



National and state ecological communities (terrestrial) that were substantially fire affected in the 2019-2020 bushfires (as at September 2020)

Ecological communities are assemblages of native species that inhabit a particular area in nature. Extensive bushfires across temperate Australia in 2019-2020 impacted on a diverse range of Threatened Ecological Communities (TECs) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as well as other ecological communities (or equivalent entities) recognised at the state/territory or regional level. As well as direct impacts from burning, the fires exposed these ecological communities to other fire-related threats.

The Wildlife and Habitat Bushfire Expert Panel (Panel) and the Australian Government Department of Agriculture, Water and the Environment (DAWE) requested an independent assessment from ecological community experts of threats, impacts and priorities for responses to the 2019-20 bushfires. This resulted in a report to the Department and Panel led by Professor David Keith from the Centre for Ecosystem Science at the University of NSW, in collaboration with other ecological community experts from across the country:

Keith DA, Auld TD, Barrett S, English V, Gallagher R, Gray R, van Leeuwen S, McIlwee A, Mitchell D, Tozer MG, Williams RJ, Yates CJ, Neldner J, Buchan A, White MD, Rogers D, West A, Seddon J, Simpson CC (in prep) *Terrestrial Ecological Communities in Australia: initial assessment and management after the 2019-20 bushfires*. Report to the Wildlife and Habitat Bushfire Expert Panel and the Australian Department of Agriculture, Water and the Environment. Centre for Ecosystem Science, University of NSW, Sydney.

Key findings of the report as endorsed by the Panel on 25 September 2020 are summarised below.

- Firstly, Table 1 describes the fire-related threats and candidate management actions for the nationally-listed ecological communities that were initially identified by the Department and Panel as being of potential concern, plus several others that were later identified as regional priorities through more detailed analysis.
- Secondly, the state/territory recognised ecological communities (or equivalent entities) that are likely to have been most affected are identified at Table 2. Candidate management actions for the Table 2 ecological communities are currently in preparation and will be released when available.

Identification of Fire-related Threats

Ten criteria were used by Keith et al. to assess the susceptibility and exposure of nationally listed ecological communities to fire threats. Assessments were based on available spatial data on TEC distribution, fire extent, fire frequency and severity, pre-fire drought and erosion susceptibility, as well as expert-based appraisal of the impact assessment criteria. Each TEC was assessed against each criterion and assigned an impact category (major, moderate, negligible or not assessed) based on exposure and susceptibility to the mechanism of threat identified in respective criteria.

- **Fire – drought interactions** - Pre-fire drought can reduce population size and/or resilience of plant and animal populations within an EC, impacting on its capacity for regeneration after fire. Post-fire drought can negatively impact post-fire survival, reproduction and recruitment processes in plants and animals within an EC by limiting supply of essential resources such as water, food and shelter. Risks to component biota may be large if drought occurs in the first autumn-winter after fire or the following spring-summer.
- **High fire frequency** - Exposure to short temporal intervals between successive fires can disrupt plant life cycle processes (e.g. recruitment, replenishment of seed banks) or change structural components of animal habitats which are essential to post-fire recruitment and population persistence. ECs that are potentially sensitive to this mechanism include those with large numbers of obligate-seeding plants, structurally dominant or keystone plants that suffer elevated mortality from successive fires, or with animal assemblages dependent on vegetation for food or shelter. The time required for these critical elements to recover post-fire varies between ECs. For fire-prone sclerophyll ECs (heathlands, dry forests) and some wetlands, up to 15 years may be needed between successive fires to ensure recovery of function and persistence of biota. Wet forests (including rainforests) and alpine ECs may require multi-decadal or century-scale fire-free periods for recovery and persistence.
- **Post-fire interactions with invasive predators and herbivores** - Plants are often at their most palatable and least resilient to herbivore activity (e.g. leaf and shoot removal, trampling and substrate degradation) in the post-fire environment where herbivores (both native and introduced) have enhanced foraging efficiency and converge on regenerating burnt areas to exploit fresh growth. Similarly, certain vertebrate and invertebrate animals are most exposed to predation in the post-fire period when shelter is reduced and foraging efficiency of introduced and native predators is enhanced. Concentrations of herbivores and predators within and in the vicinity of the fire footprint may therefore increase mortality of component plants and animals within ECs recovering from fire. Effects may be exacerbated when burnt patches are small or have high perimeter to area ratios which promote herbivore incursions in high densities. The most sensitive ECs to this mechanism are those with in areas with high abundance of herbivores or predators, high sensitivity to herbivory, trampling and predation, and patchy fire patterns.
- **Fire-disease interactions** - Plant species from particular genera and families are susceptible to diseases such as *Phytophthora* spp., *Armillaria* spp., Myrtle Rust, psyllid outbreaks, Canker fungi and other pathogens. Fires may amplify the impact of such diseases and elevated mortality or tissue dieback of structurally or functionally important plant taxa may affect animal habitat or food resources and induce declines in diversity and function of the EC. Implications of animal diseases (e.g. Chytrid fungus) for community diversity and function are less understood, but potentially significant in some cases. Disease effects may also be exacerbated by drought.
- **Sensitivity to fire severity** - In some ECs, persistence of important biotic components are sensitive to extremely high fire severity. Examples include reduced survival of canopy fauna, plant regenerative organs and seed banks, changed abundance and configuration of woody debris, and consumption of peaty substrates. ECs exposed to this mechanism include those with abundant or diverse representation of species groups with those traits. In such cases, fire

