Protecting threatened species and ecological communities before and during bushfire: Learning from the 2019–20 fires

In brief

Preparation for wildfires, and responses to wildfires have improved for human life and property, but there has been far less progress in protecting threatened species and ecological communities before, during and after wildfire. Our project aimed to identify what is required to improve conservation outcomes during large fire events. We conducted semi-structured interviews and a survey with conservation managers and fire operations staff to learn from their experiences in the 2019–20 fire season.

Our research highlights that most conservation assets were not explicitly prioritised for protection in fire operational responses, and this lack of targeted action contributed to the exceptional losses of biodiversity in the 2019–20 fires. Participants identified a range of impediments to the conservation

of biodiversity, including a lack of accessible information on feasible actions, and limited guidance about which conservation assets should be prioritised for action as the fires approached. Conservation assets were more likely to receive protective action if they were located at a single site, if they were an iconic species and if there was strong advocacy for action.

We have developed a set of recommendations focused around, first, spreading risk before fire events to increase the resilience of the environment and reduce biodiversity losses, and second, to minimise the risk of serious impacts to conservation assets during fire events. These recommendations work together to form a roadmap to improve outcomes for biodiversity in a changing climate, and to minimise the risks in a future where large wildfire events are inevitable.

Background

The scale, intensity and duration of the 2019–20 fire season tested our capacity to conserve threatened species and ecological communities. The fire response focused on human life and property, with little strategic action to protect biodiversity. While some iconic species were able to be saved by a rapid response, many species and ecological communities were severely impacted. Actions for biodiversity conservation largely focused on the post-fire period, including the triage of animals, supplementary feeding and targeted herbivore and predator control.

The fire response involved a multitude of agencies and organisations, and extensive professional and volunteer personnel across the states and territories. The perspectives of those involved in the fire response provides valuable and unique insights into what worked well with respect to conservation outcomes, and the gaps to be overcome to improve future response. Learning lessons from the 2019–20 fires is crucial to ensure the persistence of Australia's conservation assets in the future.

2019/20 megafire in Victoria. Image: Parks Victoria

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Main aims of the research

The aim of this project was to learn from the experiences and practices of conservation managers and fire operations staff during the 2019–20 fire season. We wanted to identify what is required to improve conservation outcomes during future large fire events.

What we did

Our primary source of information came from conducting semi-structured interviews with state agency biodiversity and fire operations staff. We interviewed 32 people from 13 land management agencies across the six states and the Australian Capital Territory. Most participants had substantive roles with a biodiversity focus, with 57% of these filling a fire operations role during the 2019–20 fires. The interview data were coded and analysed using a thematic analysis approach to identify and interpret relevant themes. These themes were the framework used to organise and report the observations.

We also conducted an online survey to understand perceptions of the success and failings of the fire response with respect to threatened species and ecological communities, and mechanisms for improvement. We received 20 responses from our target group of conservation practitioners and resource managers from across Australia.

The considerable knowledge and experience of those involved in the protection of conservation assets during the 2019–20 fires were compiled and form the basis of a roadmap. The roadmap identifies the elements required to ensure better outcomes for biodiversity in future events, and poses a series of recommendations.

Key findings

Our research highlights that most conservation assets were not explicitly prioritised for protection in fire operational responses, and this lack of prioritisation contributed to the exceptional losses of biodiversity in the 2019–20 fires.

In preparation for fires, agencies had a variety of data, tools and strategies to guide responses during the fires. They used these to varying degrees and with differing levels of success. Where available, mapping, GIS data layers and bushfire mitigation plans were helpful to identify locations and distributions of vulnerable conservation assets.

However, with regards to specific targeted actions that need to occur during a fire, only two agencies referred to specific emergency planning for threatened species that outlined the actions that could or should be undertaken during a fire. These emergency plans were limited to species identified as high-risk or high-value.

