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Response by the Australian Government to the 2019–20 wildfires

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Summary

Context and challenges

- The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) focuses Australian Government interests on the protection of matters of national environmental significance.
- Many of these matters were affected by the 2019–20 wildfires.
- Given the impacts of these fires, responses to prevent extinction and support recovery needed to be made urgently and targeted towards those species and ecological communities that were in most need of such management. Determining this response required rapid assessment of impacts.

Main findings

- The Australian Government committed an initial $2 billion National Bushfire Recovery Fund to support a wide range of responses to the 2019–20 wildfires; this included a $200 million investment for the recovery of native wildlife and their habitats. This funding provided the foundational support for many post-fire emergency responses to prevent extinction and support recovery of fire-affected species and ecological communities.
- The Australian Government responded rapidly to the biodiversity losses caused by the 2019–20 wildfires.
- This response was characterised by a high degree of consultation and collaboration with state/territory conservation agencies, conservation non-government organisations (NGOs), researchers and many other stakeholders.
- The response was substantially informed by an independent advisory panel established by the Minister for the Environment.
- Largely as informed by this panel, the Australian Government Department of Agriculture, Water and the Environment ('the Department') rapidly developed

priority listings of the ecological communities, plants and animals that were most affected by the 2019–20 wildfires, with such listings then used to help allocate investments in recovery efforts.

- The Australian Government undertook a series of regional consultative workshops in the most fire-affected areas to develop, fund and implement priority actions at regional scale for the recovery of fire-affected biodiversity.
- The Australian Government supported the independent Threatened Species Scientific Committee to prioritise and undertake an expedited assessment of the conservation status of a large set of fire-affected species and ecological communities most in need of conservation and management.
- The Australian Government established a Royal Commission into National Natural Disaster Arrangements, and the Department's evidence encompassed the impacts of the fires on biodiversity, measures to reduce impacts of future fires and assist recovery, the respective roles of the Commonwealth and the states in environmental management, and options for improvement around data, mapping, and species distribution modelling. These contributions to the Commission were one way in which the biodiversity impacts, issues and response were integrated with broader policy considerations following the fires. The Australian Government supported in principle the Commission's recommendation relating to biodiversity.
- The Department worked closely with the National Bushfire Recovery Agency (now National Recovery and Resilience Agency) to maintain a focus on biodiversity impacts and response among other Australian Government actions.
- Recognising that shortcomings in national coordination and availability of critical data constrained assessment of the impacts of these fires on biodiversity, the Australian Government supported a suite of projects and initiatives to improve data availability and fill some key knowledge gaps. Such evidence will increase preparedness for any future comparable event.

Introduction

The Australian Government had a leadership and coordination role in many aspects of the response to the 2019–20 wildfires. The role was backed by the Australian Government making more than $2 billion available for recovery. With respect to the natural environment, the Australian Government's role is focused on protection of matters of national environmental significance, as defined in the EPBC Act. These matters include species and ecological communities nationally listed as threatened, species listed as migratory under a range of international agreements, World Heritage properties and wetlands of international importance (listed under the Ramsar Convention on Wetlands).

From late 2019, it became evident that wildfires across large areas of eastern Australia were having an unprecedentedly severe impact on many of these matters, with reports in early January 2020 of more than 1 billion animals affected (see Chapter 12) and impacts on many threatened species and ecological communities (Woinarski *et al.* 2020). Given the exceptionality of the threat, there was no pre-existing response package. However, the Australian Government responded rapidly, consultatively and strategically: it provided national leadership, fostered collaborations, and invested substantially in research and recovery actions, guided by an evidence-based prioritisation process.

A rapid national overview of the extent and severity of impact of the wildfires on biodiversity was conducted internally by the Department of Agriculture, Water and the Environment ('the Department'). This analysis, published online on 20 January 2020 (while fires were still raging), confirmed that the impacts on biodiversity were exceptional, reporting that 327 nationally listed threatened species (nearly 20% of all Australian threatened species) had at least 10% of their modelled likely or known distributions within the fire extent, of which 49 species had more than 80% of their modelled likely or known distributions within the fire extent. The Department's rapid assessment also demonstrated significant impacts on some World Heritage properties.

The Department's initial analyses also identified that the extent, severity and impacts of the 2019–20 wildfires were exceptional across much of eastern and southern Australia and delineated these areas (the 'Preliminary Analysis Area') as a focus for concern (Chapter 1), rather than diluting management response across the nation as a whole. Most of the analyses of biodiversity impacts of the 2019–20 fires have subsequently been restricted to this area (Legge *et al.* 2022), including throughout this book.