severity impacts may be influenced by prolonged smouldering rather than canopy consumption (as commonly reflected in fire severity maps). Effects are amplified by recurrence of consistently low or high severity fires and may be exacerbated by drought or disease. Although low severity fires may result in reduced seedling emergence, that process was not addressed in the context of 2019-2020 fires. In heathlands and some dry sclerophyll forests, vertebrate and invertebrate pollinators, and in some rainforests vertebrate dispersal vectors, play important roles in ecosystem recovery. While abundances of at least some of these taxa are reduced in the immediate post-fire seasons, many of these are highly mobile and much is still to be learnt about their post-fire recovery response, its dependence on flowering responses, and the subsequent implications for fruit set. Due to these uncertainties, none of the assessment outcomes rely entirely on assumptions about pollinator responses to fire severity.

- **Weed invasion** - Some sites are predisposed to invasion by exotic plants that transform the structure, function and composition of ECs. Fire may provide opportunities for accelerated growth and recruitment of existing exotics or invasion of these species into the EC (especially where weed sources are within or proximal to burnt areas) and subsequent elimination of native plant and animal species through competition or habitat modification. Ecological Communities that occur mainly in areas where bushland has been fragmented, disturbed by forestry practice, extractive industries or clearing, or affected by runoff from nutrient sources (e.g. urban infrastructure, improved pasture, runoff of nutrient-enriched, polluted wastewater or stormwater, etc.) are most susceptible to this mechanism, and these factors should be considered in assessing the likelihood of weed impacts below.
- **Fire sensitivity of key components** - Some ECs include functionally important components that have no means of in situ persistence through fire events or recolonization after such events because they lack regenerative organs, stored propagules or dispersal traits (i.e. ECs where short-range endemic invertebrates (e.g. trapdoor spiders, land snails) are an important component of the communities). A single fire may eliminate such components or substantially diminish their role in the community, an effect that persists until they slowly disperse and re-establish from unburnt patches in the area.
- **Fire interactions with hydrological change** - A number of ECs associated with streams, lakes and wetlands have sensitive dependencies on hydrological regimes. Fires may interact with changes in hydrology by accelerating or exacerbating impacts or by causing 'ecological shocks' that would not otherwise occur if the two processes did not interact with one another. Examples include post-fire pulses of ash and nutrient inflows that reduce dissolved oxygen content and cause high mortality of aquatic biota, reduced resilience to fire caused by reduced flows or groundwater, and enhanced flammability (i.e. peat swamps) caused by reduced flows, flooding or groundwater.
- **Sensitivity and exposure to post-fire disturbance, erosion or pollution** - Intense rainfall events after fires may lead to extensive localised erosion and/or sedimentation that transforms habitat structure (rocks, soils, landforms), destroys structural biomass and depletes component species populations. Ecological Communities in climates prone to high intensity rainfall events, and in steep terrain, riparian landforms or on unconsolidated substrates are the communities that are most exposed to this mechanism. Importantly, this mechanism may include ECs outside the fire footprint but affected by processes in burnt areas.
- **Cumulative exposure to high risks** - This criterion addresses ECs that may be at risk from interactions of two or more mechanisms described above, but not from any single mechanism as a consequence of the 2019-2020 fires or where lags in expression of impacts may be mediated or released by the fires. This mechanism may also include ECs outside the fire footprint but affected by processes in burnt areas.

