances, you may choose to burn around these areas e.g. burning the vegetation surrounding a freshwater wetland to reduce the likelihood of impact from bush fires.

[2] Guidelines for Ecologically Sustainable Fire Management, NSW National Parks and Wildlife Service (2004)

[3] Burning is excluded from the following Freshwater Wetland Classes: Coastal Freshwater Lagoons, Montane Bogs and Ferns and Montane lakes.

If these vegetation formations make up the entire agreement area, BCT or an accredited assessor will discuss alternative disturbances or management actions which can be used to improve biodiversity values within the agreement area.

c. Can a burn be implemented without major risk to property and infrastructure?

The BCT recognises that all risks cannot be eliminated, and a risk management approach must be used to reduce risk to an acceptable or tolerable level. In urban and peri-urban areas of NSW, small agreement area sizes combined with the proximity of residential or industrial areas may mean that implementing a burn may pose an unacceptable risk.

Other factors that may prevent a burn from being safely implemented include:

- topography of the site, for example very steep slopes can limit accessibility
- small size of the agreement area
- close proximity to buildings and infrastructure.

In these circumstances and in consultation with BCT, other disturbance regimes or management actions such as ecological thinning or grazing (in accordance with BCT guidelines) could be used to promote positive biodiversity outcomes through disturbance which may be similar to fire. When deciding if burning can be implemented without major risk to life, property and infrastructure, considerations include:

- the presence, access to, and condition of, fire control lines including roads and trails
- fence and boundary clearings
- property and neighbour assets such as fences, buildings, utilities, and other infrastructure that may be impacted by burning
- the presence or absence of fire fighting and control infrastructure (e.g. property dams or other water sources).

You are encouraged to seek expert advice from a fire practitioner to confirm whether a burn can be implemented safely.

Where a burn cannot be safely implemented or if there is uncertainty about the risk, burning would not be an agreement management action and alternative management options can be discussed with BCT staff.

d. Could a burn be implemented whilst avoiding significant impact to fire-sensitive threatened species, Aboriginal cultural assets and ecological assets?

Burning within an agreement area must avoid significant impact to known and/or mapped fire-sensitive threatened species, Aboriginal cultural assets and ecological assets. For example, culturally modified trees (commonly known as Scar Trees) and significant hollow bearing trees must be protected from impacts during a burn.

Planning of burn locations, asset protection activities, burn timing and pre-burn mitigation measures (such as removing vegetation from the base of significant hollow bearing trees) can minimise and prevent impact in many circumstances. In other circumstances, the impacts of fire and related infrastructure, such as control line installation, may result in unacceptable impacts to the agreement area.

Where impacts cannot be avoided, burning may not be an appropriate management action and you are encouraged to contact the BCT to discuss alternative management options.

e. Burning may be an appropriate management action

Where the decision tree (Figure 5) and supporting information indicates that burning may be an appropriate management action, landholders and accredited assessors can use the rest of this guide as a framework for burn planning.

Specifically, the guide can assist with the following:

- Understanding the general principles for conducting burns within an agreement area
- Establishing when and where a burn can occur (stages 1 - 3)
- Understanding the required approval pathways for conducting ecological burning (stage 4)
- Developing a “Strategic burn plan” and “Operational burn plan” for your agreement area (stages 5 and 6)
- Understanding your monitoring, reporting and adaptive management requirements (stages 7 and 8)

Where the decision tree and supporting information indicates that burning may not be appropriate, you are encouraged to contact the BCT to discuss alternative management actions. For prospective landholders, this may also include the redesign of agreement areas.

Principles for burning as a management action

To ensure that burns implemented as a management action are planned and undertaken in a manner where the outcomes are consistent with PLC agreements, the following principles are a useful guide:

- Burning must be consistent with the terms of existing agreements.
- The BCT will support burning as a management action when it is used as a management tool to achieve Aboriginal Cultural and/or ecological outcomes.
- Burn planning and implementation aims to minimise risk to priority species and habitats, and achieve positive ecological and cultural outcomes based on traditional ecological knowledge and available scientific evidence.
- Burn planning and implementation acknowledges the presence of, and avoids negative impact to, cultural, heritage, ecological and built assets.
- Burn intervals should be identified as ranges bounded by thresholds, rather than specific years, and should focus on groups of species most impacted by fire.
- Burning is planned and implemented with consideration of how the agreement site fits within the broader mosaic of burnt and unburnt areas that differ in age across the greater landscape and/or whether the agreement site currently provides essential refugia.
- Where the agreement is in a fragmented landscape or there is limited information on fire response of the species and communities present, apply the precautionary principle by leaving a large proportion of the agreement area and a proportion of each Plant Community Type (or vegetation class) unburnt during a burn event to minimise potential adverse impacts.
- Post fire monitoring of ecological and/or cultural outcomes is essential and used to inform adaptive management.
- Strategic burn plans are flexible documents which are amended to respond to new published literature, site responses to burn implementation and other environmental, landscape and climatic factors such as bush fires and drought.
- Every burn undertaken is conducted with the appropriate environmental planning approvals and where applicable, permits and notifications in place.

BCT burn framework

Where the above decision tree (Figure 5) has determined that burning is likely to be an appropriate and useful management action for your agreement, the BCT burn framework outlines the next steps.

The BCT burn framework (Figure 6) will assist you, fire planners and fire ecologists to work through the steps required to define a burn regime for an agreement area. It also outlines key steps to be undertaken following the implementation of a burn including monitoring, reporting and identifying opportunities for adaptive management.

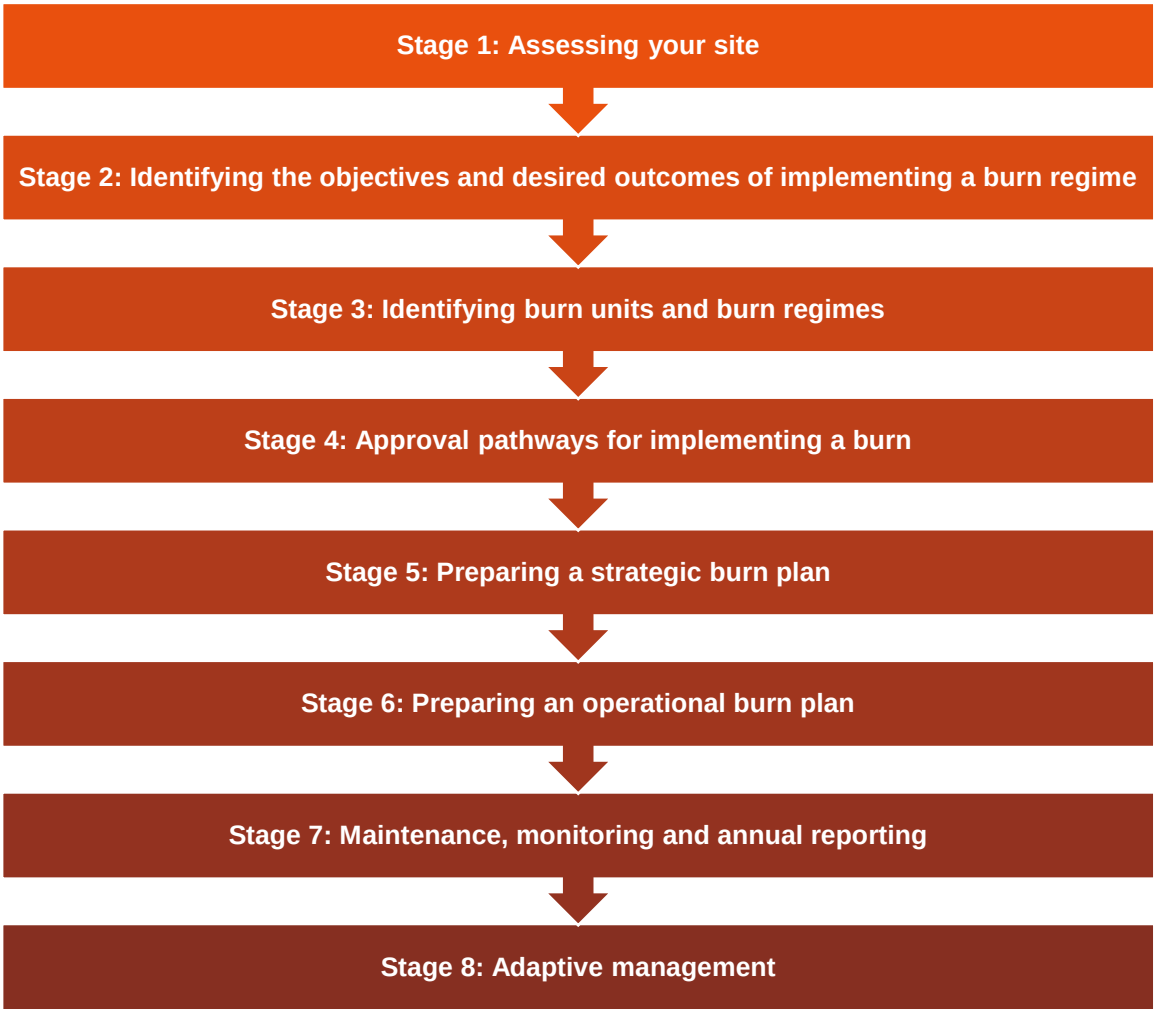

Figure 6 BCT Burn framework

Stage 1: Assessing your site

A site assessment is required for all conservation agreements (CA) and biodiversity stewardship agreements (BSA) to determine the biodiversity values on site, and to identify specific conservation objectives and appropriate management actions. This site assessment is used to help determine whether burning is an appropriate management action for the agreement area.

If you are considering the use of burning as a management action, in the majority of cases, an additional site assessment will be used to collect specific information to support the planning and implementation of burning. As shown in Table 1, the person gathering this information and when this is undertaken varies between agreement types.

