On the Brink

Submission to 2021 Major Event Review (MER) under Victorian Regional Forest Agreements from Rubicon Forest Protection Group

Contents

RUBICON FOREST PROTECTION GROUP

Introduction and Summary

The Rubicon Forest Protection Group was established in 2015 by local residents concerned about unsustainable logging in the Rubicon forest. The Group's broad aim is to protect and promote the values of the Rubicon forest and to contribute to protecting the values of Victoria's native forests more widely.

While the native forest timber industry provides profits, jobs and export earnings, continued logging at the rate envisaged under the Victorian Forestry Plan will be the antithesis of ecologically sustainable forest management (ESFM). The cumulative impact of the 2019/20 fires following the 3 megafires of the 2000s and past extensive logging, the certainty of a drier climate in the coming century with the likelihood of further megafires means that continued logging risks irreparable harm to the ecological integrity of Victorian public native forests, the very thing that ESFM is supposed to avoid.

Many threatened fauna species, such as the powerful owl, sooty owl, masked owl, ground parrot, glossy black cockatoo, broad-toothed rat, smoky mouse, spot-tailed quoll, greater glider, yellow-bellied glider, eastern pygmy possum, long-footed potoroo, long-nosed potoroo, giant burrowing frog, large brown tree frog and many other species have already been made more vulnerable to extinction by the 2019/20 fire[1]. While prescriptions exist to protect many of these species in particular logging coupes if they are detected, the Victorian Government's flagship biodiversity strategy[2] developed under the *Flora and Fauna Guarantee Act 1984* requires that the precautionary principle must be applied at far larger scales.

The current CAR system is neither sufficiently comprehensive nor adequate to protect the values it is intended to safeguard, having not been subject to proper review since the RFAs were established over 20 years ago. Accelerating climate change and four megafires later means that it is no longer fit for purpose.

Given that mature forests offer the best protection from fire, the best chance of protecting forest ecosystems and all the species within them, as the *Flora and Fauna Guarantee Act 1984* intends, is to leave native forests unlogged. This shift will allow the focus of forest management to transition from material exploitation to critical needs of future generations including improving water yields, increased carbon sequestration and nature-based tourism. These benefits should, to a large degree, offset the loss of jobs in the native forest timber industry and help the economic fortunes of forest-dependent communities, with domestic demand for nature-based forest tourism to surge in the post-covid era.

A goal of restoring the structure, if not the extent, of Victoria's native forest estate to something resembling the state in which the British colonists found it would also go some way to redressing the many wrongs that the colonists and their successors inflicted on First Nation Australians.

The arguments presented in this submission follow the terms of this Review which is to consider:

i. the operation of the five RFAs - which includes RFA objectives under the definition of Major Event
ii. ecologically sustainable forest management (ESFM) - as defined in the National Forest Policy
iii. the Comprehensive, Adequate and Representative (CAR) reserve system
iv. the effective management and protection of Matters of National Environmental Significance (MNES) - which includes species listed under the Commonwealth EPBC Act
v. harvest level
vi. the long-term stability of Victorian forests and forest industries - where 'forest industries' includes nature tourism and apiculture as well as timber and wood product industries).

The two main recommendations of this submission focus on harvest level and propose an end to logging of ash forests by 2024 and winding down logging of non-ash forests from 2022 instead of 2024 as planned under the Victorian Forestry Plan.

[1] DELWP. 2020. Victoria's bushfire emergency: biodiversity response and recovery, version 2

[2] DELWP. 2017. Protecting Victoria's Environment – Biodiversity 2037

Climate change

Climate change impacts have implications for ESFM, the CAR system and threatened species. However, the MER Summary Report presents a picture only of the immediate local impacts of the 2019/20 Black Summer bushfires, ignoring the contribution that climate change has made and will continue to make. Increasing megafire frequency is not mentioned, nor the ecosystem impacts of the 3 Victorian megafires since 2000. The latest IPCC Report[3] confirms the impacts that climate change will have on ecosystems:

> It is *virtually certain* that hot extremes (including heatwaves) have become more frequent and more intense across most land regions since the 1950s, while cold extremes (including cold waves) have become less frequent and less severe, with *high confidence* that human-induced climate change is the main driver of these changes. Some recent hot extremes observed over the past decade would have been *extremely unlikely* to occur without human influence on the climate system (section **A.3.1)**
>
> Human-induced climate change has contributed to increases in agricultural and ecological droughts in some regions [*including southern Australia (see p. SPM-12)*] due to increased land evapotranspiration16 (*medium confidence*) (section **A.3.2).** With every additional increment of global warming, changes in extremes continue to become larger. For example, every additional 0.5°C of global warming causes clearly discernible increases in the intensity and frequency of hot extremes, including heatwaves (*very likely*), and heavy precipitation (*high confidence*), as well as agricultural and ecological droughts in some regions (*high confidence*) (section **B.2.2)**.
>
> Human influence has *likely* increased the chance of compound extreme events since the 1950s. This includes increases in the frequency of concurrent heatwaves and droughts on the global scale (*high confidence*); fire weather in some regions of all inhabited continents (*medium confidence*); and compound flooding in some locations (*medium confidence*) (section **A.3.5)**
>
> SRCCL concluded that continued warming will exacerbate desertification processes (*medium confidence*) and ecosystems will become increasingly exposed to climates beyond those that they are currently adapted to (*high confidence*). There is *medium confidence* that climate change will increase disturbance by, for example, fire and tree mortality across several ecosystems. Increases are projected in drought, aridity, and fire weather in some regions (TS.4.3; *high confidence*). There is *low confidence* in the magnitude of these changes, but the probability of crossing uncertain regional thresholds (e.g., fires, forest dieback) increases with further warming (*high confidence*) (page **TS-49)**

With the latest Australian climate modelling indicating that El Nino events will become even more severe and frequent than the IPCC Report suggests[4], it is clear that the high likelihood of further megafires plus a drying climate, leaves Victoria's ash forests exposed to the risk of ecological collapse[5].

Forest immaturity

Victoria's ash forest estate is now far more immature than 20 years ago, and more youthful than at the time of colonization. When Europeans arrived in Victoria forests and woodlands covered 90 per cent of the State and some 30–60 per cent of Victorian mountain ash forests were old-growth. This figure is now just over one per cent. Immature forests lack the ecological resilience of mature forests with profound biodiversity consequences, including on listed threatened species – MNES - in the face of climate change.

