

AUSTRALIAN AND NEW ZEALAND
ENVIRONMENT AND CONSERVATION COUNCIL
BENCHMARKING AND BEST PRACTICE PROGRAM

USE OF FIRE
FOR
ECOLOGICAL PURPOSES
IN
PROTECTED AREA MANAGEMENT

LEAD AGENCY

NATIONAL PARKS AND WILDLIFE SA



**Department for
Environment and Heritage**
Government of South Australia



EXECUTIVE SUMMARY

The 1990's saw a growing emphasis on biodiversity, and recognition that maximising biodiversity in protected areas was dependent upon good management practices, including fire management. In 1994, the Australian and New Zealand Environment and Conservation Council's (ANZECC) Standing Committee on Conservation initiated a Best Practice Program across a number of key areas of natural resource management, including reviewing best practice in the ecological use of fire in protected areas.

One of the aims of the Best Practice Program was to utilise benchmarking and best practice principles to share knowledge and information about the management of protected areas. This shared knowledge and information could then aid continuous improvement in the management of natural and cultural resources and the provision of services to the community.

A lead agency was nominated for each program area to coordinate the assessment, review and reporting on benchmarking and best practice. With the ecological use of fire in its infancy in the protected areas of South Australia, National Parks and Wildlife South Australia chose to be the lead agency in "*The Use of Fire for Ecological Purposes in Protected Areas*".

This report provides a summary of current knowledge as provided by member agencies. It is recognised that further research and development in this field is required that will add to the body of knowledge in this area.

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SCOPE

Historically in protected areas, fire has been used as a tool to help protect life, built assets and forestry values. While burning may have had beneficial effects for the natural environment, these benefits were not usually the primary objective. To focus on the ecological use of fire rather than life and property protection, the project is restricted to review:

- ◆ the use of fire regimes for habitat maintenance and enhancement and/or
- ◆ the use of fire to create, maintain and protect natural area mosaics.

This includes situations where regulated wildfire or planned fire is used to either stimulate recruitment of desired species or assemblages of species or to maintain a diversity of habitat structures and age classes across natural areas within a landscape to protect ecosystem functioning. This definition excludes the use of fire where the primary objective is hazard reduction for the protection of assets.

OBJECTIVES

The objectives of the project were to:

- ◆ Identify protected area agencies within Australia and New Zealand, which manage fire for ecological purposes.
- ◆ Review what current processes, practices and resources are employed in the use of fire for ecological purposes.
- ◆ Determine how agencies determine ecological values and set management objectives.
- ◆ Examine the planning and operational environments relating to the use of fire for ecological purposes
- ◆ Review how agencies initiate and participate in research, and incorporate research findings into changed management practices.
- ◆ Consider how outcomes are measured and monitored by agencies, and what review and feedback loops are in place to allow continual improvement in the ecological use of fire.
- ◆ Facilitate further development of best practice in fire management for ecological purposes via development of a cooperative and beneficial exchange of information and processes throughout Australia and New Zealand.
- ◆ Use examples, where possible, that demonstrate good practice.

METHODOLOGY

Profiling Agencies

A detailed questionnaire was sent to all participating agencies with the aim of determining current practices in relation to the ecological use of fire in protected areas.