Table 1: Site assessment timing and responsibility

Agreement type	Timing of data collection for strategic burn plan	Person responsible for undertaking site assessment for the strategic burn plan
BSA	Preparation of the BSSAR, as part of the BSA application.	Accredited assessor. The accredited assessor may require specialist input from a fire ecologist.
CA established under the BCT's Conservation Management Program	During preparation of strategic burn plan. The timing of the strategic burn plan will be outlined in relevant Conservation Management Program documents.	Cultural burn practitioner, fire ecologist or fire planner.
CA established as a condition of consent	Preparation of strategic burn plan, as part of the CA.	Cultural burn practitioner, fire ecologist or fire planner.
CA established under the BCT's Conservation Partners Program	During preparation of strategic burn plan. This will generally occur following establishment of an agreement.	Cultural burn practitioner, fire ecologist or fire planner.

The site assessment to support the implementation of burning will typically be a combination of desktop and field-based site assessments. The information gathered will be used in stage 5 to develop a strategic burn plan, including at minimum, the following key components:

- **Burn units** – discrete areas of vegetation with the same general fire requirements to which a burn will be applied.
- **Burn regime** – the timing, intensity and frequency of the burns to be implemented for each burn unit, such as:
    - time between burns (**burn interval)**
    - intensity of the burn
    - when the next burn event should occur
    - the time of year or triggers for burn implementation.

Information collected during the site assessment for the strategic burn plan

Information collected during the site assessment should include:

- vegetation formation, plant community types (PCT) and threatened species present within the agreement area
- presence of fire sensitive and fire dependent species
- prevalence and diversity of weeds within the landscape
- site conditions
- Aboriginal cultural, non-Aboriginal and ecological assets sensitive to fire
- existing landscape and site disturbances
- land use and zoning
- proximity to built infrastructure

Site assessment for cultural burning

Cultural burn site assessments will be undertaken by Aboriginal fire practitioners in line with cultural protocols.

Further information on assessing your site

Appendix B provides more detailed information for BCT staff, accredited assessors, and fire practitioners/planners on the types of information that will support the development of a strategic burn plan for the agreement.

Stage 2: Identifying the objectives and desired outcomes of implementing a burn regime

The overall objective of implementing a burn regime for biodiversity conservation should be to maintain or improve the composition and abundance of desired species, and the structure and function of the ecosystems present on site. The BCT recognises that Aboriginal landholders will also have spiritual and cultural objectives in addition to achieving ecological objectives through the application of fire.

Every PLC agreement site is different, and there will be variation in how each agreement uses burning to achieve conservation objectives. The biodiversity values and existing disturbances within an agreement area will influence the desired short- and long-term outcomes of a burn.

The specific management issues at a site may mean that burns are restricted to a specific portion of the agreement. For example, the desired outcome may be to reduce the cover and abundance of a high threat weed over a restricted area or to reduce the biomass of a dominant native species to improve the diversity and cover of native wildflowers.

Re-introduction of burning into a long unburnt agreement area can initiate important short-term changes that will contribute towards biodiversity conservation in the longer term.

Examples of these short-term changes may include:

- removal or reduction in weed cover
- thinning dense regrowth (ecological thinning)
- reducing risk of fire adversely affecting isolated threatened species
- reducing vegetation biomass adjacent to fire-sensitive locations (such as cultural and ecological assets).

Longer-term outcomes may include:

- the protection and increase of fire-sensitive species
- the recruitment of fire dependent species
- improved species diversity and ecosystem structure and function
- maintenance of culturally and historically significant sites and habitat/resources for culturally significant species
- the undertaking of cultural practices.

It is important to clearly identify what the desired outcomes of implementing burning as a management tool are, and how these may contribute toward the greater conservation objectives of the site. Once determined, stage 3 outlines a framework for determining the best fit burn regime to support these objectives.

Stage 3: Identifying burn units and burn regimes

A key step in planning to implement burning as a management action is determining an appropriate burn regime and specific burn units. This step will be led by a person with the relevant expertise. Depending on the agreement type, this may be an accredited assessor, ecological consultant or BCT staff. In many cases, the expertise of a fire ecologist and/or fire planner will also be required.

A burn regime indicates how often a burn is to be undertaken (the burn interval), the burn pattern or application and burn intensity. Within an agreement area, there may be one or more burn regimes that are appropriate for the vegetation communities and specific plants and animals on site. The BCT acknowledges that cultural burn units and regimes are not fixed and may vary throughout each season.

A burn unit is a discrete area of vegetation with the same general fire requirements to which an individual burn is applied. Identifying burn units will assist you to control how fire is applied across the greater site and achieve specific conservation outcomes. For example, burn units may be established to stagger the timing of burning across a continuous patch of vegetation, or to set up a buffer around the habitat of a fire-sensitive plant population.

Figure 7 An example of a species to be considered in determining burn units - Parris' Bush-pea, (Pultenaea parrisiae) *listed as Vulnerable in NSW. As populations are small and highly localised, it is advised to avoid burning this species unless absolutely necessary or until more is known about their fire response. (Source:Jackie Miles / DPE)*

Appendix C outlines a framework that an accredited assessor, ecological consultant, fire planner or BCT staff may use to:

1. Identify the burn regime (or regimes) that are appropriate for the agreement, using the site information collected and available scientific information.
2. Identify burn units based on the conservation outcomes identified in stage 2, the burn regimes identified, and the general principles for using fire as a management tool.

The framework in Appendix C is supported by a list of relevant resources in Appendix G.

BOX 1 Traditional Ecological Knowledge to define burn regimes

The BCT acknowledges that many Aboriginal communities have traditional knowledge systems in place that inform Aboriginal land management. The BCT encourages the ongoing cultural practices within agreements and this guide has been developed to enable the use of traditional ecological knowledge.

Traditional ecological knowledge uses cultural systems and processes such as indicators in the landscape to inform when and where country can be burnt. These landscape triggers may be communicated as part of traditional knowledge systems or recorded as part of a traditional seasonal calendar. The BCT encourages use of these tools to assist with the intergenerational knowledge transfer of such knowledge.

The BCT supports Aboriginal landholders who are already burning country to continue to use traditional ecological knowledge to identify and implement the relevant burn regime, including indicators to implement a burn, how frequently burns should occur, the burn pattern, and fire intensity. The BCT can work with Aboriginal landholders to ensure the burn regime considers threatened species and ecological communities protected by the agreement.

Where cultural burning is being re-introduced onto country, co-design of burn regimes combining traditional ecological knowledge and available scientific resources can help landholders ensure that burns are undertaken within the existing legal frameworks and using methods that will protect country.

Traditional ecological knowledge that is used to define burn regimes and inform cultural burning will always be the Intellectual Property of the Aboriginal community applying this knowledge.

Stage 4: Approval pathways for implementing a burn

Obtaining approval and permits to implement a burn

One of the most important tasks in burn planning is ensuring the correct approvals, permits and notifications are in place before implementing the burn. While a fire planner or fire practitioner may do this task, this is ultimately the responsibility of the landholder. There could be penalties for undertaking burns without the correct approvals regardless of whether the burn results in damage to environment or property.

The process to obtain the correct approvals can be complex, takes time and is dependent on factors including :

- the purpose and intended outcome of the burn
- the time of year for burn implementation
- the proximity to assets
- the organisation or people undertaking the burn
- the location of the land
- how environmental planning instruments apply to the land, including how the land is zoned under the relevant Local Environment Plan.

The information provided below is a guide to assist you in obtaining the correct permissions, approvals and documentation required to carry out a burn on your property. For BSAs it will also assist in identifying associated costs. This section is not exhaustive and is intended to be guidance only.

The BCT recommends that you contact your Local Council, NSW RFS and relevant government agencies (described in the text below) for further information. In some cases, a consultant who specialises in environmental planning approvals may be required to prepare and submit applications for approvals and permits.

Planning approval to burn

Burning practices are governed by legislation to minimise the impact on life and safety, property, the environment, cultural and heritage assets, Aboriginal and other heritage and air quality (particularly in urban areas). Due to the risks of burning across the landscape, the potential environmental impact of a burn must be considered, and environmental assessment and planning approval may be required prior to implementing a burn. Current legislation does not provide a single approval pathway specifically for cultural or ecological burning. As a result, you should consider what planning approvals are required under existing planning frameworks and legislation.

There are two environmental planning approval pathways to demonstrate the environmental impacts of a burn have been assessed:

1. Hazard reduction certificate issued in accordance with the Bush Fire Environmental Assessment Code made under the *Rural Fires Act 1997*; or
2. Planning approval granted under the *Environmental Planning and Assessment Act 1979 (EP&A Act).*

More information on these planning approval pathways is outlined below and in Appendix D.

Bush Fire Environmental Assessment Code

A Bush Fire Hazard Reduction Certificate is evidence that a streamlined environmental assessment has been undertaken by NSW RFS in accordance with the Bush Fire Environmental Assessment Code (the Code). Hazard Reduction Certificates are provided in circumstances where a purpose of the burn is to reduce bush fire hazards.

As per the Code (section 2.5), a Bush Fire Hazard Reduction Certificate may only be issued for bush fire hazard reduction. A Certificate may not be used for purpose of ecological or cultural purposes unless there is also a genuine hazard reduction outcome. When applying for a Bush Fire Hazard Reduction Certificate, you must describe the bush fire hazard reduction outcomes of the proposed burn. In many circumstances ecological and/or cultural objectives of the agreement can be met by a hazard reduction burn and so may be the appropriate pathway to obtain approval.

Landholders or a fire practitioner/fire planner on behalf of the landholder would apply for a Bush Fire Hazard Reduction Certificate using the Bush Fire Hazard Reduction Certificate application form. The form is submitted to the relevant NSW RFS District office for approval. Contact details for the relevant district office are located on the **RFS Fire Control Centre** website.

The conditions of the Bush Fire Hazard Reduction Certificate **must** be consistent with the terms of the PLC agreement and may include conditions for the burn implementation which are to be addressed in the operational burn plan. Further to this, section 2.6 of the Code specifies that conditions of a Bush Fire Hazard Reduction Certificate must not be inconsistent with any conditions of a land management agreement, unless the public authority responsible for the agreement (BCT) has agreed.

Burns approved by a Bush Fire Hazard Reduction Certificate can be implemented by any person with the consent of the landholder, such as Aboriginal fire practitioners, burning contractors or the NSW RFS.

Burns requested by the landholder and implemented by the NSW RFS

There may be circumstances where a burn implemented as a management action for an agreement is to be carried out by the NSW RFS under a Bush Fire Hazard Reduction Certificate. This may include burns that have a hazard reduction purpose but will also provide clear ecological outcomes. This could include reducing biomass for ecological outcomes, managing the bush fire risk to a threatened species, weed control, or assisting with the re-introduction of fire into a landscape.