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[3] IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press

[4] Hannan. E. 2021. *IPCC report may have underplayed risk of freak El Nino and La Nina events*. The Age, 23 Aug 2021

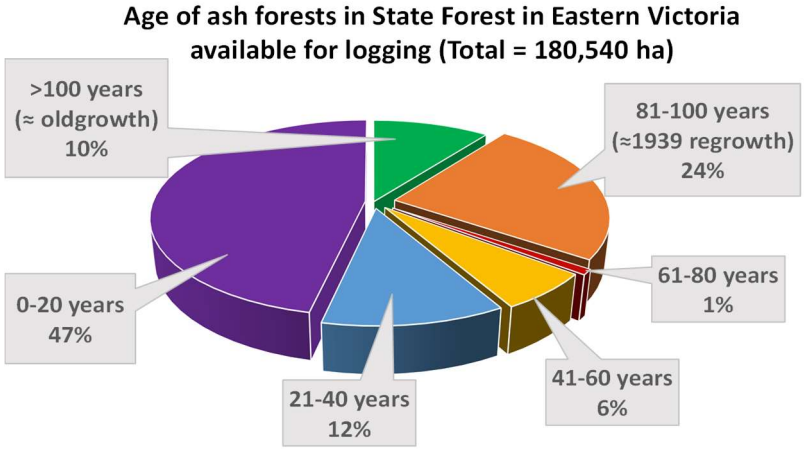
[5] e.g. Burns et al. 2015. *Ecosystem assessment of mountain ash forest in the Central Highland.* Austral Ecol, 40:386-399 and Bennett et al. (2020) *Why Australia's Severe Bushfires May Be Bad News for Tree Regeneration.* Science Matters, University of Melbourne, 30 January 2020.

The MER Summary Report notes that for ash forests the problem of resilience is heightened since ash species are typically killed by high severity fire. If this occurs ahead of seed-bearing age - around 20 years - they will not regenerate without intervention, whether by aerial seeding or hand planting. Even if DELWP were to ramp up the collection of mountain ash and alpine ash seed, the speed at which acacia species can recolonize burnt forest, a warmer and drier climate and increasing fire frequency means that past strategies of artificial reseeding may not always work. Relying on such a 'band-aid' approach in the face of climate change does not constitute ESFM as envisaged under the National Forest Policy.

The following table presents the situation across Victoria's ash forests overall:

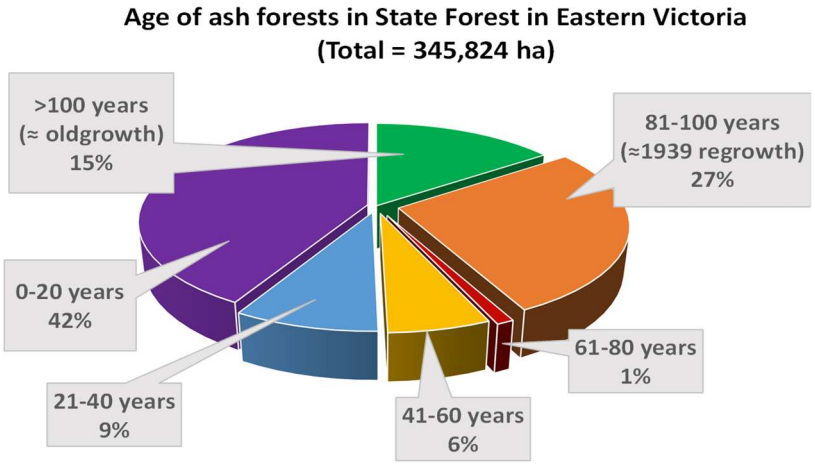
Total area of ash forest in Victoria	**547,000 ha** [6]
Ash forest area killed in megafires of 2000s	189,000 ha [7]
Ash forest area killed in fires of summer 2019-20	56,800 ha [8]
Ash forest area logged since 2000, excl fire salvage	28,600 ha [9]
Ash forest <20 years of age	**50%**

Using a different methodology – age profile data on ash stands in State Forests compiled by VicForests – the situation in ash forests available for logging resembles the overall statewide picture shown above:



Source: RFPG Freedom of Information request to VicForests, June 2021

The situation in State Forest broadly - including reserves and special protection zones – is little better.



Source: RFPG FoI request to VicForests, with data provided on 2 June 2021

[6] Victorian Government, Table 1, *VicForests Allocation Order 2013*

[7] P Fagg, et al. 2018. *Silvicultural recovery in ash forests following three recent large bushfires in Victoria.* Australian Forestry, 352:140-155.

[8] Victorian Government, DELWP, *Victoria's bushfire emergency: biodiversity response and recovery*, version 2, p. 51.

[9] Victorian Government, 2021, LastLog file downloaded from DataVic website

Megafires

In 2018, RFPG prepared an analysis of the impact of continued unsustainable logging in the Rubicon State Forest following the 2009 Black Saturday fire[10] and we commend this to the Panel.

There is evidence that young ash forests, from age about 10 to about 40 years are more prone to high intensity burn in the event of fire[11], and so more likely to propagate the fire and/or increase its overall severity[12]. While it is also clear that high fire danger weather and the wider landscape context are more profound influences on whether a particular area may burn or not[13], allowing remaining mature ash forest areas that arose from the 1939 Black Friday fires to become oldgrowth once more is clearly an important way of minimizing risks to the integrity of forest ecosystems due to future megafires.

While some 65 per cent of East Gippsland's wet and damp old-growth forest was lost between 1995 and winter 2020[14], East Gippsland is an especially biodiverse region of Victoria[15]. East Gippsland's mixed species forest that is suitable for logging amounts to 232,000 ha, representing two thirds of the total suitable mixed species forest in Victoria[16]. Of that 232,000 ha, 107,000 ha has been logged since 1980[17], much of which will have been within East Gippsland's high severity fire extent of 375,000 ha[18]. To make matters worse, most of the area was also impacted by the 2014 Goongerah-Deddick fire which covered 137,500 ha[19]. Data on such multiple impacts must be considered in this MER if the requirements of S.4B(3) of the *Flora and Fauna Guarantee Act 1984* are to be met.

