



Gary Cranitch, Queensland Museum

Initial analysis of the impacts of bushfires (August – December 2019) on threatened species in southern Queensland

Prepared by

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Cover Photograph

Silver-headed antechinus (*Antechinus argentus*) taken by Gary Cranitch, Queensland Museum.

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1 Introduction

Queensland experienced an unprecedented fire season in 2019/20 with approximately 6,617,430ha (3.8%) burnt (Figure 1) and 648 threatened species impacted to some extent.

Analysis of threatened species impacted by the 2019/2020 fire season in southern Queensland (Figure 2) was undertaken to identify and prioritise recovery actions. Southern Queensland was defined as the following: Interim Biogeographic Regions of Australia (IBRA): South East Queensland; Brigalow Belt North; Brigalow Belt South; New England Tableland; Nandewar, and; Central Mackay Coast. The approach involved a desktop analysis of the intersection of fire extent mapping in southern Queensland with spatial layers of the known and modelled distribution of threatened species. The results then guided a round table exercise by internal and external experts to validate the mapping and then identify priority actions to support persistence of the target species in the landscape, and recovery of their populations. A broader scale analysis undertaken by the Australian Government was also cross-referenced during this process.

Southern Queensland fires between August and December 2019 were severe, unseasonal and likely to have had the most adverse impacts on threatened species across Queensland. However, in many instances, fires elsewhere in the state were likewise more severe, extensive or frequent than 'normal', and their impacts on biodiversity warrant equal concern (Figure 1). Recovery efforts for these fires will be reliant on local knowledge and actions. In terms of Southern Queensland, it is important to note that the cumulative effect of the extensive drought and severe wildfires of 2018 that preceded the 2019 fires has exacerbated the impact on many threatened species. This has been reflected in the expert analysis and recovery strategies presented in this report.

This initial assessment undertaken by Queensland Government experts and external researchers is provided as a guide to inform priority recovery actions, and will require further on-ground assessment, engagement with First Nations people and development of partnerships for implementation.

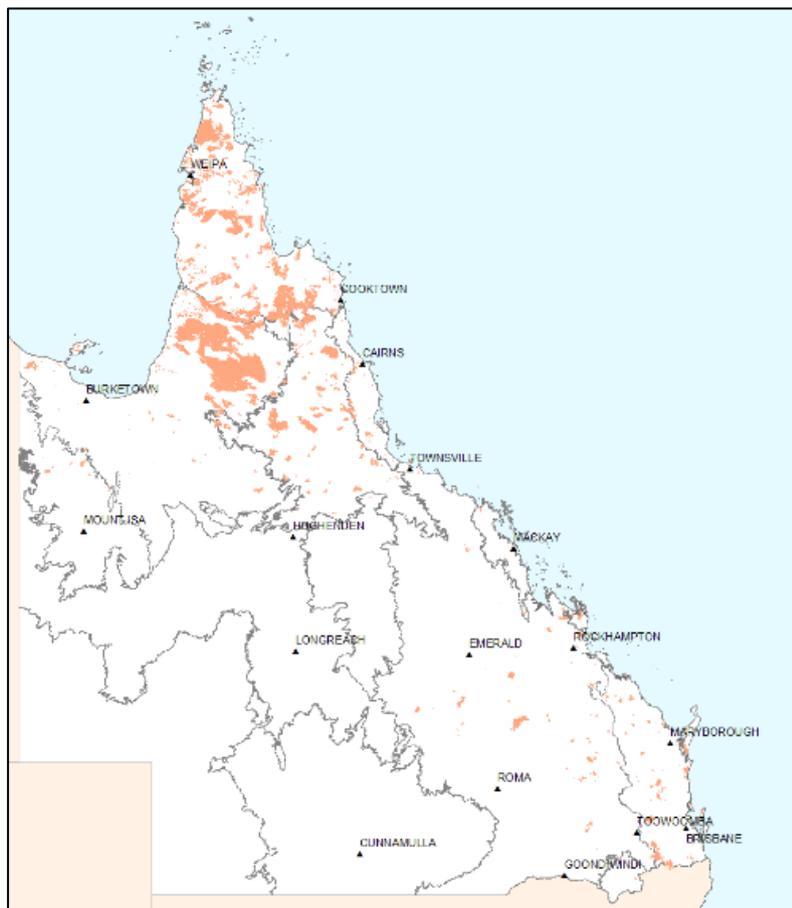


Figure 1: Extent of bushfires in Queensland (August – December 2019).

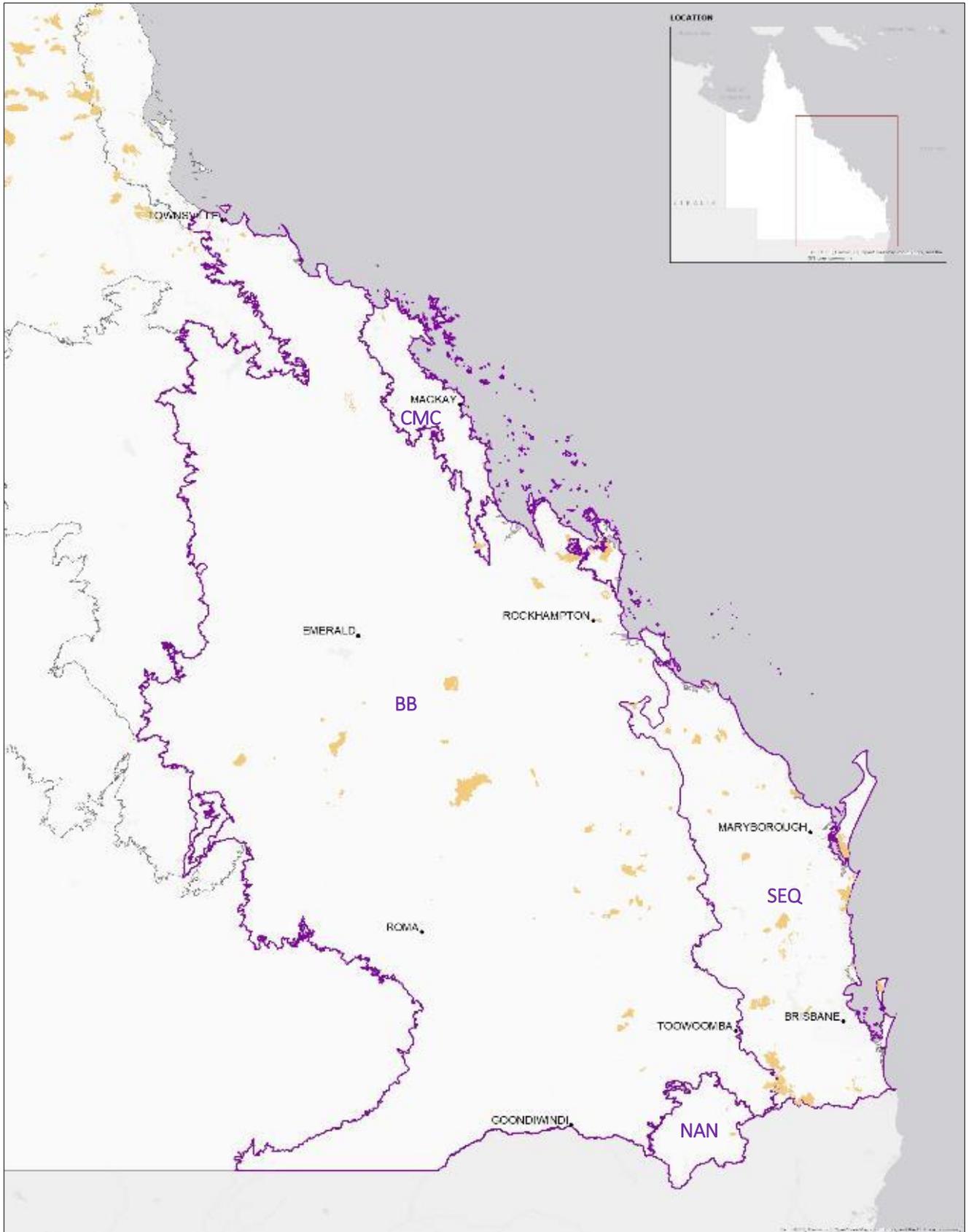


Figure 2: Southern Queensland as defined by IBRA regions.

BB = Brigalow Belt North and South, CMC = Central Mackay Coast, NAN = Nandewar, SEQ = South Eastern Queensland.

Note: some IBRA Regions on NSW-QLD border have been merged into the greater adjacent IBRA area on this map.

2 Summary

2.1 Queensland-wide Statistics

The estimated number of threatened species, under the Queensland *Nature Conservation Act 1992* (NCA) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), and the relevant proportion of habitat hectares (ha) affected by the 2019 fires is listed below (cited from *Analysis of 2019/2020 bushfire impacts on conservation values in Queensland*, Department of Environment and Science, Biodiversity Assessment Team, 2020).

Across Queensland, **648** threatened species with habitat impacted to some extent:

- 631 NCA species:
 - 153 Endangered (102 flora; 51 fauna)
 - 334 Vulnerable (246 flora; 88 fauna)
 - 144 Near Threatened. (121 flora; 23 fauna).
- 266¹ EPBC species:
 - 21 Critically Endangered. (5 flora; 16 fauna)
 - 86 Endangered. (48 flora; 38 fauna)
 - 158 Vulnerable. (116 flora; 42 fauna)
 - 1 Extinct fauna (but listed as Endangered under NCA).
- 204 threatened species (153 flora, 51 fauna) have more than 10% of their known or modelled potential habitat within the bushfire extent.
- For Koalas within the southeast Queensland (SEQ) Regional Plan area:
 - Core koala habitat (KHA) potentially impacted = 44,141 ha (7% of 629,122 ha)
 - Locally refined koala habitat (LRKHA) potentially impacted = 13,898 ha (22% of 62,720 ha).
- 9.2% (1,603,636 ha) of all protected areas have been impacted:
 - 28.5% (14,986 ha) of National Park (Scientific)
 - 26.2% (569,926 ha) of National Park (Cape York Peninsula Aboriginal Land).
 - 18.8% (65,526 ha) of Resource Reserve
 - 8.8% (4,756 ha) of Forest Reserve
 - 7.2% (512,432 ha) of National Park
 - 6.7% (5,562 ha) of Conservation Park
 - 6.3% (281,146 ha) of Nature Refuge (9 refuges have had virtually all their area impacted)
 - 3% (39,695 ha) of World Heritage Areas.
- Nationally important wetlands – extent of impact:
 - 3.9% (12,440 ha) of Ramsar wetland area
 - 7.9% (604,322 ha) of Directory of Important Wetland areas.

2.2 Southern Queensland Statistics

Within the Southern Queensland area, **343** threatened species have had habitat impacted to some extent:

- 332 NCA species:
 - 84 Endangered
 - 189 Vulnerable
 - 59 Near Threatened.
- 165¹ EPBC species:
 - 9 Critically Endangered
 - 48 Endangered
 - 108 Vulnerable.
- 111 species (79 flora, 32 fauna) have more than 10% of their known or modelled potential habitat within the southern Queensland fire extent.

¹ Number of species will not add up to the total due to some species being listed under both the NCA and EPBC.

3 Methodology

3.1 Desktop Analysis

The following data layers were used to identify which threatened species were likely impacted by the bushfires in Southern Queensland in the 2019 season, and to what extent:

- Bushfire data from August to December 2019 from Queensland Fire Emergency Services
- Draft Maxent models of potentially suitable habitat for 296 species (224 flora, 72 fauna) – January 2020
- Expert-defined core habitat models for 16 species (4 taxa of flora, 12 fauna) – various dates
- Filtered species records.

This analysis was undertaken by the Queensland Department of Environment and Science (DES) Biodiversity Assessment Team at the Queensland Herbarium in January 2020. The output included mapping and a Microsoft Excel spreadsheet of species and attributes (including conservation status, area of potential habitat and proportion of potential habitat impacted by fire).

In this analysis, existing Maxent models produced by the Species and Herbarium Collections Unit at the Queensland Herbarium, and cut to the ‘equal training sensitivity and specificity’ (ESS) threshold, were intersected with fire extent mapping to approximate the area of potential threatened species habitat burnt. It was not possible to exclude prescribed burns from the fire extent mapping, particularly for the far north of the state. Species were ranked by the percentage of potential habitat loss. As the ESS threshold should not be considered equivalent to habitat occupancy, and overall fire extent does not capture spatial variations in fire impact, further refinement of the analysis was required.

Threatened species with more than 10% of their known or modelled potential habitat impacted by fire were shortlisted as the “focus species” for further assessment by experts (Table 1).

3.2 Round Table Exercise

On 3 February 2020, DES hosted a round table exercise, firstly to refine and validate the desktop analysis, and secondly, to identify priority species, sites and recovery actions for Southern Queensland. Participants included specialists, both internal and external to the Queensland government, who offered expertise for given species or locations (Appendix 1). Some experts who were unable to attend were consulted out of session.

The round table exercise was structured around groups of taxa. For each focus fauna species the fire extent, maps of known and modelled distribution and other statistics were displayed for discussion. Guiding questions were used to prompt discussion (Appendix 2), with summaries and conclusions captured in a spreadsheet (Appendix 3).

Queensland Herbarium staff reviewed the flora species using the same guiding questions out of session, with data also captured from this process (Appendix 4).

4 Results

4.1 Fauna

4.1.1 Desktop analysis

The analysis identified threatened species listed under the NCA and EPBC with more than 5% of their known or modelled distribution impacted by fires during the August–December 2019 period. This included 15 mammal, 14 bird, 10 frog, 9 reptile and 2 fish species (Table 1).

Table 1: Threatened fauna species with greater than 5% of their known or modelled distribution impacted by fire. (Species excluded by experts from subsequent analysis are indicated by an asterisk).

MAMMALS

| Scientific Name | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Commonwealth Analysis |
|--|--|----------------------------------|--------------------|-----|------|-----------------------|
| <i>Pseudomys oralis</i> | Hastings River mouse | 41,400 | 34 | V | E | 50 to <80% |
| <i>Pseudomys novaehollandiae</i> | New Holland mouse | 30,850 | 26 | V | V | 30 to <50% |
| <i>Petrogale penicillata</i> | brush-tailed rock-wallaby | 122,048 | 20 | V | V | 30 to <50% |
| <i>Potorous tridactylus tridactylus</i> | long-nosed potoroo | 153,419 | 14 | V | V | 30 to <50% |
| <i>Rhinolophus philippinensis</i> * | greater large-eared horseshoe bat | 345,077 | 13 | E | V | x |
| <i>Dasyurus maculatus maculatus</i> | spotted-tailed quoll (southern subsp.) | 119,480 | 13 | V | E | 10 to <30% |
| <i>Bettongia tropica</i> * | northern bettong | 19,882 | 12 | E | E | X |
| <i>Hipposideros diadema reginae</i> | diadem leaf-nosed bat | 3,727 | 12 | NT | | X |
| <i>Dasyurus hallucatus</i> | northern quoll | 11,553 | 11 | C | E | X |
| <i>Saccolaimus saccolaimus nudicluniatus</i> | bare-rumped sheath-tail bat | 126,764 | 9 | E | V | X |
| <i>Petauroides volans</i> | greater glider | 27,017 | 8 | V | V | X |
| <i>Petrogale sharmani</i> | Sharman's rock-wallaby | 57,615 | 8 | V | V | X |
| <i>Chalinolobus dwyeri</i> | large-eared pied bat | 228,791 | 6 | V | V | X |
| <i>Murina florium</i> * | tube-nosed insectivorous bat | 57,960 | 6 | V | | X |
| <i>Phascolarctos cinereus</i> | koala | 63,992 | 6 | V | V | X |

BIRDS

| Scientific Name | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Commonwealth Analysis |
|---------------------------------------|-----------------------------|----------------------------------|--------------------|-----|------|-----------------------|
| <i>Dasyornis brachypterus</i> | eastern bristlebird | 3,217 | 35 | E | E | 30 to <50% |
| <i>Atrichornis rufescens</i> | rufous scrub-bird | 3,071 | 35 | V | E | 50 to <80% |
| <i>Menura alberti</i> | Albert's lyrebird | 13,406 | 32 | NT | | X |
| <i>Erythrorhynchus radiatus</i> | red goshawk | 1,269 | 26 | E | V | X |
| <i>Cyclopsitta diophthalma coxeni</i> | Coxen's fig-parrot | 1,526 | 24 | E | E | 10 to <30% |
| <i>Pezoporus wallicus wallicus</i> | ground parrot | 5,533 | 18 | V | | X |
| <i>Calyptorhynchus lathami</i> | glossy black-cockatoo | 53,403 | 14 | V | | X |
| <i>Stipiturus malachurus</i> | southern emu-wren | 658 | 13 | V | | X |
| <i>Lathamus discolor</i> | swift parrot | 556 | 8 | E | CE | X |
| <i>Podargus ocellatus plumiferus</i> | plumed frogmouth | 4,706 | 7 | V | | X |
| <i>Neochmia ruficauda ruficauda</i> | star finch (eastern subsp.) | 132 | 6 | E | E | X |
| <i>Tyto novaehollandiae kimberli</i> | masked owl (nth subsp.) | 329 | 6 | V | V | X |
| <i>Ninox strenua</i> | powerful owl | 4,600 | 5 | V | | X |
| <i>Turnix melanogaster</i> | black-breasted button-quail | 2,691 | 5 | V | V | x |

REPTILES

| Scientific Name | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Commonwealth analysis |
|-----------------------------------|------------------------------|----------------------------------|--------------------|-----|------|-----------------------|
| <i>Pygmaeascincus sadleri</i> | Magnetic Island dwarf skink | 407 | 34 | V | | X |
| <i>Coeranoscincus reticulatus</i> | three-toed snake-tooth skink | 2,109 | 25 | C | V | 10 to <30% |
| <i>Phyllurus kabikabi</i> | Oakview leaf-tailed gecko | 4,517 | 18 | E | | X |
| <i>Nangura spinosa</i> | Nangur skink | 15,594 | 16 | E | CE | 10 to <30% |
| <i>Phyllurus caudiannulatus</i> | ringed thin-tailed gecko | 4,123 | 16 | V | | X |
| <i>Anilius silvia</i> | striped blind snake | 644 | 10 | NT | | X |
| <i>Lampropholis mirabilis</i> | saxicoline sunskink | 448 | 7 | NT | | X |
| <i>Delma torquata</i> | collared delma | 195,972 | 6 | V | V | X |
| <i>Acanthophis antarcticus</i> | common death adder | 2,172 | 5 | V | | X |

FROGS

| Scientific Name | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Commonwealth Analysis |
|------------------------------|-----------------------------|----------------------------------|--------------------|-----|------|-----------------------|
| <i>Philoria kundagungan</i> | red-and-yellow mountainfrog | 34,151 | 52 | V | | x |
| <i>Mixophyes fleayi</i> | Fleay's barred frog | 52,451 | 30 | E | E | 10 to <30% |
| <i>Litoria olongburensis</i> | wallum sedgefrog | 26,501 | 18 | V | V | 10 to <30% |
| <i>Litoria pearsoniana</i> | cascade treefrog | 69,180 | 16 | V | | x |
| <i>Litoria cooloolensis</i> | Cooloola sedgefrog | 14,965 | 15 | NT | | x |
| <i>Litoria freycineti</i> | wallum rocketfrog | 27,721 | 15 | V | | x |
| <i>Crinia tinnula</i> | wallum froglet | 33,570 | 12 | V | | x |
| <i>Adelotus brevis</i> | tusked frog | 103,644 | 9 | V | | x |
| <i>Cophixalus mcdonaldi</i> | Mount Elliot nurseryfrog | 802 | 5 | V | CE | x |
| <i>Mixophyes iteratus</i> | giant barred frog | 12,773 | 5 | E | E | 30 to <50% |

FISH

| Scientific Name | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Commonwealth Analysis |
|----------------------------|---------------------|----------------------------------|--------------------|-----|------|-----------------------|
| <i>Nannoperca oxleyana</i> | Oxleyan pygmy perch | 3,757 | 22 | V | E | 30 to <50% |
| <i>Pseudomugil mellis</i> | honey blue eye | 2,440 | 19 | V | V | 10 to <30% |

Threatened, rare and range restricted invertebrate species have been identified as a faunal group for which information is lacking. Further work is needed to address these deficiencies.

4.1.2 Round Table Exercise

The species with greater than 10% of their distribution impacted were then shortlisted to be the focus of the expert analysis (refer to shaded rows in Table 1).

Some species were identified early by experts as having their distributions almost entirely outside of the defined Southern Queensland area. This was a result of undertaking the desktop analysis for all of Queensland, and then filtering by species with potential distribution in Southern Queensland. These species were removed from further assessment. Other species that experts identified as warranting inclusion in the shortlist but were not (likely due to a lack of records in corporate databases), were added during the round table exercise.

The data collected for each of the focus fauna species during the round table exercise was summarised (Appendix 3). This allowed the list to be further refined to 25 priority fauna species.

Below is a summary of the threats and recovery actions for each of the priority fauna species resulting from the combined desktop analysis and round table exercise.