In January and February 2020, as fires were still burning, the Minister for the Environment, the Hon Sussan Ley MP, hosted a series of emergency consultative roundtables, focused on immediate recovery actions, with more than 200 representatives from state and territory agencies, conservation and wildlife care organisations, business, industry, Traditional Owners, scientists and natural resource managers. These meetings ensured a high level of collaboration and transparency among the many respondent groups, and helped galvanise and target the rapid deployment of remedial actions, with such response supported by the urgent provision of funding (see below).

In January 2020, the Minister also established an expert advisory group, the Wildlife and Threatened Species Bushfire Recovery Expert Panel, to provide strategic advice, particularly about identifying the natural values that had been most fire-affected and prioritising management responses to support their recovery. The functions, operation and outcomes of this panel are described in more detail below.

The Australian Government established a royal commission into the 2019–20 wildfires. The commission had a broad scope, explicitly including the clarification, coordination and accountability of Commonwealth and state/territory responsibilities for fire management, the need to try to improve resilience within the context of changing climate, and legislative and policy reform; it also included consideration of biodiversity impacts. This commission is considered in more detail in Chapter 30, but we note here that many matters described in this chapter were presented by the Department as evidence to that commission. The Australian Government supported in principle the commission's recommendation relating to biodiversity.

In this chapter, we describe some main components of the Australian Government's response to the 2019–20 wildfires, focusing particularly on its national leadership and coordination role in supporting post-fire recovery actions for the most fire-affected components of biodiversity.

Funding support

The Australian Government established a $2 billion National Bushfire Recovery Fund to support a wide range of responses to the 2019–20 wildfires. Within this program, there was an explicit component to support biodiversity recovery efforts ('Wildlife and Habitat Bushfire Recovery' investment). An initial $50 million investment ('Phase 1 emergency

response', for short-term projects) was established in January 2020. This comprised rapidly delivered allocations of $13 million to state and territory governments for on-ground emergency interventions and priority recovery actions, $11.9 million for a competitive grants program, $10.3 million for wildlife rescue and care services and establishment of insurance populations of fire-affected species, $7 million for natural resource management organisations for emergency actions including control of pests and weeds that may compound fire impacts and constrain recovery, $5 million to Greening Australia for revegetation efforts, and $2.5 million to Conservation Volunteers Australia to support volunteer involvement in recovery efforts.

In addition to this support for urgent on-ground management responses, a further $2 million was allocated by the Australian Government to fire-related research, through the Threatened Species Recovery Hub of the National Environmental Science Program. This funding was provided for more detailed analyses of the impacts of the 2019–20 wildfires on biodiversity, to help support survey and monitoring efforts, and to assess management effectiveness.

A subsequent Phase 2 ('Recovery and Resilience') funding stream of $150 million was announced in May 2020, for projects operating for up to 2 years from July 2020. This comprised $110 million for on-ground actions to recover biodiversity in the seven most fire-affected regions (see more detailed account below); $28 million to support the assessment and listing process for fire-affected species, and planning, coordination and monitoring of species' recovery (including $2 million for a national monitoring program for the koala *Phascolarctos cinereus*), and administration of the program (see more detailed account below); $10 million in grants for community-led conservation actions; and $2 million to support knowledge exchange on Indigenous fire management. Collectively, this support provided for recovery actions that were appropriate, and could be implemented, at national, state/territory, regional and local scales. The $200 million allocated over ~2 years by the Australian Government to recover biodiversity affected by the 2019–20 wildfires is exceptional in the context of typical resourcing for threatened species management in Australia.

A key obligation for all funded projects was for regular reporting on outcomes. Such reporting will help monitor recovery and build the evidence base about the relative effectiveness of management actions, and hence will allow for an increased preparedness for, and effectiveness in, responding to any future comparable event.

However, as the Australian Government funding focused on addressing the immediate and shorter-term impacts of the fires, all projects were initially required to be delivered and funding expended by June 2022. Due to COVID-19 restrictions affecting on-ground activities throughout 2020–21, some projects have been extended through to mid-2023 to ensure the contracted wildlife recovery outcomes can be met. For many species and ecological communities, post-fire recovery will not occur in such a short period (Legge *et al.* 2021), and much longer commitments to remedial management will be required.