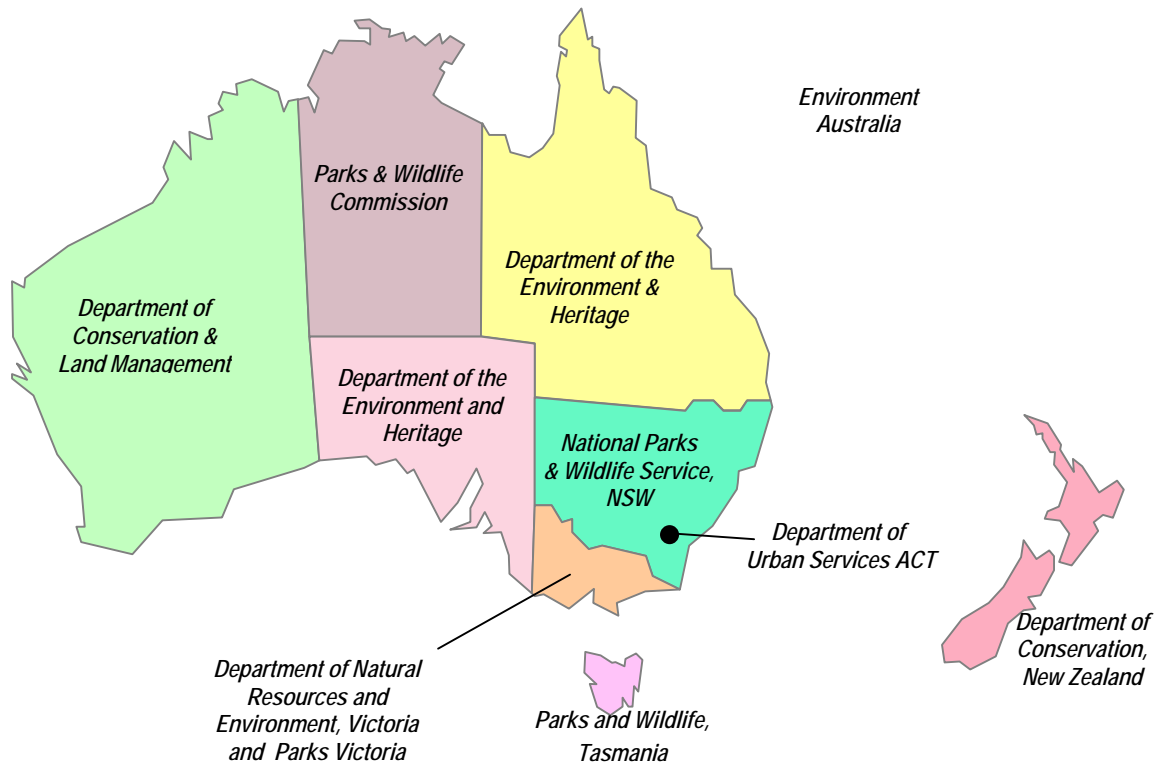


Figure 1: ANZECC Participant Agencies in Australia and New Zealand.

Key areas covered by the questionnaire included:

- agency overview
- policy and legislative framework
- planning framework
- ecological and operational parameters
- organisational statistics and staff development
- community partnerships and neighbours
- research into the ecological use of fire.
- training, publicity and promotions.

Workshop

A workshop was undertaken bringing relevant people from different agencies together to discuss best practice in the context of using fire for ecological purposes. A best practice model was evaluated and refined at the workshop, while a practical example using fire for ecological purposes was tested against the model to ensure the model had practical relevance.

Determining and Developing Best Practice

Examples of good practices from agencies (gained from the questionnaire responses and the workshop) were evaluated against the model to determine benchmarks for 'best practice'. When compared to the best practice model, most agencies freely admitted to not embracing all aspect/s of the model. Therefore, it would be premature to highlight one agency as an exemplary example of 'best practice'. However, most agencies are aiming and progressing toward improvement in using fire for ecological purposes (despite a dwindling funding and resource base). Rather than highlighting partial best practices, the focus of this report is outlining a straightforward approach to best practice process as it applies to the use of fire for ecological purposes in protected areas in Australia and New Zealand.