Not logging native forests increases carbon storage

The RFAs commit both Governments to the goals, objectives and implementation of the National Forest Policy Statement which includes an expectation that forests will be managed to 'maintain or increase their 'carbon sink' capacity and to minimise the emission of greenhouse gases from forest activities'.

The two main claims that proponents of continued native forest logging make about its greenhouse gas impacts are that 'sustainable' logging will lead to greater net carbon sequestration than not logging, and secondly that the principal substitutes for native forest wood products result in higher GHG emissions.

The first claim is based on two entwined elements: that the final logging product will store carbon for a considerable period and that more carbon is captured by a regenerating forest than an unlogged forest.

VicForests' logging data (next page) allows the first element to be readily dismissed. It shows that the proportion of ash forest logs that become high value sawlogs (grade D and above) is only around 25 per cent of total log volume and the proportion of non-ash logs is under 20 per cent and has fallen to as low as 10 per cent. The average across both stand types is 20 per cent, but allowing for losses in sawing (flitches, off cuts and sawdust) and construction barely half of an 'average' sawlog will end up installed as a long-life product. Thus barely 10 per cent of an 'average' log hauled from a forest ends up as a long-lived timber product. The second element of the claim depends critically on the extent, stand age, intensity and frequency of future fires that it is impossible to adequately factor in.

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[10] *Fire and logging as a biodiversity threat with potentially irreversible consequences for the Rubicon State Forest*.
[11] Taylor et al. 2014. *Nonlinear Effects of Stand Age on Fire Severity*. Conservation Letters, 7: 355–370
[12] Zylstra et al. 2021. *Native forest logging makes bushfires worse – and to say otherwise ignores the facts.* The Conversation, May 20, theconversation.com
[13] Bowman et al. 2021. The severity and extent of the Australia 2019–20 *Eucalyptus* forest fires are not the legacy of forest management. Nature Ecology & Evolution. 5:1003–1010
[14] Michael Feller, VNPA, December 2020, vnpa.org.au/old-growth-forests-imperilled-in-victoria
[15] Victorian Environment Assessment Council. 2017. *Conservation Values of state forests. Assessment report.*
[16] VicForests *2014 Area Statement* Table 4
[17] Victorian Government, 2021, LastLog file downloaded from DataVic website
[18] MER Summary Report, Table 4
[19] Emergency Management Victoria. 2014. *Goongerah-Deddick Trail Fire, January - March 2014, Community Report*

	Ash stands			Non-ash stands			Total eastern Victoria		
Year	D+ sawlog volume (m^3)	Total log volume (m^3)	% D+ sawlog	D+ sawlog volume (m^3)	Total log volume (m^3)	% D+ sawlog	D+ sawlog volume (m^3)	Total log volume (m^3)	% D+ sawlog
2012/2013	207,563	846,863	25%	94,764	846,863	11%	302,327	1,693,727	18%
2013/2014	208,486	809,645	26%	90,207	809,645	11%	298,692	1,619,289	18%
2014/2015	204,534	924,650	22%	88,982	924,650	10%	293,516	1,849,299	16%
2015/2016	242,982	958,064	25%	98,586	958,064	10%	341,568	1,916,128	18%
2016/2017	201,728	803,406	25%	93,987	803,406	12%	295,716	1,606,811	18%
2017/2018	154,554	653,635	24%	112,756	653,635	17%	267,310	1,307,269	20%
2018/2019	130,851	573,584	23%	97,528	573,584	17%	228,379	1,147,167	20%
2019/2020	109,575	455,294	24%	85,536	455,294	19%	195,111	910,589	21%

Source: RFPG FoI requests to VicForests, 2017, 2019, 2021

The second of the claims also depends largely on the scope of the analysis, such as whether a 'life-cycle' approach is taken and the assumed end-use of the products. The claim is commonly made in relation to solid wood products, especially in relation to steel framing or concrete floors used in houses, but since most native forest logs end up as short-lived paper and packaging products, or short-lived wood products like timber pallets, such an analysis is not especially helpful.

A different claim is "well, if you don't log it, it'll burn down", but the implied carbon storage aspect of that claim is also contradicted by the evidence. Where megafires occur in loggable forests most of the standing biomass remains behind and may do so for many decades[20].

Biodiversity

Last year's biodiversity report by DELWP[1] sets out the calamitous impact of the 2019-20 Black Summer fires on threatened species. This must be seen in the context of the extreme youthfulness of our forests due to previous decades of fire and logging and the ongoing threats posed by climate change, especially heatwaves, droughts and the real threat of more megafires. Under these circumstances, continued logging as envisaged under the Victorian Forestry Plan threatens the ecological resilience of our forests and heightens the risk of accelerating extinctions.

Silvicultural adaption as a response to climate change

A significant contribution to how forest management might respond to climate change was made in 2010 by Australian plant physiologist, land restoration specialist and forest scientist, Associate Professor David Doley from the University of Queensland. The summary of Prof Doley's paper[21] is as follows:

> *Predicted climatic changes within the next forty years could lead to the extinction of some Australian forest species from their present environments. Rates of change in critical environmental conditions may exceed the rate of dispersal of species so that natural biological processes may not be sufficient to ensure the continuation of species in the most suitable environments. Most plant species will grow satisfactorily beyond their natural distribution ranges provided critical growth stages are facilitated and physical factors and competition are managed appropriately. The nature and extent of physical changes and the biological attributes of species must be better understood in order to apply adaptive measures. An important role for forests outside conservation reserves will be to act as repositories for species threatened by climate change. Silviculture can and should be used within these forests to maintain species in desired locations and to introduce them to suitable new locations. Native forest silviculture is complex and our understanding of most species is limited, but we must strive to overcome the effects of past disturbances and realise the many benefits that forests can provide in the future.*

[20] Dr Heather Keith. 2020. *The role of forests in the global carbon cycle with an example from the Victorian wet sclerophyll forests.* www.delwp.vic.gov.au/futureforests/science-and-research/public-lecture-series/public-lecture-five

[21] Doley, D. 2010. *Response of forests to climate change: silviculture and threatened species*. Aust For. **73**:115–125

Impact on Victorian Forestry Plan

The 2019/20 Black Summer bushfires mean that Victoria's montane ash ecosystems are in peril if logging continues as envisaged by the Victorian Forestry Plan until 2030.