Key impediments identified by participants included a lack of accessible information on feasible actions, and limited information on which conservation assets should be prioritised for action as the fires approached. Not surprisingly, participants suggested that a more comprehensive set of fire suppression plans was required to guide actions during the fires, either for single species (highly threatened or valued species) or via regional or landscape scale plans. In addition, participants acknowledged that more actions needed to be implemented before the fires to "spread risk" (e.g., fire breaks and species translocations) or increase ecological resilience (i.e., via targeted threat management).

Even where vulnerable conservation assets were identified, and pre-established fire action plans existed,

Key findings

multiple challenges constrained or impeded implementation of actions. Many interviewees recognised the unprecedented nature of the fires, whereby their scale, intensity and highly unpredictable behaviour had significant consequences for whether control efforts could be safely implemented. This was exacerbated by the inadequacy of resources and capacity directed toward conservation assets, and the accessibility, relevance and currency of available ecological data. In some instances, participants noted challenges with interagency relationships and culture that manifested in a lack of awareness of the location and importance of conservation assets.

When threatened species or ecological communities were identified as being at risk, several factors helped the targeted protection of these conservation assets. Having biodiversity

representatives in Incident Control Centres was as a key factor in improving outcomes. These representatives came in a range of forms, including Natural Values Officers, Wildlife Controllers and Parks personnel in Incident Management Team roles. This representation facilitated access to, and interpretation of, ecological data and increased the awareness of conservation assets. The contribution of local knowledge, often not captured in plans or mapping, was also considered important.

We found that conservation assets were more likely to receive targeted protective action if they were located at a single site, had a pre-existing high profile (e.g., were an iconic species) and there was strong advocacy for action, either within the Incident Management Team, from political interest or external stakeholders.

Conservation assets were given greater consideration if the fire was located on national park estates, and the fire was primarily the responsibility of the land manager or parks agency, if there was a feasible and explicit plan of action for protection, and where suitable resources could be secured to implement actions.

Actions to protect human life and property were, understandably, always the priority. However, even where extra resources might have been available, participants identified a critical missing element. Conservation assets are not integrated into the decision frameworks and governance structures that guide the allocation of resources to protect other values (e.g., life, property, infrastructure), so consideration of conservation assets was opportunistic and ad hoc.
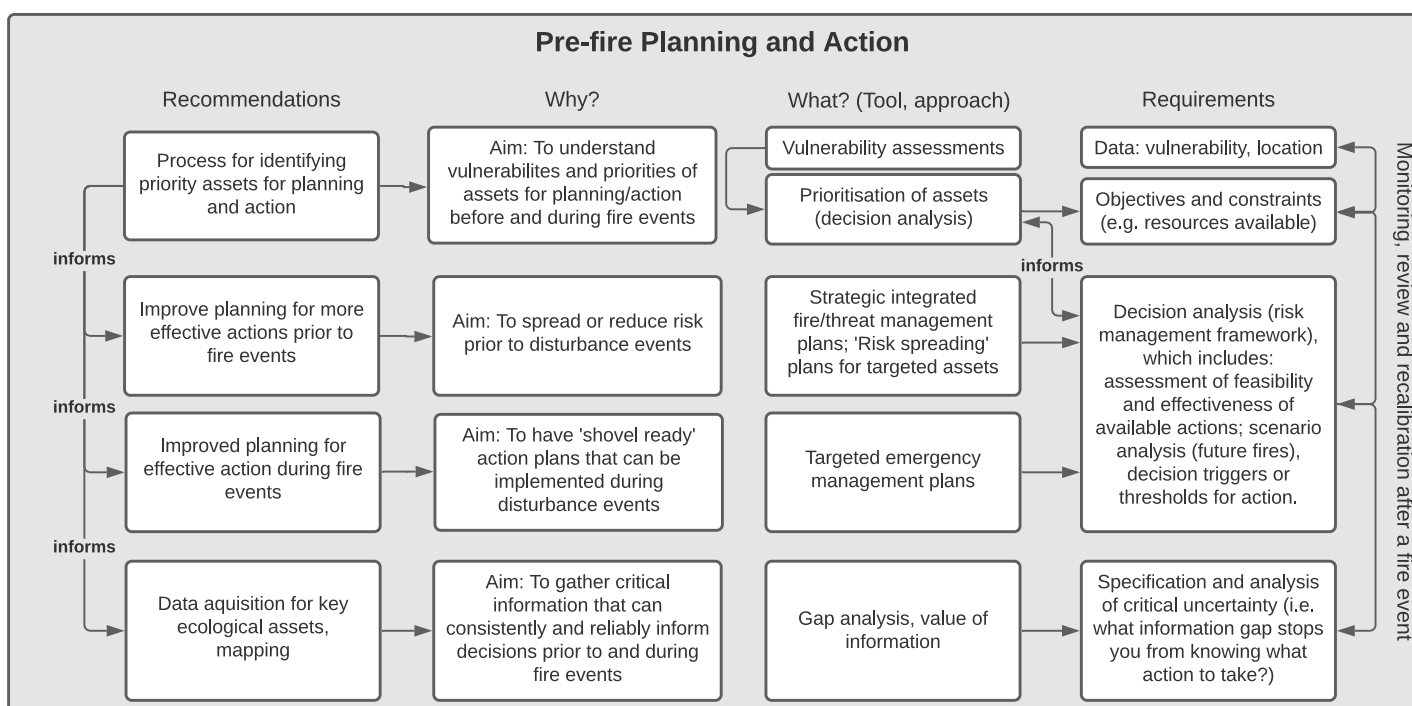