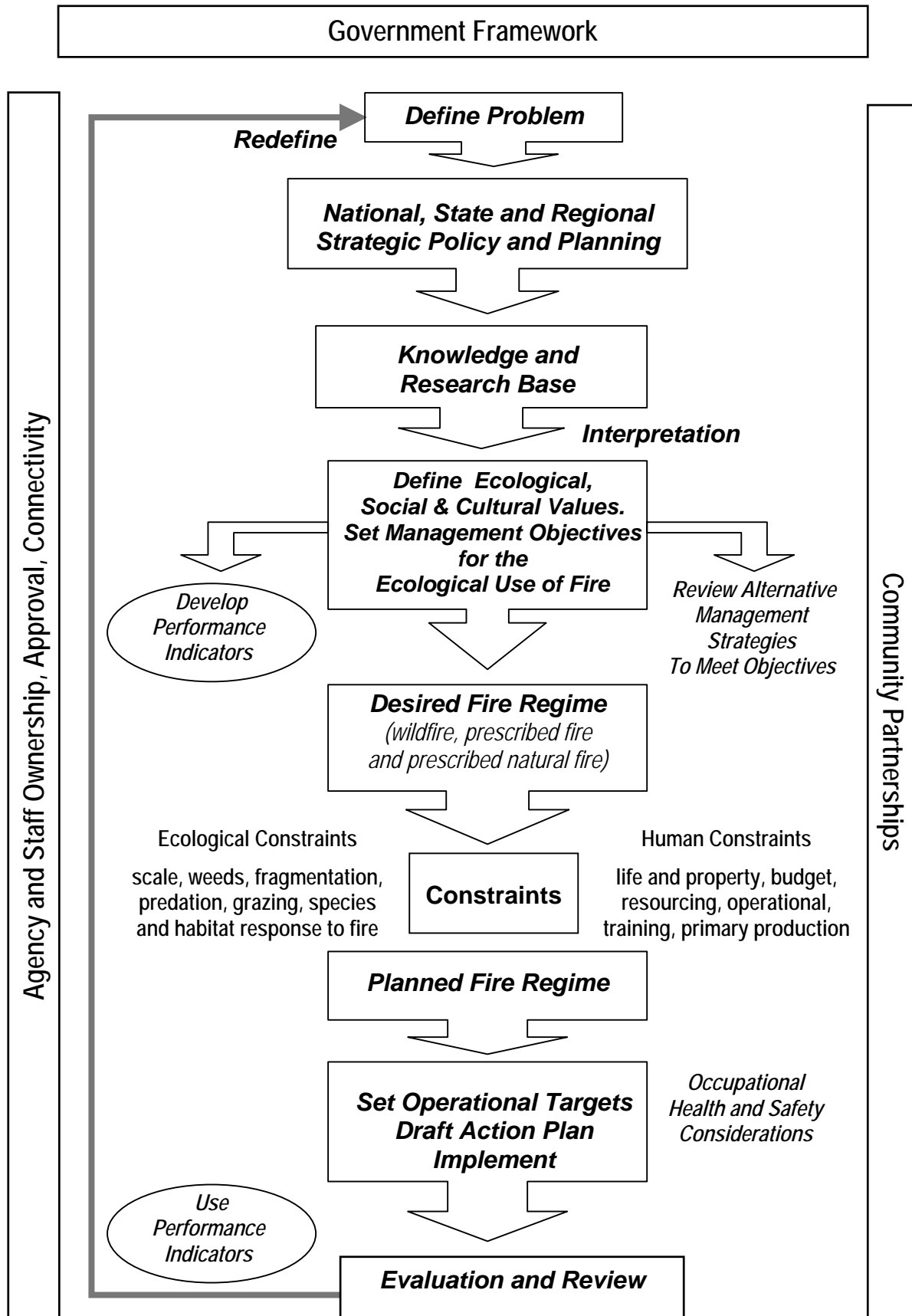
BEST PRACTICE IN THE ECOLOGICAL USE OF FIRE

A best practice model for the use of fire for ecological purposes has been developed and is illustrated on the following page. The model has been designed to:

- ◆ complement other programs in protected area management
- ◆ incorporate biodiversity objectives
- ◆ integrate with existing fire management
- ◆ consider other best practice programs
- ◆ consider existing planning mechanisms
- ◆ be readily adaptable to meet the needs of different agencies.

The model identifies and describes the main stages in planning and using fire for ecological purposes. The model is circular to illustrate the principle of continual improvement or adaptive management.

Ecological Use of Fire in Protected Areas



COMPONENTS OF THE BEST PRACTICE MODEL LEGISLATION, STRATEGIC PLANNING AND POLICY

Federal and State Government directives provide the legislative and political framework under which all fire and biodiversity management activities are undertaken. Unfortunately, existing legislation for some agencies may be clear in regard to wildfire suppression, but vague or non-existent regarding the prescribed use of fire, particularly for ecological purposes. Links between the use of prescribed fire and biodiversity do not usually exist.