The following table shows that around 60 per cent of our ash forest stands that are both available and suitable for logging have been logged since 1980. Of the remaining 40 per cent much is fire killed regeneration or is in ecologically compromised fragments surrounding old logging coupes[22]. Under these circumstances continued logging of our ash forests, given accelerating climate change and more frequent megafires, is plainly ecologically unsustainable.

FMA	40yr area logged	Suitable area	% logged
Benalla-Mansfield	1,688	6,000	28%
Central	20,019	35,000	57%
Central Gippsland	24,763	35,000	71%
Dandenong	8,957	13,000	69%
East Gippsland	2,082	4,000	52%
North-east	4,632	17,000	27%
Tambo	13,997	24,000	58%
Grand Total	**76,137**	**134,000**	**57%**

Notes: (a) Suitable area (hectares) from Table 4 VicForests 2014 *Area Statement*;
(b) Logged area data extracted from LastLog file downloaded from DataVic website.
Not adjusted for logged areas subsequently included in National Parks of other reserves.

In announcing the start of the review the Engage Victoria website posed the question '*Will the Major Event Review affect the Victorian Forestry Plan and timber harvesting?* to which the answer was that '*The Victorian Government is continuing to implement the Victorian Forestry Plan, which will see native timber harvesting phased out over the next decade and end by 2030*'. But at the same time the scope of the Review explicitly provides that harvest levels - presumably reduced - are indeed on the table.

As the RFPG had long argued, our tall native forests, especially our ash forests, already faced a dire existential threat following the megafires of the 2000s. This has already resulted in substantial reductions in harvesting across all RFAs and had already been recognized as unsustainable by the Government in its decision to end logging by 2030. The Government must revise the Victorian Forestry Plan, by immediately bringing forward the start of the phase down period currently set for 2024, to 2022, and making far steeper reductions in the phase down.

Indeed, the 2019 amendments to Victoria's *Flora and Fauna Guarantee Act 1984* effectively oblige the State Government to reconsider the phase down arrangements in the Victorian Forestry Plan. Those elements of the Act with particular relevance to the Panel's deliberations are set out in Attachment 1 (key provisions highlighted in red).

Recommendations

1 Cease logging ash forests by 2024

2 Wind down mixed species logging from 2022

3 Maximise forests' ability to act as a carbon sink by ending fire salvage logging

4 VicForests to review its *Harvesting and Regeneration Systems Strategy* to incorporate climate adaptation resilience of the kind suggested by Associate Professor David Doley

5 Adopt the headline recommendations made by the Victorian National Parks Association in its report *After the Fires*:

[22] Taylor and Lindenmayer. 2020. *Temporal fragmentation of a critically endangered forest ecosystem*. Austral Ecol.

1. *Protect each of the key refuges identified in this report and any other remaining unburnt forests from current and future logging to ensure the survival and persistence of flora and fauna species that rely on these forests to survive.*
2. *Commit to not logging any identified habitat remaining in Victoria for each threatened species significantly affected by the 2019–20 bushfires, particular those identified in this report.*
3. *Prioritise funding and restoration of areas impacted by the bushfires to restore habitat and provide better resources for weed and pest control programs in forest areas to improve recovery from bushfire events.*
4. *Declare and map the key refuges identified in this report as high priority assets in need of protection from all types of future fires, including planned burns.*

Flow-on impacts

VicForests' customers

The impact of the recommended changes to the Victorian Forestry Plan on sawlog supply will lead to job losses and mill closures sooner than previously expected. This will require bringing forward transition funding for affected businesses and workers, as well as accelerating other forest and forestry-related opportunities, including:

- Increased funding for both agroforesty, and dedicated timber plantations on farmland based on the sharefarming principles so that landowners earn an annual income. Landowners with existing plantations should be eligible for participation in such schemes to encourage their retention rather than returning them to pasture after harvest.
- Funding for the establishment of commercial eco-tourism accommodation facilities in selected areas where logging has ceased, perhaps using recently logged mountain-top areas such as Mt Matlock, Mt Torbreck or the Royston Range, or in semi-remote valleys such as along the Big River.
- Redevelop historic infrastructure, such as the Rubicon haulage line and aqueduct tramway, as commercial tourism ventures.
- Developing new forest protection and forest restoration jobs including maintenance of roads, removal of weeds, replanting and thinning failed coupes, pest removal e.g. deer and pig

The impact of the reduction on pulplog supply will require other sources of pulplogs to be found for the Maryvale Mill up until 2030 when the legislated supply contract ends. The obvious short-term replacement is the plantation-grown woodchip resource being exported from western Victoria via Portland. The woodchips could be transported by rail from Portland to Maryvale, although it is not known what commercial difficulties might arise in buying existing forward contracts for this wood. The added recurrent cost to the Government of an additional supply of, say 150,000 m^3 p.a. until 2030, could be around $10m p.a. [23], but that is simply the price that must be paid for safeguarding our native forests and maximizing their ability to function as a carbon sink.

Increased water yield in Melbourne's water catchments

The net economic benefit of the extra water that would enter Melbourne's water supply catchment over the next 70 years is estimated to be around $100m (Attachment 2)

Increased domestic eco-tourism

RFPG is unable to estimate the economic value of the benefit of increased forest tourism, although the Otways region has experienced a significant increase in tourism since logging there ended.

[23] Poyry Management Consulting Australia. 2011. *Review of issues affecting the transition of Victoria's hardwood processing industry from native forests to plantations: Final Report*

Key provisions of the *Flora and Fauna Guarantee Act 1984* Attachment 1

4 Objectives of this Act

The objectives of this Act are—

(a) to guarantee that all taxa of Victoria's flora and fauna, other than taxa specified in the Excluded List, can persist and improve in the wild and retain their capacity to adapt to environmental change; and

(b) to prevent taxa and communities of flora and fauna from becoming threatened and to recover threatened taxa and communities so their conservation status improves; and

(c) to protect, conserve, restore and enhance biodiversity, including—

(i) flora and fauna and their habitats; and
(ii) genetic diversity; and
(iii) ecological communities; and
(iv) ecological processes; and

(d) to identify and mitigate the impacts of potentially threatening processes to address the important underlying causes of biodiversity decline; and

(e) to ensure the use of biodiversity as a natural resource is ecologically sustainable; and

(f) to identify and conserve areas of Victoria in respect of which critical habitat determinations are made.

