Best Practice Principles for Prescribed Burning

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An Australian Government Initiative

FFMG

— Centre of Excellence —
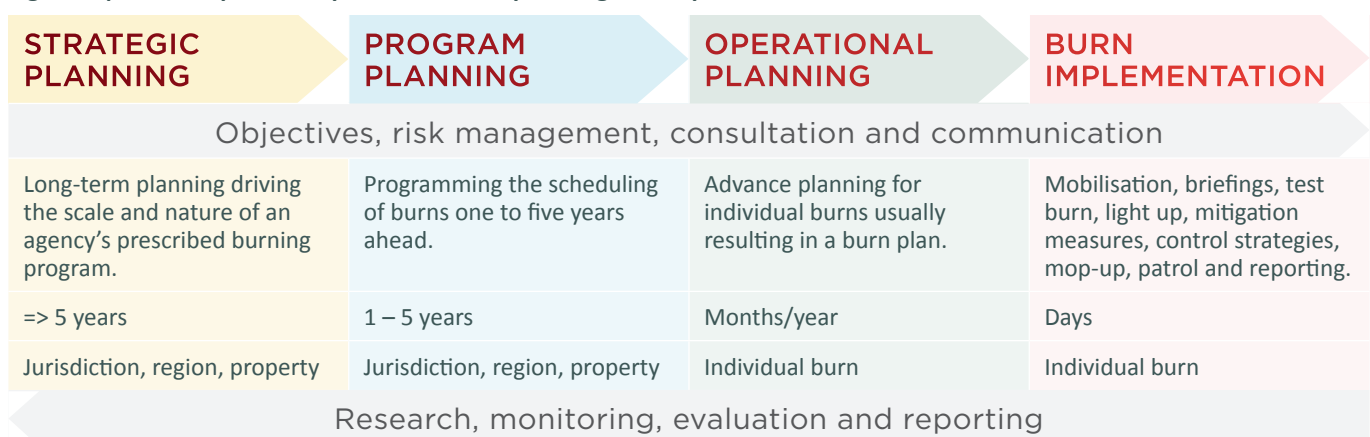PRESCRIBED BURNING

INTRODUCTION

The National Burning Project (NBP) has brought together inter-related aspects of prescribed burning across Australasia to design guiding frameworks and principles for a more holistic and consistent approach to prescribed burning. A number of detailed reports have been produced (as shown opposite), each of which stands alone, yet with synergies across reports that have been drawn together into a number of easy to use synopses:

- *Process Map of Prescribed Burning*
- ***Best Practice Principles for Prescribed Burning (this document)***
- *Risk Management Framework For Prescribed Burning*
- *Objectives, Monitoring and Evaluation Framework for Prescribed Burning*
- *Program Logic for Prescribed Burning*

The synopses are designed to facilitate greater utilisation of the prescribed burning principles by land and fire professionals, to improve consistency nationally, and provide orientation to users about the NBP products and how they fit together.

The frameworks produced by the NBP identify four phases of planning and implementation for prescribed burning. All of these ready-to-utilise synopses are presented across the four phases of prescribed burning as described below.

Figure 1 | The four phases of prescribed burn planning and implementation

STRATEGIC PLANNING	PROGRAM PLANNING	OPERATIONAL PLANNING	BURN IMPLEMENTATION
Objectives, risk management, consultation and communication			
Long-term planning driving the scale and nature of an agency's prescribed burning program.	Programming the scheduling of burns one to five years ahead.	Advance planning for individual burns usually resulting in a burn plan.	Mobilisation, briefings, test burn, light up, mitigation measures, control strategies, mop-up, patrol and reporting.
=> 5 years	1 – 5 years	Months/year	Days
Jurisdiction, region, property	Jurisdiction, region, property	Individual burn	Individual burn
Research, monitoring, evaluation and reporting			

The *Best Practice Principles For Prescribed Burning* offered here is a ready-to-utilise synopsis of the principles produced for the National Burning Project's two National Guidelines:

- *National Guideline for Prescribed Burning Strategic and Program Planning*
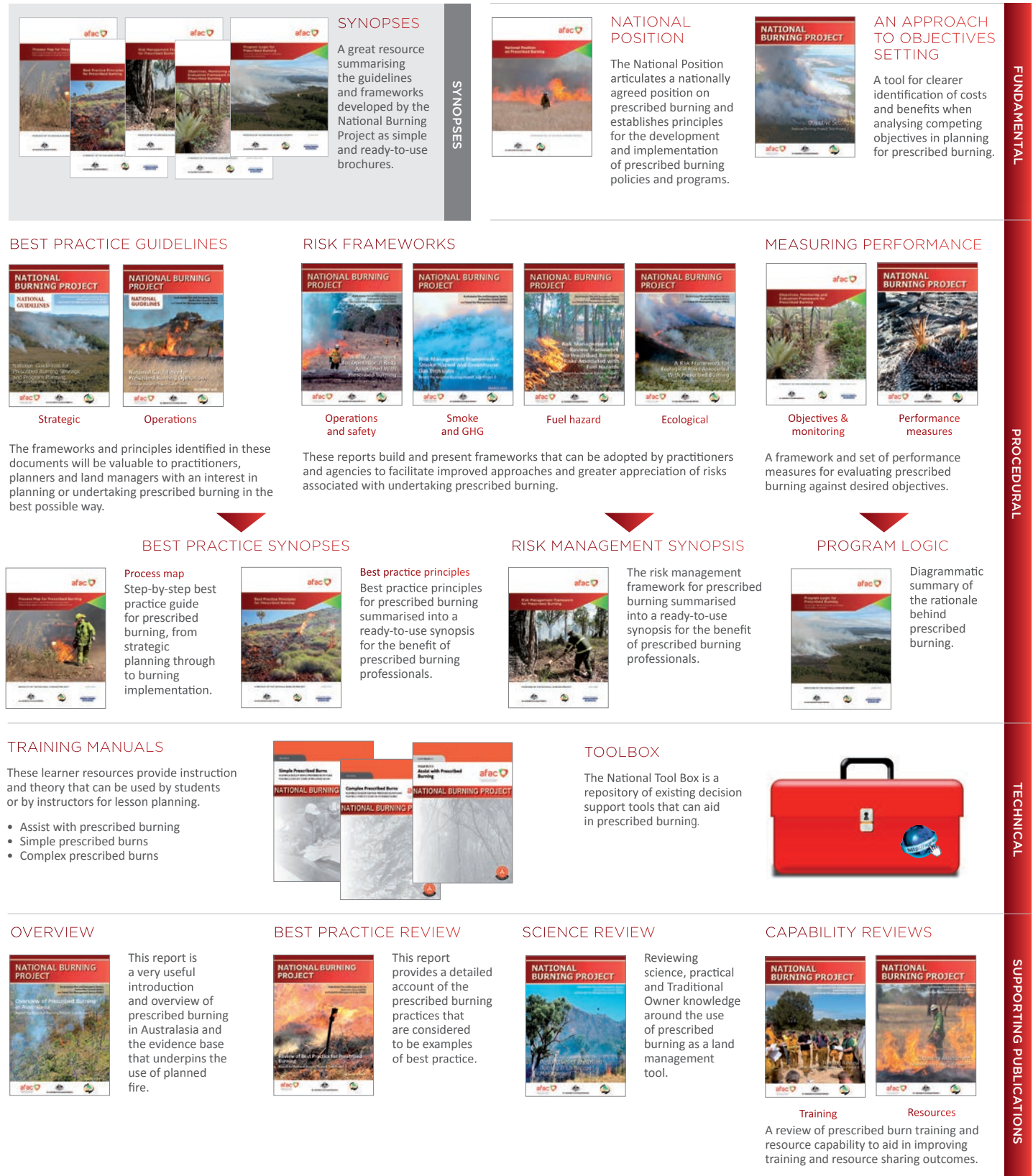- *National Guideline for Prescribed Burning Operations*

This best practice principles synopsis is expected to have benefits to those involved in developing or reviewing organisational procedures, IT systems, business processes or policy as well as assist those undertaking burn planning or implementation.

Although the principles tend to follow a logical sequential order, agencies could well undertake steps in a different sequence according to their own needs. The sequence of the principles is not in any order of importance.

Adrian Pyrke, EcoLogical Australia

NATIONAL BURNING PROJECT

The National Burning Project was jointly commissioned by the Australasian Fire and Emergency Service Authorities Council (AFAC) and the Forest Fire Management Group (FFMG) and has produced a range of products as shown below.

SYNOPSES

A great resource summarising the guidelines and frameworks developed by the National Burning Project as simple and ready-to-use brochures.