Identification of Candidate Management Actions

For each threat type, candidate management actions were identified to mitigate immediate impacts, abate ongoing threats and/or build resilience in respective TECs. The candidate management actions are generic by nature, in part to allow for local nuancing. In each case, specific applications of an action should be considered. For example, to reduce risks from fire-drought interactions and frequent fire, more specific actions may include:

- Avoid implementing fires including hazard reduction burns in all recently burnt habitat (including but not limited to habitat burnt in 2019/2020).
- Protect unburnt parts of TEC distributions that function as refuges (i.e. avoid burning, clearing or logging in that habitat) in order to avoid putting all the species at risk at once.
- Develop fire management plans to ensure that any future wildfires that threaten to burn over recovering sites are rapidly extinguished and to avoid or minimise risks from hazard reduction burning in adjacent areas (i.e. by escaping containment lines).
- Monitor recovery of key TEC components to determine the time required to re-establish habitat

Table 1: Fire-related threats and recommended candidate management actions for fire-affected EPBC-listed ecological communities

Ecological Community	Status	Range states	Major or moderate fire-related threats	Candidate management actions
Alpine Sphagnum Bogs and Associated Fens	Endangered	ACT, NSW, TAS, VIC	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • High fire severity • Post-fire weeds • Sensitivity of key components • Interaction with hydrological change • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs, horses, deer and hares/rabbits. • Control feral predators. • Manage access to enable recovery. • Undertake strategic translocations to restore functional components. • Manage structural components of sites and undertake habitat supplementation. • Undertake weed surveys, treatment and removal. • Restore/manage groundwater or surface water. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.

Ecological Community	Status	Range states	Major or moderate fire-related threats	Candidate management actions
Aquatic Root Mat Community in Caves of the Swan Coastal Plain	Endangered	WA	<ul style="list-style-type: none"> • Interaction with hydrological change 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Restore/manage groundwater or surface water. • Undertake strategic research to develop or assess management options.
Broad leaf tea-tree (<i>Melaleuca viridiflora</i>) woodlands in high rainfall coastal north Queensland	Endangered	QLD	<ul style="list-style-type: none"> • Post-fire predation/ herbivory • Post fire disease 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral predators. • Monitor, prevent and treat myrtle rust and exclude fire from affected areas. • Undertake strategic research to develop or assess management options.
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	NSW	<ul style="list-style-type: none"> • High fire frequency • Post-fire predation/ herbivory • Post fire disease • High fire severity • Post-fire weeds • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Protect burnt areas from future fires. • Control feral predators. • Monitor, prevent and treat Phytophthora and exclude fire from affected areas. • Manage access to enable recovery. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	Endangered	QLD, NSW	<ul style="list-style-type: none"> • Post-fire predation /herbivory • High fire severity • Post-fire weeds • Sensitivity of key components • Interaction with hydrological change 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	NSW	<ul style="list-style-type: none"> • High fire frequency • Post-fire predation/ herbivory 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Protect burnt areas from future fires. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.