4A Principles of this Act

It is a principle of this Act that a decision, policy, program or process gives proper consideration to the following—

(a) the rights and interests of traditional owners by—

(i) acknowledging cultural and spiritual connections to land, biodiversity and resources through a relationship with country; and
(ii) supporting participation in decision-making, planning and the development of policies, programs and processes; and
(iii) facilitating access to biodiversity and providing opportunities for economic advancement;

(b) the potential impacts of climate change;

(c) the best practicably available information relevant to biodiversity;

(d) the precautionary principle, such that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;

(e) enabling public participation;

(f) supporting collaboration between government, the community and partner agencies.

4B Ministers and public authorities to give proper consideration of objectives

(1) In performing any of their functions that may reasonably be expected to impact on biodiversity in Victoria, including a function under this Act or any other Act, a Minister and a public authority must give proper consideration to the objectives of this Act, so far as is consistent with the proper exercising of their functions.

(2) In addition to subsection (1), a Minister and a public authority, so far as is consistent with the proper exercising of their functions, must give proper consideration to any instrument made under this Act, including—

(a) the Biodiversity Strategy; and
(b) action statements; and
(c) critical habitat determinations; and
(d) management plans.

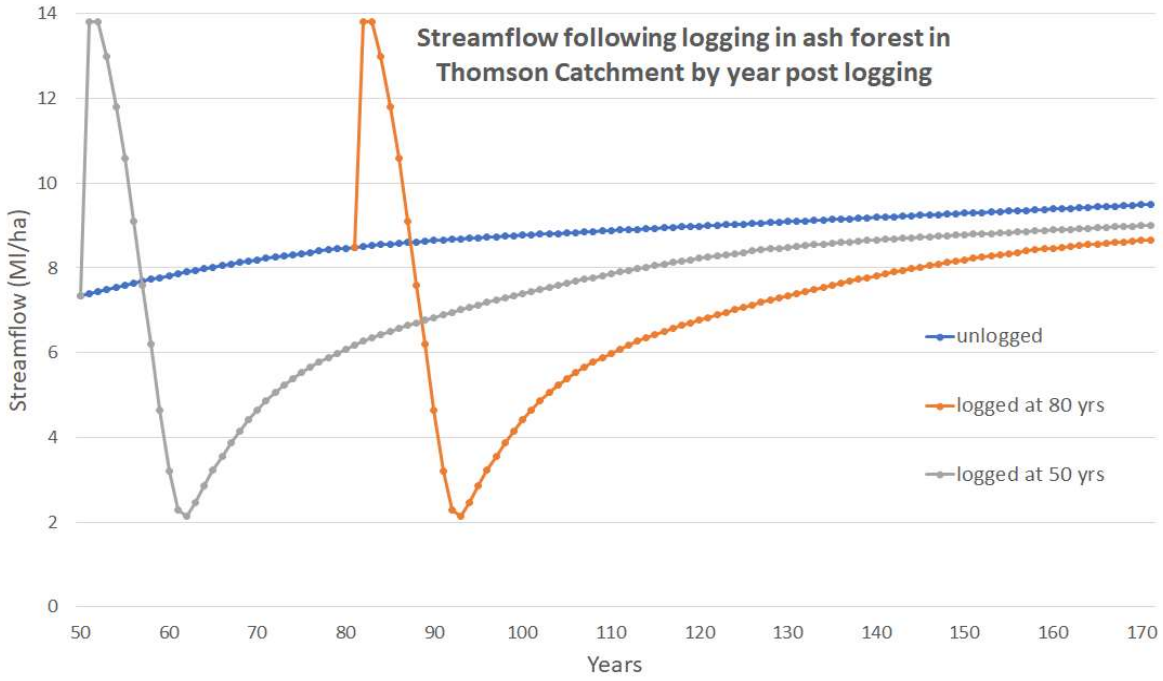
(3) Without limiting subsections (1) and (2), consideration must be given to the potential impacts on biodiversity, including—

(a) long and short-term impacts; and
(b) beneficial and detrimental impacts; and
(c) direct and indirect impacts; and
(d) cumulative impacts; and
(e) the impacts of potentially threatening processes.

Water loss from logging in the Thomson catchment Attachment 2

Decades of research into the hydrology of Melbourne's water catchments have examined the diminished streamflows that follow the conversion of mature ash forests, whether through logging or bushfire, into denser and more thirsty regenerating forests. Thus, for a decade or so after bushfire or logging streamflows rise but as the ash forest and its leaf area grow, flows start to decline.

A report by the CRC for Catchment Hydrology published the modelled water loss profile in the Thomson catchment[24] assuming no intervening bushfires. An adaptation of this profile for alpine ash is shown below[25], with the modelled impact of logging in 1939 regrowth at ages 50 years and 80 years.



The difference in areas under the blue line and under the grey line equates to the water lost over 120 years as a result of logging one hectare of 50-year-old ash forest in the Thomson catchment. Similarly, the difference in areas under the blue line and under the orange line equates to the water lost over 90 years as a result of logging one hectare of 80-year-old ash forest in the Thomson catchment. So, knowing the area logged allows the water loss over time to be calculated for any particular forest age.

The area of ash forest logged within the Thomson catchment since catchment logging ramped up has been extracted from data maintained by DELWP in its MapShare application. This is set out below:

Year	Area (ha)	Year	Area (ha)	Year	Area (ha)	Year	Area (ha)
1980-81	33	1990-91	190	2000-01	131	2010-11	168
1981-82	45	1991-92	80	2001-02	130	2011-12	143
1982-83	0	1992-93	108	2002-03	120	2012-13	145
1983-84	29	1993-94	190	2003-04	123	2013-14	216
1984-85	40	1994-95	276	2004-05	122	2014-15	102
1985-86	38	1995-96	185	2005-06	93	2015-16	133
1986-87	52	1996-97	150	2006-07	37	2016-17	152
1987-88	45	1997-98	158	2007-08	49	2017-18	46
1988-89	168	1998-99	93	2008-09	134	2018-19	110
1989-90	268	1999-00	157	2009-10	120	2019-20	na

[24] Peel, M et al. 2000. Predicting the water yield impacts of forest disturbance in the Maroondah and Thomson catchments using the Macaque model. Technical Report 00/14. Cooperative Research Centre for Catchment Hydrology.
[25] Ibid. Fig 7.7, p.55

The Code (MSPs clause 3.5.1.5(a)) permits an average of 150 ha of ash forest in the Thomson water catchment to be logged each year and it is assumed that logging will continue at this rate, as it has done over the past three decades.