Mammal Species: Brush-tailed rock-wallaby (*Petrogale penicillata*)

Location: Mt Barney National Park, Main Range National Park, Crows Nest area (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Open Forest / rocky outcrops

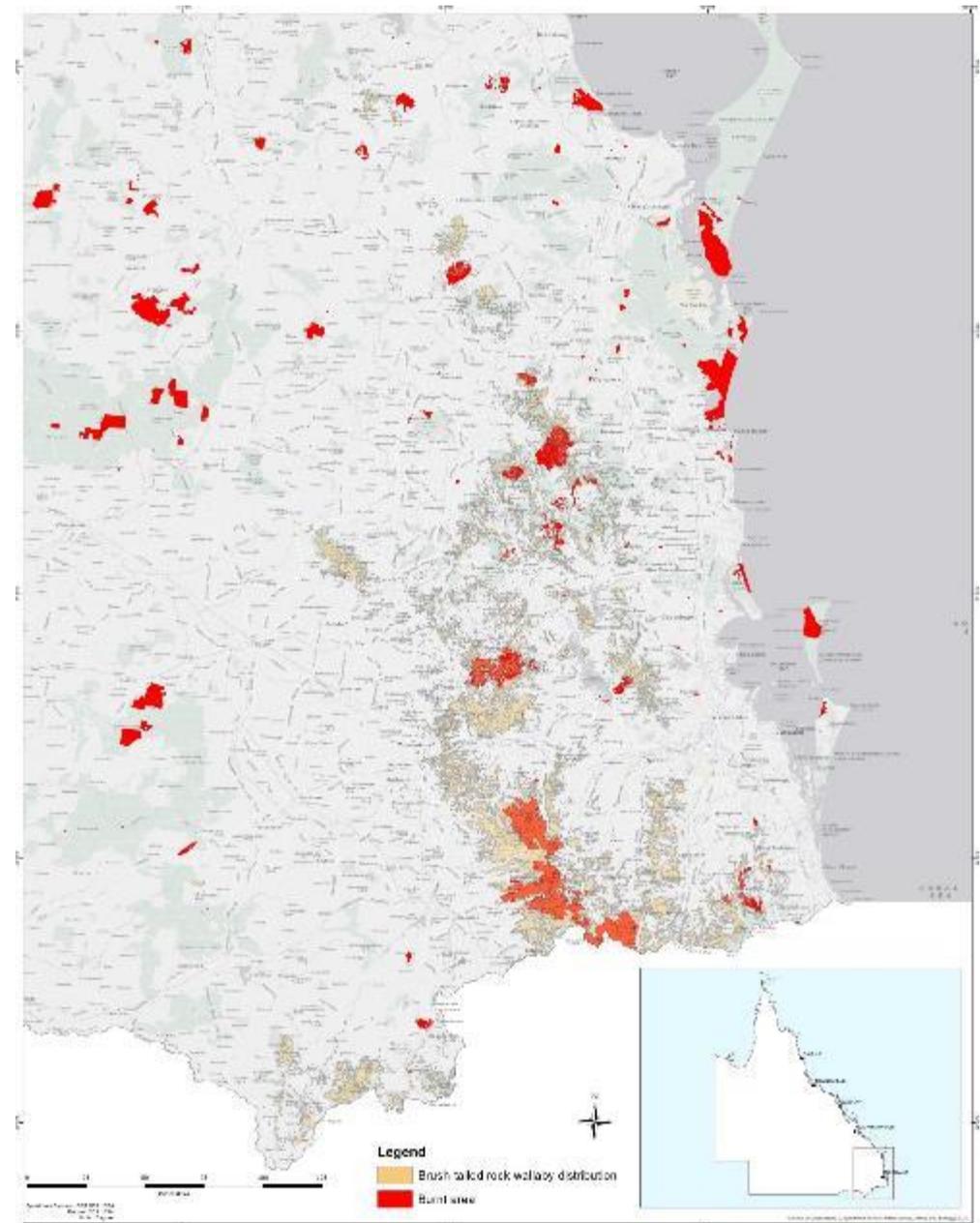
Threats: Introduced predators (feral cats and foxes), herbivores impacting limited food sources

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Monitoring
- Translocation to supplement population if deemed necessary following survey.



Mammal Species: New Holland mouse (*Pseudomys novaehollandiae*)

Location: Main Range National Park, (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Open forest

Threats: Habitat loss, predation from introduced predators (feral cats and foxes)

Immediate response needs:

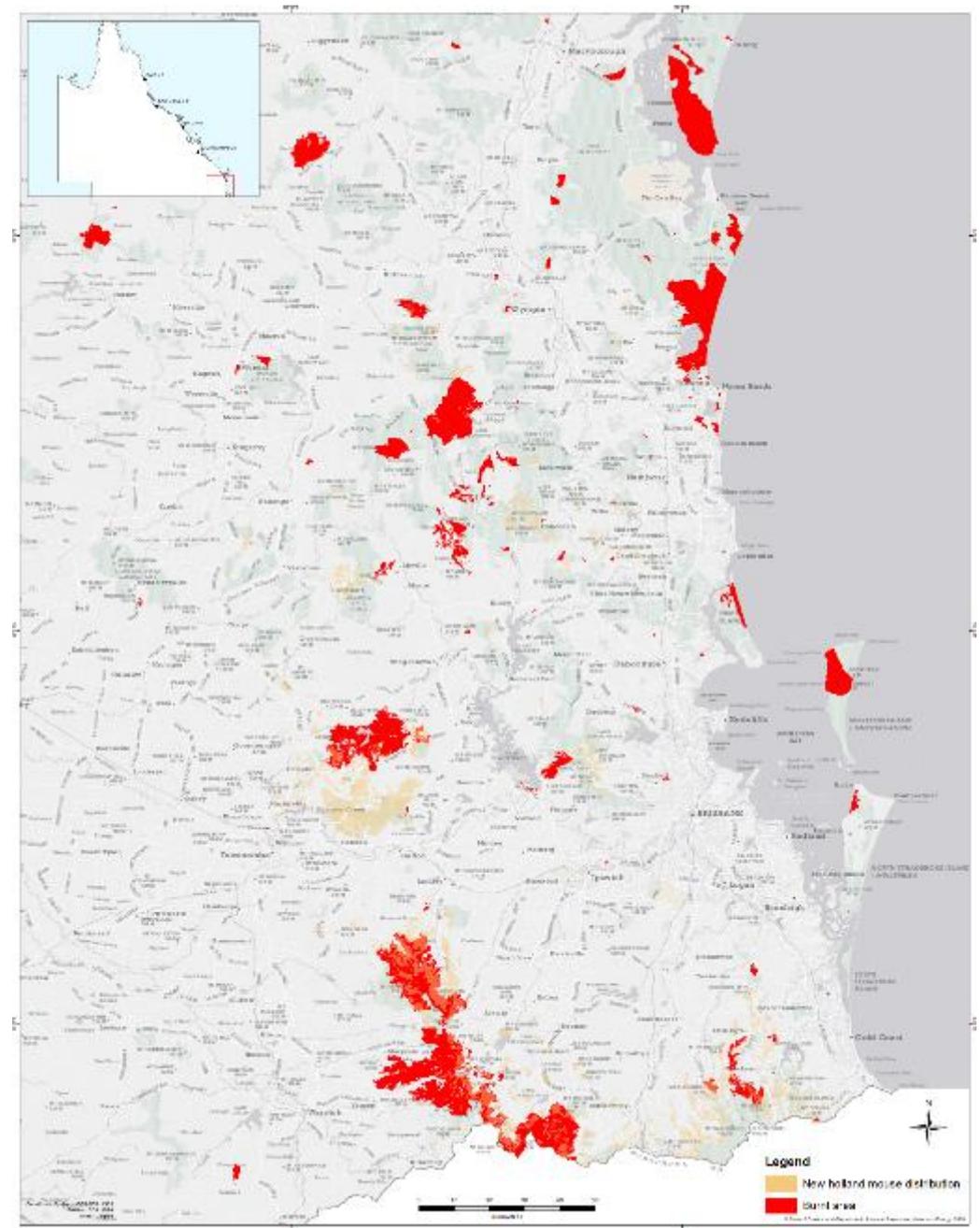
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Research and monitoring.

Comments

- Potential to use detector dogs for survey.



Mammal Species: Hastings River mouse (*Pseudomys oralis*)

Location: Main Range National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Open Forest

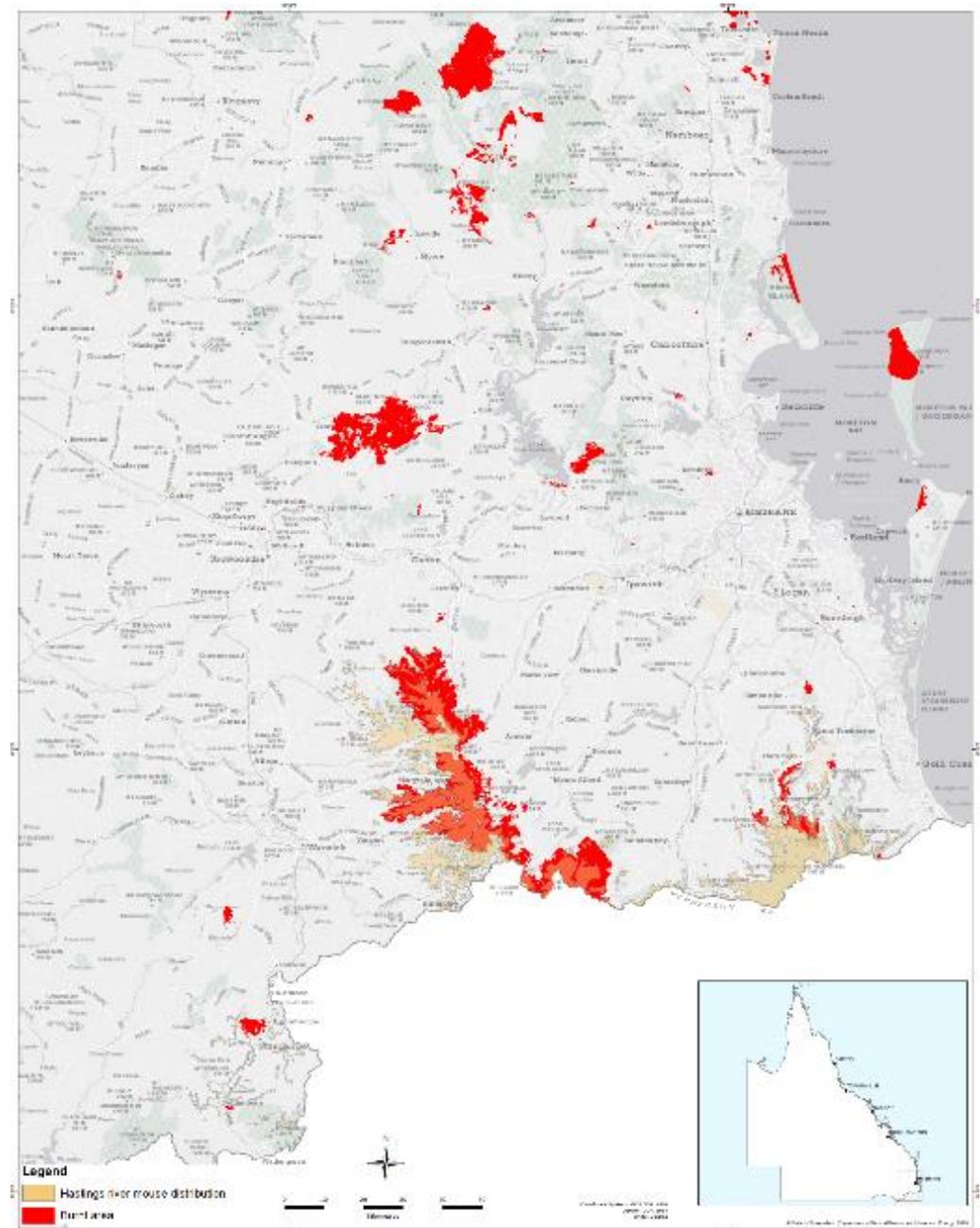
Threats: Habitat loss and subsequent understorey/midstorey thickening, introduced predators (feral cats, foxes)

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control
- Herbivore control
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation
- Rapid and other on-ground assessment for species and communities of concern
- Provision of supplementary shelter, food and for animals where needed
- Other.

Longer term response:

- Thin regrowth to avoid habitat changing from grassy open forest to an open forest with dense midstorey, shading out grasses.
- Review fire management objectives.
- Research opportunity on long term monitored sites.
- Potential need for meta-population management.



Mammal Species: Spotted-tailed quoll (southern subspecies) (*Dasyurus maculatus maculatus*)

Location: Main Range National Park, Mt Barney National Park, Girraween National Park, and surrounds (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Rainforest, Wet sclerophyll forest, open forest

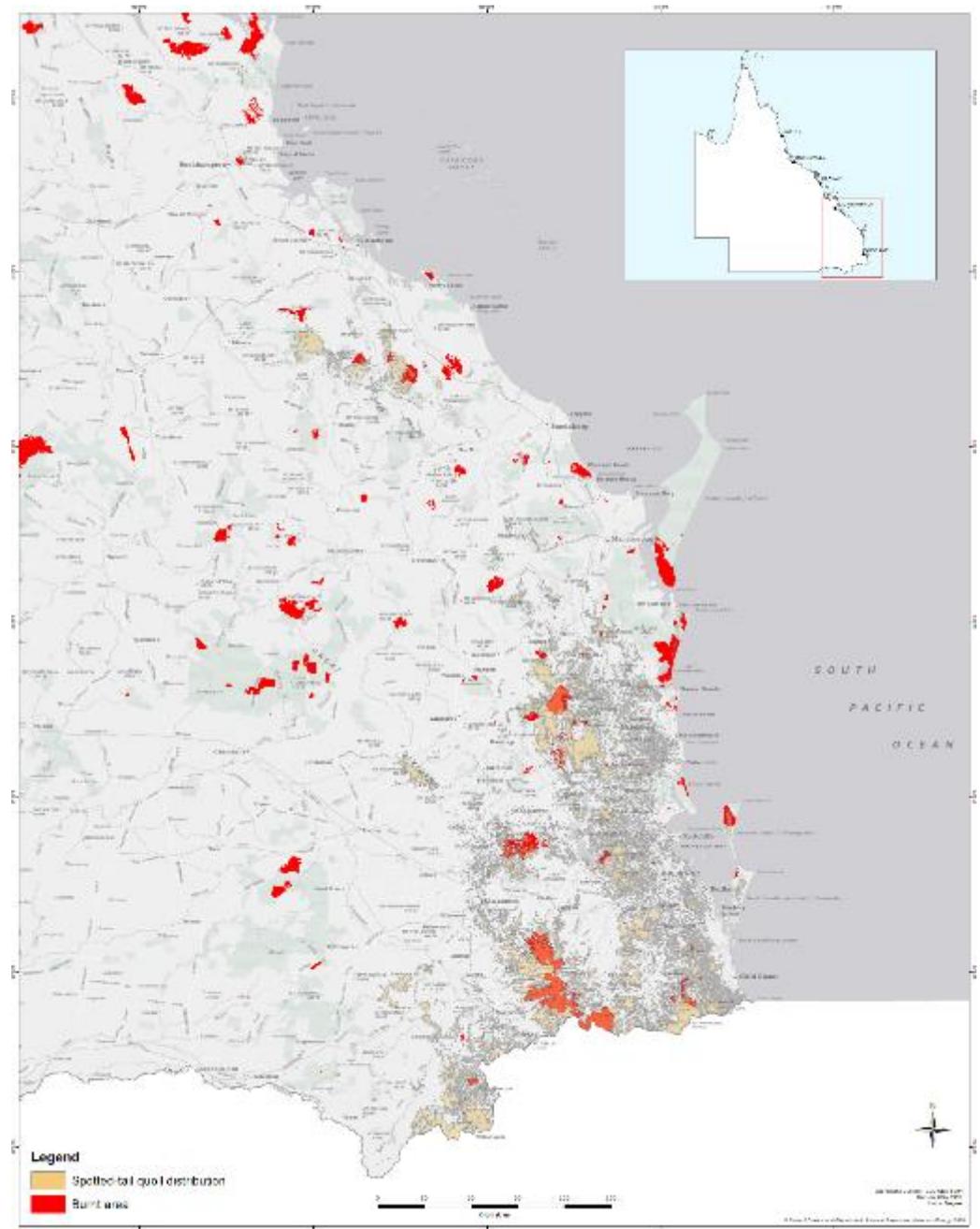
Threats: Introduced predators, confounded by impacts of 2018 fires

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion).
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Education about interactions with people, which are likely to increase post fire.



Mammal Species: Long-nosed potoroo (*Potorous tridactylus tridactylus*)

Location: Broad distribution including but not limited to Main Range National Park, Mt Barney National Park, Lamington National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Rainforest, wet sclerophyll forest, open forest and woodland

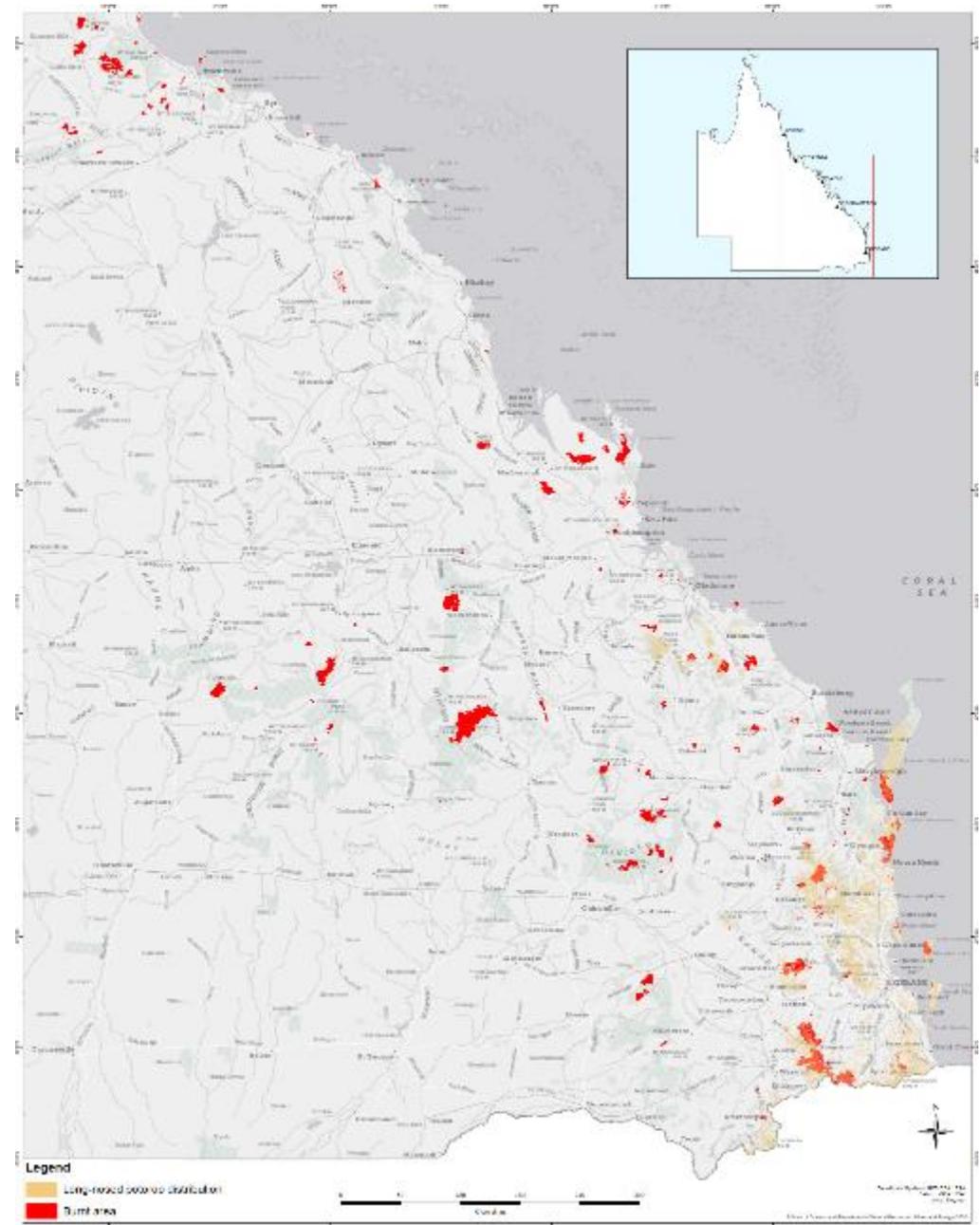
Threats: Predation by introduced predators (feral cats and foxes)

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion).
- Feral predator control.
- Herbivore control
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation..
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Monitoring and improved knowledge of distribution and important populations.
- Review the fire management strategy to ensure there is appropriate focus on reducing risk to critical unburnt areas and fire sensitive habitat.



Mammal Species: Silver-headed antechinus (*Antechinus argentus*)

Addition: This report modelled 4% impacted habitat but experts estimate 10-25% of habitat and 70% of the population were impacted based on recent field surveys of Bulburin National Park.

Location: Bulburin National Park (other smaller populations in Kroombit Tops NP and Blackdown Tableland NP, both of which had extensive wildfire in late 2018).

Habitat type: Rainforest, open forest, vine forest.

Threats: Introduced predators, invasive species (lantana), introduced herbivores, decline in prey (insects in leaf litter), drought, 2018 fire.

Immediate response needs:

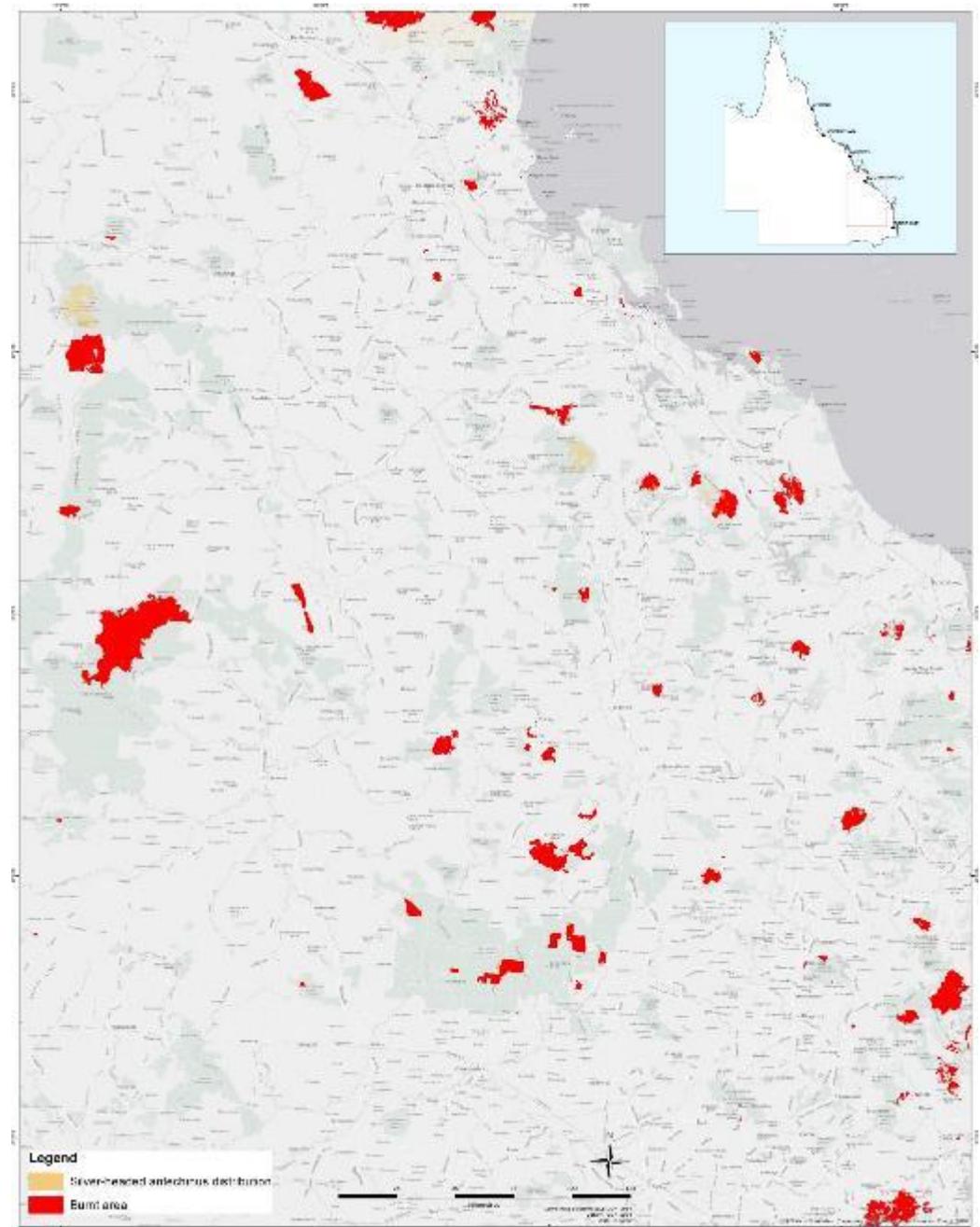
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (weed invasion, predator exposure and loss of foraging habitat).
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals.