There needs to be:

- ◆ A clear nexus between an agency's legislative requirements and its strategic objectives (Best Practice in Performance Reporting in Natural Resource Management 1997); and
- ◆ An overlap or link between legislation for fire management and legislation for biodiversity.

There should be a clear flow-on from national and state legislation through to state and regional policy and strategic planning, with linkages between the ecological use of fire and other fire management issues, as well as linkages with general protected area management.

Ideally there should be clear policies and strategic planning in place, to incorporate the ecological use of fire into an agency's biodiversity management policy. Also, to integrate biodiversity management into bushfire prevention and suppression policy.

Strategic planning should identify priorities for the ecological use of fire on several levels:

- ◆ National and State
- ◆ Regional – across different land tenures, between reserves in a region
- ◆ Across vegetation communities and habitats

Strategic planning for the ecological use of fire should also link with other planning areas such as:

- ◆ Regional planning
- ◆ Reserve planning
- ◆ Local, district and community bushfire protection planning
- ◆ Indigenous land management
- ◆ Biodiversity planning

KNOWLEDGE AND RESEARCH BASE

It is important to get a standardised approach across an agency to data gathering and information collation. The data and information should:

- ◆ meet the current and anticipated future needs of the agency and field managers
- ◆ be widely available and easily accessible by both central and regionally-based staff
- ◆ have a spatial or GIS component
- ◆ have quality standards in place to ensure consistency and compatibility across the agency (and possibly with other agencies)
- ◆ have relevance and functionality in respect to the ecological use of fire.

A sound knowledge base for informed decision-making includes the following elements:

Fire regimes – past and current fire regimes in terms of:

- timing or seasonality
- frequency or fireinterval
- intensity
- patchiness
- scale.

Vegetation – what vegetation communities are present, their distribution and age class.

Community Composition – an indication of species' presence, abundance and richness.

Life History (Vital Attribute) Information – includes the method of persistence, conditions required by species for establishment and the timing of life stages.

Habitat Requirements - why species live there

Key Fire Response Indicator Species – these are species that exhibit some response to certain fire regimes and may be judiciously used as performance indicators.

Threatened species – it is essential to have an understanding of the distribution and life history information of threatened species if they are going to be enhanced by strategies for fire management planning and implementation.

Threatening processes – consideration should be given to threatening processes such as grazing, weeds, diseases and predation, their interaction with fire and implications for fire management. Threat abatement strategies should be incorporated into fire management planning.

Fuel dynamics, weather, climate and fire behaviour

Erosion, air and water quality, greenhouse gases.

Surrounding Landuse - including forestry, residential areas, primary production

Social and Cultural Philosophies and Understanding

Traditional Ecological Knowledge - wherever possible, indigenous knowledge should be recognised and used in defining ecological values and setting management objectives.

It is important, particularly in the early stages of planning, to seek out and evaluate as much relevant information as is practically possible. This includes giving consideration to the results of research projects and outcomes from monitoring programs and integrating those into planning.

DEFINING VALUES, SETTING OBJECTIVES, INCORPORATING CONSTRAINTS

Once collated, the biological and fire information requires assessing and interpreting to identify the key ecological values or assets within the study area. The next step is to determine specific ecological management objectives for these key values and define the role (if any) of fire in meeting those objectives. Transforming fire-related ecological objectives into practical implementation is a three-step process:

1. Determine the ideal or desired fire regime to meet the ecological objective/s
2. Identify any constraints and consider their impact/s upon a desired fire regime
3. Adjust fire regime

Taking a step-wise approach recognises that although the objectives for ecological management may be explicit, there is inevitably pressures or constraints impacting upon the ability to plan and manage purely to meet those objectives. A compromise must be reached, balancing what is desired with what is practical to implement.