NATIONAL POSITION

The National Position articulates a nationally agreed position on prescribed burning and establishes principles for the development and implementation of prescribed burning policies and programs.

AN APPROACH TO OBJECTIVES SETTING

A tool for clearer identification of costs and benefits when analysing competing objectives in planning for prescribed burning.

FUNDAMENTAL

BEST PRACTICE GUIDELINES

Strategic   Operations

The frameworks and principles identified in these documents will be valuable to practitioners, planners and land managers with an interest in planning or undertaking prescribed burning in the best possible way.

RISK FRAMEWORKS

Operations and safety   Smoke and GHG   Fuel hazard   Ecological

These reports build and present frameworks that can be adopted by practitioners and agencies to facilitate improved approaches and greater appreciation of risks associated with undertaking prescribed burning.

MEASURING PERFORMANCE

Objectives & monitoring   Performance measures

A framework and set of performance measures for evaluating prescribed burning against desired objectives.

PROCEDURAL

BEST PRACTICE SYNOPSES

Process map
Step-by-step best practice guide for prescribed burning, from strategic planning through to burning implementation.

Best practice principles
Best practice principles for prescribed burning summarised into a ready-to-use synopsis for the benefit of prescribed burning professionals.

RISK MANAGEMENT SYNOPSIS

The risk management framework for prescribed burning summarised into a ready-to-use synopsis for the benefit of prescribed burning professionals.

PROGRAM LOGIC

Diagrammatic summary of the rationale behind prescribed burning.

TRAINING MANUALS

These learner resources provide instruction and theory that can be used by students or by instructors for lesson planning.

- Assist with prescribed burning
- Simple prescribed burns
- Complex prescribed burns

TOOLBOX

The National Tool Box is a repository of existing decision support tools that can aid in prescribed burning.

TECHNICAL

OVERVIEW

This report is a very useful introduction and overview of prescribed burning in Australasia and the evidence base that underpins the use of planned fire.

BEST PRACTICE REVIEW

This report provides a detailed account of the prescribed burning practices that are considered to be examples of best practice.

SCIENCE REVIEW

Reviewing science, practical and Traditional Owner knowledge around the use of prescribed burning as a land management tool.

CAPABILITY REVIEWS

Training   Resources

A review of prescribed burn training and resource capability to aid in improving training and resource sharing outcomes.

SUPPORTING PUBLICATIONS

STRATEGIC PLANNING

NATIONAL AND STATE/TERRITORY LEVEL POLICY AND INSTITUTIONAL FRAMEWORKS

- A broad awareness of national level legislation *(e.g. EBPC Act)* and statements (e.g. National Position on Prescribed Burning) *(See National Guidelines for Prescribed Burning Strategic and Program Planning Page 10)*
- A current understanding of relevant state/territory legislation and regulation, agency objectives, state-wide performance measures, relevant fire management codes of practice, standard operating procedures, guidelines, institutional structures and responsibilities and data management systems (See National Guidelines for Prescribed Burning Strategic and Program Planning Pages 12 and 15)

Notes: State-level policy frameworks may provide direction on matters of planning scope, and may prescribe objectives and performance metrics

INPUTS
- Laws, policies, land/natural resource management plans and bushfire management plans relevant to land and fire management in the planning area;
- Strategic planning guidelines and templates to guide planning teams;
- Available data and information relevant to hazards, at-risk socio-economic and environmental values, fire history, landscape access and containment features for prescribed burn strategy design, and ecosystem condition and the role of fire in maintaining or restoring ecological resilience;
- Traditional owner fire knowledge and collaboration where possible;
- Stakeholder issues, needs and capacity/willingness to collaborate in strategic plan development, promotion and implementation;
- Resources for undertaking the range of planning processes and actions, supported with appropriate training, mentoring and professional development;
- Planning and decision-support tools and relevant technical guides.