NSW RFS brigades have a hazard reduction schedule. If your agreement area fits within that schedule, the burn may be undertaken by the NSW RFS. This will be determined on a case by case basis by the local NSW RFS brigade.

Further information is available on the NSW RFS website.

Approval under the EP&A Act

Where a Bush Fire Hazard Reduction Certificate is not an option, you should consider whether planning approvals and assessment will be required under the EP&A Act. The below sections provide an overview of approval and assessments that may be required under the EP&A Act.

Biodiversity stewardship agreements

Management actions which create biodiversity credits are exempt development for the purpose of the EP&A Act. This means assessment or approval processes under the EP&A Act are not required to implement actions outlined in the BSA management plan.

If you are proposing to burn for an outcome that will not contribute to biodiversity gain or is not identified as a management action in the BSA, that activity will not be exempt under the EP&A Act. In this circumstance you will need to consider whether assessment and approvals are required under the EP&A Act.

See section 4.4 of this guide for an overview of other permits and approvals which may be required before a burn can be implemented.

Conservation agreements and wildlife refuge agreements

Burning in a CA or WRA where burning is not listed as a management action requires assessment under the EP&A Act.

To determine what type of assessment is required, you will need to understand:

- whether the burning is considered 'development'
- any relevant environmental planning instruments which apply to the land
- how land is zoned under the relevant local environmental plan (LEP)
- how burning as a management action is classified under the LEP.

LEPs are available on the relevant Local Government website or via the ePlanning website. You can use the LEP map to determine the land zone of your agreement area.

In some cases, a burn as a management action to improve the biodiversity of the site can meet the definition of 'environmental protection works' as defined by the relevant LEP. You are encouraged to contact your local Council for confirmation.

You are encouraged to seek advice from an environmental planning consultant to understand how the burning activity is defined under the relevant LEP and how that activity is classified for your land zone. If burning is considered 'development' under the EP&A Act it may be classified in the LEP as one of the following:

- Prohibited – the effect of this is a burn cannot occur at that location[4].
- Exempt development – this means no assessment or approval process is required by the EP&A Act.
- Permissible *with* consent (including complying development) – this means development consent will be required to carry out the burn;

[4] Activities are generally prohibited unless specifically listed in one of the categories below.

- Permissible *without* consent – if the burning is considered an 'activity' under Part 5, Division 5.1 of the EP&A Act, the burning will require environmental assessment under that Part.

Burns permissible with consent

Where a burn is considered development that is permissible with consent, development consent from the relevant local council is needed before a burn can be implemented. An application for development consent requires a statement of environmental effects to be submitted as part of the development application. You will need to engage an environmental planning consultant to prepare a statement of environmental effects to assess the impact of the burn.

The statement of environmental effects may also outline recommendations relating to avoiding, minimising or offsetting any potential impacts of the fire. These recommendations must be included in the operational burn plan.

You are encouraged to visit your Local Government website for more information.

Burns permissible without consent

In some circumstances a burn may be permissible without consent and be classified as an activity under Part 5, Division 5.1 of the EP&A Act. An activity under Part 5, Division 5.1 of the EP&A Act requires an environmental assessment to be carried out before a determining authority grants approval for the activity. If the BCT is considered to be the determining authority of the activity, the BCT will not endorse a burn.

Cultural burning note

If Aboriginal landholders engage an environmental consultant to prepare the planning and approval documents, they are encouraged to explain the burn pattern and timing of the burn.

Cultural burning has variable timeframes, specific thresholds, and can occur at multiple times throughout a year. It is recommended that Aboriginal landholders and Aboriginal fire practitioners talk to their consultant about preparing a statement of environmental effects for a program of burning throughout the year or across multiple years, instead of a single burn event.

The mosaic pattern of cultural burns mean only portions of land are burnt at any one time; this is important to explain as this may mean that certain approvals are not required.

Working with the environmental consultant ensures that environmental planning approval reflects how cultural burning will be undertaken.

Other legislation and policies which may apply

Where the burn is assessed under the EP&A Act, other legislative approvals or restrictions may apply. BCT recommends that you engage your environmental planning consultant to assist you through this process.

Further information is included in Appendix D.

Permits and approvals

There are a number of additional approvals and permits which include:

- notice of the intention to burn
- approval to burn in the open (if applicable)
- fire permit (if applicable).

Table 2 summarises the likely permits and approvals which may be required to implement a burn. You will need to consider the circumstances for each burn event.

Table 2: Summary of permit and approval requirements.

Planning approval pathway	**Who is implementing burn**	**Approvals and permits required to be obtained by the landholder**		
		Notice of intention to burn	Approval to open burn	Fire Permit
Bush Fire Hazard Reduction Certificate	NSW RFS	Yes – unless otherwise arranged by NSW RFS	No	No
	Other	Yes	No	Yes
EP&A Act - exempt development (BSAs)	NSW RFS	Yes – unless otherwise arranged by RFS	Yes	Yes
	Other	Yes	Yes	Yes
EP&A Act (CAs and WRAs)	NSW RFS	Yes – unless otherwise arranged by NSW RFS	Yes	Yes
	Other	Yes	Yes	Yes

Notice of intention to burn (burn notice)

Where a burn is to be implemented, you are required to provide notification prior to the burn occurring. This is called a burn notice.

The burn notice must include:

- the name of the person proposing to light the fire
- the location, purpose, period, and time of the fire proposed to be lit.

The notice is to be provided to the owners and/or occupiers of all adjacent land, including those across roads and waterways from the agreement area, and the local NSW Fire Control Centre.

This notice must be provided in writing more than 24 hours ahead of the burn and a copy of the burn notice saved for your records.

You can notify the NSW RFS via their online form 'Notify us of your planned burn'.

For more information on notification requirements see the NSW RFS Publication 'Before you light that fire'.

Approval to open burn

To implement a burn without a Hazard Reduction Certificate, you may need approval to burn in an open area (Opening Burning approval) under the *Protection of Environment Operations (Clean Air) Regulation 2021* (Clean Air Regulation).

The Local Government Area where the burn is proposed will determine whether an Open Burning approval is required under the Clean Air Regulation. The Local Government Area will also determine which agency will review the application.

Schedule 1 of the Clean Air Regulation identifies the burning approval requirements for different government areas.

For more information on open burning see the NSW EPA webpage 'Open burning – reducing air pollution from fires'.

Fire Permits

A fire permit is a fire safety approval from the NSW RFS or FRNSW. It sets the rules around how a fire is lit and maintained, and outlines when fire activities are occurring.

FRNSW district

If the land is within a FRNSW Fire District, a fire permit is required all year round. This is because of the risk to buildings and infrastructure is present at any time of the year.

You are encouraged to contact your local fire station for a permit. The FRNSW webpage, Find a Fire Station will help you find your closest FRNSW station

For more information visit the FRNSW webpage, Fire Permits

NSW RFS district

For land within a NSW RFS district, a Fire Permit will be required if the burn is to be implemented within the statutory bush fire danger period. A fire permit may also be required outside of the bush fire danger period depending on the scope of the burn and the location of built assets in proximity to the proposed burn.

Under the RF Act, a fire permit may only be issued if:

a. a bushfire hazard reduction certificate has been issued for that purpose; or
b. any approval, consent or other authority required for the purpose under the EP&A Act or any other law has been given; or
c. lighting a fire for the purpose does not contravene any other Act or law.

BCT recommends that you contact your local Fire Control Centre to determine if a fire permit is needed. You must ensure you are aware of the start date of the statutory bush fire danger period in your Local Government Area and whether it is varied by the NSW RFS.

NSW RFS webpage, Bush Fire Danger Period and Fire Permits.

Navigating approval pathways to implement a burn – an example

A landholder wants to implement a burn within their CA to assist the regeneration of fire dependant species on site. Burning is not specifically outlined as a management action in the agreement so they have spoken to their BCT regional contact about whether burning is an appropriate action. The BCT regional contact has confirmed that burning is appropriate and will contribute to biodiversity conservation.

The conservation area is located within the Shoalhaven City Council area. The burn is considered to be development for the purposes of the EP&A Act and it falls within the definition of environmental protection works in the Shoalhaven Local Environmental Plan 2014 (Shoalhaven LEP).

Using the map in the Shoalhaven LEP, the landholder has identified that their land is zoned as RU2 Rural Landscape. Environmental protection works are permitted with consent in Zone RU2 Rural Landscape in the Shoalhaven LEP. The circumstances relating to this burn mean the burn can be considered environmental protection works, and this means that the burn may only be carried out with development consent.

The landholder will need to have a statement of environmental effects prepared and submitted to the Shoalhaven City Council with a development application. The landholder employs a consultant to prepare the statement of environmental effects. The consultant also confirms:

- where development consent the burn is provided under the EP&A Act, burning does not require approval under the Local Land Services Act
- the Biodiversity Offset Scheme (BOS) does not apply to the burn
- a biodiversity conservation licence is not required because the burn will be assessed and approved under Part 4 of the EP&A Act.

The Shoalhaven City Council considers the development application and statement of environmental effects and provides development consent to carry out the burn.

Once the landholder has been granted development consent from Shoalhaven City Council, the landholder:

- confirms no approval is required under the Clean Air Regulation
- contacts their local Fire Control Centre to apply for a fire permit
- notifies all the surrounding landholders at least 24 hours prior to burning.

Stage 5. Preparing a strategic burn plan

What is a strategic burn plan?

A strategic burn plan is used to document the long-term and adaptive approach to burning within the agreement area. It outlines how the burn units and associated burn regimes will be implemented to support the desired outcomes and overall conservation objectives. The preparation of the plan is informed by the information gathered during stages 1 to 3 of this guide. The strategic burn plan is also used to inform operational burn plans (stage 6).

The strategic burn plan could be used by a landholder to assist the preparation of planning approval for a schedule of burns.

A strategic burn plan does not replace a property-scale bush fire risk management plan. You are encouraged to prepare a separate bush fire risk plan for your entire property which may include management of fire fighting infrastructure within the agreement area.

Who prepares a strategic burn plan?