Human Constraints

- **Funding and Resources** - this was the principal constraint identified, preventing optimal conservation management. By hampering the critical step of collecting, collating and interpreting biological information it impairs the quality of decisions and actions. Funding and resource levels also impact on staff competency by restricting training and developmental opportunities. Restricted funding can also affect prevention and suppression capabilities.
- **Surrounding Landuse** - often dictates that the protection of pasture, timber, crops or built assets is of paramount importance and cannot be ignored.
- **Protection of Life and Property** - while it may be possible to marry life and property protection with ecological management a more likely scenario is conflict between these two objectives. Risk management and litigation threats dictate that ecological objectives are generally secondary to life and property protection. This does not mean, however, that ecological objectives should always be ignored in such areas. Due consideration should still be given to reaching a compromise between ecological and protection objectives. If protection becomes the primary objective then the rationale behind the decision should be documented and the environmental impact assessed with a view to minimising any adverse impacts.

Ecological Constraints

Fragmentation and Scale - much of the Australian landscape is fragmented, with protected areas often small in size and isolated from other native vegetation. This leads to problems of scale when trying to implement strategies that ideally should be implemented at a landscape-scale.

Threatening processes - weed invasion, grazing and predation compromise the ecological use of fire. It is not always possible to downsize solutions to ecological problems without exacerbating the impacts of post-fire grazing, predation and weed infestation. The risks and benefits need to be evaluated, along with the costs of implementing remedial action eg post-fire predator or weed control.

Meeting different fire and habitat requirements of individual species within a community can be a constraint. Again a compromise must be found in a fire regime which maximises biodiversity, the community as a whole, while minimising the risk of local extinction of any species.

OPERATIONAL TARGETS, ACTION PLAN, IMPLEMENTATION

Operational targets are management tactics or actions that serve strategic objectives. Operational targets outline the on-ground actions needed to meet the ecological objectives previously set. Targets are likely to relate to the location, size, timing and desired intensity of either wildfires or prescribed fires. The aim may be to exclude fire or to limit the extent of a fire in a given area.

Target setting is followed by an action plan to accomplish these targets with the available staff, equipment and resources. In the case of prescribed use of fire, an action plan will be burn plan. Particularly in the case of a burn plan, the action plan must take into account occupational health and safety issues, minimising risk to life and property. On-ground implementation should follow the steps outlined in the action plan.

EVALUATION AND REVIEW

The emphasis in best practice models is on continual improvement through adaptive management, based on the assumption that we must continuously adapt to change by adjusting our management strategies. Obviously, continual improvement can only occur if there exists a means of measuring outcomes and results against objectives and targets. It is imperative, therefore, that performance indicators and monitoring programs are developed before management strategies are implemented. The key to best practice lies in using performance indicators and monitoring programs to improve practices.

While monitoring of ecological burning programs has been identified as a key issue by several protected area agencies, there is often a lack of confidence in what and how to monitor, and often-insufficient resources to conduct an adequate monitoring program.

It was generally agreed by agencies that most evaluation and review tends to concentrate on the operational side of fire management. Reporting often targets a review of the area burnt, cost of staff, resources and the like, while ecological monitoring often targets one particular species.

Monitoring may be lacking in the following areas:

- ◆ Fire parameters - intensity, fuel load consumption, predicted versus actual results given the fuel, weather and burning conditions.
- ◆ Vegetation community - statistics on areas burnt/not burnt to include comparisons between pre and post-fire vegetation communities in terms of structure, composition and age class distributions.
- ◆ Inclusion of fauna and invertebrates in monitoring program.
- ◆ Clear articulation of success or failure to achieve objectives.
- ◆ Having a tiered level of indicators being monitored
- ◆ Grazing Pressure
- ◆ Long-term impacts of high frequency fire or, conversely, the absence of fire.

General best practice principles relating to monitoring have been developed for *ANZECC's National Framework for the Management and Monitoring of Australia's Native Vegetation*. Although intended for cover and condition monitoring of vegetation they are applicable to ecological fire monitoring.