Ecological Community	Status	Range states	Major or moderate fire-related threats	Candidate management actions
Eastern Stirling Range Montane Heath and Thicket	Endangered	WA	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • Post fire disease • High fire severity • Interaction with hydrological change • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Monitor, prevent and treat Phytophthora and exclude fire from affected areas. • Manage access to enable recovery. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	NSW	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • High fire severity • Post-fire weeds 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.

Ecological Community	Status	Range states	Major or moderate fire-related threats	Candidate management actions
Illawarra-Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion	Critically Endangered	NSW	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • Post-fire weeds • Sensitivity of key components • Interaction with hydrological change 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Monitor, prevent and treat myrtle rust and exclude fire from affected areas. • Manage access to enable recovery. • Undertake strategic translocations to restore functional components. • Manage structural components of sites and undertake habitat supplementation. • Undertake weed surveys, treatment and removal. • Undertake erosion/sedimentation mitigation works. • Undertake strategic research to develop or assess management options.
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	QLD, NSW, VIC	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • Post fire disease • High fire severity • Post-fire weeds • Sensitivity of key components • Interaction with hydrological change • Disturbance/erosion/ pollution • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Monitor, prevent and treat myrtle rust and exclude fire from affected areas. • Manage access to enable recovery. • Undertake strategic translocations to restore functional components. • Manage structural components of sites and undertake habitat supplementation. • Undertake weed surveys, treatment and removal. • Undertake erosion/sedimentation mitigation works. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.

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Lowland Grassy Woodland in the South East Corner Bioregion	Critically Endangered	NSW, VIC	<ul style="list-style-type: none"> • Drought – fire interactions • Post-fire predation/ herbivory • Post fire disease • Post-fire weeds • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Monitor tree heath and psyllid/carabid outbreaks, minimise nutrient influx, exclude fire, control outbreaks and re-plant trees if required. • Undertake weed surveys, treatment and removal. • Undertake erosion/sedimentation mitigation works. • Undertake strategic research to develop or assess management options.
Lowland Rainforest of Subtropical Australia	Critically Endangered	NSW, QLD	<ul style="list-style-type: none"> • High fire frequency • Post-fire predation/ herbivory • Post fire disease • High fire severity • Post-fire weeds • Sensitivity of key components • Interaction with hydrological change • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Monitor, prevent and treat myrtle rust and exclude fire from affected areas. • Manage access to enable recovery. • Undertake strategic translocations to restore functional components. • Manage structural components of sites and undertake habitat supplementation. • Undertake weed surveys, treatment and removal. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	NSW, QLD	<ul style="list-style-type: none"> • Post-fire predation/ herbivory • Post-fire weeds 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral hares/rabbits. • Control feral predators. • Manage access to enable recovery. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.

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Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	ACT, NSW	<ul style="list-style-type: none"> • Post-fire weeds • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and horses. • Control feral predators. • Undertake strategic translocations to restore functional components. • Undertake weed surveys, treatment and removal. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.
New England Peppermint (<i>Eucalyptus nova-anglica</i>) Grassy Woodlands	Critically Endangered	NSW, QLD	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • Post fire disease • High fire severity • Post-fire weeds • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs, horses and deer. • Control feral predators. • Monitor tree heath and psyllid/carabid outbreaks, minimise nutrient influx, exclude fire, control outbreaks and re-plant trees if required. • Undertake weed surveys, treatment and removal. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.
Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	WA	<ul style="list-style-type: none"> • High fire frequency • Post-fire predation/ herbivory • Post fire disease • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral hares/rabbits. • Control feral predators. • Monitor, prevent and treat Phytophthora and exclude fire from affected areas. • Manage access to enable recovery. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.