Longer term response:

- Manage regrowth to maintain suitable vegetation structure.
- Follow fate of species at long-term monitored sites.
- Potential need for meta-population management.
- Review the fire management strategy.
- Improved management of threats for the other two populations.

Comment:

- Detector dogs trained for this species and can assist in survey.



Reptile Species: Ringed thin-tailed gecko (*Phyllurus caudiannulatus*)

Location: Bulburin National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Subtropical vine forest (and adjacent wet sclerophyll forest and hoop pine plantation)

Threats: Habitat loss, invasive pests (pigs, cats, lantana, high biomass grasses)

Immediate response needs:

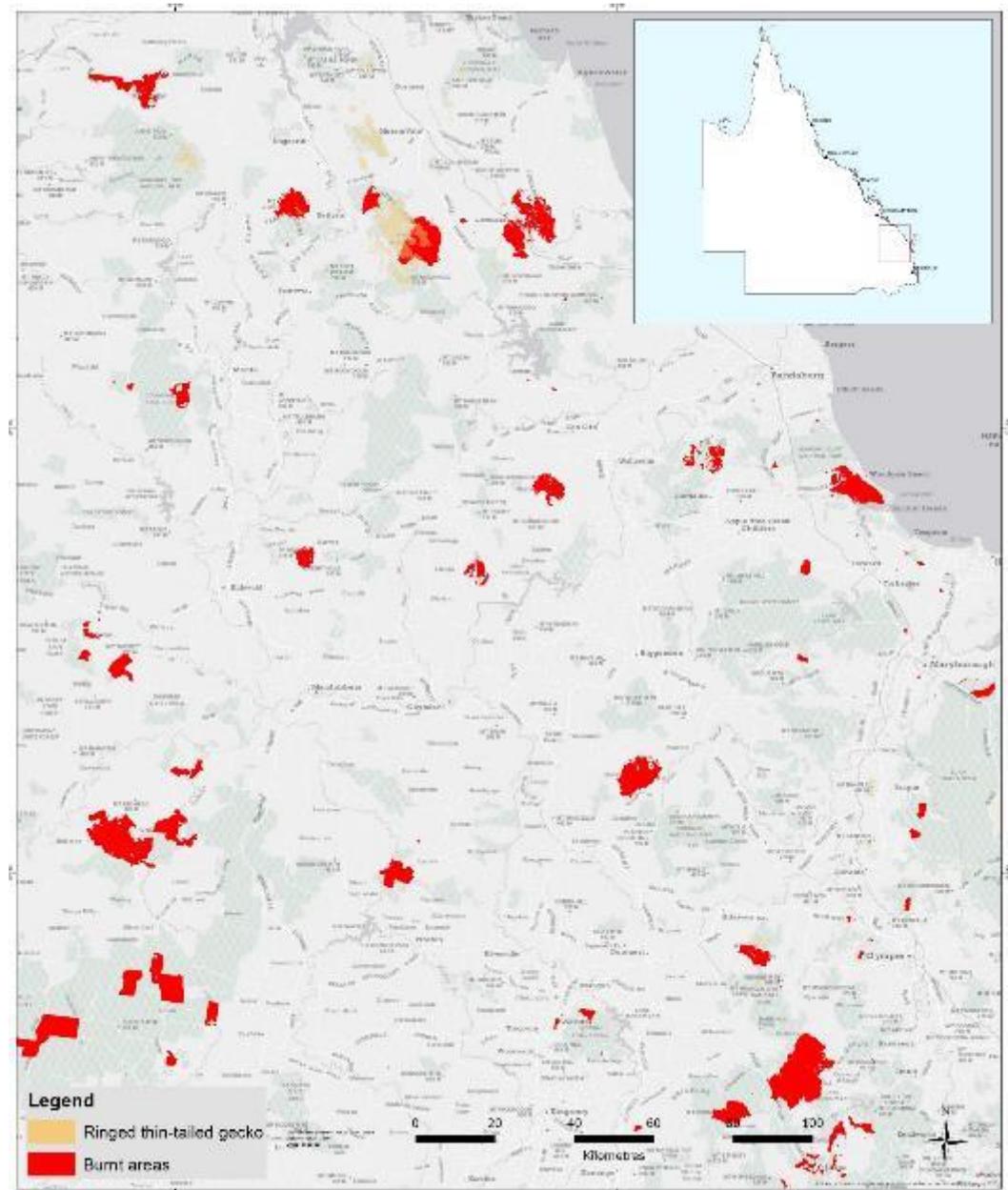
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weeds and future fire risk).
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control.

Longer term response:

- Protect habitat from future fire risks
- Develop new advice and guidance documents that no longer assume that bushfires will not penetrate vine forest on rock substrate (as these fires did).

Comment:

Modelled habitat is overestimated, not known to exist from any areas except for Bulburin NP. Estimate 10-30% of habitat impacted by fire.



Reptile Species: Nangur skink (*Nangura spinosa*)

Location: Oakview National Park, Nangur National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Vine thicket

Threats: Increased exposure to illegal take due to improved access conditions post-fire, predation from introduced predators (cats and foxes), herbivore impacts (deer), invasive weeds.

Immediate response needs:

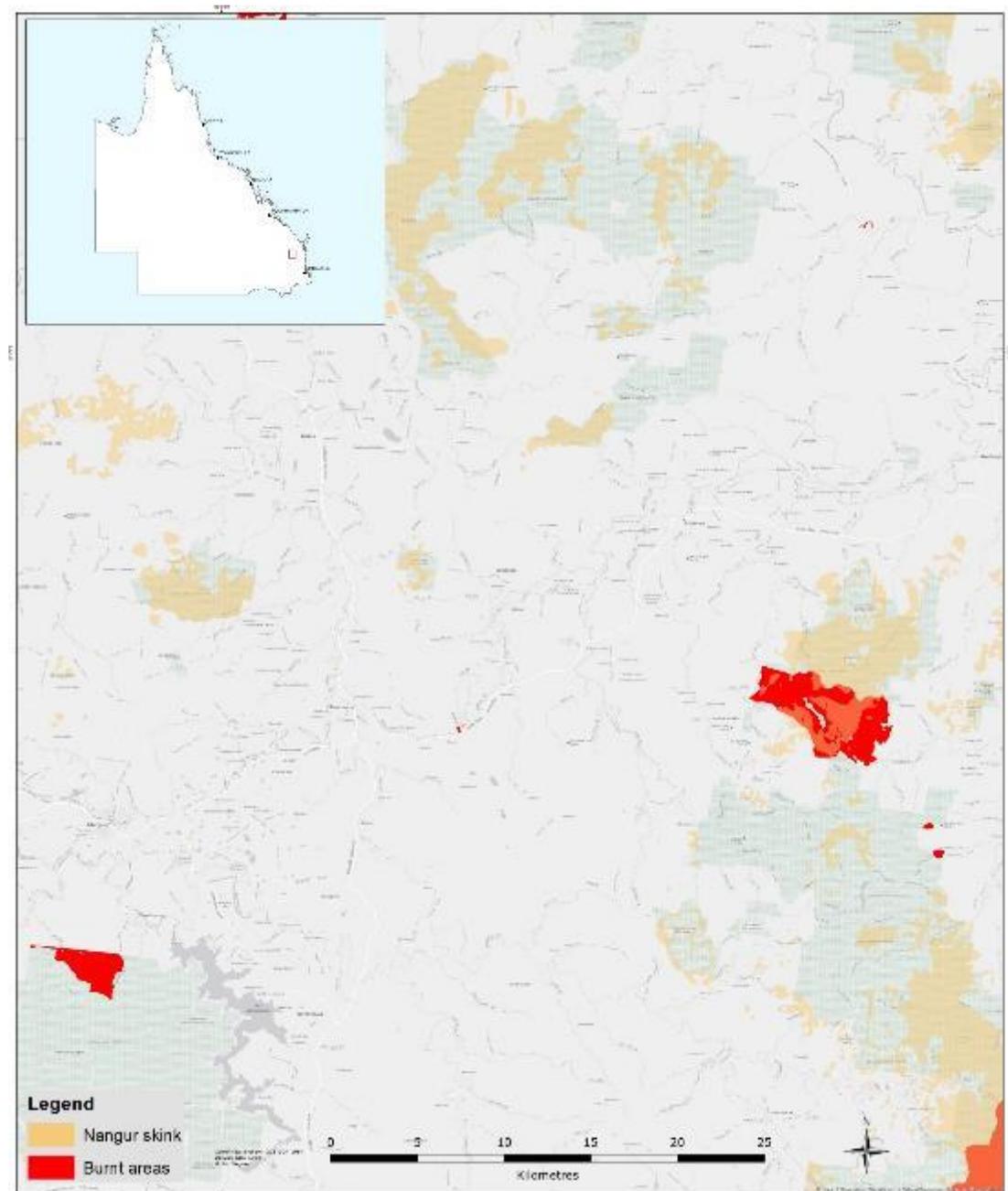
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion and future fire).
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals.
- Other – rationalise access and increased surveillance
 - weed control to protect core habitat post-fire.

Longer term response:

- Protect habitat from future fire risks.
- Develop new advice and guidance documents that no longer assume that bushfires will not penetrate vine forest on rock substrate (as these fires did).

Comment:

- Modelled habitat is overestimated, not known to exist from any areas except for Bulburin and Oakview NPs.
- Response can be combined with Oakview leaf-tailed gecko.



Reptile Species: Oakview leaf-tailed gecko (*Phyllurus kabikabi*)

Location: Oakview National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Vine thicket

Threats: Increased exposure to illegal take due to improved access conditions post-fire, predation from introduced predators (cats and foxes), herbivore impacts (deer), invasive weeds

Immediate response needs:

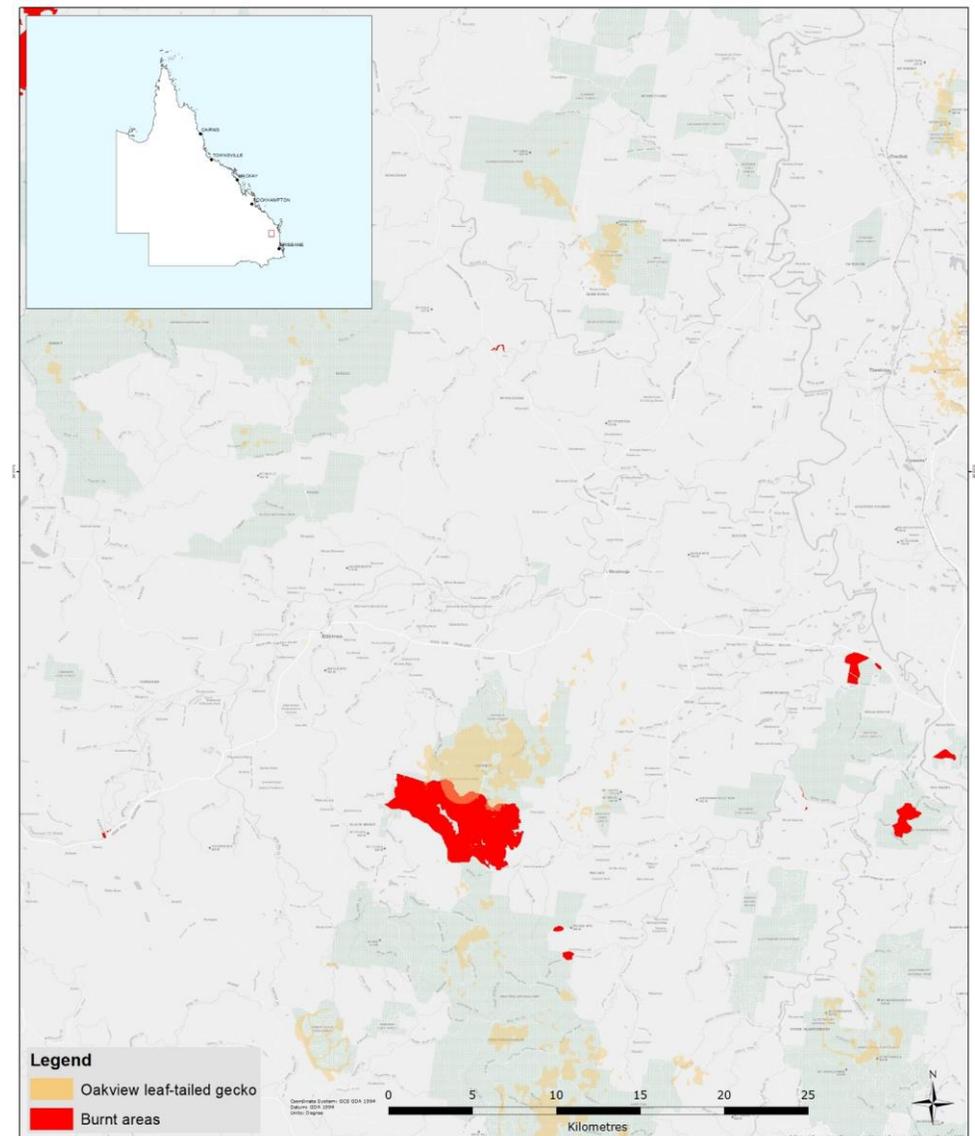
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion and future fire)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – fencing to restrict access for illegal take and increased regulation – weed control to protect core habitat post-fire.

Longer term response:

- Protect habitat from future fire risks.
- Develop new advice and guidance documents that no longer assume that bushfires will not penetrate vine forest on rock substrate (as these fires did).

Comment:

- Response can be combined with that for *Nangura spinosa*.



Frog Species: Red-and-yellow mountain frog (*Philoria kundagungan*)

Location: Main Range National Park (see adjacent figure for overlay of known/modelled distribution and fire extent – see also note below)

Habitat type: Rainforest and occasionally wet sclerophyll forest

Threats: Invasive species (pigs), weed invasion (lantana, mist flower, Crofton weed and high biomass grasses), drought

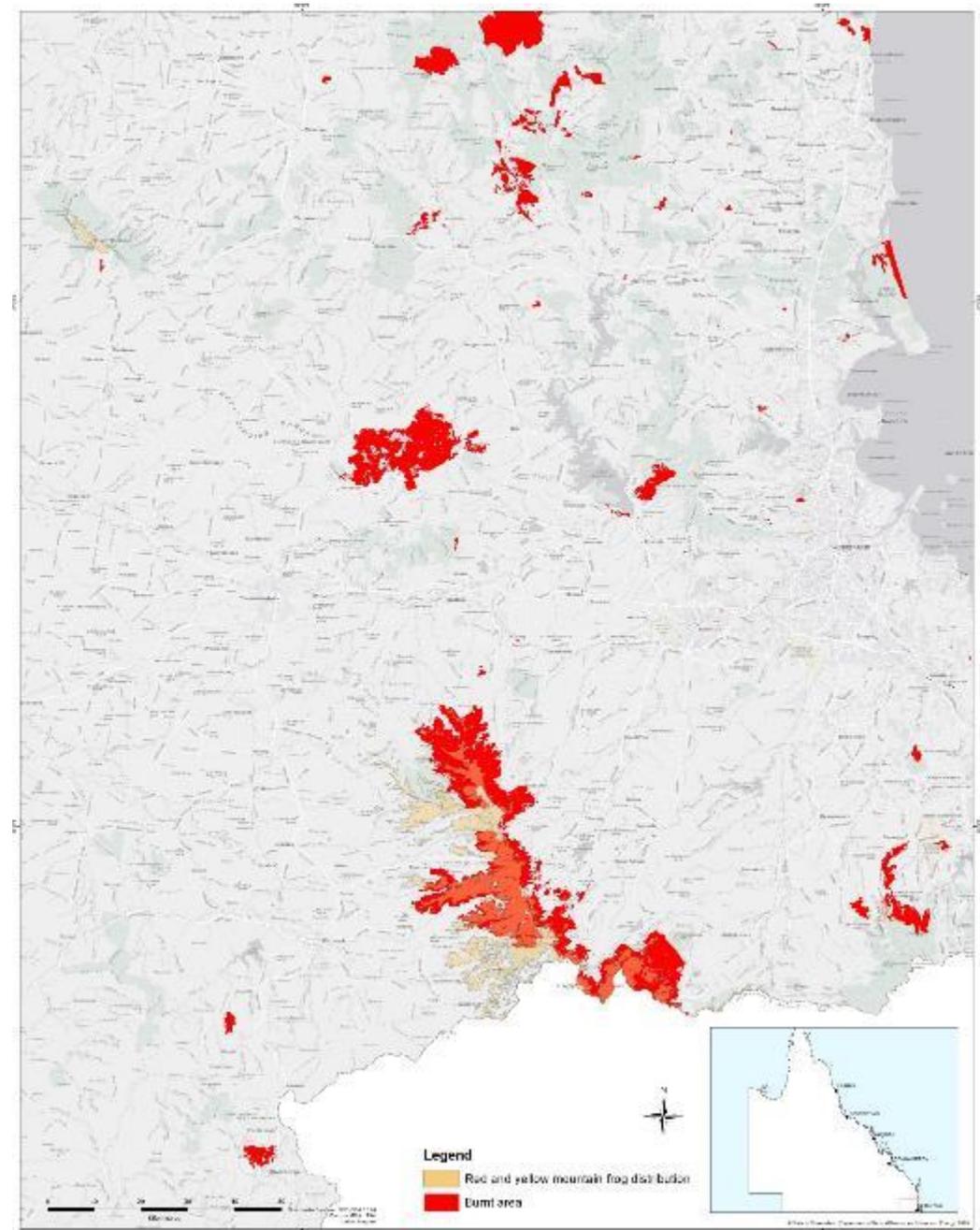
Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control (especially pigs).
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control.

Longer term response:

- Monitoring of breeding sites
- Hydrological monitoring for water quality.
- Potential need for meta-population management.

*Note that populations of *Philoria* from the Mount Barney massif have at times been identified as *P. kundagungan* and the map of modelled habitat for *P. kundagungan* shows significant areas of potentially suitable habitat burnt within Mount Barney National Park. However, this is an undescribed allopatric species of *Philoria* restricted to the Mount Barney massif and Lever's Plateau area that is currently being described. Both species have highly restricted distributions which have been subject of extensive wildfire both within Qld and NSW.*



Frog Species: Cascade treefrog (*Litoria pearsoniana*)

Location: Main Range National Park, Mt Barney National Park, Lamington National Park and potentially in the Jimna State Forest area (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Rainforest, wet sclerophyll and open forests

Threats: Weed invasion (riparian weeds), decline in water quality, introduced herbivores

Immediate response needs:

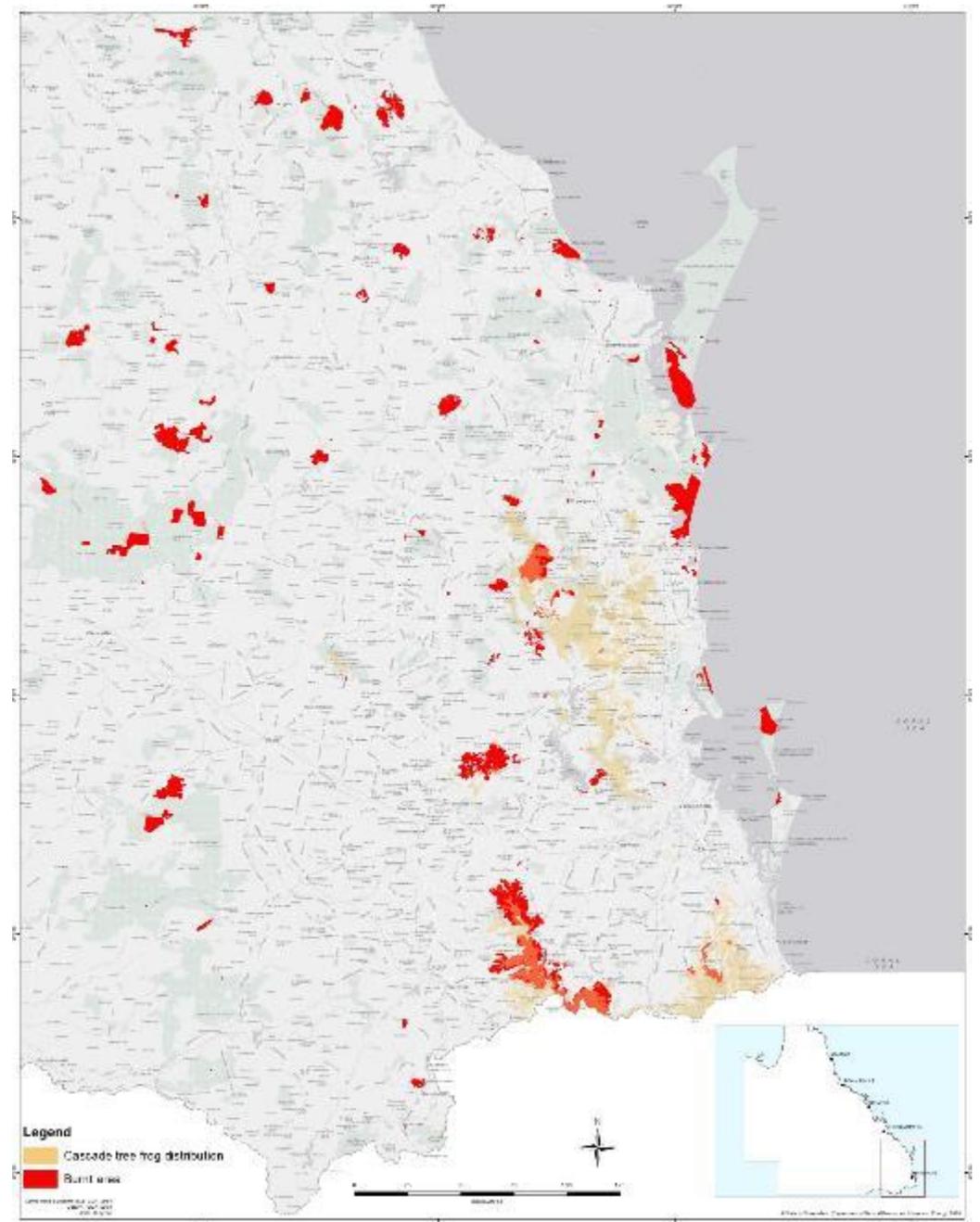
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control.