A strategic burn plan is to be prepared by a fire planner who has experience in fire ecology and/or cultural burning.

When engaging a fire planner you should request confirmation of their qualifications, and of their experience in preparation of strategic burning documents, fire ecology and fire management. Fire planners should be able to show you examples of similar plans they have previously prepared and be able to confirm that these plans have been successfully implemented.

You should confirm that the fire planner has the appropriate and current insurance such as third party, and personal and public liability insurance.

What is the BCT's role in reviewing the strategic burn plan?

The BCT is responsible for reviewing and endorsing the ecological components of the strategic burn plan. The review would include confirming that the plan is designed to support biodiversity conservation outcomes, adequately protects cultural and ecological assets, and that the burn regime and burn units are appropriate to achieve the agreement objectives.

How does a strategic burn plan relate to my agreement?

The requirements and timing to prepare a strategic burn plan varies with agreement type (Table 3).

Table 3: The requirement, location and timing of a strategic burn plan for different agreement types.

Agreement type	Is a strategic burn plan required?	Location of strategic burn plan	Preparation timing
BSA	Yes	Strategic burn plan forms part of the BSA management plan as the Fire for Conservation plan.	As part of the BSA.
CA – Conservation Management Program	It depends. In some circumstances it will be required as part of the management plan.	Document that supports the CA. May form part of the agreement.	Dependent on the relevant Conservation Management Program.
CA - conditions of consent	Yes	Document that supports the CA.	Generally, as part of the CA.
CA – Conservation Partners Program and WRA	No A landholder may choose to prepare a strategic burn plan.	Document that supports the CA or WRA. Generally does not form part of the agreement.	As required.

BSA note:

The strategic burn plan is expected to be submitted as part of the 'Fire for Conservation Management Plan' component of the BSA application.

This document will outline the frequency of the burns that are planned to occur, actions to prepare for burn implementation, and the scope of the burns. Preparing the plan at this stage is crucial to allow for the relevant management action costs to be included in the Total Fund Deposit (TFD).

All information in the Plan and the associated costings must be sufficiently justified in the BSSAR.

What needs to be in the strategic burn plan?

The strategic burn plan outlines the burn regime and burn units for the agreement area. It must also describe how the burn regime will be implemented over time to achieve the defined objectives within an agreement area. It must also outline who will implement the burn.

An example of the scope of a strategic burn plan is provided in Appendix E.

Why does the strategic burn plan outline who will implement the burn?

The scope and proposed method of the burn may influence who is able to implement the burn to achieve the desired outcomes. For example, Aboriginal cultural burning can only be undertaken or led by Aboriginal fire practitioners.

The strategic burn plan will outline the relevant experience and/or qualifications required to implement the burns.

Examples of appropriately qualified fire practitioners who may implement the burn to deliver the desired outcomes include:

- Aboriginal fire practitioners
- ecological contractors who specialise in burns
- NSW RFS
- landholders with the relevant experience to implement the burn.

It is important that the strategic burn plan is provided to the practitioner who will prepare the operational burn plan and implement the burn.

Non-Aboriginal landholders engaging Aboriginal fire practitioners

Non-Aboriginal landholders can engage Aboriginal fire practitioners to undertake culturally informed burns or cultural burns.

Where a strategic burn plan is required, the document must be submitted to the BCT to confirm that it is consistent with the agreement and can achieve the objectives of the agreement.

Traditional Seasonal Calendar

This section is relevant for Aboriginal landholders.

What is a traditional seasonal calendar?

A traditional seasonal calendar illustrates the relationship between the changing of the seasons, the interactions with the landscape, food sources, bio-cultural indicators, flora, and fauna. Traditional seasonal calendars also document indicators which show when it is, and when it is not, safe to burn country. Traditional seasonal calendars are prepared using traditional ecological knowledge and traditional knowledge systems developed over tens of thousands of years.

Can a Traditional Seasonal Calendar be used?

Yes, where Aboriginal landholders are continuing or re-introducing burning within their agreement area, a Traditional Seasonal Calendar is encouraged to be used or prepared as part of a strategic burn plan.

At this time, BCT does not support non-Aboriginal landholders requesting preparation of a Traditional Seasonal Calendar for their land.

What is BCT's role in reviewing Traditional Seasonal Calendars?

Where cultural burning is being re-introduced on Aboriginal-owned land review of the burning component of Traditional Seasonal Calendars will be undertaken by BCT as part of the due diligence process. The review would be focused on confirming no cultural assets, threatened species, or threatened ecological communities are negatively impacted by the burn and that the intellectual property of the knowledge remains with the knowledge holder or community.

Is funding available to prepare a Traditional Seasonal Calendar?

The BCT may provide funding for Aboriginal landholders to prepare a Traditional Seasonal Calendar, see Appendix H for more information.

Stage 6: Preparing an operational burn plan

What is an operational burn plan?

This plan informs and guides the on-ground site preparation for a burn and implementation of a single burn event. The strategic burn plan provides guidance on ecological considerations to inform the preparation and scope of the operational burn plan.

The plan is used to document the objectives of the burn and the methodology that will be used to achieve the objectives. It is also used to outline available resources and safety measures that will be put in place to manage risks.

The operational burn plan is to be consistent with, and is used to implement, the burn as outlined in the strategic burn plan (stage 5). An operational burn plan is required before the implementation of each burn within an agreement.

Who prepares an operational burn plan?

An operational burn plan is prepared prior to each burn event by a fire practitioner, who is usually the person who will implement the burn.

The strategic burn plan will outline the experience and/or qualifications of the person who will prepare the operational burn plan.

What needs to be in the operational burn plan?

The operational burn plan is the on-ground guide to implementing the burn. The content and detail of an operational burn plan will vary from site to site. Generally, burns which are large, or to be implemented in urban areas or complex environments, will have more detailed and complex operational burn plans.

An example operational burn plan is outlined in Appendix F.

What needs to be considered in an operational burn plan for the burn to be consistent with a PLC agreement?

Every PLC agreement is different and the reasons for burn implementation will also vary.

To be consistent with the terms of an agreement, the operational burn plan will need to outline how the planning, pre-burn site preparation and implementation of the burn aligns with the objectives and recommendations of the strategic burn plan. Where a strategic burn plan is not required, the

operational burn plan must outline how the principles of this guide have been applied. For example, the plan may document how implementation of the burn will:

- Follow the recommendations of the strategic burn plan in relation to factors such as burn timing and intensity.
- Be implemented in a manner that is appropriate for the protection of species likely to occur on the site.
- Contribute to the maintenance or improvement of the specific biodiversity values of the site or be part of a cultural practice.
- Minimise and mitigate specific ecological impacts.
- Prevent impacts on the cultural assets within the agreement area.
- Where applicable, address the conditions as outlined in the Bush Fire Hazard Reduction Certificate or relevant environmental planning approval.

General actions that can be implemented during pre-burn site preparation to minimise adverse impacts on ecological or cultural assets may include:

- A walk through of the burn area to flush out animals.
- Removal of biomass from around the base of cultural and ecological assets including, but not limited to, Scar Trees and significant hollow bearing trees.
- Remove or wet down vines from trees to prevent fire using the vines to enter the tree canopy.
- Where a cool burn is to be undertaken – the manual and/or mechanical removal of excess biomass such as exotics to reduce the fuel load.
- Wetting down or establishment of wet lines if water supply is sufficient.
- Control line planning to:
    - avoid areas of threatened species or ecological assets
    - avoid cultural assets
    - minimise clearing, where possible
    - use existing landscape features or tracks to minimise the need for clearing all biomass, where possible.

When the burn is implemented, the following principles can be considered to minimise adverse impacts to ecological and cultural assets:

- managing the burn to minimise flame and scorch to the canopy
- monitoring
- timing the burn to avoid key breeding seasons of threatened species
- not undertaking a burn during or immediately following site or landscape-scale disturbances such as bush fire, drought or flood.

The strategic burn plan will outline additional considerations for the burn implementation that are specific to the site and the associated ecological objectives of the burn.

What is BCT's role in reviewing the operational burn plan?

The BCT does not have a role in approving or endorsing the operational burn plan.

The BCT will review the operational burn plan to confirm that it reflects and does not compromise the objectives as outlined in the strategic burn plan or the PLC agreement.

Items that the BCT will check are only related to the ecological outcomes and protection of cultural and ecological assets. This will include confirmation that the timing and extent of the burn is in line with the strategic burn plan, that any new landscape disturbances or impacts of clearing for control lines have been taken into consideration, and that all ecological and cultural assets are appropriately managed.

BSA note:

The TFD is expected to include:

- the cost of an appropriately qualified person to prepare an operational burn plan, prior to each burn event
- the cost of obtaining the relevant permits and notifications
- the cost of implementing each burn event.

The Fire for Conservation Management Plan will be used to inform operational burn plans.

Stage 7: Maintenance, monitoring and annual reporting

Maintenance and post-burn management actions

Fire is a natural disturbance within a landscape. The response of the site to the burn will be dependent on a number of factors including the intensity, method and timing of the burn, the history of disturbances and the resilience of the site.

Following the implementation of a burn, the burnt area will be very sensitive to disturbance and the best action to take is to rest the site (e.g. exclude grazing and not undertake revegetation activities) and minimise soil disturbance. The area should be observed, effects of the fire noted, and the site allowed to naturally regenerate.

Weed and pest control is likely to be required following the burn and the subsequent years. Weeds that are unlikely to be burnt during the fire should be removed prior to the burn. Follow up weed control should always be prioritised following a burn.

More information is available on the BCT website via the BCT R.E.N.E.W.S Conservation area recovery post-fire fact sheet, which provides monitoring guidance for landholders following a bush fire event.

You are encouraged to contact your BCT regional officer for further advice on post-burn management actions.

Monitoring and record keeping

Monitoring is conducted for a number of purposes, including establishing baselines (i.e. measuring conditions before or just after management actions), to detect trends (changes in condition in a certain direction) and to measure the cumulative effects of management actions.

Monitoring before and after burns can be guided by a combination of traditional ecological knowledge systems, scientific principles, technology, language and experience of the parties involved.

Cultural monitoring

BCT recognises traditional ecological knowledge is the appropriate knowledge system for monitoring the outcomes of a cultural burn.