Much of the assessment of impacts and management response described in this book owes at least in part to this funding program provided by the Australian Government.

The Wildlife and Threatened Species Bushfire Recovery Expert Panel

This specially established advisory panel was chaired by the Australian Government's Threatened Species Commissioner, Dr Sally Box, and comprised eight additional

independent experts (including four of this book's editors) in fire ecology, threatened species management, structured decision analysis, *ex situ* conservation and Indigenous knowledge. Representatives of state and territory conservation agencies attended panel meetings as observers, to provide jurisdictional perspectives and to foster coordination in priority management responses. The panel's primary purpose was to advise on prioritising recovery actions for fire-impacted native species, ecological communities, natural assets and their Indigenous cultural value.

At its first meeting in January 2020, the panel set four broad objectives for the recovery effort:

1. Prevent extinction and limit decline of native species.
2. Reduce the immediate suffering of native animals directly impacted by the fires.
3. Maximise the chances for long-term recovery of native species and communities.
4. Ensure learning and continual improvement are at the core of the response.

The panel also identified a series of priority actions that needed to be implemented urgently to meet these objectives:

- protection of unburnt areas within or adjacent to recently burnt ground that provide refugia;
- control of feral predators and herbivores to reduce the pressure on native species where appropriate;
- emergency salvage of plant and animal species for *ex situ* conservation or wild-to-wild translocation;
- rapid on-ground assessment for species and communities of concern; and
- supplementary shelter, food and water for animals where appropriate.

These objectives and priority activities provided the subsequent framework for the Australian Government's response and the distribution of its funding support. The panel met 20 times over the period of its 9-month tenure (January to September 2020).

Overseen by the panel, a series of analyses prepared by the Department and other experts provided rapid assessments of the fire impact on biodiversity. These assessments were used to help direct urgent management response to the species and ecological communities most needing such support, and to help identify the type of management action that could be most effective. To help coordinate recovery efforts and to inform the public more generally, these prioritisation analyses were published on the Department's website, for vertebrates and a small set of invertebrates (initially in February 2020, updated in March 2020), ecological communities (in February 2020), invertebrates (in April 2020) and plants (initially in April 2020, updated in October 2020), with subsequent formal publication (Legge *et al.* 2022; Gallagher *et al.* in press). These assessments also served to indicate which species and ecological communities may have become newly eligible, because of the fires, for national listing as threatened or – in the case of already listed species or ecological communities – for up-listing to a more imperilled status.

Informed by such prioritisations, the expert panel then provided advice to the Australian Government on recovery actions to be delivered by state and territory governments as well as applicants for funding under successive tranches of the $11.9 million for a competitive grants program (the 'Wildlife and Habitat Bushfire Recovery' investment fund), to ensure funding was directed as comprehensively as possible across the set of priority fire-affected species and ecological communities, targeted to those whose recovery most needed support, and applied the management actions most likely to be effective.

Regional recovery planning and implementation

The Australian Government invested $110 million ('the Regional Fund') to build on existing recovery work and support efforts beyond the immediate post-fire recovery period, focused on seven regions recognised to have the greatest biodiversity impacts as a result of the wildfires (Fig. 22.1). These funds were allocated to priorities determined through regional co-design workshops, to strategic recovery initiatives and to recovery efforts that required coordination across regions.

Co-design workshop investments

Co-design workshops were held in August and September 2020 with the stakeholders involved in post-fire management (state governments, regional natural resource management (NRM) groups, Traditional Owners, non-government organisations (NGOs), Landcare groups, local council) in each region to (1) share and consolidate knowledge of existing efforts; (2) identify ecological priorities that required additional funding to secure their recovery (i.e. gaps in investment); and (3) outline an indicative action plan to guide the allocation of these funds. The aim was to develop plans that would deliver the greatest benefit to the priority species, ecological communities and other natural assets in each region by 2030.