Figure 1: Pre-fire planning roadmap to reduce risk before fire events, increase resilience of environments and reduce conservation losses during fire.
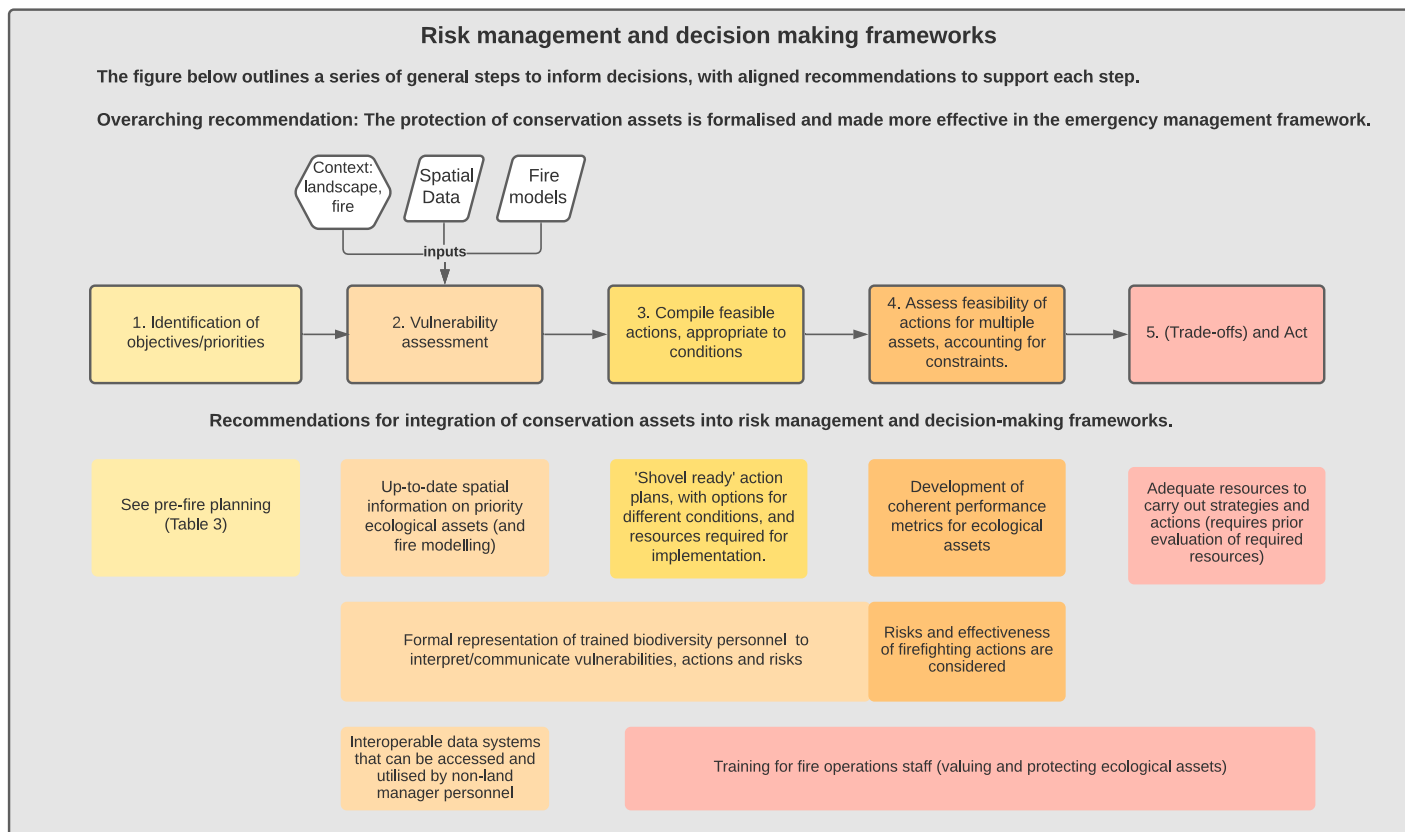
Risk management and decision making frameworks