Thus, if 150 ha of ash forest is logged in 2020 the average annual loss in dam inflows between now and 2100 will be 238 megalitres. This may seem a small amount, just 0.15% of the 150 gigalitres per year that the Wonthaggi desalination plant is slated to deliver, or under 0.1% of Melbourne's annual water consumption, but it nevertheless it has a significant and measurable cost.

An appropriate price for free-flowing river water is to be found in a recent study by researchers in Melbourne University's School of Engineering[26]. It priced additional water entering Melbourne's storages at from $400 - $1,000 per megalitre, depending on the spare storage capacity. With Melbourne's catchments likely to be well below capacity for the foreseeable future the appropriate figure to use is $1,000 per megalitre.

Calculations of the 'present value' of losses (or gains) in the future generally requires the use of a discount rate to reflect the uncertainty of the future, including technological changes, and a general preference to forgo a future benefit in order to realise a more certain immediate value. However, with a rapidly growing population, a drying climate, increased bushfire risk, growing demands to maintain environmental flows, and with water having no feasible economic substitute and significant new storage capacity impossible, the use of a discount rate that reduces future value is certainly inappropriate. Indeed the real price of water can only be expected to increase over time.

So continued logging the ash forests in the Thomson catchment at current rates between now and 30 June 2030 will result in reduced streamflows between now and 2100 of 213,700 megalitres valued at $213 million – more than double the price VicForests will receive for the timber sold.

However, since the water flowing into the Thomson dam is all profit since it has no collection cost the correct comparison is not with the sale price of the wood but with VicForests' profit. Given their proximity to Maryvale and Heyfield, Thomson coupes are probably VicForests' most profitable, but even so this will be a few million annually at most. So, allowing for it to make a profit from these coupes of, say, $20 million from now until 2030, by far the highest economic benefit to which the ash forests of the Thomson catchment can be put is to be left unlogged.

Clearly a major fire, would change the picture, but given the major bushfires Victoria has already experienced this century, killing vast areas of mature ash forest, preserving the dwindling area of mature ash forest in Victoria must take priority.

[26] Western, A W. et al.2017. The economic value of water in storage. School of Engineering University of Melbourne

Supplementary submission to 2021 Major Event Review (MER) under Victorian Regional Forest Agreements from Rubicon Forest Protection Group

Biodioversity impacts transcend State boundaries.

The attached presentation delivered on 27 August in a webinar hosted by the IFA/AFG is tendered in support of the biodiversity arguments presented in the principal submission from Rubicon Forest Protection Group submitted on 26 August.

The detailed work presented by Craig Dunne of Forestry Corporation of NSW on a variety of threatened listed species highlights some of the profound biodiversity impacts of the south coast NSW fires. With these fires adjacent to those in East Gippsland, the work has a dual relevance for the Panel. It not only illustrates the fate of many threatened species in Victoiria due to the fires, which the Panel is obliged to consider, but also points to the importance of the Panel considering the impact of the NSW and Victorian fires as a whole, rather than looking at the Victorian fire impacts in isolation.

It would seem prudent for the Panel to invite Mr Dunne to discuss the implications of his work.

28 August 2021

Attachment: Biodiversity impacts and recovery, Craig Dunne, Forestry Corporation of NSW

Biodiversity impacts and recovery

Craig Dunne

Field Ecologist – South coast

Forestry Corporation

Case studies - Fauna

- Yellow-bellied gliders (subalpine montane forests)
- Greater gliders (Coastal and tablelands forests)
- Bandicoots and potoroos (remote cameras)
- Glossy-black Cockatoos (foraging fears)