For each workshop, the Department developed a regional profile including information on the distributions of priority fire-affected species and ecological communities, and the actions most likely to support their recovery. This detailed compilation was made

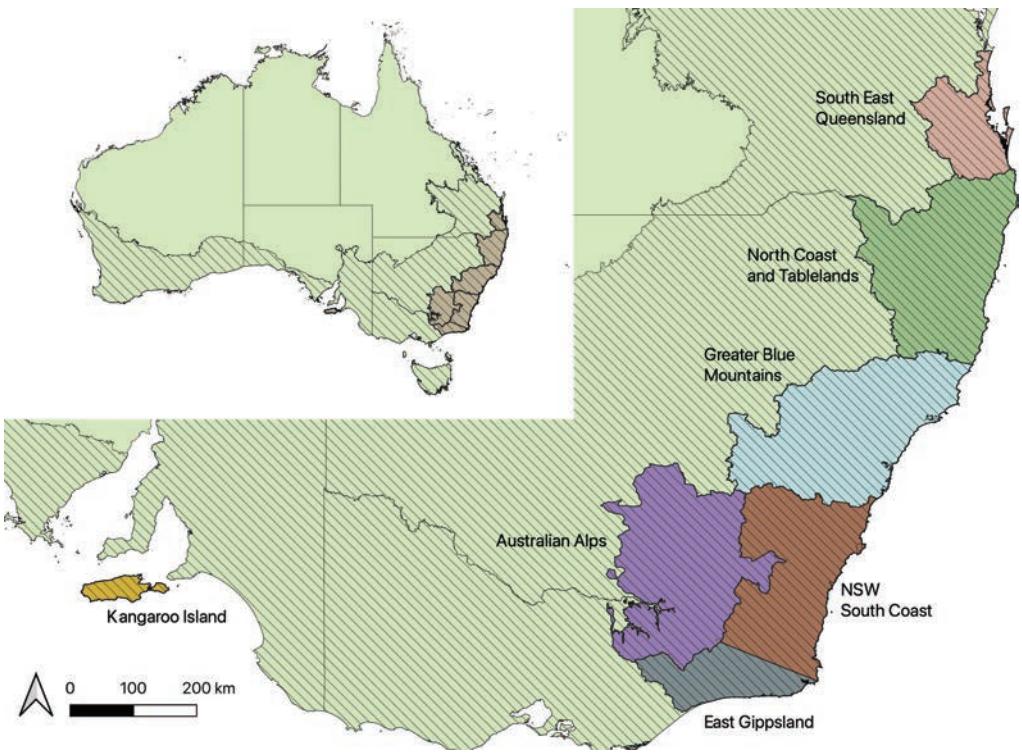

Fig. 22.1. The seven priority areas identified by the Department of Agriculture, Water and the Environment for regional scale biodiversity recovery planning and management.

possible through the development within the Department of an advanced spatial analysis tool that helped illustrate and compare benefits for priority species arising from any potential management option, and to ensure that benefits were spread widely across priority fire-affected species and ecological communities (Fig. 22.2). State agencies and NRM regions contributed to the regional profiles by providing state and regional-scale information on fire impacts and priorities for recovery.

Workshop participants shared perspectives on the impacts of the 2019–20 fires, the priorities and threats in each region, the existing management and planning underway (targeting priorities), and any perceived gaps in investment. Participants were then split into groups to develop a strategy, with detail on the actions, locations, priority matters targeted by each action, and the approximate budget allocated to each action. Individual strategies were then explored and discussed by the larger group, which was tasked with developing a consensus action plan for the region.

Table 22.1 highlights the level of investment and types of actions supported in each region. The funding was often used to consolidate or expand existing programs (e.g. pest control programs), highlighting the perceived importance of managing ongoing threats. In order to assess and hone the effectiveness of management actions, monitoring was explicitly built into the investments, and the results of this monitoring may resolve some of the uncertainty associated with the type, duration and magnitude of intervention required to achieve long-term benefits.

The additional investment was seen as an opportunity to support and build capacity for Traditional Owner-led planning and recovery of Country. Notably, moving beyond the emergency recovery period, participants also wanted to improve fire planning and management (including cultural and ecological burning) to increase the resilience of priority assets, and mitigate the effects of climate change. Likewise, focus was given to the identification, management and protection of refugial areas. In some regions (East Gippsland and