Longer term response:

- Monitoring with focus on breeding sites
- Hydrological monitoring for water quality.

Comment:

This is a low priority species as it is relatively abundant and widespread and most of the population probably stays within close proximity to streams



Frog Species: Fleay's barred frog (*Mixophyes fleayi*)

Location: Main Range National Park, Mount Barney National Park, Lamington National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Rainforest, wet sclerophyll and open forest

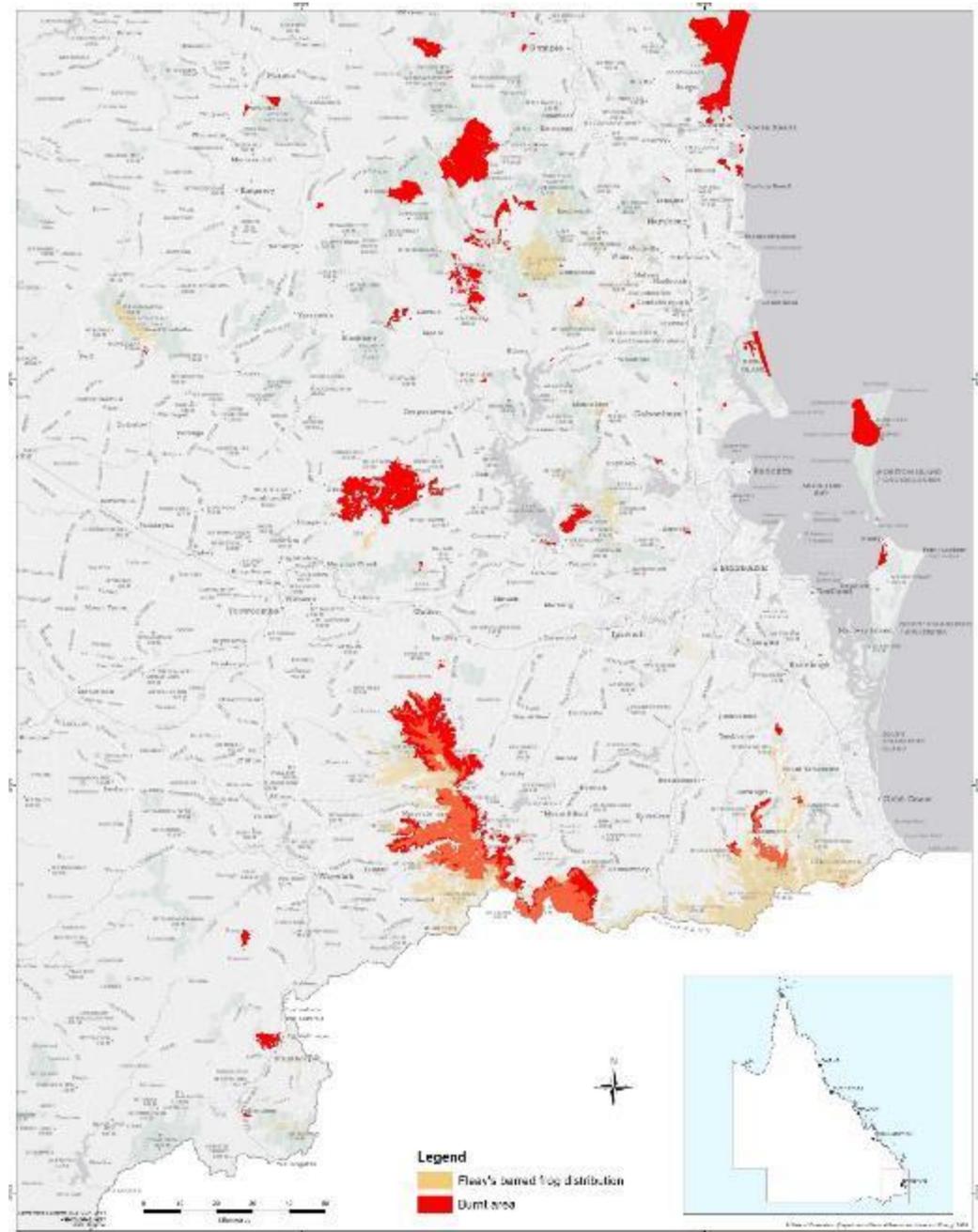
Threats: Invasive species (pigs), weed invasion (lantana, mist flower, Crofton weed and high biomass grasses), drought

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control.

Longer term response:

- Monitoring with focus on breeding sites
- Research on interaction between water quality parameters and different frog life stages.
- Hydrological monitoring for water quality.



Frog Species: Wallum froglet (*Crinia tinnula*)

Location: Cooloola section Great Sandy National Park, Noosa National Park, Peregrin urban areas, Moreton, Fraser, North Stradbroke and Bribie Islands (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Acid wallum wetlands

Threats: Habitat loss (if peat layer burns in wallum wetlands), drought, eutrophication, weed invasion

Immediate response needs:

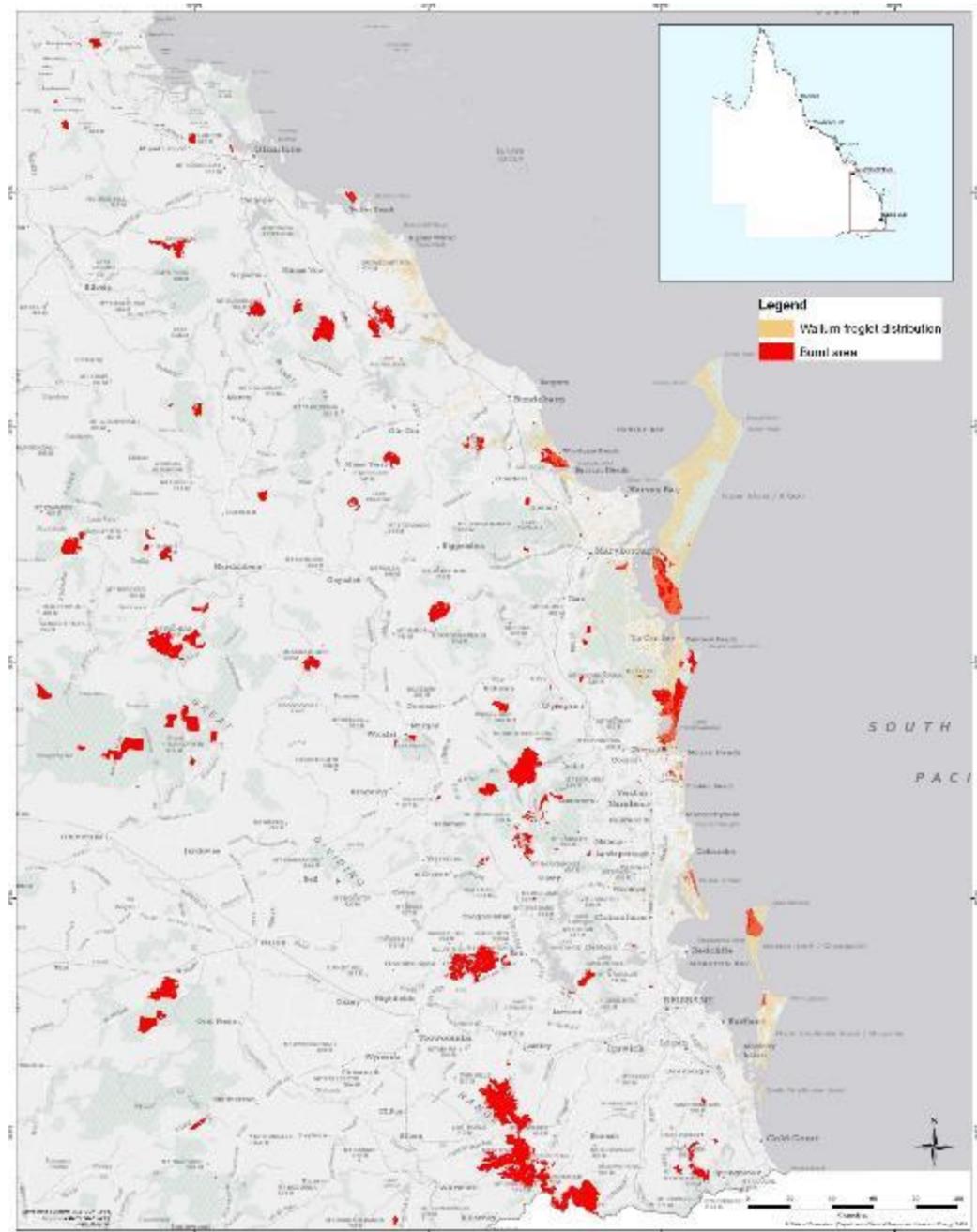
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control, protection of peri-urban habitat from storm water runoff.

Longer term response:

- Consider reintroduction/translocation of frogs to small isolated patches if there are cases of local extinction.

Comment:

This is a low priority species as it is relatively abundant and widespread.



Frog Species: Cooloola sedgefrog (*Litoria cooloolensis*)

Location: Cooloola section of Great Sandy NP, Noosa National Park, (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Acid wallum wetlands

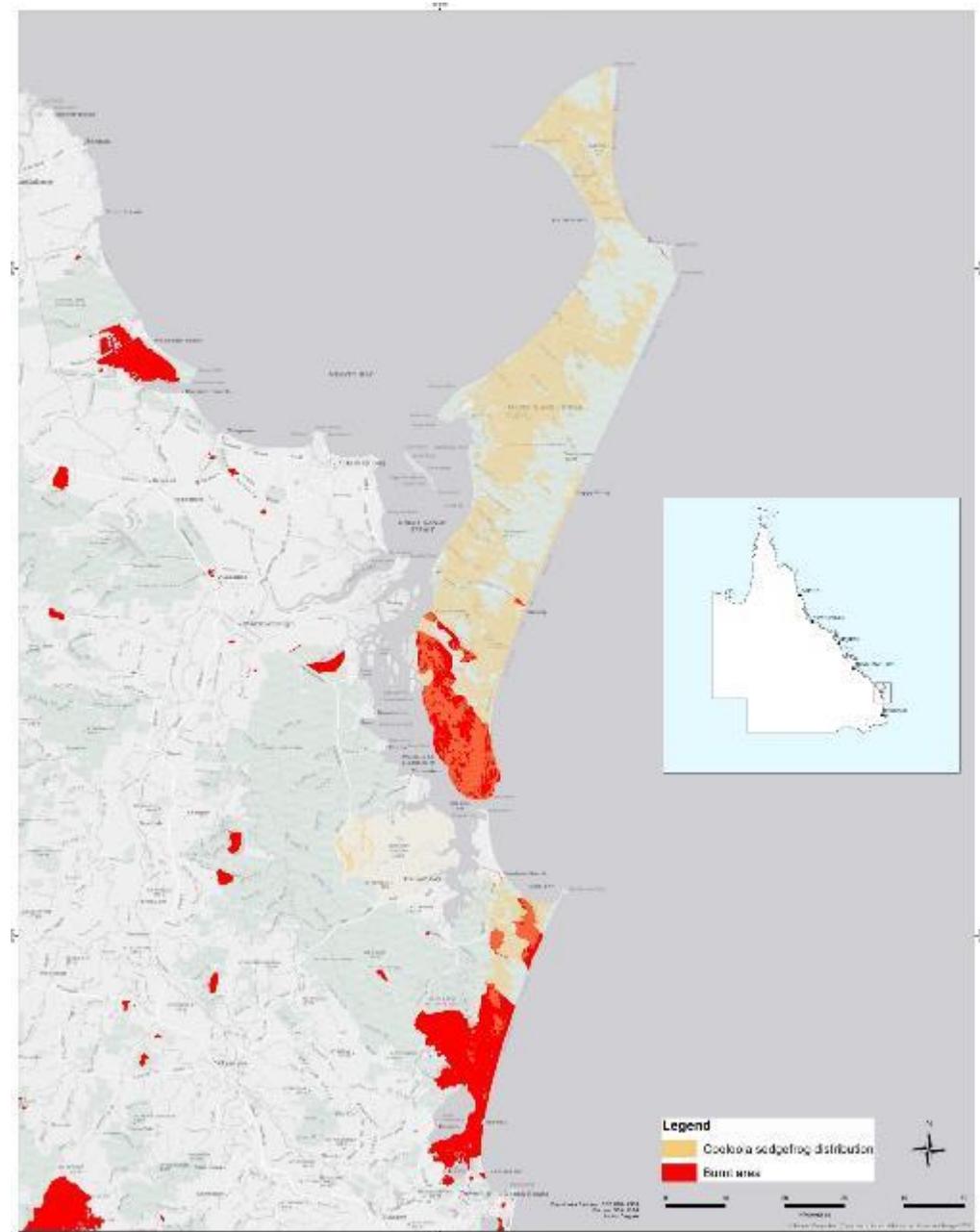
Threats: Habitat loss (peat layer burns in wallum wetlands), competition from eastern sedgefrog *Litoria fallax* within or proximal to disturbed areas, exotic fish, eutrophication, weed invasion, drought.

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control, protection of peri-urban habitat from storm water runoff.

Longer term response:

- Consider reintroduction/translocation of frogs to small isolated patches if there are cases of local extinction.



Frog Species: Wallum rocket frog (*Litoria freycineti*)

Location: Cooloola section Great Sandy National Park, Noosa National Park, Peregrine urban areas, Moreton, Fraser, North Stradbroke and Bribie Islands (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Acid wallum wetlands

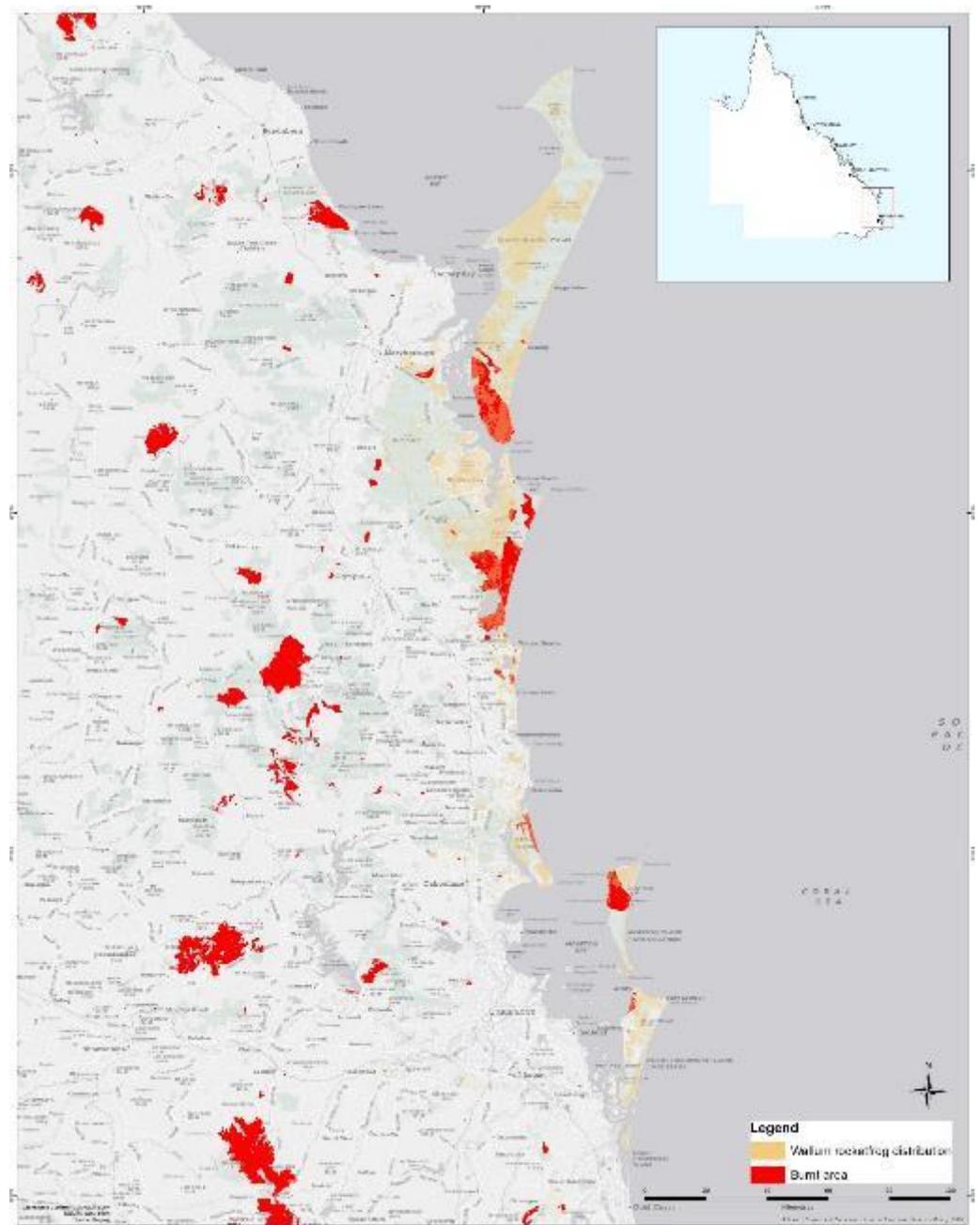
Threats: Habitat loss (peat layer burns in wallum wetlands) competition from striped rocketfrog *Litoria nasuta* within or proximal to disturbed areas, exotic fish, eutrophication, weed invasion, drought.

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control, protection of peri-urban habitat from storm water runoff.

Longer term response:

- Consider reintroduction/translocation of frogs to small isolated patches if there are cases of local extinction.



Frog Species: Wallum sedgefrog (*Litoria olongburensis*)

Location: Cooloola section Great Sandy National Park, Noosa National Park, Peregrine urban areas, Moreton, Fraser, North Stradbroke and Bribie Islands (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Acid wallum wetlands

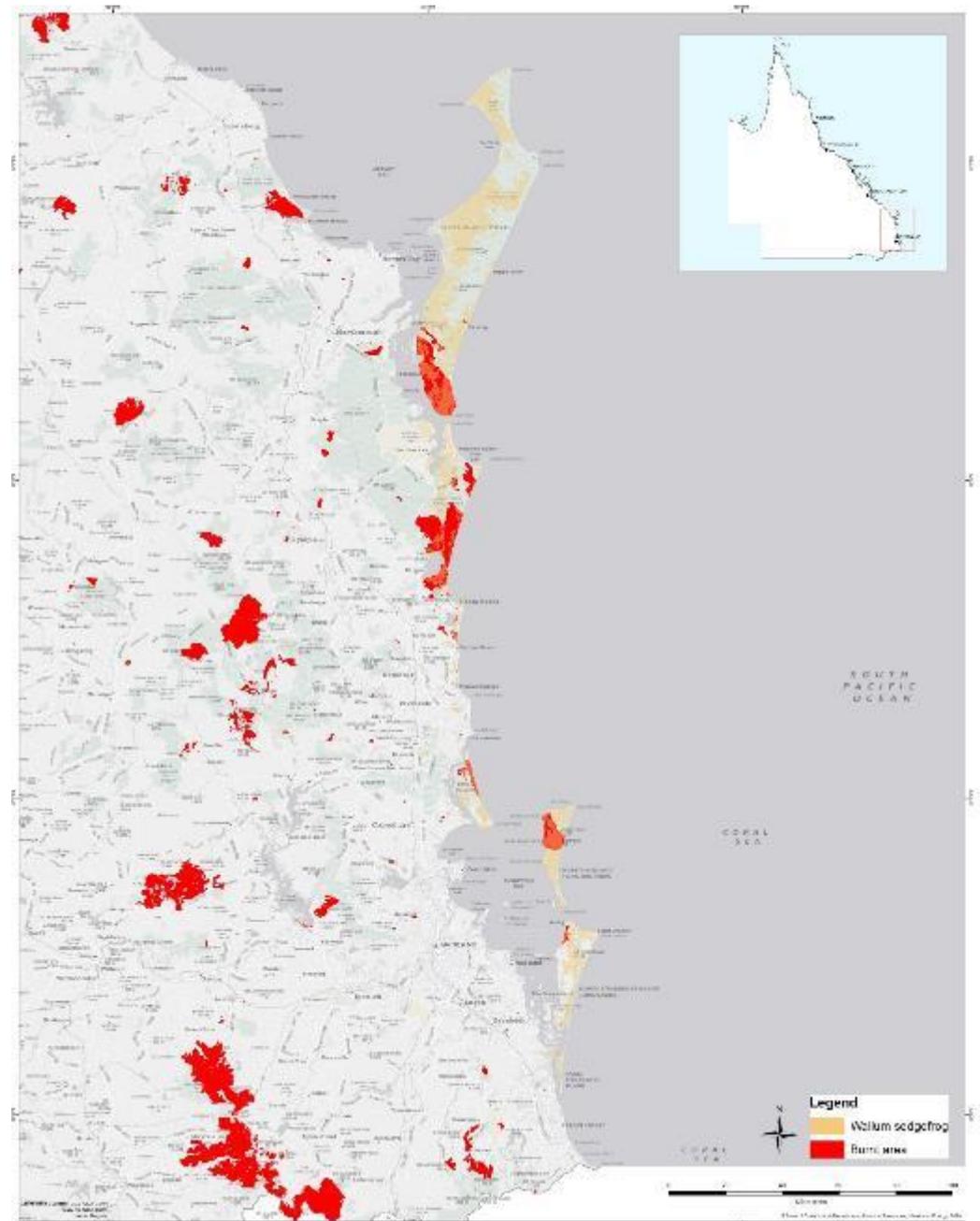
Threats: Habitat loss (peat layer burns in wallum wetlands), competition from eastern sedgefrog *Litoria fallax* within or proximal to disturbed areas, exotic fish, eutrophication, weed invasion, drought.