- ◆ Adoption of a method suitable for sampling and detecting change in the vegetation community (including sampling scale and frequency) and which incorporates an assessment of uncertainty in interpreting outputs
- ◆ A sampling strategy which is robust, repeatable and independent of the individual doing the sampling

- ◆ A commitment to sample the full range of spatial and temporal variability needed to meet the objectives, an allocation of sufficient resources to maintain and support the monitoring strategy in meeting its objectives
- ◆ Acceptance of the need for the monitoring program and commitment to implementing outcomes from relevant stakeholders
- ◆ Appropriate dissemination/communication of the information component of monitoring activities.
- ◆ Inclusion of feedback loops and mechanisms to incorporate outcomes of the monitoring strategy into policy review or development and land management practices

THE ROLE OF FIRE MANAGEMENT PLANS

Fire management plans should be the medium for integrating most elements of the best practice model in order to facilitate and monitor actions. Ideally the plan should integrate:

- ◆ Legislation, policy and strategic frameworks
- ◆ Budget - identify funding requirements at the time of plan approval. How much is it going to cost to use or manage fire for ecological purposes? If the planning does not have a link with the budget development and allocation cycle then the budget will determine what actions will be undertaken and not the plan.
- ◆ Processes for monitoring and review of plan prescriptions and implementation - reporting regularly on the implementation of fire management plans will allow problems to be detected early and fixed early with benefits in efficiency and effectiveness.
- ◆ Priorities - the plan should detail a priority listing of tasks and actions but remain flexible enough to allow for the incorporation of new information or circumstances.
- ◆ Clear and documented processes to facilitate the implementation phase – in the same way that the process of plan preparation is documented in manuals.

(adapted from the ANZECC Best Practice Report on Protected Area Management Planning)

THE ROLE OF PEOPLE - AGENCY AND STAFF OWNERSHIP, APPROVAL AND CONNECTIVITY

Achieving a sense of ownership and approval of ecological fire management processes was identified as a critical component by agencies managing protected areas. It is essential to gain acceptance of the process from the senior management and executive level down to the on-ground people. This can only be achieved through good lines of communication within the agency. That is, communication between policy makers, planners, scientists, rangers and assistants. If people from different areas of the agency have been encouraged to participate in the preparation, adoption and implementation of ecological fire planning, if their contributions have been recognised and valued, then the program/s will be successful.

Involving People Checklist

- ✓ Staff are actively involved in the process and understand its significance
- ✓ Staff have the knowledge, context, skills, authority and responsibility they need to do the job
- ✓ Staff are adequately trained and have access to required tools and methodologies
- ✓ Accountability for results is clearly established
- ✓ Appropriate ways exist for recognising and celebrating success
- ✓ Methods and schedules are established for reporting progress
- ✓ A clear understanding exists of expectations of both staff and the process
- ✓ Performance Indicators exist and feedback mechanisms are in place

COMMUNITY PARTNERSHIPS

The complex and sometimes threatening nature of bushfires necessitates careful consideration of people's concerns, from several perspectives. The most effective way of doing this is to view partnerships as an essential component of any fire management and incorporate a process for forming and maintaining these relationships. An example of such a partnership is to give due respect and incorporate the wealth of indigenous knowledge existing in some regions. The wisdom of indigenous people should be sought before fire is manipulated for ecological benefit on indigenous lands and their concerns incorporated into decision making. Partnerships should be formed with other stakeholders in a similar manner, assuming that the two-way exchange of information is vital to success. Stakeholders include neighbours, rural and urban landholders, fire fighting agencies, local, district or shire councils, other government agencies, conservation groups and tertiary institutions.

CONCLUSION

The best practice model presented in this report represents a simple approach to managing a complex and dynamic ecological process. If it only serves to stimulate agency or staff debate and discussion around current practices and processes and what constitutes future 'best practice' then it will have served its purpose.

ACKNOWLEDGMENTS

Recognition and thanks must go to all the protected area representatives who provided insights into their agency's management practices relating to the use of fire for ecological purposes. People contributed by participation in the questionnaire, attendance at the workshop, providing publications and resource documents.

Special recognition to Gordon Friend (NRE Victoria), for his judicious critique of the first draft, resulting in a reworking of format and content.

APPENDIX 1
STATE OF THE ART IN AUSTRALIA AND NEW ZEALAND
A SUMMARY OF QUESTIONNAIRE RESPONSES

This section provides a general overview of the ecological fire practices of Australian and New Zealand protected area agencies, gleaned from the questionnaire results.