Cultural monitoring is used to understand a burn, the burn methodology and how species have responded to a burn. Cultural monitoring will include looking at species profiles and identifying specific monitoring techniques for each species at certain timeframes. This can be informed by a traditional seasonal calendar.

Each community will have its own cultural monitoring design and the BCT recognises that each cultural group will have its own monitoring framework. The BCT recognises that spirit and ceremony are important components of cultural monitoring.

Indigenous community-based monitoring systems and techniques are implemented before and/or following a burn to identify community-based indicators such as:

- vegetation health
- bio-cultural indicator species
- species of cultural significance
- cultural keystone species
- changing seasons
- changing climate
- community wellbeing
- intergenerational knowledge transfer.

Cultural monitoring uses these indicators to understand the success of a burn. For example, where there is an instant influx of insects and other species, including native bees and lizards, this is considered a good burn.

With climate change, cultural monitoring techniques can provide information on seasonal variability over a range of time scales, including visual patterns of variations over periods of time, such as weeks, months and years.

Where cultural monitoring is being re-introduced into a landscape, BCT is available to assist Aboriginal landholders identify techniques for monitoring country.

It is acknowledged Aboriginal communities may want to engage in monitoring co-design with the BCT or research institutions. Where there is a partner in monitoring, the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) Code of Ethics must apply.

BCT are currently developing cultural monitoring guidelines. Please speak to BCT for more information.

Optional landholder data collection and monitoring – contributing to citizen science

Citizen science is scientific work undertaken by members of the public, often in collaboration with or under the direction of professional scientists and scientific institutions.

The BCT has a strong interest in collecting data on the conservation outcomes of the specific management actions on BCT agreement sites. This is generally facilitated by the Ecological Monitoring Module (EMM) implemented by BCT staff (or Accredited Assessors for BSAs). However, all landholders are encouraged to get involved in the BCT's citizen science initiatives, which encourage interested landholders to collect and share data related to the management actions they are undertaking on their site. This information is ultimately used to increase knowledge about biodiversity management and outcomes and improve BCT's guidance for landholders.

For example, data that you are encouraged to collect following fire on your property includes:

- information on the scale and intensity of any unplanned fire
- anecdotal observations of changes in the prevalence of different plants or animals

- observations of ecosystem recovery (e.g. germination and resprouting of plants)
- observations of any erosion
- observation of any changes to surface water flows or water quality (e.g. sedimentation).

You may choose to undertake additional monitoring of the recovery of areas after a burn. This could include:

- increased photo point monitoring before and after the burn. For example, a suggested regime is a frequency of monthly photo point monitoring for the first six months and then every three months for the year following that.
- use of remote cameras or acoustic recorders to detect fauna before and after the burn (discuss access to equipment with BCT staff).

Landholders interested in opportunities to contribute to BCT citizen science programs are encouraged to contact the BCT for more information.

Annual reporting record keeping

Landholders who have entered into Conservation Management Program (funded) agreements or BSAs submit annual reports to the BCT. Where a burn has been completed, records of the burn must be submitted as part of the annual report.

BSAs

The information collected during the post burn monitoring, as per the management plan template, is to be submitted as part of the landholder annual report.

Following the implementation of a burn, you are expected to collect data about the burn in accordance with the relevant annual reporting and monitoring templates. This information is to be submitted to the BCT as part of the subsequent annual report and can be used to assist in adaptive management.

Data that must be collected includes, but is not limited to:

- area burned (hectares)
- map of the areas burnt
- date of the burn
- organisation or persons who implemented the burn
- burn intensity and methodology
- cost of the burn planning and implementation.

Ecological monitoring guidance and the BCT Ecological Monitoring Module

The BCT Ecological Monitoring Module (EMM) provides a framework for monitoring biodiversity responses to management at all agreement sites. The EMM Operational Manual outlines how and when ecological response monitoring is to be undertaken (generally by either BCT staff or, for BSAs, accredited assessors).

The requirements for ecological response monitoring under the EMM vary depending on the agreement type, management regime and biodiversity values at the site. Accredited assessors working to prepare a BSA application must include ecological response monitoring designed in line with the EMM Operational Manual and guidance below.

Monitoring design (BSAs and CAs)

In general, the objective of post-fire monitoring under the EMM is not to track all the small-scale changes associated with site recovery after a burn, as this has been well-documented in the scientific literature. Instead, ecological response monitoring, following a burn aiming to achieve conservation objectives, should be designed to understand whether the condition of biodiversity has improved compared to unburned control sites and compared to conditions at the site prior to the burn over the medium to long term.

The primary consideration for monitoring design is the purpose and objective of any planned burning. These objectives are identified in stage 2 of the BCT burn framework and detailed in the strategic burn plan. If the objective of burning is to maintain or establish a fire regime with the appropriate frequency and intensity for a particular vegetation community, with the objective of maintaining overall condition, then the default monitoring approach prescribed by the EMM would be appropriate. However if the conservation objective is more specific, for example, to support a particular fire-dependent threatened species (e.g. a threatened orchid) by stimulating reproduction, then monitoring should be designed specifically to measure this response.

For more detail, see the EMM Operational Manual on the BCT website.

Figure 8 BCT staff conducting ecological monitoring with a landholder (Source: Coral Latella)

Stage 8: Adaptive management

As the impact of fire on an ecosystem is difficult to predict, the BCT recommends taking an adaptive management approach to implementing fire as a management action. Adaptive management involves designing management actions and monitoring to build our understanding of the effectiveness of different management approaches. Regular biodiversity monitoring across all PLC agreements, guided by the Ecological Monitoring Module (EMM) supports the implementation of adaptive management at both the site and program scales. The BCT uses the information collected and knowledge generated to continually refine and improve the ecological management advice it provides to landholders. These monitoring data, traditional ecological knowledge and data on burn implementation can all also be used to inform adaptive management approaches specific for your site, in consultation with the BCT.

Review of strategic burn plan

BSAs

The Fire for Conservation Plan in a BSA will be reviewed every five years as part of the five-year management plan review process. The BCT and the landholder will discuss the effectiveness of the current plan and the BCT will advise the landholder whether it is recommended that the plan is updated by an appropriately qualified person.

For existing agreements without strategic burn plans or clear burn outcomes, the five-year management plan review is an opportunity to enable these agreements to be brought in line with this guide and the EMM.

CAs established under the Conservation Management Program

The Strategic Fire Plan will be reviewed as part of the review of the agreement management plan, which occurs every five years.

The BCT will work with landholders to support them during the five-yearly management plan review.

Appendix A – Glossary

Term	Description
Aboriginal Cultural Asset	An area or object of significance to Aboriginal people.
Accredited assessor	A person accredited by the Department to apply the Biodiversity Assessment Method.
Bush Fire Environmental Assessment Code	A streamlined environmental assessment process for use in determining bush fire hazard reduction certificates.
Burn interval	Also referred to as fire interval, the timing and frequency of burns to be implemented for a burn unit for the desired ecological and/or cultural outcomes. Stated as the upper and lower thresholds for the burn frequency or time between burns.
Burn regime	For the purpose of this guideline refers to the timing (e.g. seasonal conditions), intensity, and frequency of the burns to be implemented for a burn unit. This includes when the next burn event should occur, and the time of year or triggers for burn implementation.
Burn unit	Discrete areas of vegetation with the same general fire requirements to which a burn will be applied.
Cultural species	Culturally important species which are highly significant for local people, with prominent functional roles in their diet, materials, medicine, cultural identity and/or spiritual values (Cristancho & Vining, 2004; Garibaldi & Turner, 2004).
the Department	Department of Planning and Environment.
Fire ecologist	A scientist that studies the role of fire in ecosystems.
Fire for Conservation Plan	A sub-plan within the BSA management plan that functions as the strategic burn plan.

Fire planner	A person who has experience in strategic burn preparation. They set parameters for when a burn is appropriate and the triggers to implement a burn. This can include an Aboriginal person who prepares Traditional Seasonal Calendars.
Fire practitioner	An individual with suitable experience and/or qualifications in implementing burns. This may include an Aboriginal fire practitioner, prescribed burning contractor, NSW Rural Fire Service, or a landholder.
Hazard reduction	Activity undertaken specifically to reduce or manage material (fuels) that can carry a bush fire.
Hotspots Fire Project	A program jointly managed by the Nature Conservation Council of NSW and the NSW RFS to assist landholders manage their bush fire risk in an ecologically sensitive manner.
Operational burn plan	A site-specific document that informs and guides the on-ground site preparation for a burn and implementation of a single burn event within an agreement area.
Precautionary principle	The precautionary principle states that where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.
Strategic burn plan	Site specific document developed to plan the long-term implementation of burning within an agreement area.
Vegetation formation	Broad NSW vegetation classification as per Keith (2004).

Appendix B – Site assessment

This appendix outlines the site assessment approach to collect information which will inform the strategic burn plan.

Confirm the vegetation formation, Plant Community Type (PCT) and species present within the agreement area

The vegetation formation, PCT and species present within the agreement area are important factors to consider when determining burn units and appropriate burn regimes. The desktop and field-based site assessment will be used to identify and map the location of the PCTs and threatened species or significant cultural species which are present within the agreement area.

The precautionary principle should be applied when preparing the species list. For example, fire sensitive threatened species identified as likely present should be considered, even if not directly observed on site.

Presence of threatened fire dependent and fire sensitive species

Desktop and field-based site assessments should also consider the presence or likely presence of fire dependent and fire sensitive threatened species.

This includes species which:

- may require fire, heat, or smoke for recruitment (fire dependent); or
- do not require fire for recruitment and have no specific adaptation to avoid or survive a fire, or recruit after fire (fire sensitive).

The presence of fire sensitive species may not prevent burns from being implemented. However, they must be considered when establishing burn regimes, burn units and buffer areas, and appropriate justification provided. The establishment of an appropriate strategic burn plan will assist in minimising the risk to these species.

Appendix G provides further information on resources that you can use to investigate the fire dependency or sensitivity of the vegetation formations, PCTs and threatened species you identify on your site.