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control, protection of peri-urban habitat from storm water runoff.

Longer term response:

- Consider relocation of frogs if low number in burnt habitat as habitat restoration will be slow



Bird Species: Glossy black-cockatoo (*Calyptorhynchus lathami*)

Location: Main Range National Park, Mt Barney National Park, Conondale National Park, Lamington National Park, Crows Nest area and various other locations (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Open forest

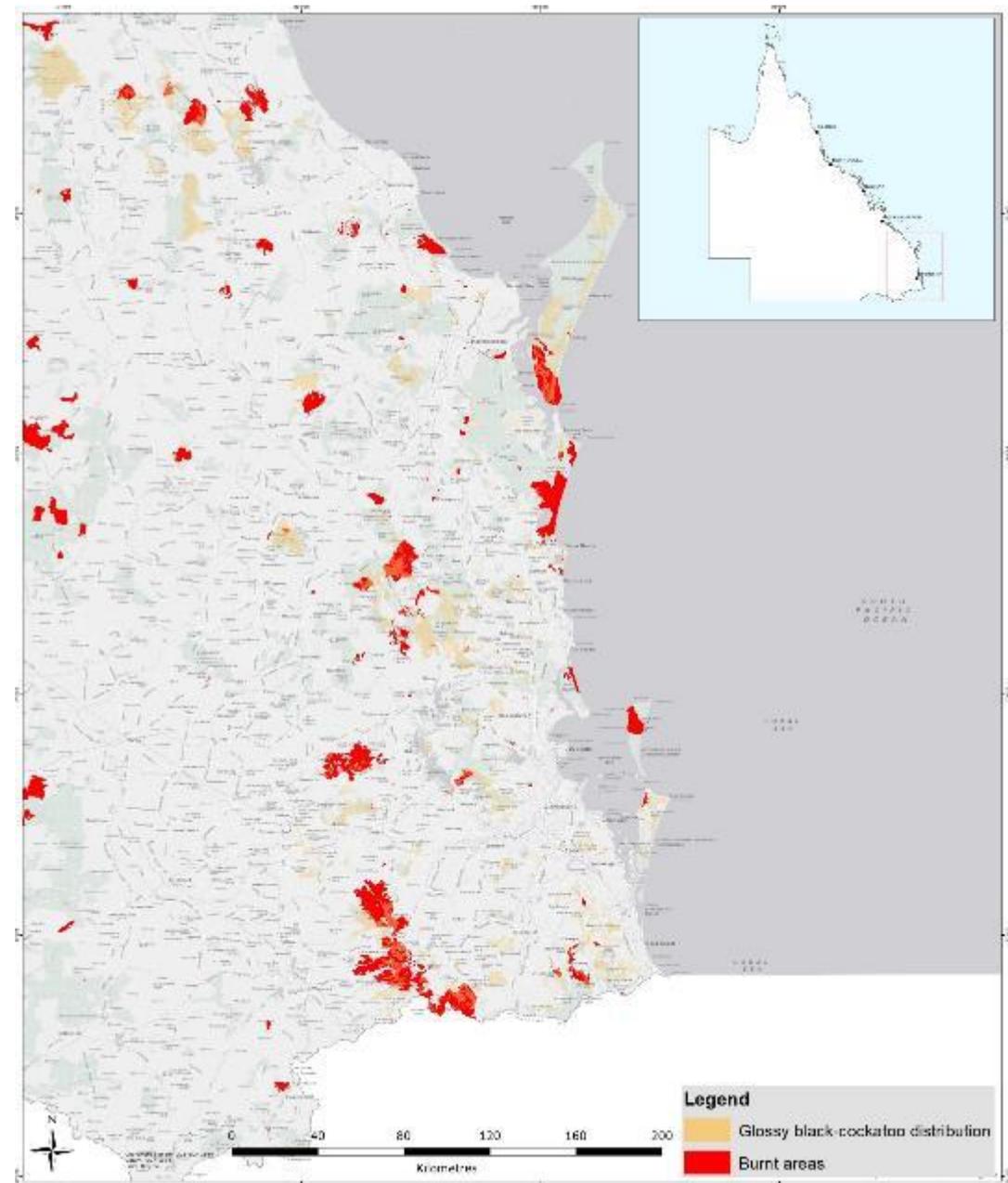
Threats: Inappropriate fire regimes, loss of food trees, habitat loss, dieback, drought, 2018 fire

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern (mapping of important forage and breeding areas)
- Provision of supplementary shelter, food and for animals where needed.
- Other – trial artificial nesting

Longer term response:

- Revise prescribed burning regimes and protect habitat mosaics/refuges from future fires
- Identify important nesting habitat and improve connectivity



Bird Species: Eastern bristlebird (*Dasyornis brachypterus*)

Location: Historically known from areas burnt in Main Range and Mount Barney NPs. Private lands around Lamington National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Open forest

Threats: loss or change in habitat, predation by introduced predators (feral cats and foxes)

Immediate response needs:

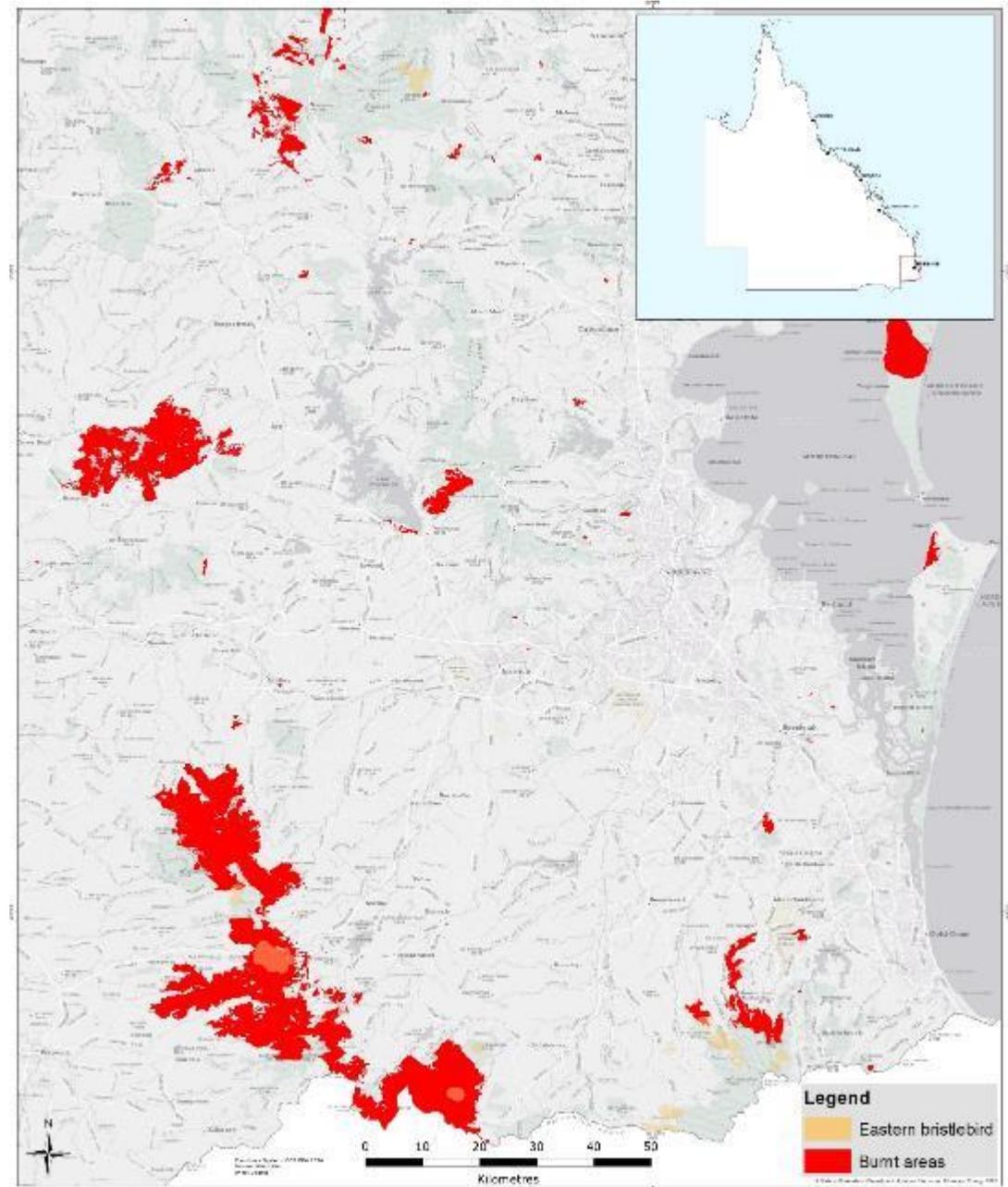
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control.

Longer term response:

- Protect against future fires on private lands.
- Follow recovery team advice and support actions across borders

Comment:

Very few individuals in Queensland so consider collection of birds for captive breeding programs to repopulate when habitat suitable.



Bird Species: Coxen's fig-parrot (*Cyclopsitta diophthalma coxeni*)

Location: Main Range National Park, Lamington National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Rainforest

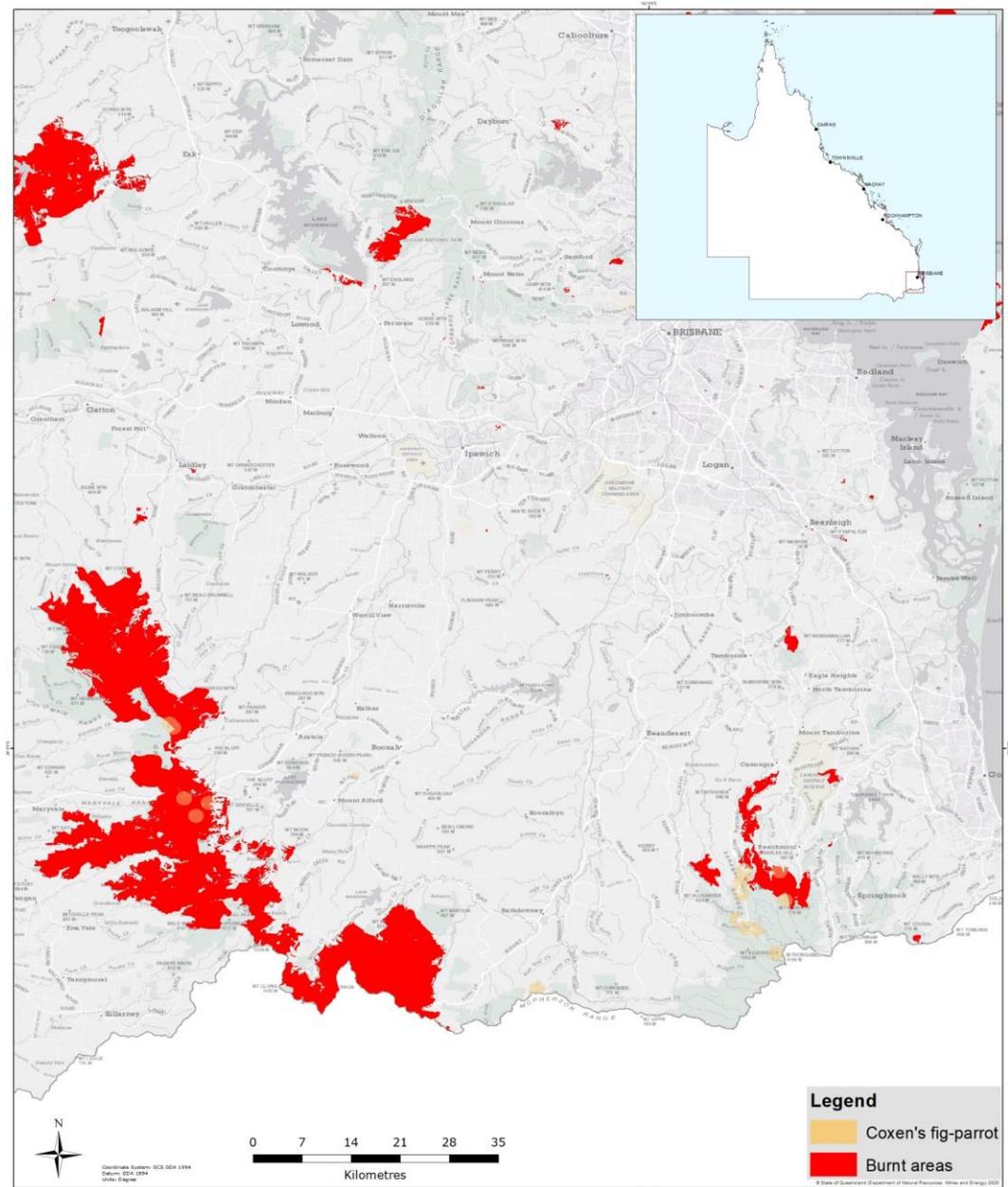
Threats: loss of well-established food trees, temporal and spatial gaps in availability of food resources, invasive weeds (lantana)

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – weed control.

Longer term response:

- Protection of fig and other food species.
- Prevent rainforest fires.
- Landscape management for weeds
- Habitat restoration and food tree planting programs



Bird Species: Albert's lyrebird (*Menura alberti*)

Location: Main Range National Park, Mt Barney National Park, Lamington National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Rainforest, wet sclerophyll forest

Threats: Predation by introduced predators (feral cats and foxes)

Immediate response needs:

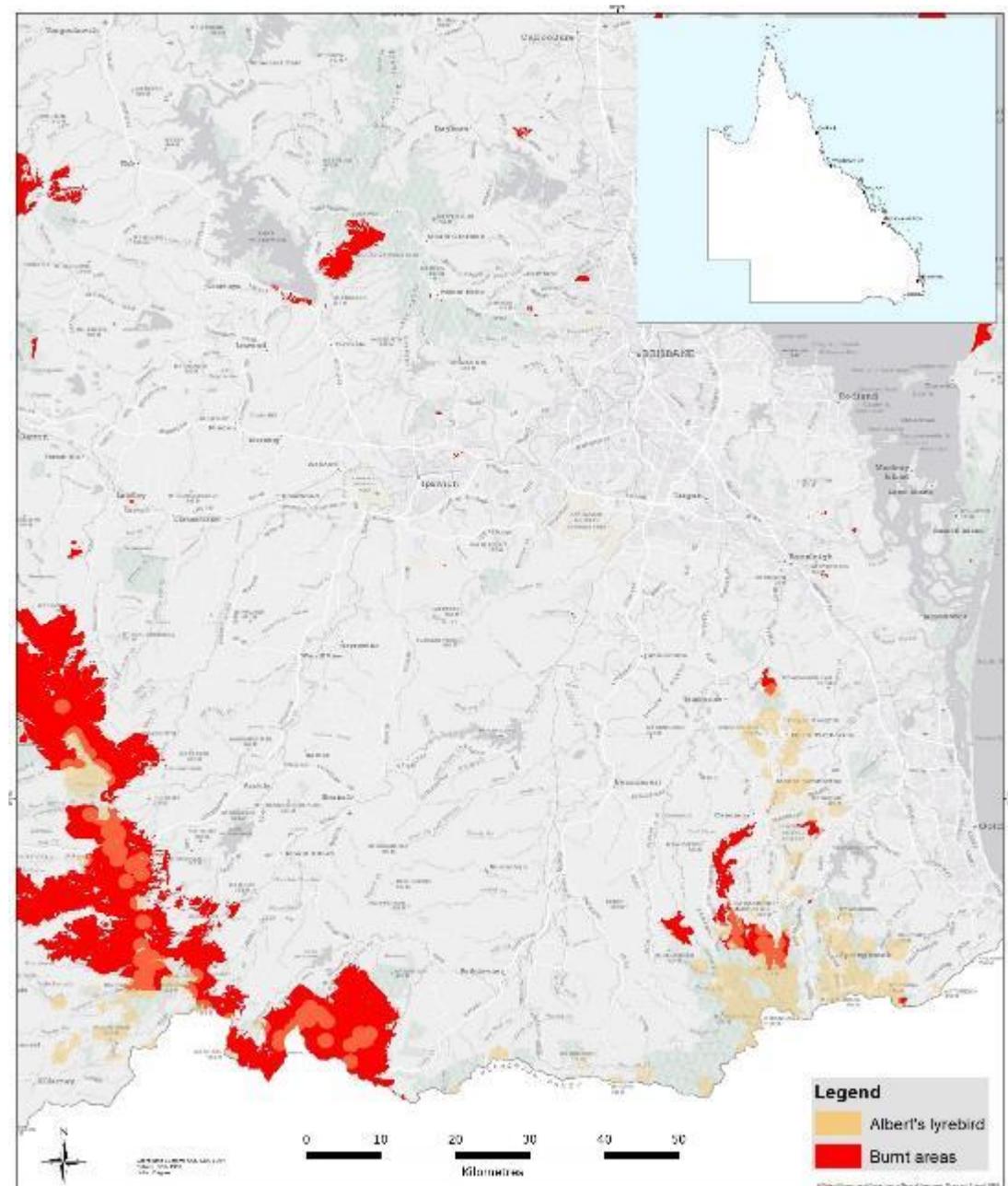
- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Introduced predator control.

Comment

Lower priority, large areas of its core habitat (rainforest) did not burn, overlaps with rufous scrub-birds so survey together.



Bird Species: Rufous scrub-bird (*Atrichornis rufescens*)

Location: Main Range National Park, Mt Barney National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Rainforest, montane heath

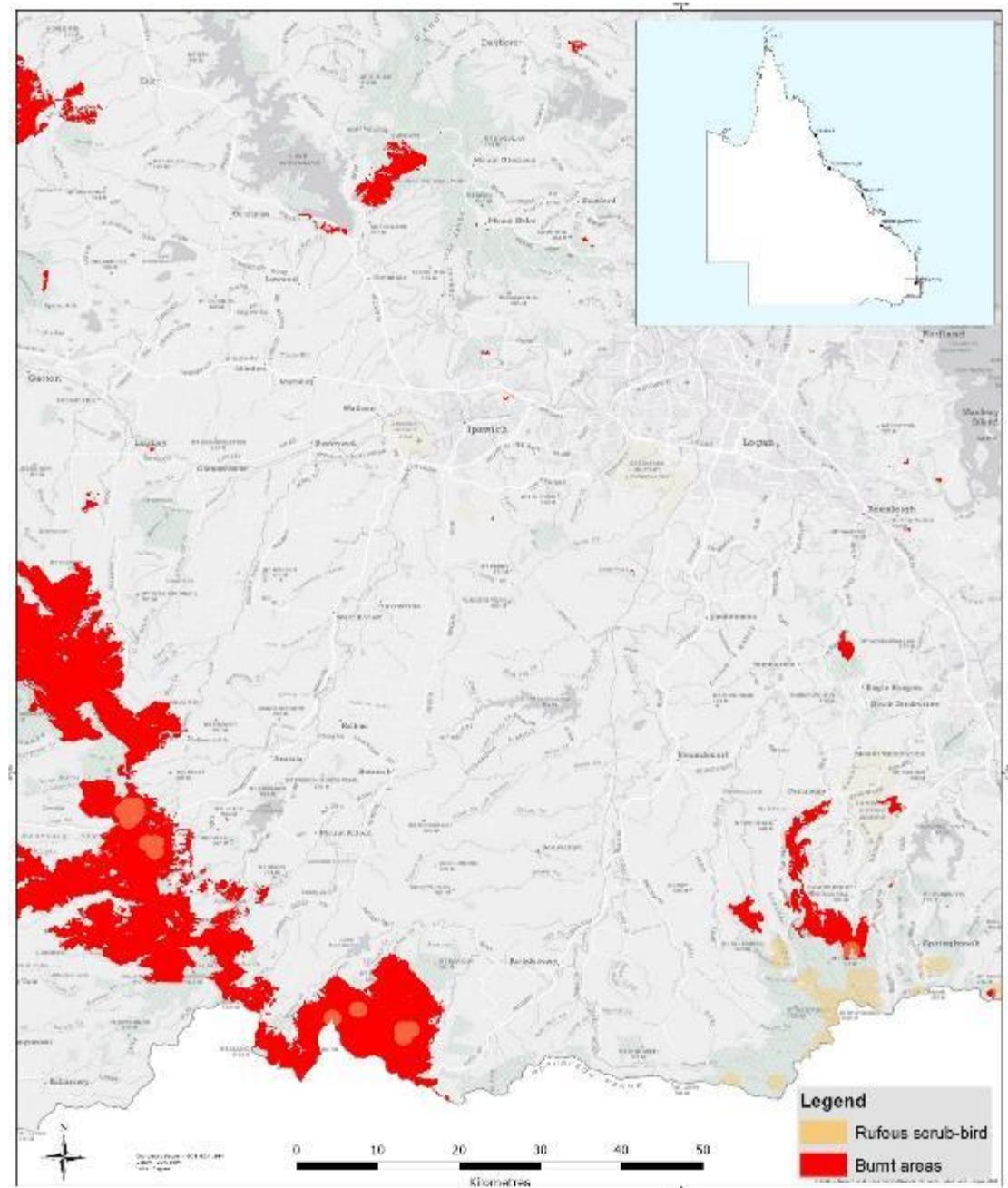
Threats: Habitat loss, direct fire impact, predation by introduced predators (feral cats)

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Relocation of birds if habitat is not suitable, make birds available for captive breeding programs to repopulate other areas (interstate).