Agencies and Active Management

Most protected areas in Australia and New Zealand are potentially subject to fire. This represents an enormous area, particularly in years of ephemeral fuel conditions, when reserves in more arid areas also become more fire prone.

Some agencies admit to little active management of fire to achieve ecological outcomes (SA, Vic, NZ and ACT). Other agencies (NSW, QLD, NT, EA) maintain figures in excess of 75% of their protected areas being actively managed for ecological outcomes. To explain this dichotomy in fire management requires an understanding or a breakdown of the broad term 'ecological use of fire'.

It is widely recognised that ecological problems may be associated with large high intensity wildfires eg the possibility of local extinctions, lack of refuge areas and increased lag times for re-colonisation. Prescribed burning is used to minimise large high intensity fires and to minimise the detrimental effects to the environment of such fires. This is considered to be active fire management for ecological purposes to some agencies, while other agencies do not consider the primary purpose of this prescribed burning to be ecologically based.

While disaster aversion may be a valid reason for prescribed burning, it skews the results for some agencies. Also, it does not provide an accurate picture of agencies' fire management practices in achieving ecological outcomes in other areas of vegetation, threatened species' or habitat management. Therefore, there is no clear indication, from the questionnaire, of the scale of ecological use of fire for these other areas of management.

Communities and Habitats at Risk

There were many similarities across Australia and New Zealand. The types of communities, habitats and ecosystems of particular concern in fire management include:

- aquatic environments eg. wetlands, peat and lowland bogs, riverine, mangroves, saltmarshes
- fire-sensitive species and communities eg. *Callitris* pine, rainforest remnants
- old growth areas such as mallee and mulga (*Acacia aneura*)

- grasslands
- recently burnt vegetation and regenerating forest
- habitat for rare and threatened species and communities
- weed-infested vegetation

Legislative, Policy and Planning Frameworks

Widely varying legislation, policy and planning frameworks exist across Australia and New Zealand affecting protected area management. Protected area agencies operate under a framework combining legislation, policy and planning. The legislation applying to some agencies is general in nature, but followed by more explicit policy and planning. This strengthens the framework, allowing integration of different areas of protected area management such as threatened species, vegetation, weed and fire management.

All Australian States and New Zealand have some form of legislation relating to biodiversity and the protection and conservation of flora and fauna. All have legislation allowing for the establishment of Protected Areas. Some have tiered legislation allowing for various forms of reserve with varying degrees of protection from other land uses such as forestry or mining, and varying ownership (public or private). Production of management plans for protected areas are a legislative requirement of all States and New Zealand, following establishment of a reserve.

All agencies have involvement in other planning frameworks, via legislation or policy, including regional biodiversity plans, species management plans and fire management plans.

Public consultation is prescribed through legislation for most agencies while research and funding arrangements for protected area management and fire management are largely provided through policy.

Managing wildfires and maintaining operational readiness for fire management and suppression are covered by various acts across Australia and New Zealand. The differences between the acts are largely about who has primary responsibility for fire suppression, that is, fire emergency services or the protected area agency. In the case of using planned fire for ecological purposes, this is not often included or clearly defined in legislation. Often it requires an interpretation of the whole framework - legislation, policy and planning, to establish the constraints and opportunities for the ecological use of fire in a reserve.

Resourcing

Where does the money go?

Specific funding within agencies for the ecological use of fire or for incorporating ecological objectives into fire management is often not available. Even when it is, most agencies cannot accurately extract information on the amount of money being spent on ecological fire management or even fire management as a whole.

Most agencies noted a major problem is long-term funding not being available to meet long-term management strategies such as monitoring or burn plans covering multiple years.

It appears that those agencies using fire for ecological purposes are often agencies with a long history of prescribed burning and they are able to allocate funding to meet ecological objectives.

The conclusion from the questionnaire and workshop discussion is that resource allocation needs to:

- be presented in a relatively consistent way allowing comparison between fire management and other reserve management activities
- allow calculation of ecological fire management costs separate to other fire management activities
- meet medium to long-term management strategies, funding for the future.