Prevalence and diversity of weeds within the landscape

Weeds present within the agreement area and in the surrounding landscape may influence how burning is applied to the site and the specific burn method. For example, some weed species can be managed using fire, whereas others may actually benefit from a burn. Similarly, the presence of a species may increase the intensity of a fire, increasing the risk of negative impacts on other species

present. Understanding the species present and their ecological response to fire will assist in determining conservation objectives (stage 2) and the best fit fire regime (stage 3). This information is also important to inform the scope of any post-burn management actions (stage 7).

The site assessment will record:

- weed species present in moderate to high density requiring management within the agreement area
- specific weed species present that are known to be favoured by fire
- weeds in the landscape defined as weeds of national significance (WONS) or those that meet the definition of high threat weeds in the Biodiversity Assessment Method.

Site conditions

Site conditions should be reviewed to inform how a burn is likely to behave. This information will be considered when preparing a strategic burn plan and to inform operational burn plans.

The site conditions should be documented in accordance with best practice processes during the site assessment. Site conditions reviewed may include, but are not limited to:

- topography and slope of the agreement area and surrounding area
- soil type and moisture
- climatic and rainfall trends and conditions
- a general description of current fuel load and fuel type.

Built, Cultural and ecological assets sensitive to fire

Aboriginal Cultural Heritage

During the site assessment, the presence of known Aboriginal Cultural Heritage objects and places will be reviewed. Accredited assessors should review the BSA Application Supporting Document Guide for more information.

Burning and the associated activities **must not** negatively impact upon Cultural Heritage objects and/or places. Impact may be caused by the fire itself, from smoke or through disturbance to the groundcover or vegetation. It is an offence under the *National Parks and Wildlife Act* 1974 to damage Aboriginal objects and/or places without an Aboriginal Heritage Impact Permit and the BCT will not approve management actions where there may be an impact to an Aboriginal object and/or place.

The BCT will provide guidance on avoiding direct or indirect impacts to Aboriginal Cultural Heritage items so this information can be incorporated into burn planning and implementation. In most circumstances, this will be the exclusion of fire from an appropriate radius around the item or relocating control lines.

Recorded Aboriginal objects and/or places will be identified as part of BCT due diligence processes when establishing an agreement. The BCT recognises that not all Aboriginal heritage items are recorded within the existing Aboriginal Heritage Information Management System, especially on

private land where formal surveys have not been undertaken. If Aboriginal objects and/or places occur on a property, a cultural heritage expert may need to be engaged to locate these before any burns are undertaken and advise on how they can best be protected. This information can inform part of the strategic burn plan as outlined in stage 5.

Conservation assets that are sensitive to fire

The BCT or accredited assessors will survey the site for the presence of conservation assets that are sensitive to fire, and provide guidance for how these should be managed prior to and during the implementation of a burn. In most cases, this will involve excluding fire within an appropriate radius around the asset. This may be achieved through the creation of a buffer around the asset, clearing fuels from around the asset in the case of a specific tree, or complete exclusion of fire from the relevant management zone.

Conservation assets known to be sensitive to fire include:

- hollow bearing trees
- fallen hollow logs
- fire sensitive threatened plant and animal species
- the habitat of threatened species that are sensitive to fire
- certain soils (such as peat and those with high erosion potential)
- vegetation formations and PCTs which do not recover well from fire such as wetlands riparian areas and rainforests
- fire sensitive cultural species.

In addition to conservation assets known to be sensitive to fire, the BCT acknowledges that there are many species for which fire sensitivity is unknown. Furthermore, some species may not be considered fire sensitive, however a burn may have negative impacts due to factors such as the small size of the population, or the isolated, fragmented nature of the site. This risk will be managed by adhering to the burn principles when planning burns, and through ongoing monitoring.

The presence, location and extent of conservation assets which are sensitive to fire will be mapped during the site assessment and included in the strategic burn plan (Stage 5). The post burn monitoring will also provide opportunity to review the success of measures to protect these assets, and determine adaptive management strategies which can be applied to future burns if needed.

Existing landscape and site disturbances

The scale and timing of disturbances experienced within the site and the surrounding landscape will be used to inform the burn regime, including when the next burn event can be implemented. The type of disturbance can range from extreme weather events to inappropriate land management or bush fires. For example, where the surrounding landscape has recently experienced a bush fire event, it may not be appropriate to proceed with a planned burn within an agreement area as the area may be providing an important refuge for animals and recruitment source for the recovery of the burnt areas.

Fire history of the landscape

The fire history can help the BCT, fire planners and accredited assessors to understand the past fire disturbance regime and gain insight into the current species composition and structure. It will also help build a picture of previous land management and the likely resilience of the site. This information will inform development of the strategic burn plan and assist decision making for implementing a burn.

Fire history information may include:

- the last year the site and surrounding landscape was burned
- the location, extent, and intensity of the last fire
- the reason for the last fire e.g. cultural burn, bush fire, hazard reduction burn
- if the burn is to be implemented by Aboriginal fire practitioners, they will take into consideration the traditional fire regime of the landscape.

There are several sources for this information including:

- landholder and local residents
- traditional owners[5]
- the local NSW RFS district office
- bush fire boundary spatial data[6]
- signs in the landscape such as burn scars, charcoal, or biomass levels
- history museums and libraries and online databases[7].

The fire history, combined with identifying a burn regime (stage 3), will help identify the timeframe for the next burn and ensure that a burn is not implemented too soon.

Resources which may assist with determining the fire history of the agreement area are in Appendix G - Relevant resources.

Existing disturbances

Existing disturbances or stresses are those that may impact the ability of the burn to achieve the desired ecological outcomes, or influence when the first burn can be undertaken.

Existing disturbances may be specific to the agreement area or be operating at landscape scale. Forecasts should be checked for disturbances such as extreme weather events... Other impacts such as existing management actions where the timing is known to you can be factored into burn planning.

Disturbances may include, but are not limited to:

- drought
- bush fire
- floods
- vehicular impact

[5] It is acknowledged that Traditional Ecological Knowledge is the Intellectual Property of Aboriginal Traditional Owners and may not be shared with non-Aboriginal people. Where this information is shared a fee and an Intellectual Property Agreement will be associated with providing this information.
[6] This data is available via SEED - Wildfires and Prescribed Burns spatial data see Appendix 1 for more information.
[7] Trove, managed by the National Library of Australia, is an example of an online database which can be used to research fire history.

- ground disturbance such as erosion or landslips
- grazing (including over-abundant native herbivores)
- ecological thinning
- plant pathogen infestations (e.g. *Phytophthora cinnamomi*).

Introducing fire following these disturbances is more likely to have an overall negative impact or not meet the desired management objectives. In some circumstances, it will be better to delay a burn until the site has recovered from the disturbance. This timeframe will be dependent on the impact of the disturbance on the plant community type or threatened species.

The strategic burn plan must account for the possibility of these disturbances occurring in the future and indicate when contingency strategies will be considered. In the event of a disturbance event occurring, the strategic burn plan should be modified accordingly, noting the change for when the next burn event should occur and why.

Implementing burning following landscape scale bush fire

You should be aware that where the landscape has been impacted by bush fire, the burning of an unimpacted agreement area as a management action may not be appropriate until the surrounding area is sufficiently regenerated.

The agreement area may act as a refuge for fauna and be an important seed source for flora.

If you are concerned about managing and minimising your bush fire risk, you are encouraged to talk to your NSW RFS district office in consultation with the BCT to investigate alternatives, or how a burn can be implemented to minimise biodiversity impact.

Existing management issues

The site will be assessed to determine if there are existing management issues to be addressed before a burn is undertaken within the agreement area. Minimising existing management issues can improve how the agreement area responds to a burn.

Existing management issues may include:

- inappropriate grazing regimes
- presence of fire tolerant invasive grasses
- presence of high fuel loads in a specific location.

This information will be included in the strategic burn plan.

Bush fire management zones and bush fire risk management infrastructure

You are expected to engage with your local NSW RFS and review documents prepared by the relevant Bush Fire Risk Management Committee (if active in the area) to understand how the PLC agreement should consider:

- the Bush fire Risk Management Plan for the area
- the current Community Protection Plan (if existing)
- any other relevant strategies.

Bush fire management zones

Bush Fire Management Committees identify Bush Fire Management Zones in developing Local Bush Fire Risk Management Plans. The zones applied within these plans may influence how frequently burns should be undertaken for bush fire hazard reduction purposes.

In some cases, the frequency of burns specified in a plan may not support all the management objectives of the agreement. For BSAs this may impact the potential of areas to achieve a gain in biodiversity values.

The following zones (if present) need to be identified:

- Strategic Fire Advantage Zone
- Land Management Zone
- Asset Protection Zones (community scale).

Each zone has a specific purpose and may have specific management objectives. The relevant NSW RFS district office should be contacted for advice on how these areas are, and will be, managed.

This information is important to differentiate burn units in stage 3 and is also a major consideration in developing an agreement.

Bush fire risk management infrastructure

The NSW RFS provides advice on essential infrastructure that can reduce the risk of damage to life and property in bush fire prone areas. These include identifying available water sources for fire-fighting activities, providing access by emergency vehicles and the protection of property.

The following infrastructure is to be documented and mapped during the assessment of the site:

- Existing water sources such as:
    - reticulated (piped) water
    - water holding structures (tanks, dams, swimming pools etc).
- Existing or future fire infrastructure such as:
    - fire breaks
    - fire trails
    - fire truck turning bays
    - property scale asset protection zones.
- Existing or future infrastructure that may be dangerous to fire authorities such as waste disposal locations, fence wire and explosive materials.

Managing risk also involves identifying factors on site that may increase the risk of damage to life and property such as the presence of flammable materials on site, or the presence of powerlines.

Appendix C – Defining burn regime and burn units

This section provides guidance on defining burn regimes and burn units. The below framework is expected to be used by all practitioners who prepare strategic burn plans.

Framework for defining a burn regime and burn units

Determining a burn regime requires an understanding of the fire ecology of the plant and animal species at the site. In stage 1, information on the vegetation formations, PCTs and the presence of fire dependent or fire-sensitive species should have been collected as part of the site assessment. This information will form the basis for determining the appropriate fire regimes for the site. For example a dry sclerophyll forest community may be burnt in a mosaic pattern at an average frequency of once every 25 years (with variable longer or shorter intervals), but fire exclusion would be suitable for a rainforest.