Bird Species: Ground parrot (*Pezoporus wallicus wallicus*)

Location: Peri-urban areas Sunshine Coast, Cooloola section of Great Sandy National Park, Noosa National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Wallum heath

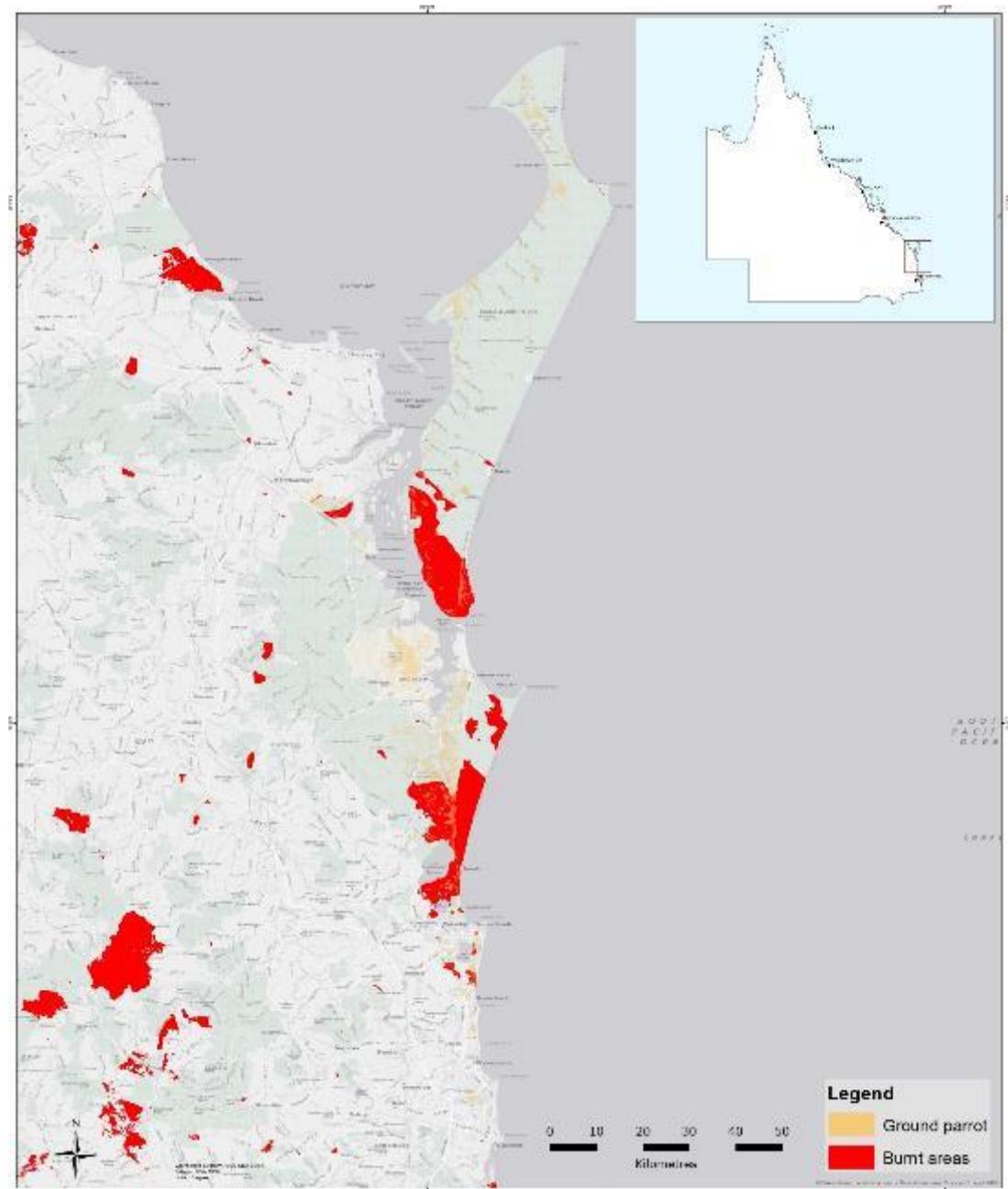
Threats: Predation by introduced predators (feral cats and foxes), inappropriate fire regimes, woody thickening

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Identify and protect key habitats from future wildfires.
- Manage woody thickening.
- Implement an acoustic monitoring program.
- Consider reintroduction/translocation to small isolated patches if there are cases of local extinction.



Bird Species: Southern emu-wren (*Stipiturus malachurus*)

Location: Girraween National Park, Mount Clunie area, Cooloola section of Great Sandy National Park (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Wallum heath, montane heath, grassy sclerophyll forest

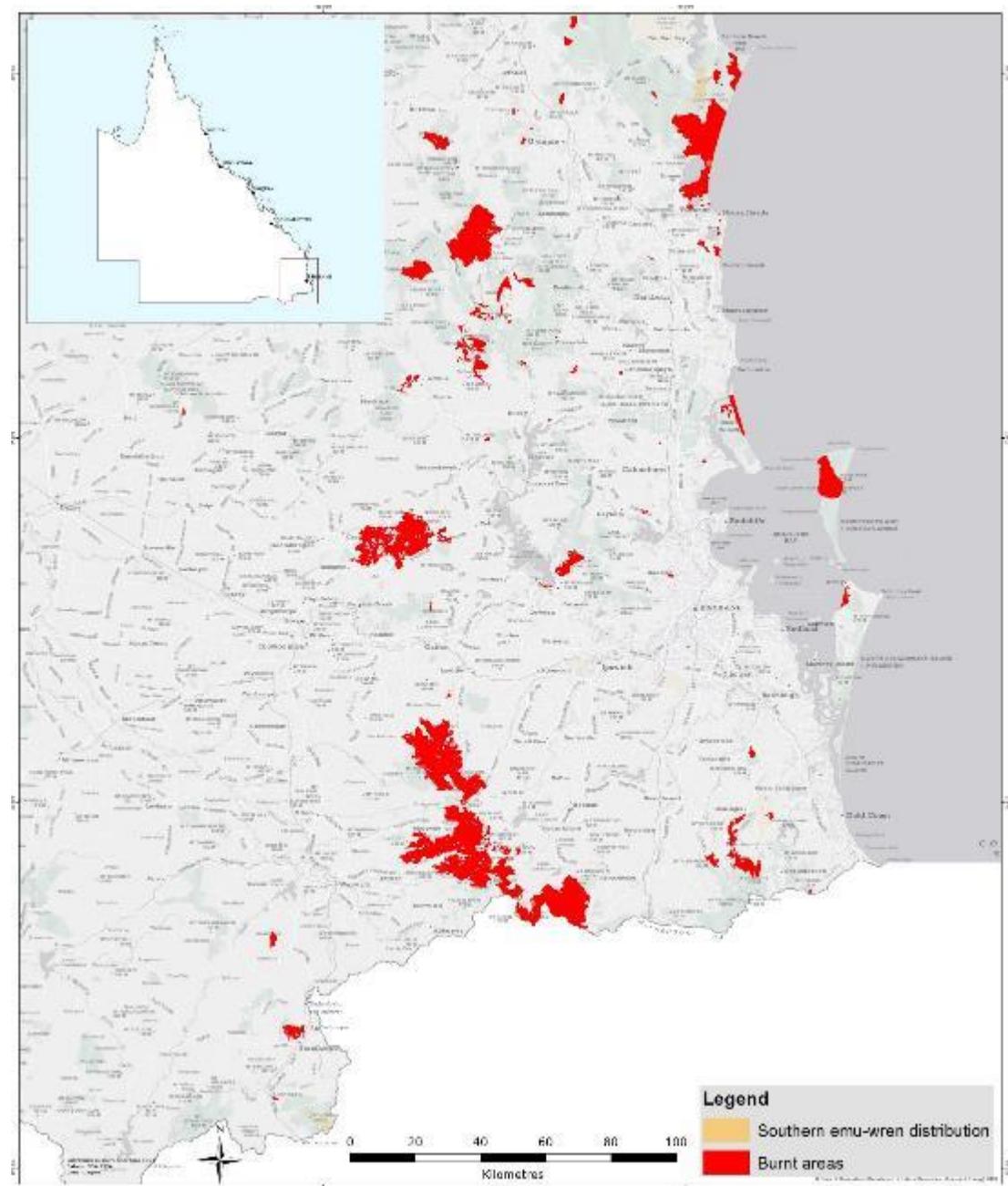
Threats: Predation by introduced predators (feral cats and foxes), habitat loss (woody thickening), 2018 fires

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other.

Longer term response:

- Manage meta-population through relocation if needed.
- Increase knowledge of the distribution and abundance of this species in montane areas.



Fish Species: Oxleyan pygmy perch (*Nannoperca oxleyana*)

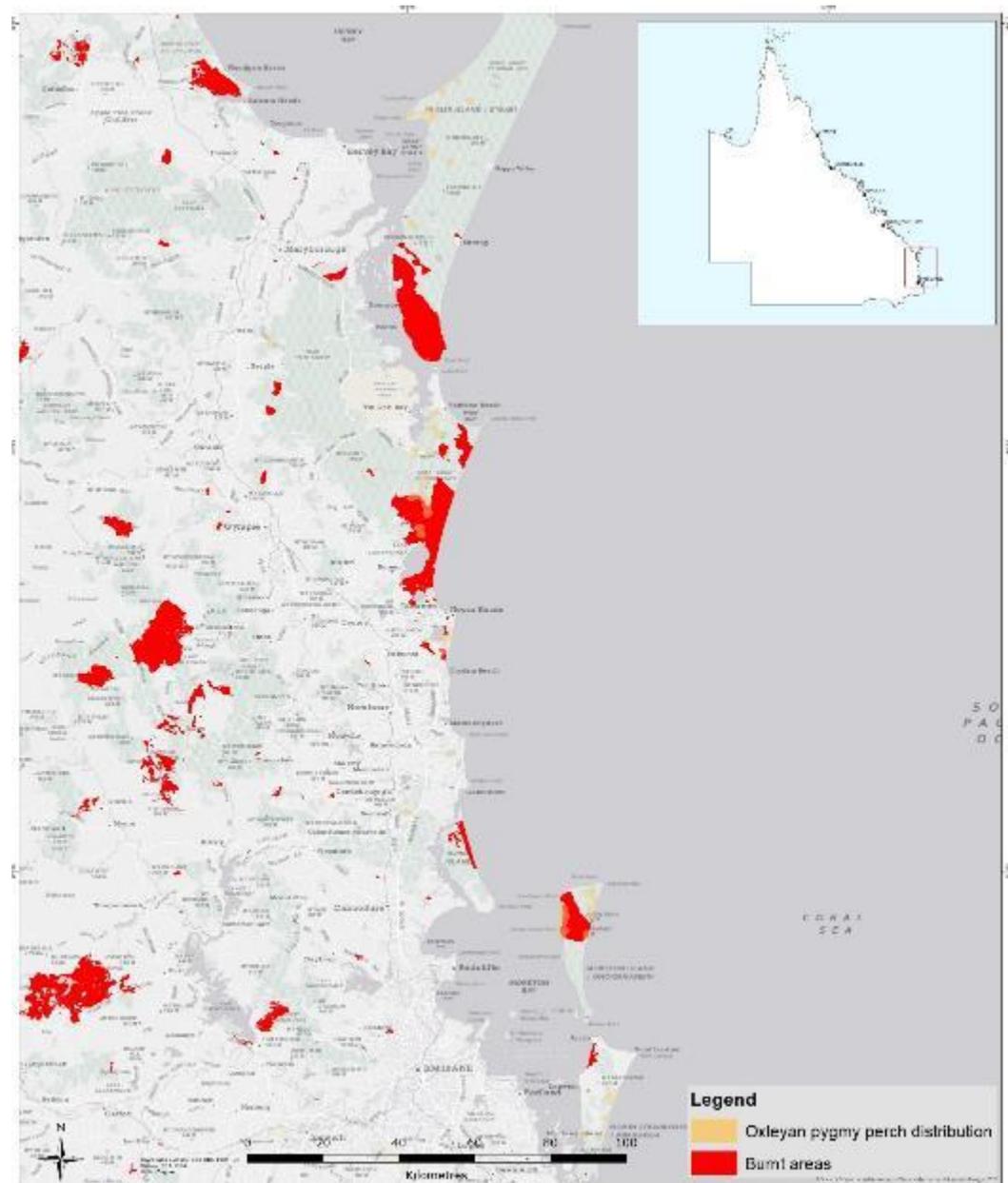
Location: Noosa National Park, Peregian urban areas, Moreton Island. Populations on Fraser Island and North Stradbroke Island also potentially affected (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Acid wetlands (small streams, lakes and swamps) in coastal wallum and dune systems.

Threats: Localised extinctions due to post-burn runoff and deposition of sediment and ash in stream systems, causing habitat degradation and reduced water quality; riparian weed invasion. Stream systems likely less resistant to fire than lake systems.

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other – Captive holding/breeding of threatened stream populations. Habitat rehabilitation (including weed control). Possible reintroductions in isolated systems that have demonstrated to have undergone complete localised extinctions.



Fish Species: Honey blue eye (*Pseudomugil mellis*)

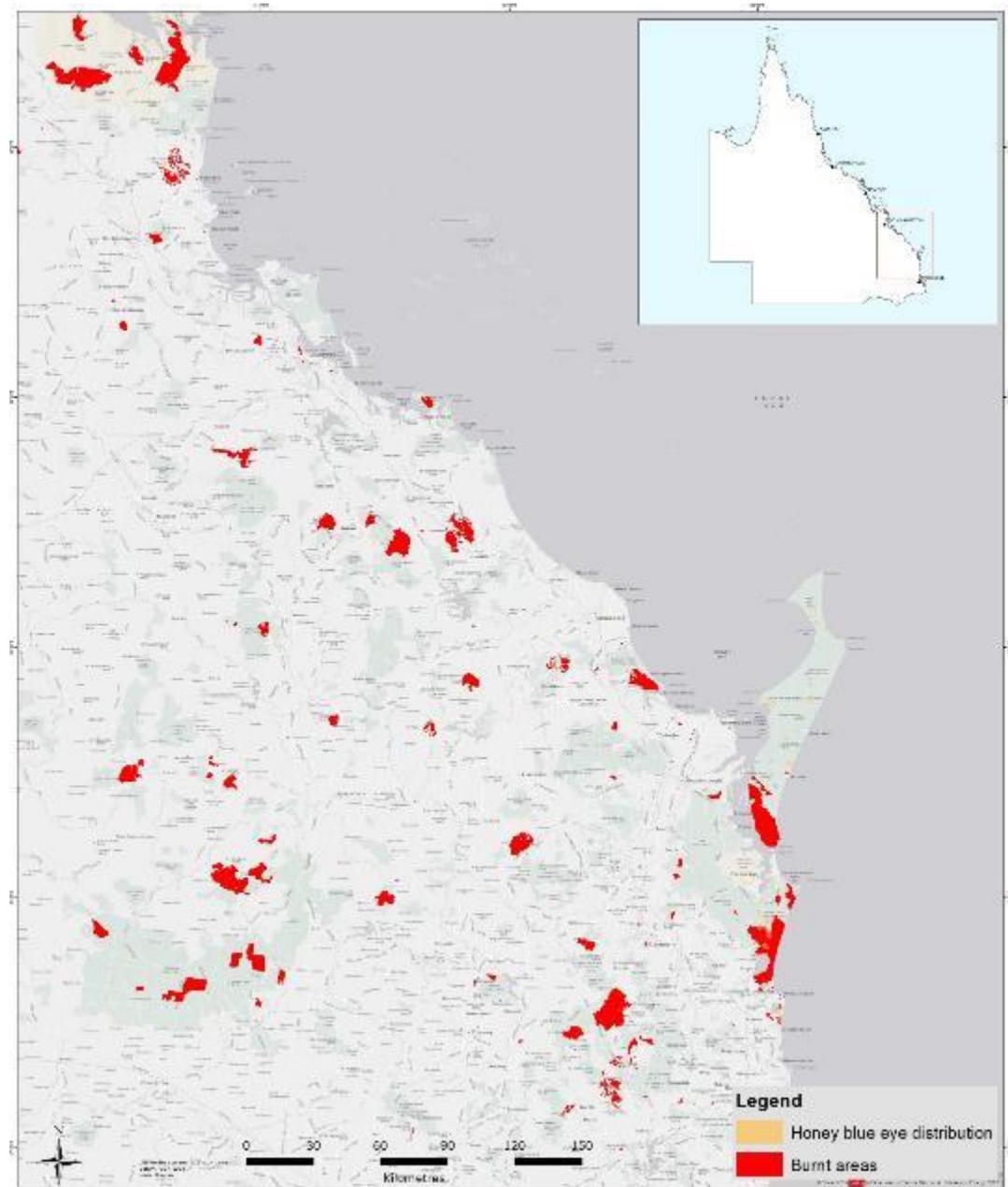
Location: Noosa National Park, Peregrine urban areas (see adjacent figure for overlay of known/modelled distribution and fire extent)

Habitat type: Acid wetlands (small streams, lakes and swamps) in coastal wallum and dune systems.

Threats: Localised extinctions due to post-burn runoff and deposition of sediment and ash in stream systems, causing habitat degradation and reduced water quality; riparian weed invasion. Stream systems likely less resistant to fire than lake systems.

Immediate response needs:

- Protecting unburnt areas within or adjacent to fire extent that provide refugia (from weed invasion)
- Feral predator control.
- Herbivore control.
- Emergency salvage of species (plants and animals) and replanting of species for ongoing ex-situ conservation or wild-to-wild translocation.
- Rapid and other on-ground assessment for species and communities of concern.
- Provision of supplementary shelter, food and for animals where needed.
- Other- Captive holding/breeding of threatened stream populations. Habitat rehabilitation (including weed control). Possible reintroductions in isolated systems that have demonstrated to have undergone complete localised extinctions.



4.2 Flora

4.2.1 Desktop Exercise

The analysis identified 79 threatened plant species with greater than 10% of their known or modelled distribution impacted by fires during the August–December 2019 period (Table 1).

Table 2: Results of desktop analysis listing the threatened flora species with greater than 5% of their known or modelled distribution impacted by fire.

| Scientific Name | Family | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC |
|--|-----------------|------------------------|----------------------------------|--------------------|-----|------|
| <i>Zieria montana</i> | Rutaceae | | 524 | 100 | V | |
| <i>Bertya Ernestiana</i> | Euphorbiaceae | | 897 | 91 | V | V |
| <i>Tetramolopium vagans</i> | Asteraceae | | 1,155 | 74 | V | |
| <i>Agiortia cicatricata</i> | Ericaceae | | 624 | 69 | NT | |
| <i>Euphrasia bella</i> | Orobanchaceae | Lamington eyebright | 414 | 68 | E | V |
| <i>Pimelea umbratica</i> | Thymelaeaceae | | 1,220 | 68 | NT | |
| <i>Eucalyptus beaniana</i> | Myrtaceae | | 1,396 | 66 | V | V |
| <i>Dendrobium schneiderae</i> var. <i>schneiderae</i> | Orchidaceae | | 892 | 62 | NT | |
| <i>Leonema elatius</i> subsp. <i>beckleri</i> | Rutaceae | | 473 | 61 | E | |
| <i>Pultenaea whiteana</i> | Fabaceae | Mt. Barney bush pea | 619 | 61 | V | |
| <i>Pseudanthus pauciflorus</i> subsp. <i>pauciflorus</i> | Picrodendraceae | | 692 | 58 | NT | |
| <i>Bulbophyllum weinthalii</i> subsp. <i>weinthalii</i> | Orchidaceae | | 592 | 57 | V | |
| <i>Eucalyptus codonocarpa</i> | Myrtaceae | mallee ash | 1,755 | 50 | NT | |
| <i>Leptospermum barneyense</i> | Myrtaceae | | 806 | 50 | V | |
| <i>Homoranthus decumbens</i> | Myrtaceae | | 335 | 46 | V | E |
| <i>Sarcochilus hartmannii</i> | Orchidaceae | | 476 | 44 | V | V |
| <i>Hibbertia monticola</i> | Dilleniaceae | mountain guinea flower | 1,134 | 43 | NT | |
| <i>Micromyrtus patula</i> | Myrtaceae | | 182 | 41 | E | |
| <i>Brachyscome ascendens</i> | Asteraceae | Binna Burra daisy | 450 | 40 | V | |
| <i>Cooperhooikia scabridiuscula</i> | Goodeniaceae | cooperhooikia | 773 | 40 | V | V |
| <i>Eucalyptus dunnii</i> | Myrtaceae | Dunn's white gum | 1,072 | 39 | V | |
| <i>Durringtonia paludosa</i> | Rubiaceae | durringtonia | 1,374 | 38 | NT | |
| <i>Eucalyptus sideroxylon</i> subsp. <i>improcera</i> | Myrtaceae | | 180 | 37 | V | |
| <i>Acacia barakulensis</i> | Mimosaceae | | 350 | 33 | V | |
| <i>Acacia acronastes</i> | Mimosaceae | | 1,149 | 32 | NT | |
| <i>Macadamia janseni</i> | Proteaceae | | 202 | 30 | E | E |
| <i>Comesperma breviflorum</i> | Polygalaceae | | 957 | 29 | NT | |
| <i>Tecomathe hillii</i> | Bignoniaceae | Fraser Island creeper | 771 | 27 | NT | |
| <i>Muellerina myrtifolia</i> | Loranthaceae | | 922 | 27 | NT | |
| <i>Cryptocarya glaucocarpa</i> | Lauraceae | | 456 | 26 | V | |