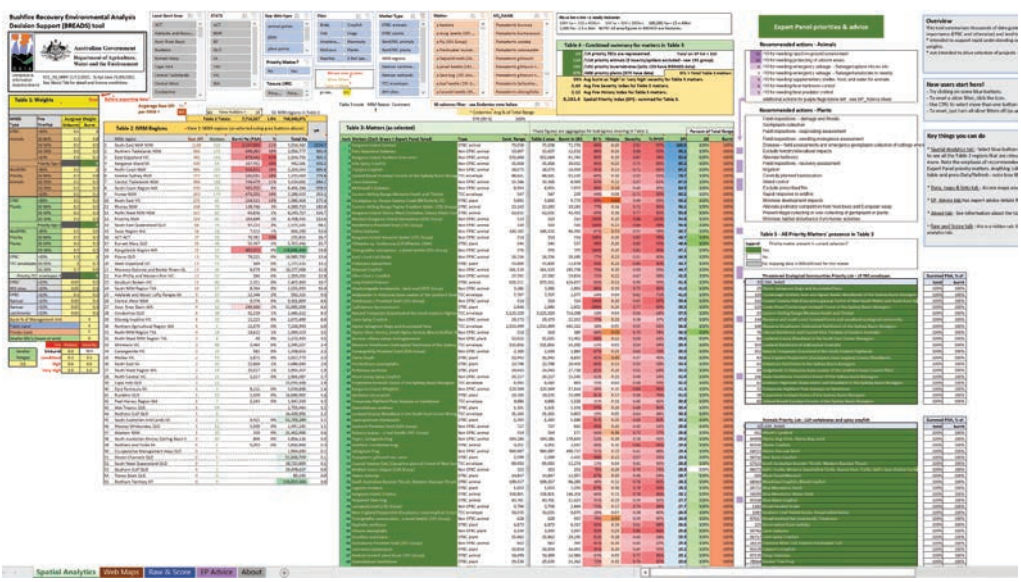

Fig. 22.2. Illustration of planning tool used in regional workshops to provide rapid assessment of the relative benefits of management options for priority fire-affected species and ecological communities.

Australia's Megafires: Biodiversity Impacts and Lessons from 2019-2020
Editors: Libby Rumpff, Sarah M. Legge, Stephen van Leeuwen, Brendan A. Wintle and John C. Z. Woinarski
CSIRO Publishing 2003

Table 22.1. Summary of regional fire metrics and priority management themes highlighted (dark shading) for recovery funding identified through co-design workshops.

Note that much more detailed actions are given in individual regional reports, available at https://www.dcceew.gov.au/environment/biodiversity/bushfire-recovery/funding-support/regional-delivery-program.

Region	Total regional area (km^2)	% total area burnt (% of this in high to very high severity fire)	Regional Fund co-design workshop budget allocated ($ million)	Management theme										
				Traditional Owner-led planning & management	Feral herbivore control	Predator control	Fire planning and management	Weed control and vegetation restoration	Erosion control	Species-specific intervention	Refugia management	Data collation/ validation	Governance	Capacity building
Australian Alpine environment	131 143	4 (60)	8	■	■	■	■	■	■	■				
Forests and coastal ecosystems of East Gippsland	21 047	42 (59)	14	■	■	■		■		■	■			
Greater Blue Mountains and World Heritage Area	76 563	15 (50)	13	■	■	■	■	■	■	■	■	■		
Kangaroo Island	4426	38 (83)	5			■	■			■				
Rainforests of New South Wales north coast and tablelands	Region: 71 553; Gondwana Rainforests: 2688	Total region: 23 (45); Gondwana Rainforests: 46	13	■	■	■	■	■		■		■		■
Forests of the New South Wales south coast	55 543	21 (61)	15	■	■	■		■	■	■	■			■
Rainforests of south-east Queensland	23 731	4 (46)	4		■	■	■	■					■	

Greater Blue Mountains) this was highlighted as a particular focus of investment, while in other areas participants specified these areas as locations for implementation of strategic actions such as weed control.

Regional workshop participants were faced with difficult decisions, particularly when costs prohibited action at the scale necessary to have meaningful outcomes. This is evident, for example, in the south-east Queensland and Kangaroo Island regions, which had to target their investment in a smaller set of actions. Another example was the limited investment in erosion control, despite some regions (e.g. the Alpine region) facing serious ongoing issues with health of waterways. Participants discussed gaps in investment in targeted actions for some priority species. However, strategic actions such as herbivore control were often favoured over targeted actions, because it was likely that more enduring benefit would be realised across the list of priority assets.

These regional workshops were highly effective collaborative mechanisms to craft and deliver a carefully considered, coordinated and integrated package of much needed immediate management responses, and strategic investments for the future. They served to mesh national priorities for fire-affected biodiversity with local and regional perspectives and actions, and provided the evidence-based foundation to deliver substantial targeted investment in a remarkably short timeframe. Without doubt, they provided a critical contribution to the recovery of a high proportion of the most fire-affected species, ecological communities and other environmental assets. A more precise evaluation of that benefit will be possible in the near future, as individual actions, the overall portfolio of investments, and the recovery of species and ecological communities are monitored and reported.