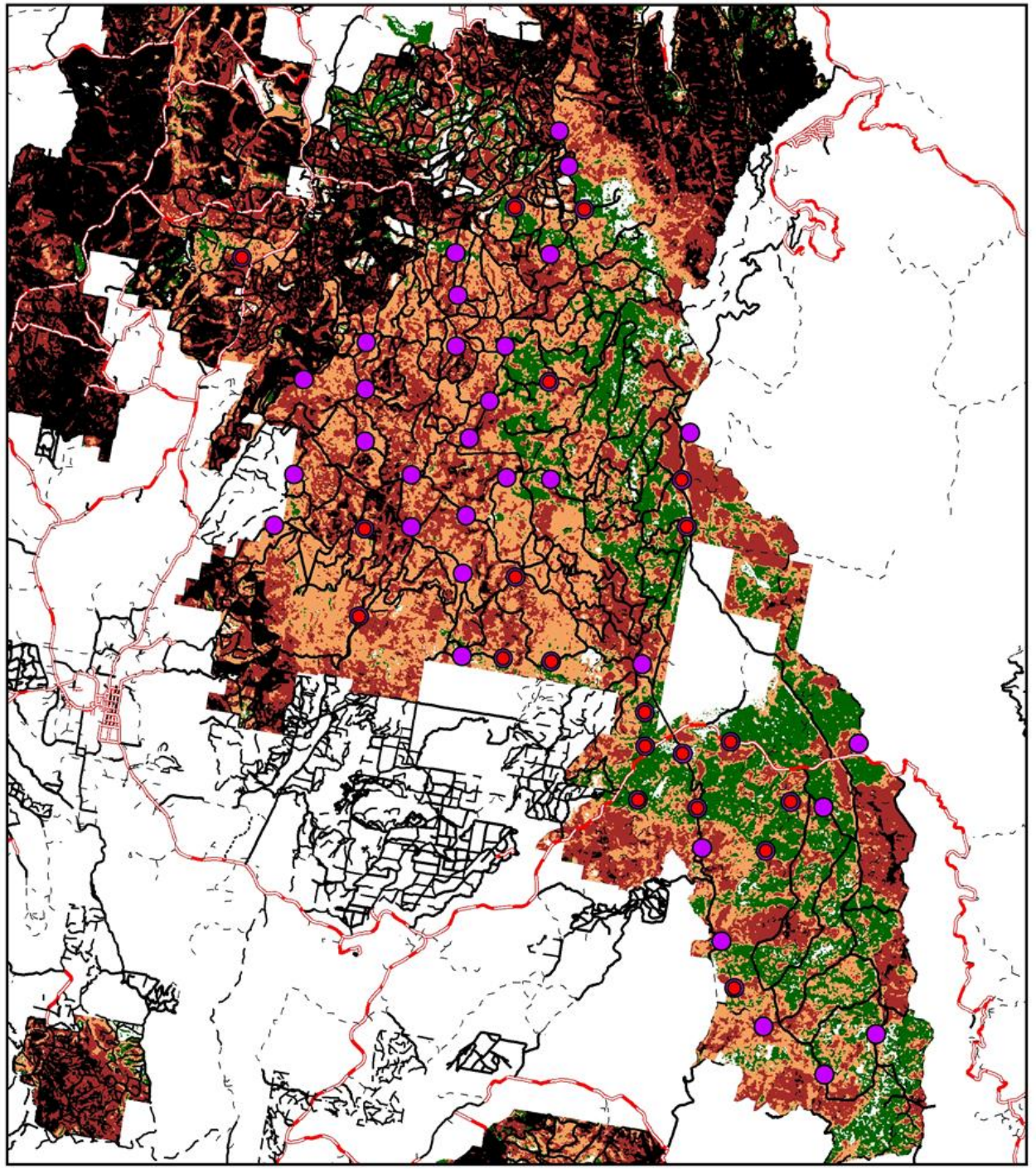
Case studies - Flora

- East Lynne Midge orchid (fire and rain)
- Bodalla Pomaderris (Some like it hot)
- Chefs Cap Correa (slow and steady)

Yellow-bellied gliders

- Species management plan
  126 sites from 1995 – 2021

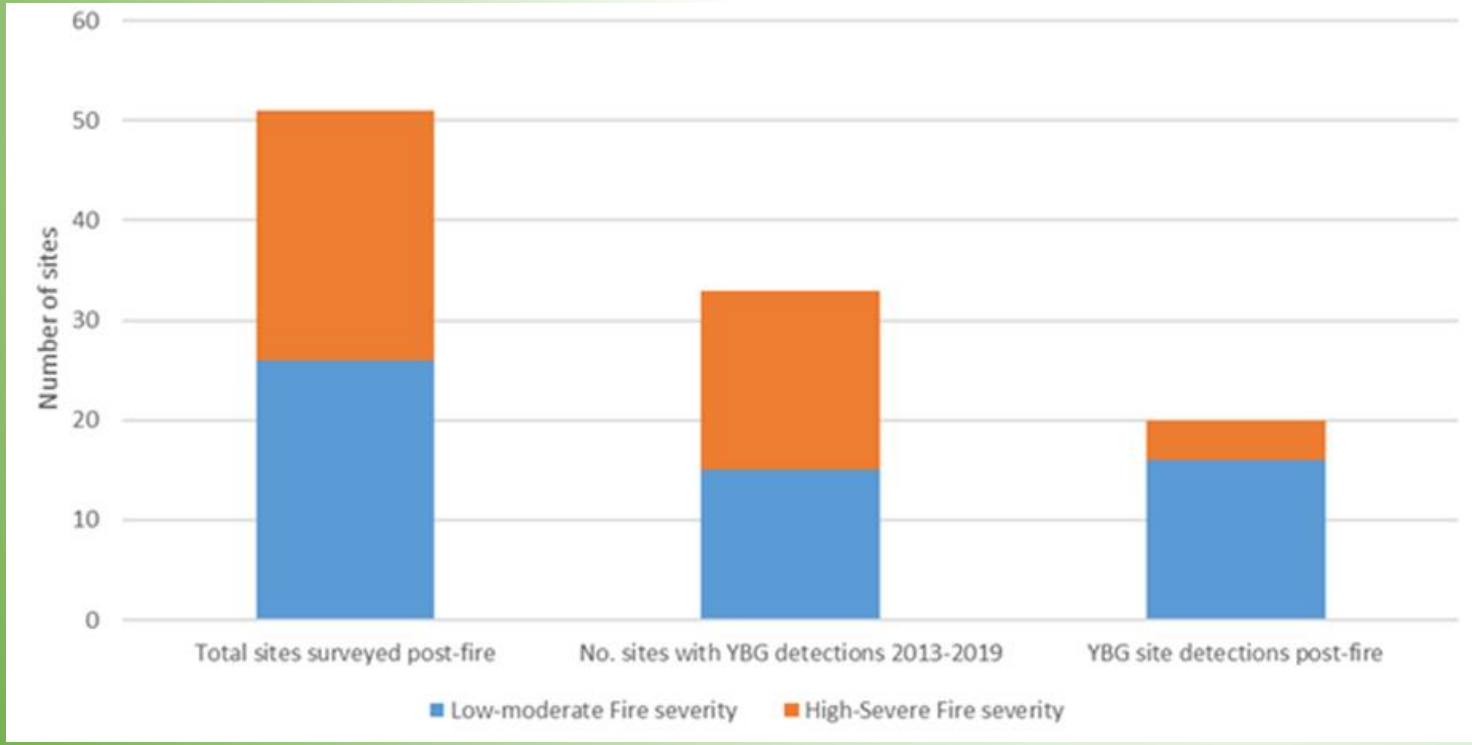
- Post fire surveys
  51 sites in 2020/2021
  20 with Yellow-bellied glider