The figure below outlines a series of general steps to inform decisions, with aligned recommendations to support each step.

Overarching recommendation: The protection of conservation assets is formalised and made more effective in the emergency management framework.

Context: landscape, fire / Spatial Data / Fire models → inputs

| 1. Identification of objectives/priorities | 2. Vulnerability assessment | 3. Compile feasible actions, appropriate to conditions | 4. Assess feasibility of actions for multiple assets, accounting for constraints. | 5. (Trade-offs) and Act |

Recommendations for integration of conservation assets into risk management and decision-making frameworks.

| See pre-fire planning (Table 3) | Up-to-date spatial information on priority ecological assets (and fire modelling) | 'Shovel ready' action plans, with options for different conditions, and resources required for implementation. | Development of coherent performance metrics for ecological assets | Adequate resources to carry out strategies and actions (requires prior evaluation of required resources) |

Formal representation of trained biodiversity personnel to interpret/communicate vulnerabilities, actions and risks | Risks and effectiveness of firefighting actions are considered

Interoperable data systems that can be accessed and utilised by non-land manager personnel | Training for fire operations staff (valuing and protecting ecological assets)

Figure 1: *A roadmap to integrate conservation assets into the emergency management framework... In a risk management framework, Step 1 is aligned with the problem formulation stage, the inputs to Step 2 are used in an exposure assessment 2; Step 3 and 4 are aligned with an effects analysis, and Step 4 involves characterisation of risk and decision-making.*
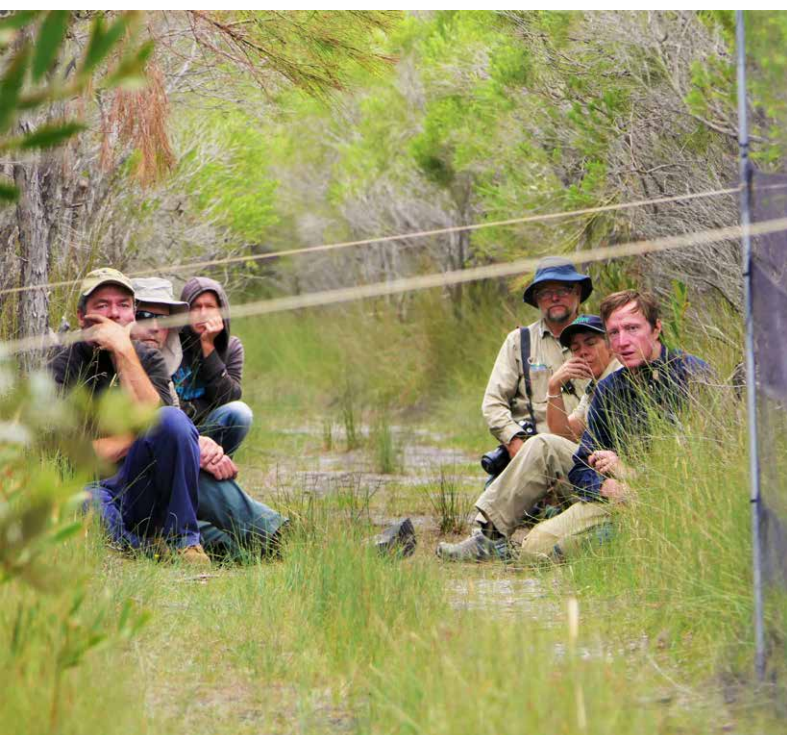
ABOVE: A multi-agency effort led to the successful emergency removal of endangered eastern bristlebirds. Images: Mark Antos