| Scientific Name | Family | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC |
|---|-----------------|---------------------------|----------------------------------|--------------------|-----|------|
| <i>Sarcophilus weinthalii</i> | Orchidaceae | blotched sarcophilus | 338 | 26 | E | V |
| <i>Bothriochloa bunyensis</i> | Poaceae | Bunya Mountains bluegrass | 56,562 | 24 | V | V |
| <i>Phlegmariurus varius</i> | Lycopodiaceae | | 314 | 23 | V | |
| <i>Gonocarpus effusus</i> | Haloragaceae | | 4,676 | 23 | V | |
| <i>Gonocarpus hirtus</i> | Haloragaceae | | 297 | 22 | V | |
| <i>Astonia australiensis</i> | Alismataceae | | 381,543 | 22 | E | |
| <i>Arundinella grevillensis</i> | Poaceae | | 513 | 22 | V | |
| <i>Rutidosia crispata</i> | Asteraceae | | 164 | 22 | V | |
| <i>Daviesia quoquoversus</i> | Fabaceae | | 488 | 22 | V | |
| <i>Clematis fawcettii</i> | Ranunculaceae | | 65,548 | 21 | V | V |
| <i>Discaria pubescens</i> | Rhamnaceae | | 287 | 21 | NT | |
| <i>Allocasuarina emuina</i> | Casuarinaceae | Mt. Emu she-oak | 4,593 | 20 | E | E |
| <i>Macarthuria complanata</i> | Macarthuriaceae | | 352 | 19 | NT | |
| <i>Banksia conferta</i> | Proteaceae | | 67,284 | 18 | V | |
| <i>Westringia sericea</i> | Lamiaceae | native rosemary | 291 | 18 | V | |
| <i>Solanum callium</i> | Solanaceae | brush nightshade | 193 | 18 | V | |
| <i>Parsonia largiflorens</i> | Apocynaceae | | 197 | 18 | E | |
| <i>Pomaderris crassifolia</i> | Rhamnaceae | | 93,544 | 17 | V | |
| <i>Grevillea linsmithii</i> | Proteaceae | | 1,441 | 17 | E | |
| <i>Glycine argyrea</i> | Fabaceae | | 529 | 17 | NT | |
| <i>Sphaeromorphaea major</i> | Asteraceae | | 481 | 17 | NT | |
| <i>Eucalyptus conglomerata</i> | Myrtaceae | swamp stringybark | 13,959 | 17 | E | E |
| <i>Prasophyllum wallum</i> | Orchidaceae | Wallum leek orchid | 27 | 17 | V | V |
| <i>Marsdenia longiloba</i> | Apocynaceae | | 53,370 | 17 | V | V |
| <i>Melaleuca cheelii</i> | Myrtaceae | | 3,250 | 16 | NT | |
| <i>Zieria exsul</i> | Rutaceae | | 6,226 | 16 | E | |
| <i>Pterostylis nigricans</i> | Orchidaceae | | 325 | 16 | NT | |
| <i>Blandfordia grandiflora</i> | Blandfordiaceae | christmas bells | 32,280 | 16 | E | |
| <i>Acacia baueri</i> subsp. <i>baueri</i> | Mimosaceae | tiny wattle | 47,882 | 16 | V | |
| <i>Archidendron lovelliae</i> | Mimosaceae | bacon wood | 48,208 | 16 | V | V |
| <i>Olearia hygrophila</i> | Asteraceae | swamp daisy | 219 | 16 | E | E |
| <i>Boronia rivularis</i> | Rutaceae | Wide Bay boronia | 1,401 | 15 | NT | |
| <i>Phaius bernaysii</i> | Orchidaceae | yellow swamp orchid | 83 | 15 | E | E |
| <i>Boronia keysii</i> | Rutaceae | Key's boronia | 436 | 15 | V | V |
| <i>Ricinocarpus speciosus</i> | Euphorbiaceae | | 68,798 | 15 | V | |

| Scientific Name | Family | Common Name | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC |
|---|----------------|--------------|----------------------------------|--------------------|-----|------|
| <i>Myrmecodia beccarii</i> | Rubiaceae | | 153,341 | 15 | V | V |
| <i>Wahlenbergia scopulicola</i> | Campanulaceae | | 139 | 15 | V | |
| <i>Ozothamnus vagans</i> | Asteraceae | | 252 | 14 | V | V |
| <i>Actephila bella</i> | Phyllanthaceae | | 152 | 14 | V | |
| <i>Rhodamnia rubescens</i> | Myrtaceae | | 80,564 | 13 | E | |
| <i>Brachychiton</i> sp. (Ormeau L.H.Bird AQ435851) | Sterculiaceae | | 3,214 | 13 | E | CE |
| <i>Eucalyptus hallii</i> | Myrtaceae | Goodwood gum | 11,528 | 13 | V | V |
| <i>Rhaphidospora cavernarum</i> | Acanthaceae | | 126,681 | 12 | V | |
| <i>Homoranthus porteri</i> | Myrtaceae | | 68,212 | 12 | V | V |
| <i>Floydia praealta</i> | Proteaceae | ball nut | 54,869 | 12 | V | V |
| <i>Eriocaulon carsonii</i> | Eriocaulaceae | | 647 | 11 | E | E |
| <i>Dichanthium setosum</i> | Poaceae | | 605 | 11 | C | V |
| <i>Zieria collina</i> | Rutaceae | | 2,903 | 11 | V | V |

4.2.2 Round Table Exercise

As a result of the lower number of experts available to validate and identify recovery actions for threatened plants, relative to threatened fauna, the round table exercise was undertaken out of session by Queensland Herbarium staff.

A total of 30 priority plant species were identified with a low to medium resilience to fire and more than 20% loss of modelled potentially suitable habitat. In general, recovery responses were restricted to protecting remaining populations and habitat, and to weed control at impacted sites (ensuring weed control does not adversely impact regeneration). Pig control was identified as important to protecting some species. Most priority species require ongoing protection from fire during regeneration time. More broadly, the round table identified an immediate need to provide further information and education for land managers (including protected area managers) regarding what species they have and how best to protect them.

The full dataset of outcomes from the round table exercise was summarised (Appendix 4).

5 Strategic Project Areas

The analysis detailed above allowed the identification of key localities where multiple priority threatened species, often with similar threats, have been impacted (Figure 3). Table 3 presents the priority threatened species impacted in these areas.

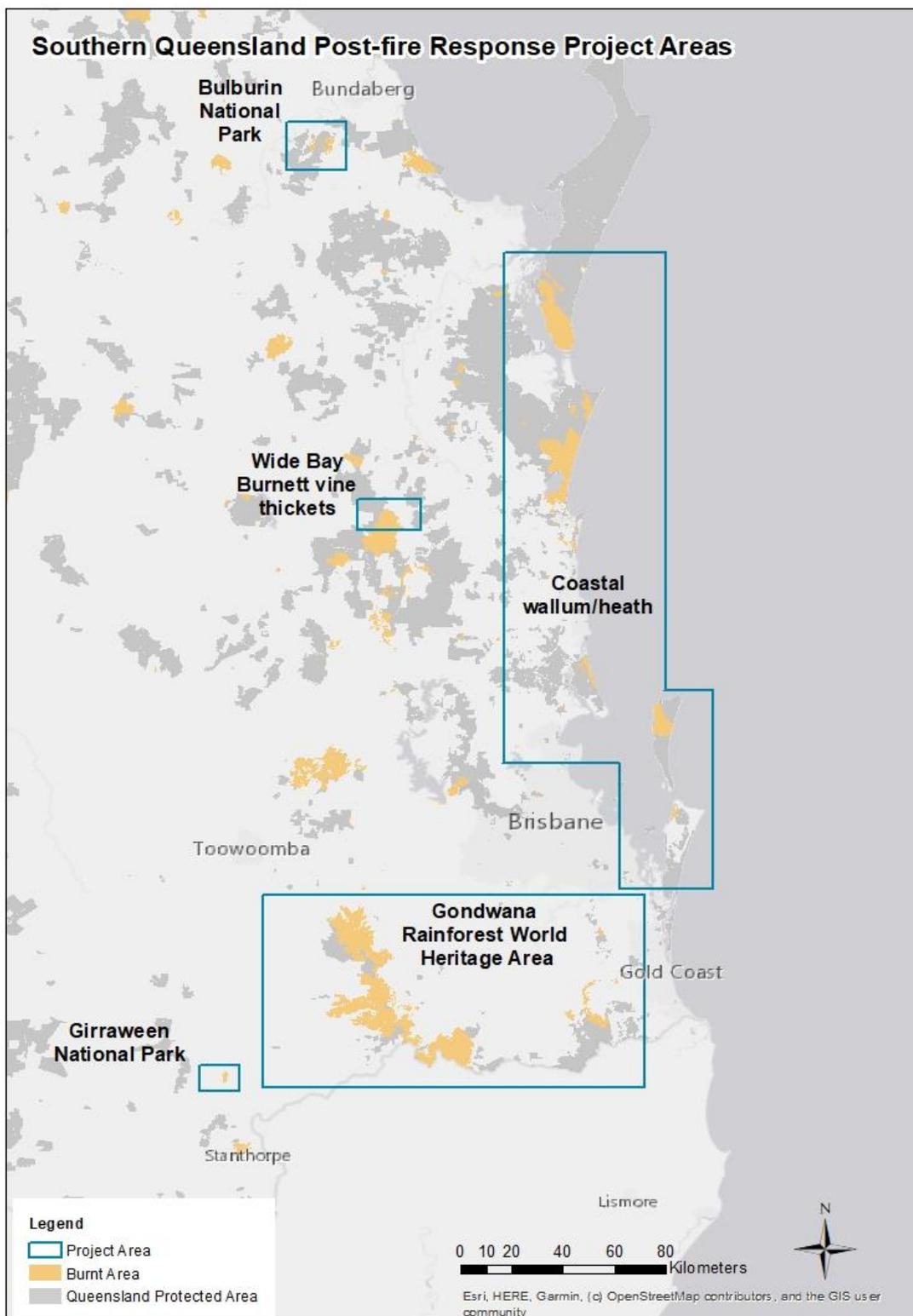


Figure 3: The key locations identified for draft strategic recovery projects.

Table 3: Priority threatened species in strategic project areas.

| Project Area | Fauna Species | Flora Species |
|--|---|---|
| Gondwana Rainforests World Heritage Area | <p>Threatened species associated with rainforest, wet sclerophyll, montane heath and open forest habitats identified as priorities through expert elicitation and occur in an area of high fire impact:</p> <p>.Eastern bristlebird, rufous scrub-bird, Coxen's fig-parrot, Albert's lyrebird, glossy black-cockatoo, brush-tailed rock-wallaby, New Holland mouse, Hastings River mouse, cascade treefrog, Fleay's barred frog, red-and-yellow mountain frog, spotted-tailed quoll and long-nosed potoroo.</p> | <p>Threatened species associated rainforest, wet sclerophyll, montane heath and open forest habitats identified as priorities through expert elicitation and occur in an area of high fire impact:</p> <p><i>Zieria montana, Bertya ernestiana, Tetramolopium vagans, Agiortia cicatricata, Euphrasia bella, Pimelea umbratica, Dendrobium schneiderae var. schneiderae, Leionema elatius subsp. beckleri, Pultenaea whiteana, Pseudanthus pauciflorus subsp. pauciflorus, Bulbophyllum weinthalii subsp. weinthalii, Leptospermum barneyense, Sarcochilus hartmannii, Hibbertia monticola, Brachyscome ascendens, Cooperookia scabridiuscula, Comesperma breviflorum, Muellerina myrtifolia, Sarcochilus weinthalii, Phlegmariurus varius, Gonocarpus hirtus and Clematis fawcettii.</i></p> |
| Coastal wallum and heathlands | <p>Threatened species associated with wallum habitats identified as priorities through expert elicitation and occur in areas of high fire impact:</p> <p>Wallum froglet, Cooloola sedgefrog, wallum rocketfrog, wallum sedgefrog, eastern ground parrot, southern emu-wren, honey blue eye and Oxleyan pygmy perch</p> | <p>Threatened species associated with rainforest and wallum habitats identified as priorities through expert elicitation and occur in areas of high fire impact:</p> <p><i>Durringtonia paludosa, Tecomanthe hillii, Allocasuarina emuina and Gonocarpus effusus</i></p> |
| Bulburim National Park | <p>Threatened species associated with subtropical vine forest, wet sclerophyll and open forest habitats identified as priorities through expert elicitation and occur in areas of high fire impact:</p> <p>Ringed thin-tailed gecko and silver-headed antechinus.</p> | <p>Threatened species associated subtropical vine forest and wet sclerophyll habitats identified as priorities through expert elicitation and occur in areas of high fire impact:</p> <p><i>Macadamia janseni</i></p> |
| Wide Bay-Burnett vine thickets | <p>Threatened species associated with vine thicket habitats identified as priorities through expert elicitation and occur in areas of high fire impact:</p> <p>Oakview leaf-tailed gecko and Nangur skink.</p> | |
| Giraween National Park | <p>Threatened species identified as priorities through expert elicitation and occur in areas of high fire impact:</p> <p>Southern emu-wren</p> | |

Recovery Actions:

- Assess and map fire severity, including ground truthing.
- Survey of threatened species populations.
- Pest management (feral cats, foxes, pigs, weeds).
- Post-fire population recovery monitoring.
- Protect from illegal take.

Note, recovery actions for priority species will have co-benefits for all species occurring in these habitats and will improve overall ecosystem health.

6 Future Work

- Consult with internal and external stakeholders, First Nation peoples and potential partners to further develop strategic projects and plan effective and efficient delivery models and resourcing.
- Communicate the results of the analysis and the strategic project plans to influence and align activities that can be delivered by a range of stakeholders.
- Further refine the analysis using high probability thresholding of Maxent models intersected with detailed mapping of fire severity class.
- Undertake severity mapping and priority site assessments to better inform the development of strategic projects.
- Incorporate survey findings into species distribution models to better inform species conservation status and ongoing management actions.
- Review fire management strategies and develop revised guidelines where appropriate to protect threatened species.

7 APPENDICES

Appendix 1 – Attendees at expert round table

| Name | Organisation |
|-----------------------|------------------------|
| Courtney Duncan | DES |
| Dean Payne | DES |
| Harry Hines | DES |
| Teresa Eyre | DES |
| Leonard Olyott | DES |
| Melinda Laidlaw | DES |
| Steven Howell | DES |
| Kirstin Kenyon | DES |
| Manda Page | DES |
| Geoff Lundie-Jenkins | DES |
| John Neldner | DES |
| John Hodgson | DES |
| Tim Seelig | DES |
| Sarah Parker-Webb | DES |
| Jodie Mehrtens | DES |
| Michael Mathieson | DES |
| Ian Gynther | DES |
| Dan Ferguson | DES |
| Dave Stewart | DES |
| Christopher Sanderson | DES |
| Melanie Venz | DES |
| Rod Hobson | Independent |
| Liz Gould | Healthy Land and Water |
| Michelle Ward | UQ |
| Diana Fisher | UQ |
| Patrick Couper | Qld Museum |
| Paul Oliver | Qld Museum |
| Sara Legge | NESP |
| Eric Vanderduys | CSIRO |
| Richard Seaton | AWC |
| Mark Kennard | Griffith University |

Appendix 2 – Guiding Questions

Threatened Species Bushfire Response Roundtable

Guiding Questions

3 Feb 2020

The following sets of questions will be put up for discussion on the day. There is scope for other questions. Two scribes will be capturing the answers to these questions in a spreadsheet and also as notes.

In response to the presented data:

Is the modelled distribution accurate for this species? Yes / No?

Is the fire impacted area accurate? Yes / No?

Does the % impacted seem sensible / accurate? Yes / No?

Has critical habitat been impacted? Yes / No

Is impacted population critical for the species survival Yes / No?

In your expert opinion:

What is the likely resilience of the species to the fire impact?

- Low resilience – little to no recovery without intervention.
- Medium resilience – recovery takes time, would benefit from some intervention
- High resilience – recovers well with little to no intervention
- Fire improves conditions for species

What are primary threats to this species as a result of the fire? I.E what are the most significant threats to the survival of this species (in the fire impacted areas).

Types of Threats (describe threat):

Recovery responses

Response type - Describe the types of management responses that are required to either protect or recover the species or mitigate the threat.

What sector is best placed to undertake the response?

What is the potential cost of the recovery response?

- Low (hundreds)
- Medium (thousands)
- High (hundreds of thousands to millions)

Time frame for response (when do we need to undertake the recovery response?)

- Immediate (months)
- Medium term (years)
- Long term (many years)

Other considerations

Do the suggested recovery actions have any negative impacts on other species?

Do the suggested recovery actions result in co-benefits for other threatened species?

Who are the species experts if not in the room?

Appendix 3 – Data from round table exercise for fauna

Full data summary of fauna focus species from round table exercise.

- Mammals–blue, Birds–orange, Frogs–green, Reptiles–yellow, Aquatic species–white.
- Red text are species added on advice from the round table exercise.
- Strike-through text are species identified from the round table exercise as not likely to occur in the focus area.