STRATEGIC PLAN SCOPING PRINCIPLES

PRINCIPLE 1
Strategic planning must comply with relevant laws, policy and agency requirements relevant to prescribed burning – start strategic planning with an up-to-date understanding of relevant legal requirements, policies and objectives.
- Key action: Orient team to current policy and organisational requirements
- See National Guideline Strategic Page 31

PRINCIPLE 2
The planning scale (duration and spatial coverage) should reflect regional vegetation growth, fuel accumulation and fire occurrence cycles, and be relevant to how assets and fire prone areas are arranged in a landscape.
- Key action: Determine appropriate plan scale and duration
- See National Guideline Strategic Page 32

PRINCIPLE 3
Prescribed burning objectives are not constrained by tenure differences, institutional responsibility demarcations or administrative boundaries – planning scope should address how prescribed burning objectives are to be optimised and managed across different tenures and administrative boundaries, in partnership with all stakeholders.
- Key action: Determine land tenures to be covered by the plan and the relevant stakeholders to be engaged in planning
- See National Guideline Strategic Page 34

PRINCIPLE 4
Resourcing capacity, planning systems and capability maturity are key factors influencing the design of a strategic planning methodology – the method selected should be well-matched to the available planning capability and area complexity.
- Key action: Select an achievable strategic planning model appropriate to the degree of planning area complexity and planning capability
- See National Guideline Strategic Page 36

STRATEGIC PLAN DEVELOPMENT PRINCIPLES

PRINCIPLE 5
The needs, concerns and knowledge of relevant stakeholders requires appropriate consideration during planning to maximise plan effectiveness, ownership and support for, and commitment to, plan implementation.
- Key action: Prepare an appropriate stakeholder engagement plan
- See National Guideline Strategic Page 38

PRINCIPLE 6
Strategic plans should contain o indicators and metrics, enabling performance.
- Key action: Determine stra
- See National Guideline Stra

PRINCIPLE 7
Landscape fire risk is highly vari on risk assessment covering con infrastructure protection, land a maintenance of ecological resili
- Key action: Identify hazards
- See National Guideline Stra

PRINCIPLE 8
Prescribed burn strategy option assessment of historical and po
- Key action: Analyse potenti to enhance fire containmen strategic firebreak locations risk values.
- See National Guideline Stra

PRINCIPLE 9
Risk-based fire management zo specify treatment regimes and s protection and for maintenance
- Key action: Articulate a zon prescribed burning strategy
- See National Guideline Stra

PRINCIPLE 10
Different vegetation types or la approaches in terms of fire mar or practical for prescribed burni management regimes for differe units.
- Key action: Identify fire reg land, and any practical cons
- See National Guideline Stra

PRINCIPLE 11
To optimise the benefits of pres complementary risk reduction a 'shared responsibility' model), a
- Key action: Identify comple burning benefits
- See National Guideline Stra

PRINCIPLE 12
Clear systems and processes ne implementation, for monitoring these should be articulated in t
- Key action: Specify implem responsibility.
- See National Guideline Stra

OUTPUTS
- An approved fire , bushfire
- An engagement strategy
- An Implementation strategy
- A monitoring and evaluation

lear objectives linked to performance
g evaluation of burn strategy delivery and

tegic plan objectives and performance metrics
tegic Page 39

ble – strategic planning should be based
mmunity safety, asset and social/economic
and natural resource management and the
ence.

s and values, assess & evaluate bushfire risks
tegic Page 44

s analysis should be based on landscape-level
tential fire paths.

al fire paths and assess strategic options
t prospects at high risk ignition areas and
, and to prevent or reduce fire impacts on at-

tegic Page 46

ning or prioritisation systems should clearly
specifications for both life and property
e of ecological resilience.

ning or prioritisation system for applying the
.

tegic Page 50

nd management units require different
nagement, and some are not suitable
ng – strategic plans should articulate
nt vegetation types and/or land management

imes for vegetation types and other areas of
traints for prescribed burning.

tegic Page 52

scribed burning strategies, other
actions need to be identified (pursuant to a
and articulated in the strategic plan.

ementary strategies for optimising prescribed

tegic Page 55

ed to be established and agreed for plan
g and reporting, and program evaluation –
the strategic plan.

entation, monitoring & evaluation

tegic Page 56

mitigation or landscape management strategy

/
n plan

PROGRAM PLANNING PRINCIPLES

PRINCIPLE 13
Strategic planning assumptions can change by the time Program Planning is undertaken – check assumptions (especially fire history) and engage local knowledge in the planning process.

- Key action: Review strategic planning requirements and assumptions
- See National Guideline Strategic Page 58

PRINCIPLE 14
For a range of reasons, some areas will be a higher priority for burn scheduling than others – using a risk-based approach, consider relevant factors affecting burn priority.

- Key action: Prioritise burn scheduling on the basis of risk
- See National Guideline Strategic Page 59

PRINCIPLE 15
Program planning is usually the first stage of the planning sequence at which specific burn locations, boundaries and timings are nominated and thus it can be expected that additional external stakeholder interest will emerge – allow for additional stakeholder engagement activities at the program planning phase.