Multiregional species interventions and strategic investments

A further component, the Regional Bushfire Recovery for Multiregional Species and Strategic Projects program, is investing $10 million to fund priority actions for species' recovery at a national scale, and to avoid duplication and promote complementarity with other fire recovery investments.

Species and species groups identified as priorities for this funding were determined in consultation with the Expert Panel, experts from the Department, and state and territory agencies. Principles used to assess whether fire-affected species should be a high priority for multiregional action included whether:

- the species occurs, or migrates across, multiple regions and/or jurisdictions
- actions are needed across jurisdictions to address the species' recovery
- there is a need for coordinated collaborative action
- recovery actions over 18 months will make a tangible difference to the species' survival or recovery.

The 10 priority species and species groups are the spot-tailed quoll (south-east mainland population) (*Dasyurus maculatus maculatus*), grey-headed flying-fox (*Pteropus poliocephalus*), long-nosed potoroo (south-east mainland subspecies) (*Potorous tridactylus tridactylus*), brush-tailed rock-wallaby (*Petrogale penicillata*), platypus (*Ornithorhynchus anatinus*), eastern bristlebird (*Dasyornis brachypterus*), gang gang cockatoo (*Callocephalon fimbriatum*), south-eastern glossy black-cockatoo (*Calyptorhynchus lathami lathami*), two gliders (greater glider (*Petauroides volans*) and yellow-bellied glider (*Petaurus australis*)), and alpine reptiles (including the alpine she-oak skink (*Cyclodomorphus praealtus*), alpine bog skink (*Pseudemoia cryodroma*), and Guthega skink (*Liopholis guthega*)). Under the

program, national species coordinators established working groups to foster collaboration among jurisdictions, experts, NGOs and community groups, as well as maximising the value of wildfire recovery investments by sharing knowledge and reducing duplication.

A grant process was opened to project applications generated through the multi-jurisdictional working groups for each species or group of species. This ensured a strong suite of targeted and high-quality project grant applications was received that would be well placed to deliver the coordinated national-level recovery being sought under the program. Projects are focused on data, monitoring and citizen science; translocation planning or implementation; on-ground efforts; engagement and communication; and research. Funding recipients include NRM organisations, species experts, community groups, universities, state and territory governments, and zoos.

In addition to the 10 priority species described above, $12 million of the Regional Fund was directed to one iconic and wide-ranging fire impacted species, the koala, to support habitat restoration and threat mitigation in bushfire-affected regions of New South Wales and south-eastern Queensland and for coordination and delivery of more effective health research. These investments were complemented by a reassessment of the species listing status by the Threatened Species Scientific Committee and the finalisation of the national recovery plan for the koala.

Additional strategic investments were made to address gaps, further engage the community and support cross-jurisdictional coordinated activities (e.g. seed banking of priority plant species, citizen science initiatives to boost knowledge on fire impacts and recovery, and to address critical knowledge gaps for invertebrates), invasive animals coordination, and Landcare-led wildfire recovery activities.

Indigenous Fire and Land Management workshops program

The Australian Government allocated $2 million over 2020–21 and 2021–22 to support partnerships with Traditional Owners, Indigenous organisations and Indigenous enterprises to hold cultural burning and traditional land management workshops. The program design was informed by consultation with Traditional Owners, thematic experts, state cultural fire strategies and research including CSIRO's 'Climate disaster and resilience technical report' (CSIRO 2020), which identified the importance of enabling adoption of Indigenous cultural burning into contemporary land and bushfire management. The report also noted the need for targeted investment to support Indigenous-led recovery and resilience measures.

The Indigenous Fire and Land Management workshops program is also consistent with recommendation 18.2 of the 2020 Royal Commission, which stated: 'Australian, state, territory and local governments should explore further opportunities to leverage Indigenous land and fire management insights, in the development, planning and execution of public land management activities' (Royal Commission into National Natural Disaster Arrangements 2020).

The objectives of the program are to:

- support Indigenous-led knowledge sharing of Indigenous fire and land management practices;
- strengthen the knowledge and understanding of traditional Indigenous fire and land management practices; and
- support Indigenous communities to benefit from traditional fire and land management knowledge.