Recommendations

The road map developed through this research outlines recommendations focused around two primary objectives: 1) To spread risk before fire events, to both increase the resilience of the environment and reduce biodiversity losses before fire events (see Figure 1); and 2) to maximise conservation outcomes and minimise risk of serious impacts to conservation assets in fire events (see Figure 2). These recommendations work together to improve outcomes for biodiversity in a changing climate, and to minimise the risks in a future where wildfire events of such magnitude are inevitable.

Recommendations for actions before fire events

Our findings highlight the need for data collection, planning and action for biodiversity conservation to occur before fire events (Figure 1). An assessment and prioritisation of conservation assets should occur to inform priorities for action before or during a fire event, that need to be linked to spatial data for each conservation asset.

Plans need to be developed and implemented that identify actions for assets and landscapes before fire to reduce the need for reactive action during or after a fire event. For example, this could include translocation, ecological burning or pest management. Similarly, plans need to be developed that identify actions that mitigate risk to conservation assets during a fire event. Critically, these plans should identify feasible actions and the resources required, and be readily accessible and understandable by emergency controllers operating in a context of competing needs and rapid decision-making.

Planning should be supported by scenario and contingency planning to help determine the appropriate benefits and risks of acting in different fire and resource availability conditions, and knowledge about key risks faced by species during fire-fighting efforts, for example, the use of fire retardant. It is critical that monitoring, review and recalibration of the pre-fire planning roadmap is done after a fire event, to ensure the process continuously evolves and improves.

Recommendations for actions during fire operations

The protection of conservation assets needs to be formalised as a priority in the emergency management framework, including all relevant governance structures, to ensure the protection of biodiversity during fires is standard best practice, rather than the exception (see Figure 2). Formally recognising the requirement for the consideration of conservation assets in emergency events will also spread the responsibility for its protection beyond the domain of biodiversity agencies.

Conservation and cultural assets need to be integrated into existing risk and decision-making frameworks supported, first, by rapidly updated spatial information (maps) on the location and vulnerability of priority assets; second, by a range of feasible ("shovel ready") management actions that can be implemented under different conditions; and third, by developing coherent, complete performance metrics for ecological values, such that risks can be understood and evaluated alongside other values.

Biodiversity interests need to be formally represented with appropriate authority in Incident Management teams. The role of biodiversity representatives is to facilitate the availability of accessible, readily interpretable and relevant ecological data, to help with the interpretation of the vulnerability and management needs of assets and to champion the protection of conservation assets. Representatives can also play a role in networking with experts and other departments or organisations to share information and provide support. Support and coordination at the federal level, for instance, through the development of national training standards, is considered crucial to build consistency and capacity.

Interoperable systems for ecological data need to be developed that can be accessed and utilised by non–land manager personnel. It is important that data are current, accessible, interpretable and relevant to the context. Training and guidance also need to be provided to fire operations staff to improve their understanding, capacity and effectiveness for management activities targeted at conservation assets.

Overarching recommendations within this roadmap require resourcing and adoption by decision-makers, and a supporting policy and legislative framework to ensure all improvements may result in positive long-term change. Such additional support represents an investment that will help reduce future biodiversity loss and the need for massive post-fire recovery funding.

Further reading

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Further Information

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