- Key action: Consider stakeholder needs and concerns
- See National Guideline Strategic Page 64

PRINCIPLE 16
There are opportunities to minimise program delivery risk by planning burn sequences that extend on previous burns – consider how burn program delivery risk can be reduced by prudent multi-year and/or multi-stage sequencing of burns.

- Key action: Consider implementation risks when sequencing burns
- See National Guideline Strategic Page 65

PRINCIPLE 17
Unfavourable weather, and potentially other factors, can be expected to impact burn program delivery in most years – build contingency into burn programs to allow for a proportion of nominated burn areas being unavailable for burning during the planning period.

- Key action: Build contingency into burn programs
- See National Guideline Strategic Page 66

PRINCIPLE 18
Nomination of unrealistic or high difficulty/risk burn areas in a burn program can generate significant operational delivery risks, or a risk that the burn cannot be implemented – nominate proposed burn areas that are within available organisational capability to deliver safely.

- Key action: Consider implementation risk and resource capability in selecting burn areas
- See National Guideline Strategic Page 68

PRINCIPLE 19
Most burns will require a degree of site and/or boundary preparation – allow for this in program planning.

- Key action: Make allowance for burn site preparation requirements in program planning
- See National Guideline Strategic Page 70

PRINCIPLE 20
Burn program delivery complexity and risk may be strongly influenced by the aggregate works volume associated with burn program delivery – consider cumulative burn security and smoke management issues over the program delivery period.

- Key action: Consider aggregate operational risks and efficiencies
- See National Guideline Strategic Page 71

OUTPUTS
- An approved Burn Program, often with a map based component, and a prioritised list based component indicating each nominated burn areas to be attempted. Often draft or skeletal Burn Plans are included, ready for development during Operational Planning Phase.

OPERATIONAL PLANNING

SITE AND RISK ANALYSIS PRINCIPLES

PRINCIPLE 1
Consider the strategic context for the proposed burn and check the proposed burn characteristics are consistent with the strategic intent
- Key action: Decide if the proposed burn characteristics fit the strategic intent
- See National Guideline Operations Page 25

PRINCIPLE 2
Check that prior desktop planning is feasible in practice – consider and assess the operational feasibility of achieving the burn objectives
- Key action: Is the burn feasible and can the burn objectives be met?
- See National Guideline Operations Page 26

PRINCIPLE 3
Potential risks of implementing the burn need to be identified and verified so their management can be planned – identify and assess at-risk values and assets, both within and outside the burn area, and identify safety hazards
- Key action: Identify burn security risks and values at-risk from the burn – social, economic, environment, heritage. Consider fire & smoke.
- See National Guideline Operations Page 28

PRINCIPLE 4
Consult with neighbours and stakeholders to identify their issues and requirements
- Key action: Record neighbour/visitor/stakeholder issues and risks
- See National Guideline Operations Page 32

BURN EXECUTION AND RISK TREATMENT PRINCIPLES

PRINCIPLE 5
Burn planning needs to be based on well-considered assessment of how fire will behave on the site and off-site if it escapes – assess likely and potential fire behaviour of the vegetation types/fuel conditions to be burnt and confirm or modify the burning prescriptions
- Key action: Predict fire behaviour and adjust burn prescriptions.
- See National Guideline Operations Page 34

PRINCIPLE 6
Methodical planning ahead of burn implementation methods and requirements is critical to good operational efficiency – decide and plan burn preparation and contingency plan implementation requirements.
- Key actions:
  - Burn objectives, fuel, weather and fire behaviour prescriptions
  - Preparation requirements for burn boundaries
  - Ignition strategy planning
  - All risk controls required to manage at-risk values and objectives, including:
    - notifications, consultations, & hazard warnings
    - resource types and levels required to light & control the burn and manage burn crew/public safety risks (from fire & smoke)
    - burn organisation, command & control, sectorisation
    - environmental risk controls
  - Map preparation
  - Safety areas, access and escape routes
  - Contingency planning
- See National Guideline Operations Page 35

OUTPUTS
- An approved Burn Plan. Document the information, decisions and action requirements from the planning process in an agency approved Prescribed Burn Plan format. The plan should specify pre-burn preparation actions required, and incorporate necessary maps, operating instructions, and administrative arrangements relevant for burn crews to undertake their tasks safely, and identify burn record requirements.