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Robertson Rainforest in the Sydney Basin Bioregion	Critically Endangered	NSW	<ul style="list-style-type: none"> • Post-fire predation/ herbivory • Post fire disease • Sensitivity of key components • Interaction with hydrological change 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Protect unburnt fire refuges from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Monitor, prevent and treat myrtle rust and exclude fire from affected areas. • Manage access to enable recovery. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.
Sedgeland in Holocene dune swales of the southern Swan Coastal Plain	Endangered	WA	<ul style="list-style-type: none"> • Negligible – initial fire mapping indicated this ecological community may have been impacted but later investigation revealed it does not occur within the fire extent 	
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	NSW	<ul style="list-style-type: none"> • Post-fire weeds 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.
Southern Highlands Shale Forest and Woodland in the Sydney Basin Bioregion	Critically Endangered	NSW	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • Post fire disease • High fire severity • Post-fire weeds 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs and deer. • Control feral predators. • Monitor tree heath and psyllid/carabid outbreaks, minimise nutrient influx, exclude fire, control outbreaks and re-plant trees if required. • Manage structural components of sites and undertake habitat supplementation. • Undertake weed surveys, treatment and removal. • Undertake strategic research to develop or assess management options.

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Subtropical and Temperate Coastal Saltmarsh	Vulnerable	QLD, NSW, VIC, TAS, SA, WA	<ul style="list-style-type: none"> • Sensitivity of key components • Disturbance/erosion/pollution 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Manage access to enable recovery. • Manage structural components of sites and undertake habitat supplementation. • Undertake erosion/sedimentation mitigation works. • Undertake strategic research to develop or assess management options.
Temperate Highland Peat Swamps on Sandstone	Endangered	NSW	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/herbivory • Post fire disease • High fire severity • Sensitivity of key components • Interaction with hydrological change • Disturbance/erosion/pollution • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Control feral predators. • Manage access to enable recovery. • Undertake strategic translocations to restore functional components. • Manage structural components of sites and undertake habitat supplementation. • Restore/manage groundwater or surface water. • Undertake erosion/sedimentation mitigation works. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	WA	<ul style="list-style-type: none"> • Post-fire predation/herbivory • Post-fire weeds • Interaction with hydrological change • Disturbance/erosion/pollution • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral predators. • Monitor tree heath and psyllid/carabid outbreaks, minimise nutrient influx, exclude fire, control outbreaks and re-plant trees if required. • Manage access to enable recovery. • Undertake strategic translocations to restore functional components. • Undertake weed surveys, treatment and removal. • Restore/manage groundwater or surface water. • Undertake erosion/sedimentation mitigation works. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.

Ecological Community	Status	Range states	Major or moderate fire-related threats	Candidate management actions
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	NSW	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • High fire severity • Post-fire weeds • Sensitivity of key components 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral pigs, deer and hares/rabbits. • Control feral predators. • Manage access to enable recovery. • Manage structural components of sites and undertake habitat supplementation. • Undertake weed surveys, treatment and removal. • Undertake erosion/sedimentation mitigation works. • Undertake strategic research to develop or assess management options.
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	NSW	<ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • High fire severity • Post-fire weeds • Sensitivity of key components • Interaction with hydrological change • Disturbance/erosion/ pollution 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Protect unburnt fire refuges from future fires. • Protect burnt areas from future fires. • Control feral hares/rabbits. • Control feral predators. • Manage access to enable recovery. • Manage structural components of sites and undertake habitat supplementation. • Undertake weed surveys, treatment and removal. • Undertake erosion/sedimentation mitigation works. • Undertake strategic research to develop or assess management options.

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White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	QLD, NSW, VIC, ACT	<ul style="list-style-type: none"> • Drought – fire interactions • Post-fire predation/ herbivory • Post fire disease • Post-fire weeds • Disturbance/erosion/ pollution • Cumulative risks 	<ul style="list-style-type: none"> • Undertake post-fire on-ground surveys to quantify impacts, management needs and monitor recovery. • Minimise drought impacts, exclude fire, minimise disturbance to soil and vegetation, and minimise grazing. • Install targeted fencing to exclude livestock, feral grazers, or overabundant native herbivores. • Control feral hares/rabbits. • Control feral predators. • Monitor tree heath and psyllid/carabid outbreaks, minimise nutrient influx, exclude fire, control outbreaks and re-plant trees if required. • Manage access to enable recovery. • Undertake strategic translocations to restore functional components. • Undertake weed surveys, treatment and removal. • Undertake erosion/sedimentation mitigation works. • Undertake planning to accommodate co-dependency of management actions. • Undertake strategic research to develop or assess management options.
Swamp Sclerophyll Forests on Coastal Floodplains of Eastern Australia	Under assessment	NSW, QLD, TAS, VIC	TBD, likely: <ul style="list-style-type: none"> • Post-fire predation/ herbivory • High fire severity • Post-fire weed • Sensitivity of key components • Interaction with hydrological change 	