Monitoring and Performance Reporting

Monitoring the ecological outcomes of planned burning and wildfires is an evolving area. Outcomes have often been described in the past in terms of operational outputs such as fuel reduction, fire size and fire patchiness. Many agencies noted that evaluating ecological outcomes was an area that has not been formally embraced into the planning system, with limited evaluation done by many agencies. Some agencies (such as Parks Victoria with their Environmental Management System, and Queensland's Department of Environment and Heritage) were reviewing their current methods for measuring and reporting on ecological outcomes. Others, such as the Parks and Wildlife Commission of the Northern Territory and NSW National Parks and Wildlife Service, already have post fire monitoring in place to measure ecological outcomes.

Information Management

While all agencies have databases of biodiversity assets, fire histories, fire management actions and biodiversity outcomes in some format, many report:

- incomplete coverage of reserve system
- electronic format only partially available
- only partially integrated with GIS
- varying levels of accuracy, integrity and relevance.

Encouragingly many agencies have recognised their existing shortcomings and are planning upgrades of information and integrated systems in the near future.

Case Studies

Agencies were asked to provide case studies to demonstrate how:

- biodiversity goals and ecological objectives were set
- the role of fire in habitat evolution, fire history and desired fire frequency were assessed
- the appropriate burn area was determined
- key fire response species were identified
- an appropriate time since fire mosaic was identified
- appropriate fire season and fire intensity were determined
- a fire operations plan was finalised
- fire operations were implemented
- risk to built assets, property and human life was avoided (and whether a compromise on ecological objectives was required to achieve this?)
- outcomes were monitored and evaluated against goals and objectives.

These case studies have not been included. The case studies received, while often highlighting good practices in some areas, were not tailored to address the above considerations and, therefore, have not been included in this report.

Organisational Statistics and Staff Development

The questionnaire sought to find out:

- the total number of officers and contractors directly employed by the agency for protected area management
- what percentage of these staff within each agency were involved in implementing programs related to the use of fire for ecological purposes
- what proportion were trained specifically in relation to achieving biodiversity goals through the use of fire
- the contributions made by volunteers.

No conclusions were drawn from the answers. There were discrepancies in the total numbers of staff reported in this survey compared to the total numbers of staff listed in the ANZECC Report on the Profile of Organisations 1997/98 Financial Year. Another problem was the difficulty in determining the amount of time related to implementing fire programs specifically for ecological purposes, when staff's roles are multi-faceted and fire management encompasses all aspects including meeting ecological management objectives.

Community Partnerships and Neighbours

It is clear that all agencies have, through necessity, developed strong links with stakeholders on fire management, both informally and informally. However, the strengths and/or weaknesses of stakeholder relations in relation to the ecological use of fire are not obvious.

Ecological Fire Research

Some agencies have well-developed fire research networks, possibly reflecting a long history of involvement with fire management for pastoral or forestry interests. The extent of this research directed purely into the ecological use of fire was not determined. Processes are in place in some agencies for:

- determining research priorities
- evaluating the contribution of fire research to management effectiveness
- dissemination of research information
- funding external groups and individuals to undertake fire research
- incorporating scientific research into reserve management programs.

Other agencies report the opposite:

- a lack of funding for inter-agency research
- little support within their agencies for fire management research
- poor priority setting
- poor transfer of scientific results into changed management practices.

Training and Leadership

Training programs on the use of fire for ecological purposes already exist in some agencies and are incorporated into general fire management or strategic planning training while others are expanding their programs. This may reflect a change in attitude as the ecological use of fire is becoming increasingly important and being integrated into fire and reserve management programs.

A variety of mechanisms are used by agencies to influence public attitudes and promote the ecological use of fire:

- representation on fire management, fire prevention and consultative committees
- media releases
- fire debriefs and public meetings
- magazine articles, brochures, videos and public displays
- fire management plans and reserve management plans with public consultation
- ministerial briefs

Educating staff within agencies on the ecological use of fire does not always follow a formal, strategic or structured approach. Common strategies include:

- workshops, seminars and conferences
- on the job training
- training courses

For some agencies this may include inter-agency, inter-state or overseas opportunities.

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