The intended outcomes of the program are:

- Indigenous-led fire and land management workshops that support a greater understanding of Indigenous fire and land management practices within Indigenous communities;
- supporting the inclusion of Indigenous fire and land management practices in wider conventional fire and land management arrangements; and
- empowering Indigenous communities to progress Indigenous fire and land management activities.

The program funded 13 grants. The grant guidelines also encouraged separate workshops for women and young people where appropriate. The program does not include landscape burning activities – however, demonstrating and teaching burning activities can occur as part of workshops. Originally called the Cultural Burning Workshops program, the program name was changed to ensure workshops incorporated the breadth of Traditional Owner fire and land management knowledge and experience following consultation and advice that burning on Country occurs for many reasons.

Threatened species assessment and listing

The Threatened Species Scientific Committee (TSSC) is the statutory committee appointed by the Australian Minister of Environment (henceforth 'Minister') to provide independent scientific advice to achieve biodiversity conservation outcomes, specifically for threatened species and ecological communities under the EPBC Act.

As soon as possible after the 2019–20 wildfires, the TSSC developed a bushfire response plan (the Threatened Species Scientific Committee 10-point Bushfire Response Plan), which was approved by the Minister on 2 March 2020. The plan has four key objectives, which align with those of the Wildlife and Threatened Species Bushfire Recovery Expert Panel, and 10 actions (https://www.dcceew.gov.au/environment/biodiversity/threatened/publications/threatened-species-scientific-committee-bushfire-response-plan).

The major task for the TSSC has been to make recommendations to the Minister about changes in the listing status of fire-affected species and ecological communities, so that these entities could be protected as matters of national environmental significance (for entities unlisted at the time of the fires) or transferred to a higher threat status (entities listed at the time of the fires).

With the agreement of the Minister, the TSSC accepted public nominations of fire-affected species and ecological communities at any time, rather than once per year. In addition, fire-affected entities were prioritised for assessment based on advice from the Bushfire Recovery Expert Panel and the states and territories.

This number of entities that required assessment or reassessment represented a huge increase in workload for the TSSC and the Department and was enabled by:

- the Minister allocating funding to assess the listing status of fire-affected species and ecological communities and update planning documents for fire-affected biota;
- the Department providing a temporary increase in resourcing in the Protected Species and Ecological Communities Branch, including the establishment of a new directorate and reforming quality assurance processes;
- the Minister increasing the size of the TSSC from 10 to 12 members;

- public nominations for Proposed Priority Assessment List remaining open to allow the public and experts to submit nominations as information came to light on the impact of the fires on species;
- the TSSC and Minister establishing interim proposed prioritisation processes to identify further species for assessment as the impacts of the fires were better understood. In addition to annual statutory prioritisation processes, five additional interim prioritisation processes have been established;
- the TSSC increasing its number of meetings from four to 11 per year and making operational changes such as increased use of out-of-session working groups and parallel sessions within meetings;
- the Department contracting experts from the Bushfire Recovery Expert Panel, state and territory governments, the National Environmental Science Program Threatened Species Recovery Hub, the International Union for the Conservation of Nature and other scientists to assist in the preparation of listing assessments and conservation advices;
- the TSSC collaborating with the Department to provide advice on the development and implementation of the Species Expert Assessment Plan through which scientific experts are delivering listing assessments and conservation advices for large groups of species and ecological communities – including freshwater fish, turtles, three groups of plants, lizards and snakes, terrestrial mammals, frogs, and rainforests and wet forests of south-eastern Australia – to support wildfire recovery, environmental resilience and preparedness for future fire events; and
- the TSSC and the Department working in partnership to undertake preliminary evaluations for high-profile species such as the koala and greater glider. The committee is continuing to undertake preliminary evaluations of other fire-affected animals, plants and ecological communities to maximise the efficiency of the assessment process.

As of May 2022, 169 species and nine ecological communities affected by the wildfires have been included in the 2020 and 2021 Finalised Priority Assessment Lists, the formal workplans of the TSSC for status reassessment and conservation planning, by the Minister. Of that set, assessments have been completed and listing decisions made for 51 species and four ecological communities. In addition, conservation planning documents are being revised for entities listed before the 2019–20 wildfires to include the impacts of, and management response to, that extreme event. The first set of conservation advices has been prioritised based on the level of fire impact.

The TSSC also led the rewriting of the listing assessment for the proposed Key Threatening Process 'Fire regimes that cause biodiversity decline', which came into effect in April 2022.