It is important to note that there are limitations to the availability and accuracy of data on appropriate burn intervals and burn intensity for species and vegetation types in NSW. This can can make determining a burn regime challenging. However, many of the resources outlined in the following section are reviewed and updated periodically.

The following framework (Figure 8), outlines a hierarchical approach to determining an appropriate burn regime. The regime is determined by first considering the recommended fire intervals for the vegetation formations and/or Plant Community Types (PCTs) onsite. The regimes are then refined by considering the requirements of any threatened species known to occur onsite, and your specific management objectives. The final step involves identifying individual burn units and their associated burn regime.

The overall aims when identifying a burn regime using the framework and available resources should be to:

- Minimise the risk of a burn having a detrimental effect on the species and communities identified as being present.
- Identify a burn regime suitable for the majority of species within the burn unit.
- Prioritise the requirements of any threatened plants or animal species known to occur on site.

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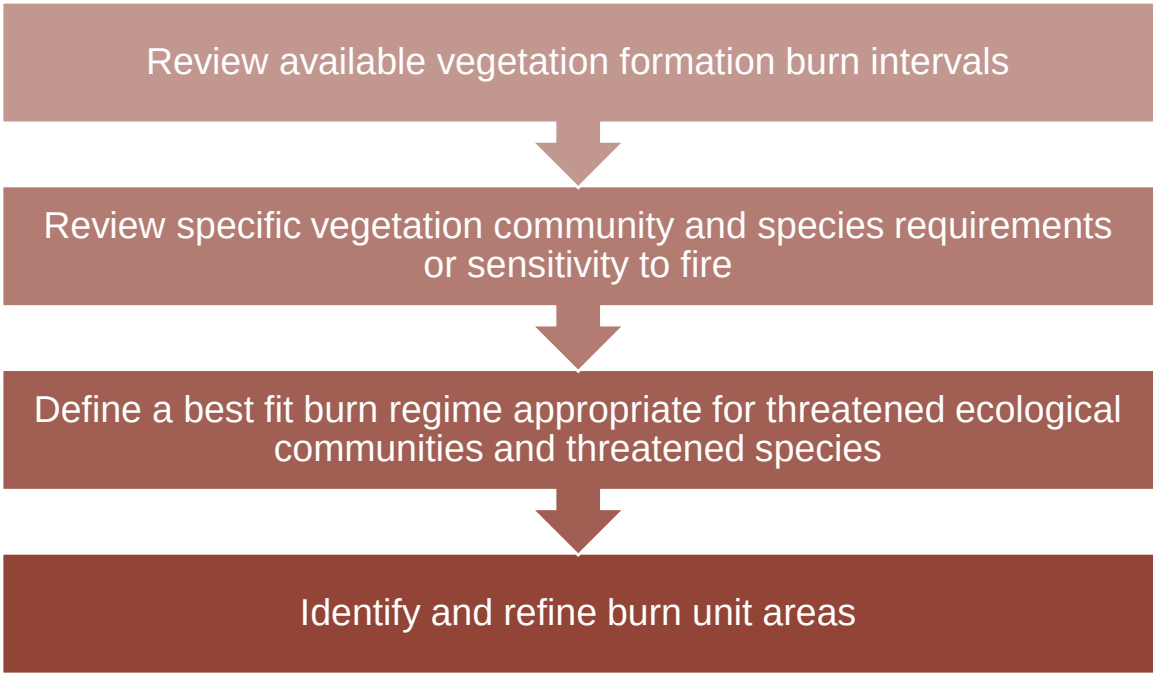

Figure 8 Framework to determine burn unit areas and burn regimes for an agreement area

Review available vegetation formation burn intervals

The first step in determining an appropriate burn regime for an agreement is identifying the recommended time between burns for the vegetation formations present, referred to as burn intervals. These intervals will form a basis for further refinement.

Recommended resources for reviewing vegetation formation burn intervals include:

- *Guidelines for Ecologically Sustainable Fire Management* (NSW National Parks and Wildlife Services, 2004).

The *Guidelines for Ecologically Sustainable Fire Management* fire intervals were designed to be used as a management framework and provide an upper and lower limit, where outside of these intervals significant decline of species populations or local extinctions may be expected.

Review specific vegetation community and species requirements or sensitivity to fire

The next step is to assess any available information on burn requirements at the regional, PCT and relevant threatened species scale to refine the intervals. For threatened species it is particularly important to ensure that the burn regime is appropriate for the lifecycle and requirements of that species.

There are a range of resources that may have information on the fire requirements of different PCTs, threatened ecological communities and threatened species such as:

- Publications relevant to the Bush Fire Environmental Assessment Code (NSW RFS):
  - Threatened Species Hazard Reduction List – Part 1 - Plants
  - Threatened Species Hazard Reduction List - Part 2 - Animals
  - Threatened Species Hazard Reduction List – Part 3 – Threatened Ecological Communities

        - Rules and notes for the implementation of the Threatened Species Hazard Reduction List
- NSW Flora Fire Response Database (accessible on request to Department of Planning and Environment)
- NSW Threatened Fauna Fire Response Database (accessible on request to Department of Planning and Environment)
- NSW Bionet Threatened Biodiversity Profile Data Collection (Department of Planning and Environment).
- Threatened species recovery plans (Department of Planning and Environment)
- Recovery Plans made or adopted under the EPBC Act (Department of Agriculture, Water and the Environment)
- Key threatening process listing for high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition (Department of Planning and Environment).
- Hotspots Fire Project publications including Ecological resources
- Scientific literature

When reviewing available data, aim to gather the following information for each PCT, known threatened species or ecological communities, and fire sensitive or fire dependent species onsite:

- known response to fire
- preferred fire interval range
- preferred season or time of year for burn implementation
- preferred fire intensity.

Links to the relevant resources are in Appendix G - Relevant resources.

BSA note:

Accredited assessors are expected to review published and grey literature, and other relevant sources for information on suitable burn regimes and burn units to support development of the Fire for Conservation Management Plan.

The burn regime and burn units are to be established for the PCT and species for which biodiversity credits are being generated. In some circumstances there may be a known fire-sensitive species which needs to be excluded from fire. Where this occurs, landholders are encouraged to generate biodiversity credits for this species.

There may be situations where biodiversity credits are proposed to be generated for ecosystems and species that have conflicting burn regimes. As per section 2.7.2 Biodiversity Assessment Method Stage 3 Operational Manual, where species credit management actions conflict with the generation of ecosystem credits, the landholder must decide which biodiversity credits will be generated for the vegetation/management zone.

Justification for the burn regime must be included in the BSSAR.

Assess the fire interval(s) identified as being appropriate for the agreement against the information you have collected on the fire requirements (or fire sensitivity) of any threatened ecological

communities or threatened species on site. Setting out this information in a table such as the example below (Table 4) may assist you to identify the best fit burn regime, or highlight the need to apply different regimes to different areas and further divide areas into different burn units).

Table 4 A table to assist in the identification of a best fit burn regime

PCT, threatened ecological community, threatened species or habitat feature	Response to fire	Preferred fire frequency	Preferred time of year for burning	Preferred fire intensity	Indicators that a burn may be beneficial or required	Notes (e.g. known or likelihood of species occurrence)

Identify and refine burn unit areas

The person preparing the strategic burn plan will determine the most appropriate burn units. Individual units will be partly determined by the best fit burn regimes, specific species requirements, and management objectives already identified. Further refinement of the burn units may also be needed to meet the general ‘Principles for burning as a management action” (see page 19).

For example, you should ensure that the burn units you have selected are designed (where possible) to achieve the following:

- A mosaic of burn areas across the greater landscape to best support species and maximise diversity. Depending on the size of the agreement area, this could be achieved by:
    - Dividing up a large agreement area with a single burn regime into multiple burn units and staggering the application of burns.
    - Varying the burn intervals within the range of acceptable intervals when applying burns across units with the same burn regime. For example, some burn units may be burnt at the upper end of the recommended fire intervals, others at the middle and some at the lower end.
    - Not burning an agreement area or part of an agreement area while it provides important refugia, for example when bush fires have impacted the greater landscape surrounding the site.
- For smaller sites, fragmented landscapes and/or sites where a predicted ecological response is uncertain, burn only small areas during a single burn event and monitor the outcomes.
- Prevent impact to fire sensitive ecosystems and species by using appropriate strategies such as buffers.

BSA note:

Accredited assessors are encouraged to consider the practicality of implementation when defining burn unit sizes and locations.

Appendix D – Other legislation which may apply

Local Land Services Act 2013

Landholders should first consider whether approval is required under the EP&A Act for the burn. Where clearing is authorised by a development consent under Part 4 of the EP&A Act, or where the clearing is an activity that is authorised by a determining authority under Part 5, Division 5.1 of the EP&A Act, approvals under the LLS Act will not be required for the burn. Burning will only be authorised under the LLS Act to the extent that it is undertaken in accordance with any conditions in the planning approval. In addition, approval is not required under the LLS Act for clearing that is part of, or ancillary to, the carrying out of exempt development as defined in the EP&A Act.

In addition, where a burn is authorised by a PLC agreement (BSA, CA or WRA), approval or authorisation under the LLS Act is not required. Burning will only be authorised under the LLS Act to the extent that it is permitted under the terms of the agreement, that is, the burn needs to be consistent with the agreement.

See the LLS Environmental Protection Works fact sheet for more information.

Prior to implementing a burn, it is recommended that you contact your LLS office to:

- inform the LLS office of how burning is authorised or enabled under the agreement
- confirm whether there are any additional considerations that are to be met.

Biodiversity Conservation Act 2016 and Biodiversity Conservation Regulation 2017 – biodiversity offset scheme

The BCT encourages landholders to employ an environmental planning consultant to determine whether the biodiversity offset scheme established under the BC Act applies to the burn.

The Biodiversity Values Map can be used to determine if the agreement contains areas of biodiversity value and accordingly, whether clearing on that land will be subject to the biodiversity offset scheme. The Biodiversity assessment and approvals navigator can be used to assist in determining if burning will trigger the biodiversity offset scheme. Further information is available via the Guide for local government on applying the Biodiversity Offset Scheme Threshold (Department of Planning and Environment).

Where the biodiversity offset scheme applies to the burn, landholders will need to engage an accredited assessor to prepare a biodiversity development assessment report to submit with the development application.