ADVANCE PREPARATIONS

PRINCIPLE 7
Good, timely preparation for burning enable burning opportunities to be taken when the and contributes to sound risk management and undertake key preparatory requirement burn/risk control
- Key actions:
  - Complete boundary and other prepa
  - Make advance notifications and publ
  - Give early notice to resources
- See National Guideline Operations Page

MONITOR FUEL AND WEATH CONDITIONS

PRINCIPLE 8
Foresee the onset of burning opportunities ready – monitor landscape/fuel drying indic to determine when suitable burning conditi approaching
- Key action: Decide when suitable burnin conditions are approaching
- See National Guideline Operations Page

FINAL PREPARATIONS

PRINCIPLE 9
Be well organised for when burning opportu arise – organise the mobilisation and tasking resources for the burn with as much advanc as possible
- Key action: Give advance notice to crew resources
- See National Guideline Operations Page

OUTPUTS
- Completion of any preparedness checkli
- Approval or endorsement of burn sched
- Resources prepared

Notes: If planning stages are done we number of risks to be managed during implementation phase will be minim

IBED BURNING OPERATIONS (AFAC 2016)

BURN IMPLEMENTATION

CONDUCT BURN-DAY CHECKS AND BRIEFING

PRINCIPLE 10
Base your burning decisions on good forecast information – obtain the latest and most accurate weather and smoke dispersion forecasts
- Key action: Obtain forecasts
- See National Guideline Operations Page 42

PRINCIPLE 11
Be well disciplined and organised in scheduling burn components – mobilise resources to burn site; check readiness; brief them and assign clear tasks
- Key action: Mobilise resources
- See National Guideline Operations Page 43

PRINCIPLE 12
Burn timing and ignition location should be based on well-considered knowledge of current and future fuel and weather conditions – monitor site fuel and diurnal weather pattern development on the day of the burn; determine suitable location and conditions for a test fire, obtain ignition approval
- Key action: Decide ignition timing. Obtain ignition approval.
- See National Guideline Operations Page 44

PRINCIPLE 13
Confirm theoretical predictions and intuitive insights with practical field evidence – light a test fire and assess fire behaviour
- Key action: Conduct a test fire and record fire behaviour observations
- See National Guideline Operations Page 46

LIGHT AND CONTROL BURN AND RISKS

PRINCIPLE 14
Exercise good discipline in executing lighting and containment operations but retain flexibility to modify pre-planned techniques where conditions vary from assumptions or change – monitor fire behaviour and always keep in mind the fire behaviour prescriptions for the burn and take action to achieve these
- Key action: Ignite and monitor burn. Record & report key issues, decisions, weather and fire behaviour
- See National Guideline Operations Page 47

PRINCIPLE 15
Ensure public safety aspects of the burn are appropriately resourced and managed – execute public safety management requirements as per burn plan and agency procedures
- Key action: Execute risk controls.
- See National Guideline Operations Page 48

ASSESS AND DECIDE SCALE-DOWN/PATROL

PRINCIPLE 16
Base decisions for resource up-scaling or down-scaling on well-considered assessments of fire behaviour potential and ongoing residual risk – monitor fire burn-out and determine arrangements for crew demobilisation, mop-up and patrol, and treatment of residual public safety risks
- Key action: Decide on up-scaling or down-scaling requirements
- See National Guideline Operations Page 50

CONDUCT POST-BURN ASSESSMENT

PRINCIPLE 17
Evaluate burn results against objectives to determine if any follow-up works are necessary, and to form part of continuous improvement process – implement post-burn assessment, evaluation and reporting
- Key action: Record post-burn evaluation results and any post-burn work requirements
- See National Guideline Operations Page 52

OUTPUTS
- Document outcomes of burn in an approved Fire Report format. Record results of post-burn evaluations. Record post-burn works requirements. Record major decisions and any incidents
- Conduct debriefings
- If objectives were not achieved, should the burn be re-scheduled?

BEST PRACTICE PRESCRIBED BURNING SYNOPSES:

- *Process Map of Prescribed Burning*
- *Best Practice Principles for Prescribed Burning (this document)*
- *Risk Management Framework for Prescribed Burning*
- *Objectives, Monitoring and Evaluation Framework for Prescribed Burning*
- *Program Logic for Prescribed Burning*

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