The scale of the 2019–20 wildfires was unprecedented and has resulted in numerous challenges for assessing impacts on species and ecological communities. Ideally, the partnerships established between the TSSC, the Department and the expert scientific community in the aftermath of the wildfires will endure and lead to more efficient and effective processes in future.

Data and information

A key finding of government inquiries reporting on the 2019–20 wildfires (e.g. Royal Commission into National Natural Disaster Arrangements 2020) was that coordination among jurisdictions in many aspects of information was suboptimal, that some critical

information was not readily accessible, and that there were many critical gaps in biodiversity knowledge (see Chapter 30). One example, evident as the fires were burning, was that fire mapping was undertaken largely independently by the states and territories, with such devolution hampering national assessments of fire extent and impact. In response, from February 2020, the Department worked with states and territories to collate a national spatial coverage for fire, the National Indicative Aggregated Fire Extent Dataset (NIAFED), which provided fire extent mapping across jurisdictions. In June 2020, the Department then published the Australian Google Earth Engine Burnt Area Map (AUS GEEBAM) developed by remote sensing specialists from the NSW Government. These national datasets allowed for consistent national assessment of impacts of these fires on species and ecological communities; such approaches will be critical for rapid assessment in future comparable events.

Further recognising the constraints to the assessment of impacts of, and implementation of responses to, the 2019–20 wildfires imposed by knowledge gaps and limited accessibility of existing biodiversity data, the Australian Government has subsequently supported a range of projects relating to biodiversity data collation and knowledge acquisition. These projects have included refined modelling of the distributions of fire-affected species (Legge *et al*. 2021); rapid taxonomic appraisal of some fire-affected species (Catullo *et al*. 2021); efforts for more strategic development and coordination of biodiversity monitoring programs especially for fire-affected species (Chapter 31; Southwell *et al*. 2022); development and maintenance of databases of life history and ecological traits that are informative of species' susceptibility to fire (Gallagher *et al*. in press); digitisation of locational information for invertebrate specimens in the Australian National Insect Collection to help make such data more accessible (https://digivol.ala.org.au/project/index/192261079); and the nationally integrated collation, storage and access ('innovative digital infrastructure'), through a Bushfire Data Commons, of a suite of datasets and models relating to fire and its impacts, including biodiversity, through the Australian Research Data Commons.

Conclusions

The Australian Government rapidly recognised the unprecedented severity of the impacts of the 2019–20 wildfires on biodiversity, including on many matters of national environmental significance. It responded urgently, with this response notable for its recognition of the need for independent expertise, for being framed by clear objectives and evidence that explicitly informed prioritisation, for being highly collaborative, and by being characterised by a substantial investment that recognised and reflected the magnitude of the impacts. Consequently, a large suite of projects, mostly involving on-ground management, undertaken by conservation NGOs, landholders, Indigenous groups, NRM organisations, research bodies, and state and territory governments, were coordinated and supported by Australian Government investments. These projects have undoubtedly done much in the short term to redress the biodiversity impacts caused by the 2019–20 wildfires. Much of this response was developed *de novo* as the 2019–20 wildfires burnt, but lessons learned will help preparedness for any future comparable wildfires.

Key implications

- The scale and magnitude of impacts on biodiversity of environmental catastrophes such as the 2019–20 wildfires require a national leadership response (and substantial

targeted funding support), with such response made more effective by consultation and collaborations across all stakeholder groups.
- An urgent, but evidence-based, response is required to such environmental catastrophes, else critical opportunities to prevent extinction and enable recovery may be lost. In this case, responses were prioritised through rapid assessment that determined the most fire-affected species and ecological communities, and the management actions they most needed.
- As demonstrated in this case, the establishment of an independent expert group allows for rapid access to information and evidence-based decision making. It may be appropriate to retain such a grouping to help prepare for future cases, rather than newly commissioning such a body after the event of the next catastrophe.
- Information shortcomings constrained some assessments of fire impacts and hence priorities for management. These need to be remedied to allow for more strategic, effective and timely responses to future catastrophes. In particular, the number and range of funded management actions now being implemented to recover biodiversity provides an extraordinary opportunity to assess the relative effectiveness of management options and inform responses to future events.
- Recovery from the 2019–20 wildfires is a long-term proposition, and additional resources and carefully coordinated programs of work will be needed to consolidate efforts to date and build the resilience of native wildlife to future disasters.

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