Ecological Community	Status	Range states	Major or moderate fire-related threats	Candidate management actions
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Under assessment	NSW, VIC	TBD, likely: <ul style="list-style-type: none"> • Drought – fire interactions • High fire frequency • Post-fire predation/ herbivory • Post fire disease • High fire severity • Post-fire weeds • Interaction with hydrological change • Disturbance/erosion/ pollution 	

Table 2: State/territory recognised ecological communities or equivalent entities that were substantially fire-affected

Ecological Community	Pre-fire Status	Range states
Complex notophyll vine forest on Cainozoic igneous rocks (RE 12.8.5)	QLD - Least Concern	QLD, likely NSW
Simple microphyll fern thicket with <i>Acmena smithii</i> on Cainozoic igneous rocks (RE 12.8.7)	QLD - Of Concern	QLD, likely NSW
Simple microphyll fern forest with <i>Nothofagus moorei</i> on Cainozoic igneous rocks at high altitudes (RE 12.8.6) / Northern Escarpment Antarctic Beech Forest (PCT 3052)	QLD - Of Concern	QLD, likely NSW
<i>Eucalyptus oreades</i> tall open forest on Cainozoic igneous rocks (RE 12.8.2)	QLD - Of Concern	QLD, likely NSW
<i>Eucalyptus laevopinea</i> tall open forest on Cainozoic igneous rocks (RE 12.8.10)	QLD - Of Concern	QLD, likely NSW
<i>Eucalyptus dunnii</i> tall open forest on Cainozoic igneous rocks / White Gum Moist Forest in the NSW North Coast Bioregion (RE 12.8.11) / White Gum Moist Forest in the NSW North Coast Bioregion	QLD - Of Concern; NSW - Endangered	QLD, NSW
Ben Halls Gap National Park Sphagnum Moss Cool Temperate Rainforest	NSW - Endangered	NSW
Mount Kaputar high elevation and dry rainforest land snail and slug community in the Nandewar and Brigalow Belt South Bioregions	NSW - Endangered	NSW
Grey Box-Grey Gum Wet Sclerophyll Forest in the NSW North Coast Bioregion	NSW - Endangered	NSW, possibly QLD
Brogo Wet Vine Forest in the South East Corner Bioregion	NSW - Endangered	NSW
Araluen Scarp Grassy Forest in the South East Corner Bioregion	NSW - Endangered	NSW
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	NSW - Endangered	NSW
Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion	NSW - Endangered	NSW
Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions	NSW - Endangered	NSW