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|---|--|------------------------|------------------------------|------------------------------------|------------------------------|--|-------------------------------|--|--|---|---|--|-------------------------|
| Hastings River mouse <i>Pseudomys oralis</i> | N overestimating extent | Y | N possibly worse. | Y | medium | Main Range National Park <i>Nightcap NP NSW / Border Ranges NP NSW. National park and private lands</i> | Open forest | Habitat loss Predators | Limited distribution. Unknown % lost & severity. Short term food shortage. Alteration of grassy understorey via midstorey thickening is a threat. Predated on by cats and foxes. | Food provision? Predator control. Shelter from predators (other areas using artificial habitats) | Thin regrowth to avoid woody thickening. Survey for distribution and fire severity. Consider metapopulation mgmt. | QPWS lead | On bristlebird habitat |
| New Holland mouse <i>Pseudomys novaehollandiae</i> | N | | ? | ? | medium | Main Range National Park <i>Crows Nest Main Range Cunninghams Gap</i> | Open forest | Habitat loss Predators | Too little data. Disperse habitat loss. Low capture / detection. Unknown density across distribution | Survey. Control herbivores and predators | Shelter from predators (other areas using artificial habitats) | QPWS lead | |
| Brush-tailed rock-wallaby <i>Petrogale penicillata</i> | N. Overestimates distribution | Y | N | Y | medium | Mt Barney National Park, Main Range National Park, Crows Nest area | Open forest Rocky outcrops | Predators Herbivores impacting food resources | Fire opens habitat for predators and makes food resources further away so animal has to travel more - exposing them to predators in those open areas | ID key sites then do predator control at key sites | | QPWS on reserve Partnership for off reserve delivery | |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|---|--|------------------------|------------------------------|------------------------------------|------------------------------|--|--|---|--|--|--|--|--|
| Long-nosed potoroo <i>Potorous tridactylus tridactylus</i> | N | | N | ? | medium | Main Range National Park Mt Barney National Park Lamington National Park <i>Other: broad distribution, sunshine coast, wide bay</i> | Rainforest, Wet sclerophyll forest, open forest and woodland | Predators | Unknown distribution and population parameters. Requires research / survey / monitoring. | Monitoring Predator control. | Landscape scale management. | QPWS on reserve Partnership for off reserve delivery | Align with actions with other species; <i>Pseudomys oralis</i> |
| Spotted-tailed quoll (southern subspecies) <i>Dasyurus maculatus maculatus</i> | N – overestimates distribution | Y | N - impact could be greater | Y | medium | Main Range National Park Mt Barney National Park Girraween National Park Lamington National Park | Rainforest Wet sclerophyll Open forest | 2018 Fire. Predators | 2018 Girraween fires. Cats and foxes. Lower priority than other listed mammals. Widespread in low numbers. Possibly benefit from fire (carrion). Interactions with people (chickens) likely to increase postfire | | Education campaign around urban interactions Predator control | Partnerships | |
| <i>Rhinolophus philippinensis</i> | Y - northern population | - | - | - | - | - | - | Doesn't occur in SEQ so not dealt with here | Impact could occur to Foraging habitats that are close to the roosting habitats | - | - | - | - |
| <i>Bettongia tropica</i> | - | - | - | - | - | - | - | Not impacted (in SEQ) | - | - | - | - | - |
| <i>Hipposideros diadema reginae</i> | - | - | - | - | - | - | - | Not impacted (in SEQ) | - | - | - | - | - |
| <i>Dasyurus hallucatus</i> | - | - | - | - | - | - | - | Not impacted (in SEQ) | - | - | - | - | - |
| Silver-headed antechinus <i>Antechinus argentus</i> | N, underestimated | Y | N | Y | medium | Bulburin National Park Kroombit Tops NP | Rainforest, open | Predators Herbivores Weeds | Introduced predator (feral cats and foxes). | Protect habitat from weed invasion and | Track fate at longterm monitoring sites, | QPWS lead, Resear | <i>Phyllurus caudiannulatus,</i> |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|--|--|------------------------|------------------------------|------------------------------------|------------------------------|--|------------------------------------|--|---|---|---|---|--|
| | | | | | | Blackdown Tableland NP | forest, vine forest | Habitat change 2018 Fires | Invasive weed species. Introduced herbivores. Habitat structure change resulting lack of cover and food resources 2018 fires at Kroombit Tops and Blackdown NP | loss of foraging habitat. Feral predator control. Survey of all sites | improve management of threats to all locations, potential meta-population management | ch partner ships | Macadamia janseni |
| Eastern bristlebird <i>Dasyornis brachypterus</i> | N. Overestimate. | Y | Y | Y | low | Private lands around Lamington National Park. Potentially Mt Barney National Park and Main Range | Open forest | Habitat change from fire regime Predation exposure | Inappropriate fire regime makes habitat unsuitable for this species. Low population numbers, poor dispersers. Only three known animals remain in Qld. | Survey for presence. | Protect against future fires on private lands. Follow recovery team advice regarding value of birds for captive breeding program | Partnerships (BirdLife, NRM) | |
| Rufous scrub-bird <i>Atrichornis rufescens</i> | N | Y | N | Y | low | Main Range National Park Mt Barney National Park Lamington National Park | Rainforest montane heath | Habitat loss Direct fire impact Predation (cats) | Fire may have wiped out much of population.. Ground cover and structure critical for this species. | Survey for remaining population. Pest control (cats) | Protect rainforest from future fires Consider relocating remaining birds to suitable habitat, or provide source population to repopulate suitable post fire habitats | QPWS lead | Survey Menura alberti and Coxin's fig parrot simultaneously (audio) |
| Albert's lyrebird <i>Menura alberti</i> | N | Y | N. Too high | Y | medium | Mt Barney National Park Lamington National Park Main Range National Park | Rainforest, wet sclerophyll forest | Predators | Foxes and cats. Much Unknown. Species were captured in a rufous scrub bird survey. "Key populations impacted" but are mobile species and "primary habitat was not burnt". | Control predators | Survey species Protect rainforest from future fires | QPWS on reserve Partnership for off reserve delivery | Survey Atrichornis rufescens and Coxin's fig parrot simultaneously (audio) |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|---|--|------------------------|------------------------------|---|------------------------------|--|--------------|--|--|--|--|----------------------------|--|
| <i>Erythroriorchis radiates</i> | N | K | N | N | high | - | - | Not a priority in SEQ | - | - | - | - | - |
| <i>Coxen's fig –parrot Cyclopsitta diophthalma coxeni</i> | N | | N (too high) | Y | medium | Lamington NP Main Range NP | Rainforest | Habitat – loss of food trees Weed invasion | Fig and other food species may have been impacted but birds are mobile. If Gallery rainforest impacted then impact will be greater. Lantana a problem in riparian vegetation of Lamington | Survey for presence and fire severity in areas with known food tree | Protection of fig and other food species from future fire. Prevent rainforest fires. Weed control | QPWS lead | Other rainforest bird species |
| Ground parrot <i>Pezoporus wallicus wallicus</i> | Y | Y | N. Too high | Y | medium | Peri-urban area of sunchsine coast Cooloola section of Great Sandy National Park Noosa National Park | Wallum | Predation (cats, foxes,) Woody thi | Protect unburnt populations north of Cooloola fire scar. Survey pop demographics Predator control | Predator control | ID and protect key habitats and protect from future fires. Survey. Consider relocation if recolonisation doesn't occur in key habitats Possibel source animals for breeding program to repopulate other areas | QPWS lead | Acid frog overlap |
| Glossy black-cockatoo <i>Calyptorhynchus lathami</i> | Y | Y | Y | Y but Food /water/nest sites not well understood. | medium | Main Range National Park Mt Barney National Park Lamington National Park Conondale National Park Crowns Nest area Various other locations | Open forest | 2018 fire Habitat loss. Dieback Drought Fire regimes | Loss food resources after fire. <i>Broadly; over prescribed burning results in loss of habitat trees, nesting habitat Presumed suitable habitat does not support birds – needs investigation</i> | Mapping of available forage areas and connectivity to nesting habitat to inform revegetation planning. | Artificial nesting habitat. Revise prescribed burning regimes and protect habitat mosaics / refuges. Future research to understand specific habitat requirements and nesting habitats. | Partner hips | Those species that require burnt mosaics |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|---|--|------------------------|------------------------------|------------------------------------|---|--|--|---|--|--|--|----------------------------|--|
| Red and yellow mountain frog <i>Philoria kundagungan</i> | Y | Y | Y | Y | low | Main Range National Park | Rainforest (occasionally wet sclerophyll forest) | Pest species Drought Weed invasion | Pigs. Lantana (in wet sclerophyll adjacent to rainforest). Riparian weeds. in unburnt valley & gullies. Post-fire susceptible to weeds | Manage high biomass grasses Pest control (pigs). Focus on breeding sites along streams | | QPWS lead | Species with same threats |
| Fleay's barred frog <i>Mixophyes fleayi</i> | Y | Y | Y | Y | low | Mt Barney National Park Lamington National Park Main Range National Park | Rainforest Wet sclerophyll Open forest | Water Quality. Pest species (pigs and weeds) | Water quality impacts downstream (silt, ash, chemicals, pH change etc.) Frog is stream breeder. Loss of females (in leaf litter) Eggs and tadpoles at risk of water quality - specific interactions unknown Pests: pigs/weeds | Pig control Weed management | Research on interaction between water quality parameters and different frog life stages. Hydrological monitoring for water quality | QPWS lead | Species with same threats |
| Wallum sedgefrog <i>Litoria olongburensis</i> | Y | Y | Y | Y | | Noosa National Park Cooloola section of Great Sandy National Park Peregian urban areas Fraser, Moreton, Nth Stradbroke and Bribie Islands | Wallum | Habitat loss Drought Pest species Competition from eastern sedgefrog Exotic fish Water quality | Population already low from drought. Wetlands where peat layer was lost changes habitat permanently. Need severity and impact assessments. Pigs and weeds post fire a problem | Landscape management | Protect from peri-urban habitat/ storm run-off. Consider reintroductions of frogs if low numbers in burnt habitat as habitat will be slow to restore | QPWS lead | Other acid frogs |
| Cascade tree frog <i>Litoria pearsoniana</i> | Y | Y | Y | N | Medium (low priority as relatively abundant and widespread) | Maine Range National Park Mt Barney National Park Lamington National Park Potentially Jimna State Forest | Rainforest Wet sclerophyll Open forests | Water Quality. Weed invasion Introduced herbivores | Hydrological issues with water quality and silting up of some habitats. Species is a stream breeder. Riparian weed invasion (less impact than other species) | Weed control | Riparian revegetation Hydrological monitoring of water quality | QPWS lead | Benefit from responses to other frog species |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|---|---|------------------------|------------------------------|------------------------------------|------------------------------|--|--------------------------|--|---|---------------------------------------|--|----------------------------|--|
| Cooloola sedgefrog <i>Litoria cooloolensis</i> | Y | Y | Y | Y | | Cooloola section of Great Sandy NP Noosa National Park <i>Other: Stradbroke narrow distribution. Fraser Island and Cooloola.</i> | Wallum | Habitat loss Drought Pest species Competition from eastern sedgefrog Exotic fish Water quality | Population already low from drought. Wetlands where peat layer was lost changes habitat permanently. Need severity and impact assessments. Pigs and weeds post fire a problem | Survey Weed control | Protect from peri-urban habitat/ storm run-off. Consider reintroductions of frogs to small isolated patches if there are local extinctions | QPWS lead | Other acid frogs |
| Wallam rocket frog <i>Litoria freycineti</i> | Y | Y | Y | Y | | Noosa National Park Cooloola section of Great Sandy National Park Peregian urban areas Fraser, Moreton, Nth Stradbroke and Bribie Islands | Wallum | Habitat loss Drought Pest species Competition from striped rocketfrog Exotic fish Water quality | Population already low from drought. Wetlands where peat layer was lost changes habitat permanently. Need severity and impact assessments. Pigs and weeds post fire a problem | Weed control | Protect from peri-urban habitat/ storm run-off. Consider reintroductions of frogs to small isolated patches if there are local extinctions | QPWS lead | Other acid frogs |
| Wallum froglet <i>Crinia tinnula</i> | <i>Low priority species as relatively abundant and widespread and stays within close proximity to streams</i> | | | | | Noosa National Park Cooloola section of Great Sandy National Park Peregian urban areas Fraser, Moreton, Nth Stradbroke and Bribie Islands | Wallum | Habitat loss Drought Pest species | Population already low from drought. Wetlands where peat layer was lost changes habitat permanently. Need severity and impact assessments. Pigs and weeds post fire a problem | Survey Weed control Pig control | Protect from peri-urban habitat/ storm run-off. | | Other acid frogs |
| <i>Pygmaeascincus sadleri</i> | Y | Y | Y | N | high | Magnetic Island | Whole of Magnetic island | - | impact low. Species broadly distributed | Nil response required | - | - | Pig and weed removal done for other species will |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|--|--|------------------------|------------------------------|------------------------------------|------------------------------|---|--|--|---|--|---|----------------------------|---|
| | | | | | | | | | | | | | benefit this one |
| <i>Coeranoscincus reticulatus</i> | N. Cryptic species under reported | Y | - | - | - | - | Rainforest main range. Wet forests. Coastal heath. Widespread. | - | Widespread species, possibly shouldn't be listed. Possible impacts on Scenic Rim. Requires ground truthing. Possibly 2 taxa genetic study | NII response required | Possibly investigate the presence of two species in the genus. | - | Pig and weed removal done for other species will benefit this one |
| Oakview leaf-tailed gecko <i>Phyllurus kabikabi</i> | N restricted to Oakview National Park | Y | N | Y but from mgt activities not fire | low | Oakview National Park | Subtropical vine forest Wet sclerophyll Hoop pine plantation | Altered access conditions post fire. Pest species | Fire not damaged habitat but fire prevention and mgt has allowed weed, pest and human access. Specifically: cats, foxes, collectors and photographer, lantana, cat's claw creeper and coral berry. Species lives in vine scrub on rock. | Predator control for deer and cats. Fencing to restrict access by collectors, photographers, others Weed control along new/renewed fire breaks entering essential habitat. Protection of remaining habitat from future fire impacts | Develop new advice and guideline documents which assume fire does not penetrate vine forests. Protect unburnt habitat from fires. | QPWS lead | <i>Nangura spinosa</i> Black-breasted button quail |
| Nangur skink <i>Nangura spinosa</i> | N restricted to Oakview and Nangur NPs | Y | N | Y but from mgt activities not fire | low | Oakview National Park Nangur National Park | Vine thicket | Habitat loss Altered access conditions post fire. Pest species | Especially susceptible to collectors and at risk of burrows being trampled. Fire not damaged habitat but fire prevention and mgt has allowed weed, pest and | Predator control for deer and foxes and cats. Fencing to restrict access by collectors, photographers, others | Develop new advice and guideline documents which assume fire does not penetrate vine forests. | QPWS lead | Phyllurus kabikabi |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|---|--|------------------------|------------------------------|------------------------------------|------------------------------|---------------------------------------|---|---|--|---|---|---|--|
| | | | | | | | | | human access. Specifically: cats, foxes, collectors and photographer, lantana, cat's claw creeper and coral berry. | | Protect unburnt habitat from fires. | | |
| Ringed thin-tailed gecko <i>Phyllurus caudiannulatus</i> | N (restricted to Bulburin NP) | Y | Y Close | Y | low | Bulbarin National Park | Subtropical vine forest and adjacent wet sclerophyll forest and hoop pine plantation | Habitat loss. Predators (cats) pest (pigs). Weeds | Pest species, cats and pigs. Possible multiple taxa in this genus. Lantana and high biomass grasses invasion in vine thickets. | Severity mapping for vine habitats. Weed control in vine thickets. | Develop new advice and guideline documents which assume fire does not penetrate vine forests. Protect unburnt habitat from fires. | QPWS lead | <i>Antechinus argentus</i> <i>Macadamia janseni</i> |
| <i>Nannoperca oxleyana</i> | N. Buffered records under-reported | | N. Underestimate | Y | low | Cooloola Peregrian downstream of xxx? | Small streams, lakes and swamps) in coastal wallum and dune systems. These systems are characterised by acidic, nutrient deficient and tannin-stained waters, with sandy substrates and submerged | Riparian and aquatic habitat and water quality degradation. <i>More broadly: Habitat destruction associated with mining, coastal land clearing and urban development. Introduced fish and other</i> | Post-burn runoff and deposition of sediment and ash in stream systems, causing habitat degradation, water quality degradation (elevated temperature, elevated pH, reduced DO), riparian degradation (loss of shade, reduction in delivery of terrestrial invertebrates as food, increased likelihood of weed invasion) | Field surveys of burnt systems. Collection and captive holding/breeding of threatened populations. Riparian weed control. | Onground survey and assessment of modelled data. Field surveys of burnt systems. Collection and captive holding/breeding of threatened populations. Riparian weed control.. | Government, Griffith Uni, other interested parties (e.g. Australia New Guinea Fishes Association - Qld chapter) | <i>Pseudomugil mellis</i> |

| Name | Does the ESS threshold approximate occupancy for this species? | Fire Area Accurate Y/N | % dist impacted accurate Y/N | Critical Habitat/ pop impacted Y/N | Species resilience to impact | Impacted Locations | Habitat type | Threats | Describe threats | Immediate response (months) | Mid - Late term response (1-5 years) | Sector to deliver response | Co-benefits of response |
|--|--|------------------------|------------------------------|------------------------------------|------------------------------|---|--|--|--|---|--|---|---------------------------|
| | | | | | | | /emergent vegetation | <i>invasive animals</i> | | | | | |
| <i>Pseudomugil mellis</i> | N. Buffered records under-reported | | N. Underestimate | Y | low | | Small streams, lakes and swamps) in coastal wallum and dune systems. These systems are characterised by acidic, nutrient deficient and tannin-stained waters, with sandy substrates and submerged /emergent vegetation | Riparian and aquatic habitat and water quality degradation. <i>More broadly: Habitat destruction associated with mining, coastal land clearing and urban development. Introduced fish and other invasive animals</i> | Post-burn runoff and deposition of sediment and ash in stream systems, causing habitat degradation, water quality degradation (elevated temperature, elevated pH, reduced DO), riparian degradation (loss of shade, reduction in delivery of terrestrial invertebrates as food, increased likelihood of weed invasion) | Field surveys of burnt systems. Collection and captive holding/breeding of threatened populations. Riparian weed control. | Onground survey and assessment of modelled data. Field surveys of burnt systems. Collection and captive holding/breeding of threatened populations. Riparian weed control. | Government, Griffith Uni, other interested parties (e.g. Australia New Guinea Fishes Association - Qld chapter) | <i>Pseudomugil mellis</i> |
| Freshwater crayfish sp. <i>Euastacus jagara</i> | N/A | | Est. 100% | Y | ? | Main Range National Park, Goomburra section | Low order streams | Climate change | Thermal intolerance | Field survey | Captive breeding? | DES WPE? | |

Appendix 4 – Data from round table exercise for flora

Full data summary of flora focus species from round table exercise

| Scientific Name | Common Name | Family | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Resilience to fire | Actions | Action 2 | Action 3 | Action 4 | National park (locations) where response is needed |
|--|------------------------|-----------------|----------------------------------|--------------------|-----|------|--------------------|---------------------------|-------------|--------------|--------------------------------------|--|
| <i>Zieria montana</i> | | Rutaceae | 524 | 100 | V | | low | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney |
| <i>Bertya ernestiana</i> | | Euphorbiaceae | 897 | 91 | V | V | low | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney |
| <i>Tetramolopium vagans</i> | | Asteraceae | 1,155 | 74 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney |
| <i>Agiortia cicatricata</i> | | Ericaceae | 624 | 69 | NT | | low | Protect remaining habitat | | weed control | | Mt Barney |
| <i>Euphrasia bella</i> | Lamington eyebright | Orobanchaceae | 414 | 68 | E | V | low | Protect remaining habitat | | weed control | | Lamington, Mt Barney |
| <i>Pimelea umbratica</i> | | Thymelaeaceae | 1,220 | 68 | NT | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Main Range |
| <i>Dendrobium schneiderae</i> var. <i>schneiderae</i> | | Orchidaceae | 892 | 62 | NT | | low | Protect remaining habitat | | weed control | | Mt Barney, Main Range, Lamington |
| <i>Leionema elatius</i> subsp. <i>Beckleri</i> | | Rutaceae | 473 | 61 | E | | low | Protect remaining habitat | | weed control | | Main Range, Springbrook |
| <i>Pultenaea whiteana</i> | Mt. Barney bush pea | Fabaceae | 619 | 61 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney |
| <i>Pseudanthus pauciflorus</i> subsp. <i>pauciflorus</i> | | Picrodendraceae | 692 | 58 | NT | | medium | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Mt Barney |
| <i>Bulbophyllum weinthalii</i> subsp. <i>Weinthalii</i> | | Orchidaceae | 592 | 57 | V | | low | Protect remaining habitat | | weed control | | Main Range, Mt Barney |
| <i>Leptospermum barneyense</i> | | Myrtaceae | 806 | 50 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney |
| <i>Homoranthus decumbens</i> | | Myrtaceae | 335 | 46 | V | E | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Barakula SF |
| <i>Sarcophilus hartmannii</i> | | Orchidaceae | 476 | 44 | V | V | low | Protect remaining habitat | Pig control | weed control | | Main Range, Mt Barney, Lamington, Springbrook |
| <i>Hibbertia monticola</i> | mountain guinea flower | Dilleniaceae | 1,134 | 43 | NT | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney, Main Range |
| <i>Micromyrtus patula</i> | | Myrtaceae | 182 | 41 | E | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Barakula SF |
| <i>Brachyscome ascendens</i> | Binna Burra daisy | Asteraceae | 450 | 40 | V | | low | Protect remaining habitat | | weed control | | Main Range, Mt Barney, Lamington |
| <i>Cooperhooia scabridiuscula</i> | coopernookia | Goodeniaceae | 773 | 40 | V | V | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney |
| <i>Durringtonia paludosa</i> | durringtonia | Rubiaceae | 1,374 | 38 | NT | | low | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Cooloola to border. |
| <i>Macadamia jansenii</i> | | Proteaceae | 202 | 30 | E | E | low | Protect remaining habitat | | weed control | | Bulburin |

| Scientific Name | Common Name | Family | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Resilience to fire | Actions | Action 2 | Action 3 | Action 4 | National park (locations) where response is needed |
|-------------------------------|-----------------------|----------------|----------------------------------|--------------------|-----|------|--------------------|---------------------------|-------------|--------------|--------------------------------------|---|
| <i>Comesperma breviflorum</i> | | Polygalaceae | 957 | 29 | NT | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney, Moogerah Peaks |
| <i>Tecomanthe hillii</i> | Fraser Island creeper | Bignoniaceae | 771 | 27 | NT | | low | Protect remaining habitat | | weed control | | Fraser Cooloola |
| <i>Muellerina myrtifolia</i> | | Loranthaceae | 922 | 27 | NT | | low | Protect remaining habitat | | weed control | | Kroombit Tops, Main Range |
| <i>Sarcochilus weinthalii</i> | blotched sarcochilus | Orchidaceae | 338 | 26 | E | V | low | Protect remaining habitat | Pig control | weed control | | Main Range, SFs around Yarraman |
| <i>Phlegmariurus varius</i> | | Lycopodiaceae | 314 | 23 | V | | low | Protect remaining habitat | | weed control | | Lamington, Mt Barney, Girraween |
| <i>Gonocarpus effusus</i> | | Haloragaceae | 4,676 | 23 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Glasshouse Mts, Mt Mee |
| <i>Gonocarpus hirtus</i> | | Haloragaceae | 297 | 22 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney, Moogerah Peaks, Main Range |
| <i>Clematis fawcettii</i> | | Ranunculaceae | 65,548 | 21 | V | V | low | Protect remaining habitat | | weed control | | Main Range, Mt Barney, Lamington |
| <i>Discaria pubescens</i> | | Rhamnaceae | 287 | 21 | NT | | medium | Protect remaining habitat | | weed control | | Carnarvon NP (most records) but widespread and patchy carnarvon to border along GDR |
| <i>Allocasuarina emuina</i> | Mt. Emu she-oak | Casuarinaceae | 4,593 | 20 | E | E | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | |
| <i>Macarthuria complanata</i> | | Macarthuraceae | 352 | 19 | NT | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Cooloola, Noosa |
| <i>Banksia conferta</i> | | Proteaceae | 67,284 | 18 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Barney, Lamington, Glasshouse Mts |
| <i>Westringia sericea</i> | native rosemary | Lamiaceae | 291 | 18 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Moogerah Peaks |
| <i>Solanum callium</i> | brush nightshade | Solanaceae | 193 | 18 | V | | low | Protect remaining habitat | | weed control | | Main Range, Lamington |
| <i>Parsonsia largiflorens</i> | | Apocynaceae | 197 | 18 | E | | low | Protect remaining habitat | | weed control | | Mooloolah, Wet Tropics |
| <i>Pomaderris crassifolia</i> | | Rhamnaceae | 93,544 | 17 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Kin Kin, Main Range, Mt Barney, Lamington |
| <i>Grevillea linsmithii</i> | | Proteaceae | 1,441 | 17 | E | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Main Range, Moogerah Peaks |
| <i>Glycine argyrea</i> | | Fabaceae | 529 | 17 | NT | | medium | Protect remaining habitat | | weed control | | Cooloola |
| <i>Sphaeromorphaea major</i> | | Asteraceae | 481 | 17 | NT | | low | Protect remaining habitat | | weed control | | Doongmabulla Spring complex in NR, otherwise in marine cooch plains |
| <i>Prasophyllum wallum</i> | Wallum leek orchid | Orchidaceae | 27 | 17 | V | V | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Noosa, Moreton Is |
| <i>Marsdenia longiloba</i> | | Apocynaceae | 53,370 | 17 | V | V | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | D'Aguliar, Main Range, Lamington |

| Scientific Name | Common Name | Family | Total Impacted Habitat Area (Ha) | % Habitat Impacted | NCA | EPBC | Resilience to fire | Actions | Action 2 | Action 3 | Action 4 | National park (locations) where response is needed |
|--|---------------------|-----------------|----------------------------------|--------------------|-----|------|--------------------|---------------------------|-------------|--------------|--------------------------------------|--|
| <i>Melaleuca cheelii</i> | | Myrtaceae | 3,250 | 16 | NT | | medium | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Littabella, Burrum Hds, Woodgate |
| <i>Zieria exsul</i> | | Rutaceae | 6,226 | 16 | E | | low | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Palmview CP |
| <i>Pterostylis nigricans</i> | | Orchidaceae | 325 | 16 | NT | | medium | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Moreton, N Stradbroke |
| <i>Blandfordia grandiflora</i> | christmas bells | Blandfordiaceae | 32,280 | 16 | E | | medium | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Fraser Is to the border, coastal |
| <i>Archidendron lovelliae</i> | bacon wood | Mimosaceae | 48,208 | 16 | V | V | low | Protect remaining habitat | | weed control | | Cooloola |
| <i>Olearia hygrophila</i> | swamp daisy | Asteraceae | 219 | 16 | E | E | medium | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Minjerribah (North Stradbroke Island) |
| <i>Boronia rivularis</i> | Wide Bay boronia | Rutaceae | 1,401 | 15 | NT | | medium | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Fraser to Mooloolah |
| <i>Phaius bernaysii</i> | yellow swamp orchid | Orchidaceae | 83 | 15 | E | E | medium | Protect remaining habitat | Pig control | weed control | | Minjerribah (North Stradbroke Island), Bribie?, Other Moreton Bay Is ? |
| <i>Boronia keysii</i> | Key's boronia | Rutaceae | 436 | 15 | V | V | medium | Protect remaining habitat | Pig control | weed control | Maintain fire free regeneration time | Cooloola |
| <i>Ricinocarpos speciosus</i> | | Euphorbiaceae | 68,798 | 15 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Widespread SEQ NPs, Kin Kin, to GDR and south to border |
| <i>Wahlenbergia scopulicola</i> | | Campanulaceae | 139 | 15 | V | | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Main Range, Lamington, Springbrook |
| <i>Ozothamnus vagans</i> | | Asteraceae | 252 | 14 | V | V | medium | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Springbrook, Lamington |
| <i>Actephila bella</i> | | Phyllanthaceae | 152 | 14 | V | | low | Protect remaining habitat | | weed control | | Bulburin |
| <i>Rhodamnia rubescens</i> | | Myrtaceae | 80,564 | 13 | E | | low | Protect remaining habitat | | weed control | | Widespread SEQ NPs, Kin Kin, to GDR and south to border |
| <i>Brachychiton</i> sp. (Ormeau L.H.Bird AQ435851) | | Sterculiaceae | 3,214 | 13 | E | CE | low | Protect remaining habitat | | weed control | | Not in NP |
| <i>Floydia praealta</i> | ball nut | Proteaceae | 54,869 | 12 | V | V | low | Protect remaining habitat | | weed control | | Kin Kin to border |
| <i>Eriocaulon carsonii</i> | | Eriocaulaceae | 647 | 11 | E | E | low | Protect remaining habitat | Pig control | weed control | | Western Qld mound springs |
| <i>Zieria collina</i> | | Rutaceae | 2,903 | 11 | V | V | low | Protect remaining habitat | | weed control | Maintain fire free regeneration time | Mt Tamborine NPs |