Further information on the biodiversity offset scheme is available on the Department of Planning and Environment Website.

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP)

The Vegetation SEPP applies where clearing is undertaken that does not require development consent under the EP&A Act in certain areas of the state, as set out in the SEPP.

Where a burn is subject to the Vegetation SEPP, and exceeds the biodiversity offset scheme threshold, approval from the Native Vegetation Panel is required.

Where a burn is subject to the Vegetation SEPP and is below the biodiversity offset scheme threshold, landholders will need a permit from Council if the vegetation is identified in the local Council's development control plan.

Biodiversity Conservation Act 2016 – Biodiversity Conservation Licence

Biodiversity conservation licences are required if a person is to undertake an act that harms threatened species, ecological communities, or their habitats. Where a burning activity is authorised under a PLC agreement or a planning approval, a Biodiversity Conservation Licence to harm threatened species is not required.

National Parks and Wildlife Act 1974 – Aboriginal Cultural Heritage

The potential for management actions to impact on Aboriginal Cultural Heritage is considered as part of the BCT due diligence process when establishing an agreement.

Management actions **must** be designed to avoid impact upon Aboriginal Cultural Heritage.

It is an offence under the *National Parks and Wildlife Act* 1974 to impact an Aboriginal object and/or place without an Aboriginal Heritage Impact Permit (AHIP).

This guide provides guidance on management of Aboriginal Cultural Heritage objects and places during the planning and implementation of a burn.

Heritage Act 1977 – Non-Aboriginal Heritage

The potential for management actions to impact on Non-Aboriginal Cultural Heritage is considered as part of the due diligence process when establishing an agreement.

Management actions **must** be designed to avoid impact upon Non - Aboriginal Cultural Heritage.

This guide provides guidance on management of Non - Aboriginal Cultural Heritage objects and places during the planning and implementation of a burn.

State Environmental Planning Policy (Coastal Management) 2018

If the agreement area is identified as a coastal management area, the BCT recommends you contact the local council and work with an environmental planning consultant to confirm the planning approval process.

Review the interactive map to confirm the agreement area is or is not identified as a coastal management area.

State Environmental Planning Policy No 19 (Bushland in Urban Areas) 1986

If the agreement area falls within public lands within the Sydney Urban Area, consent to implement the burn will be required from the relevant local Council.

The BCT recommends you contact the local council and work with an environmental planning consultant to confirm what information and documentation is required for consent.

Appendix E – Example of a strategic burn plan scope

Table 5 Example strategic burn plan scope

Heading	Content
Objectives of burns	Burn aim and objectives Performance measures
Approval pathways	Outline of planning approval, permits and notifications required prior to burn implementation
Operational burn plan and burn implementation	Outline of the expertise and qualifications of the person/s required to prepare the operational burn plans and implement the burns
Assets to be excluded from fire and/or indirect impacts	Cultural assets Ecological assets Built assets Heritage assets Identification of these assets on ground and spatially Pre-burn actions and burn protection actions
Site characteristics per burn unit	Area Topography and slopes Fire history Vegetation formation PCT Areas of moist and dry fuel Water sources
Fire management area Note: for Aboriginal landholders this may be	Management objective and outcomes

Heading	Content
replaced by a Traditional Seasonal Calendar	Relevant timeframes, seasons or seasonal conditions for burn implementation Burn regime including fire intervals and fire intensity
Adaptive management considerations	Relevant species responses to fire regime Strategic burn plan review
Fire infrastructure	Location of existing fire and fire risk management infrastructure Proposed fire infrastructure
Burn units and control lines	Map of proposed burn units/fire management areas Map of existing and proposed control lines
Consistency with the terms of the agreement	Overview of how the expected outcomes of the burn will be consistent or otherwise with the objectives of the agreement
If applicable, hazard reduction actions – consistency with the terms of the agreement	Outline of bush fire risk management actions and infrastructure Overview of how the expected outcomes of the burn will be consistent or otherwise with the objectives of the agreement
Post fire management activities	Outline of likely management activities required following the burn implementation
Monitoring and reporting	Ecological response monitoring Performance measure monitoring (BSAs only) Data collection following the burn
Burn practitioner risk management	Risk management matrix – identification and categorisation of risks related to burn implementation Risk minimisation strategies
References	List of resources and references used to inform the strategic burn plan

Appendix F – Example of an operational burn plan scope

Table 6 Example operational burn plan scope

Heading	Content
Objective	Clear objectives of the burn
Site characteristics	Area Topography Time since last fire Vegetation type Areas of moist and dry fuel Water sources Fuel load
Ignition requirements	Weather conditions required to implement a burn Site conditions required to implement a burn Fire danger index required to implement a burn
Preferred fire behaviour	Flame height Scorch height Fire speed Fire direction Method to ensure preferred fire behaviour is implemented
Burn implementation	Location and map of control lines and fire trails Location and map of contingency control lines Location and map of burn units Burn pattern and extent within each burn unit Burn ignition location, shape, size and strategy Water courses Water points

Heading	Content
	Mop up and patrol procedures (to prevent re-ignition)
Assets to be excluded from burn	Aboriginal Cultural assets Ecological assets Built assets Heritage assets
Pre-burn actions	Pre-burn methods for protecting assets Weed treatment Pest control
Approvals and notifications	Outline of planning approval to burn If applicable, outline how conditions or recommendations of planning approval have been addressed Relevant permits Notifications
Safety	Evacuation points Refuge areas Hazards on site Traffic and smoke management First aid officers Risk assessment Plan if fire breaches control lines Communications for grounds crews
Contact list	Crew names and contact numbers List of relevant stakeholders List of neighbour contact details

Appendix G - Relevant resources

Topic	Resource name	Author/Agency	Website
Cultural burning	The Victorian Traditional Owner Cultural Fire Strategy	The Victorian Traditional Owner Cultural Fire Knowledge Group	https://www.aidr.org.au/media/6817/fireplusstrategyplusfinal.pdf
Assessing your site	Standards for Low Intensity Bush Fire Hazard Reduction Burning (for private landholders)	NSW RFS	https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0011/13322/Standards-for-Low-Intensity-Bush-Fire-Hazard-Reduction-Burning.pdf
	The interaction between fire and weeds: A booklet for NSW Landholders	Hotspots Fire Project	https://hotspotsfireproject.org.au/download/fire-and-weeds-landholders-bookletfinallr.pdf
	Fire History – Wildfires and	SEED - NPWS	https://datasets.seed.nsw.gov.au/dataset/fire-history-wildfires-and-prescribed-burns-1e8b6

Topic	Resource name	Author/Agency	Website
	Prescribed Burns spatial data		
Protection of Ecological Assets	Protecting Our Hollows	Hotspots Fire Project	http://hotspotsfireproject.org.au/fact-sheets
Aboriginal Intellectual Property	AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research	Aboriginal Institute of Aboriginal and Torres Strait Islander Studies	https://aiatsis.gov.au/sites/default/files/2020-10/aiatsis-code-ethics.pdf
Resources to determine burn intervals	Guidelines for Ecologically Sustainable Fire Management	NPWS	Guidelines for Ecologically Sustainable Fire Management
	Bush Fire Environmental Assessment Code	NSW RFS	Bush Fire Environmental Assessment Code
	Threatened Species Hazard Reduction List	NSW RFS	Implementation of the Threatened Species Hazard Reduction List Threatened Species Hazard Reduction List – Part 1 - Plants

Topic	Resource name	Author/Agency	Website
			Threatened Species Hazard Reduction List – Part 2 - Animals Threatened Species Hazard Reduction List – Part 3 – Threatened Ecological Communities
	NSW Flora Fire Response Database	Department of Planning and Environment	Available on request from Department of Planning and Environment
	NSW Threatened Fauna Fire Response Database	Department of Planning and Environment	Available on request from Department of Planning and Environment
	NSW Bionet Threatened Biodiversity Profile Data Collection	Department of Planning and Environment	NSW Bionet Threatened Biodiversity Profile Data Collection
	Recovery Plans made or adopted under the EPBC Act	Department of Agriculture, Water and Environment	https://www.environment.gov.au/cgi-bin/sprat/public/publicshowallrps.pl

Topic	Resource name	Author/Agency	Website
	Threatened species recovery plans	Department of Planning and Environment	https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/threatened-species-recovery-plans
	Key threatening process listing – High frequency fire	Department of Planning and Environment	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20014
	Regional ecological resources	Hotspots Fire Project	Hotspots – Regional ecological resources
Preparation of a strategic burn plan	Guide for Developing a Fire Management Plan	Firesticks Alliance	https://www.firesticks.org.au/firesticks/wp-content/uploads/2014/06/Guide-for-Developing-a-Fire-Management-Plan_web.pdf
	Fire Planning Template	Firesticks Alliance	https://www.firesticks.org.au/education/resources/
	Producing a Property Fire Management Plan	Hotspots Fire Project	http://hotspotsfireproject.org.au/download/hotspots-workshop-1-preparing-a-fire-management-plan-booklet.pdf

Topic	Resource name	Author/Agency	Website
Burn implementation	Engaging a contractor to burn	NSW RFS	https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0004/178501/Engaging-a-Contractor-to-Burn-NSWRFS-FRNSW-fact-sheet-2020-blue.pdf
Monitoring	Hotspots Landholder Monitoring Guide	Hotspots Fire Project	https://hotspotsfireproject.org.au/download/ecological-site-assessment-and-monitoring-of-bush-fire-managementlandholder-guidelr.pdf
Post bush fire management	Managing Land Post Fire for Landholders	Hotspots Fire Project	http://hotspotsfireproject.org.au/fact-sheets
	R·E·N·E·W·S Conservation area recovery post-fire	BCT	https://www.bct.nsw.gov.au/sites/default/files/2020-04/RENEWS-conservation%20area%20recovery%20post-fire.pdf

Appendix H – Funding

Agreement type	Document providing funding information
BSA	Total Fund Deposit Guideline for biodiversity stewardship agreements
CA - Conservation Management Program	Relevant Conservation Management Program tender documents
CA - Conservation Partners Program	Conservation Partners Grants; Guide for Applicants
WRA	Conservation Partners Grants; Guide for Applicants

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