Ecological Community	Pre-fire Status	Range states
NSW Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion / ACT Black Sallee grass-herb woodland in drainage depression and moist valley flats	NSW - Critically Endangered; ACT - not listed	NSW, ACT
Jounama Snow Gum Shrubby Woodland / Jounama Snow Gum shrub woodland (PCT 3380)	NSW - not listed; ACT - not listed	NSW, ACT
Dry Rainforest of the South East Forests in the South East Corner Bioregion	NSW - Endangered	NSW
Subtropical Coastal Floodplain Forest	NSW - Endangered	NSW, QLD
Vic Cool Temperate Rainforest Community / NSW Southeast Cool Temperate Rainforest (PCT 3054)	Vic - Endangered; NSW - not listed	NSW, VIC
Vic Warm Temperate Rainforest (Coastal East Gippsland) / Warm Temperate Rainforest (Cool Temperate Overlap, Howe Range) / Warm Temperate Rainforest (East Gippsland Alluvial Terraces) / Warm Temperate Rainforest (Far East Gippsland) / NSW Southeast Warm Temperate Rainforest (PCT 3046)	Vic - Endangered (4 TECs); NSW - not listed	NSW, VIC
Dry Rainforest (Limestone) Community	Vic - Endangered	VIC
Cool Temperate Mixed Forest	Vic - Endangered	VIC, possibly NSW
Limestone Grassy Woodland	Vic - Endangered	VIC
Kangaroo Island coastal heath communities: <i>Banksia marginata</i> (mixed) shrubland / <i>Melaleuca lanceolata</i> (mixed) shrubland	SA - Not listed	SA
Kangaroo Island Mallee ash communities: <i>Eucalyptus diversifolia</i> subsp. <i>diversifolia</i> mallee woodland / <i>Eucalyptus diversifolia</i> subsp. <i>diversifolia</i> – <i>Melaleuca lanceolata</i> mallee woodland / <i>Eucalyptus diversifolia</i> subsp. <i>diversifolia</i> mallee forest / <i>Eucalyptus rugosa</i> mallee woodland / <i>Eucalyptus remota</i> mallee woodland / <i>Eucalyptus cosmophylla</i> mallee woodland	SA - Not listed	SA
Kangaroo Island riparian communities: Sugar Gum woodland / <i>Eucalyptus cladocalyx</i> woodland / <i>Leptospermum continentale</i> (mixed) shrubland	SA - Not listed	SA
<i>Eucalyptus arenacea</i> – <i>Eucalyptus baxteri</i> woodland	SA - Not listed	SA
Montane mallee of the Stirling Ranges	WA - Priority 1 PEC	WA
Coyanarup Wetland Suite	WA - Priority 1 PEC	WA
Stirling Range Upland Yate community	WA - Priority 4 PEC	WA
Ferricrete floristic community (Rocky Springs type)	WA - Vulnerable	WA
<i>Melaleuca huegelii</i> - <i>Melaleuca systema</i> shrublands on limestone ridges	WA - Endangered	WA
Ironcap Hills vegetation complexes (banded ironstone formation)	WA - Priority 3	WA
Northern Hinterland Baloghia-Booyong Subtropical Rainforest (PCT 3019)	NSW – not listed	NSW
Southeast Cool Temperate Rainforest (PCT 3054)	NSW – not listed	NSW
South Coast Grey Myrtle Dry Rainforest (PCT 3106)	NSW – not listed	NSW
Northern Escarpment Dry Rainforest (PCT 3097) / South Coast Escarpment Dry Rainforest (PCT 3105)	NSW – not listed	NSW
Southeast Warm Temperate Rainforest (PCT 3046)	NSW – not listed	NSW
Sydney Montane Basalt Rainforest (PCT 3047)	NSW – not listed	NSW
Northern Escarpment Grey Myrtle Gully Rainforest (PCT 3098)	NSW - not listed	NSW

Ecological Community	Pre-fire Status	Range states
Kosciuszko Flanks moist gully forest (PCT 3296)	NSW - not listed	NSW, possibly Vic
Kosciuszko-Namadgi Alpine Ash moist grassy forest (PCT 3307)	NSW - not listed	NSW, possibly Vic
Blue Mountains Cool Wet Eucalypt Forest	NSW - not listed	NSW
Central Tableland Montane Wet Forest (PCT 3211) / Central Tableland Peppermint-Gum montane forest (PCT 3294)	NSW - not listed	NSW
Kosciuszko Snow Gum-Mountain Gum Moist Forest (PCT 3297)	NSW - not listed	NSW
Newnes Plateau Peppermint-Ash tall forest (PCT 3687)	NSW - not listed	NSW
Northern Escarpment Messmate Moist Grassy Forest (PCT 3288)	NSW - not listed	NSW
Far North Escarpment Blackbutt grassy forest (PCT 3278)	NSW - not listed	NSW
Upper Blue Mountains moist forest (PCT 3692)	NSW - not listed	NSW
Southern escarpment ash forest (PCT 3311)	NSW - not listed	NSW