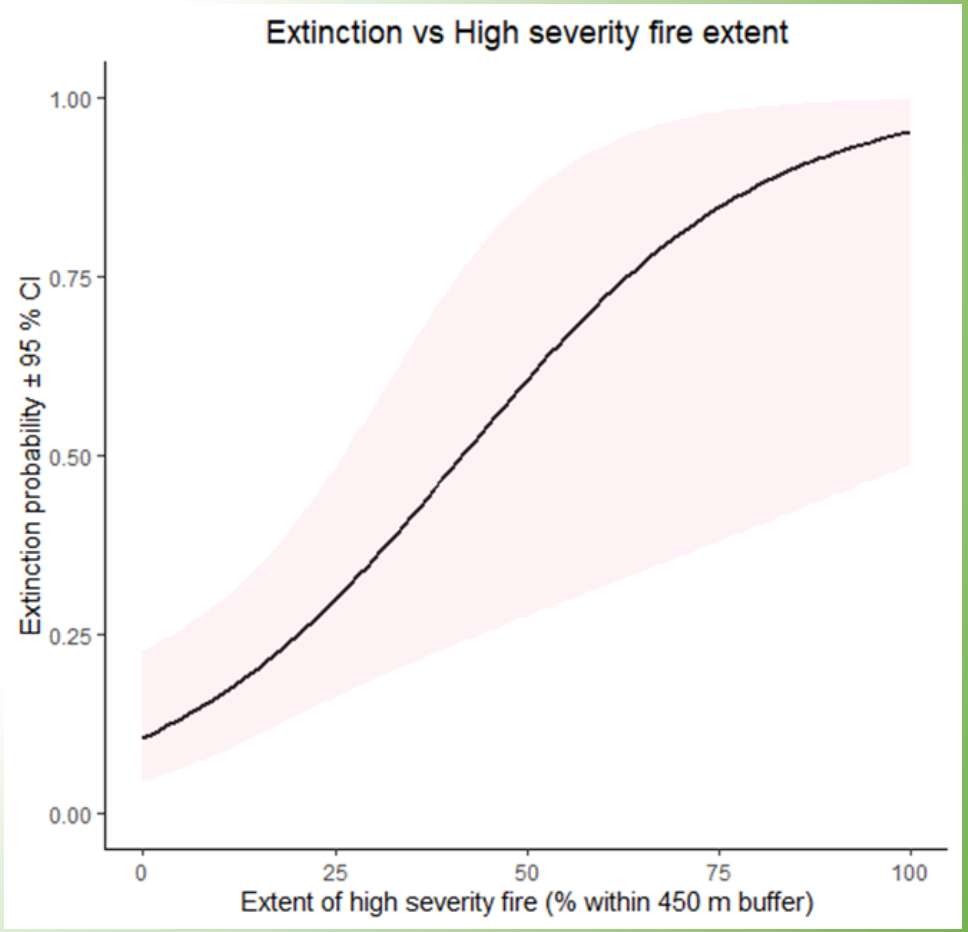


Local extinctions

- Before fire – 33 of 51 sites with Gliders
- After fire – 20 of 51 sites with Gliders

- Extinction probability highly correlated with fire severity





Greater gliders

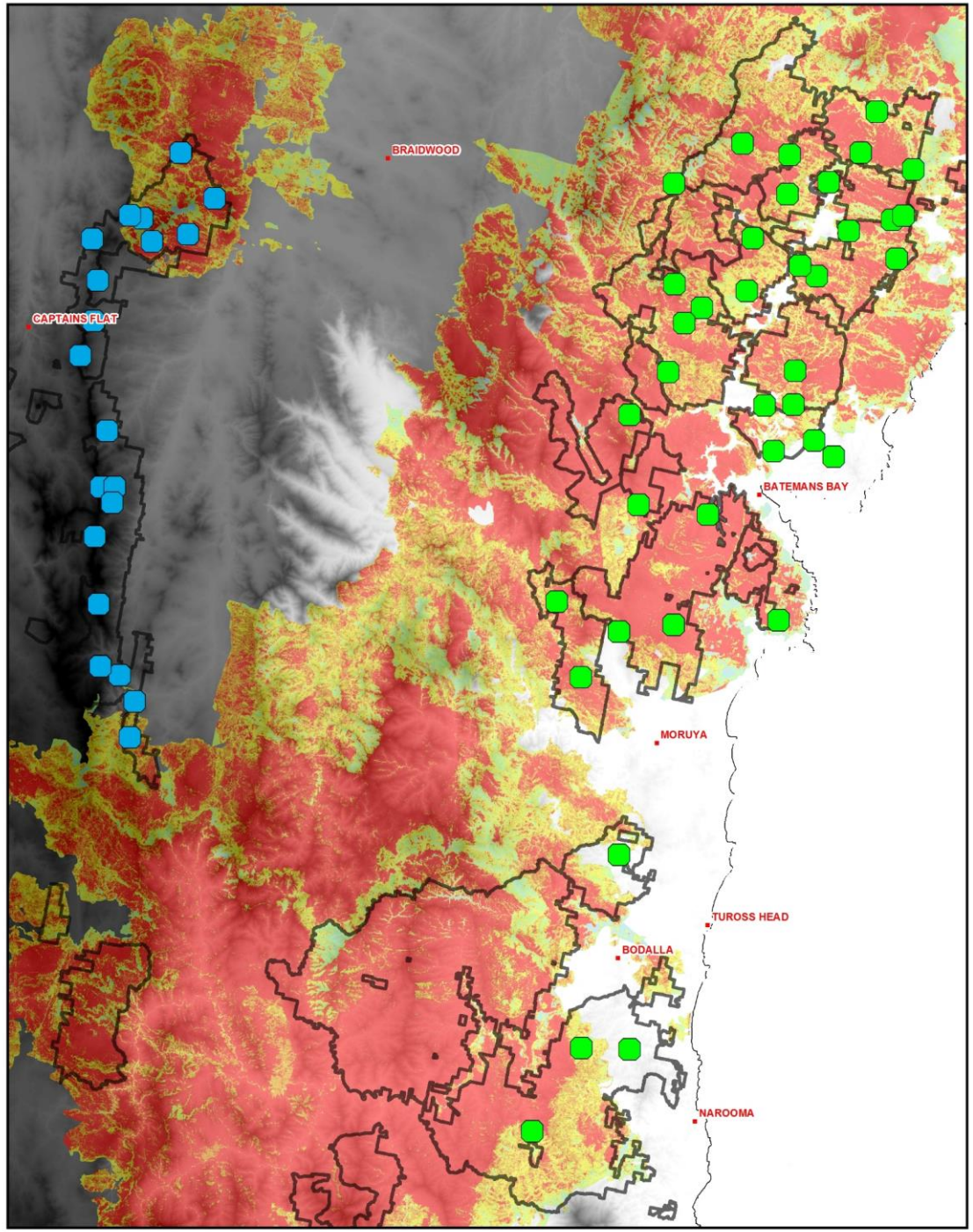
Two post fire survey programs

Tablelands – historic stronghold of species

- **19 spotlight transects**
- **42 km**

Coastal – Sporadic occurrence

- **38 spotlight transects**
- **39km**



Greater gliders

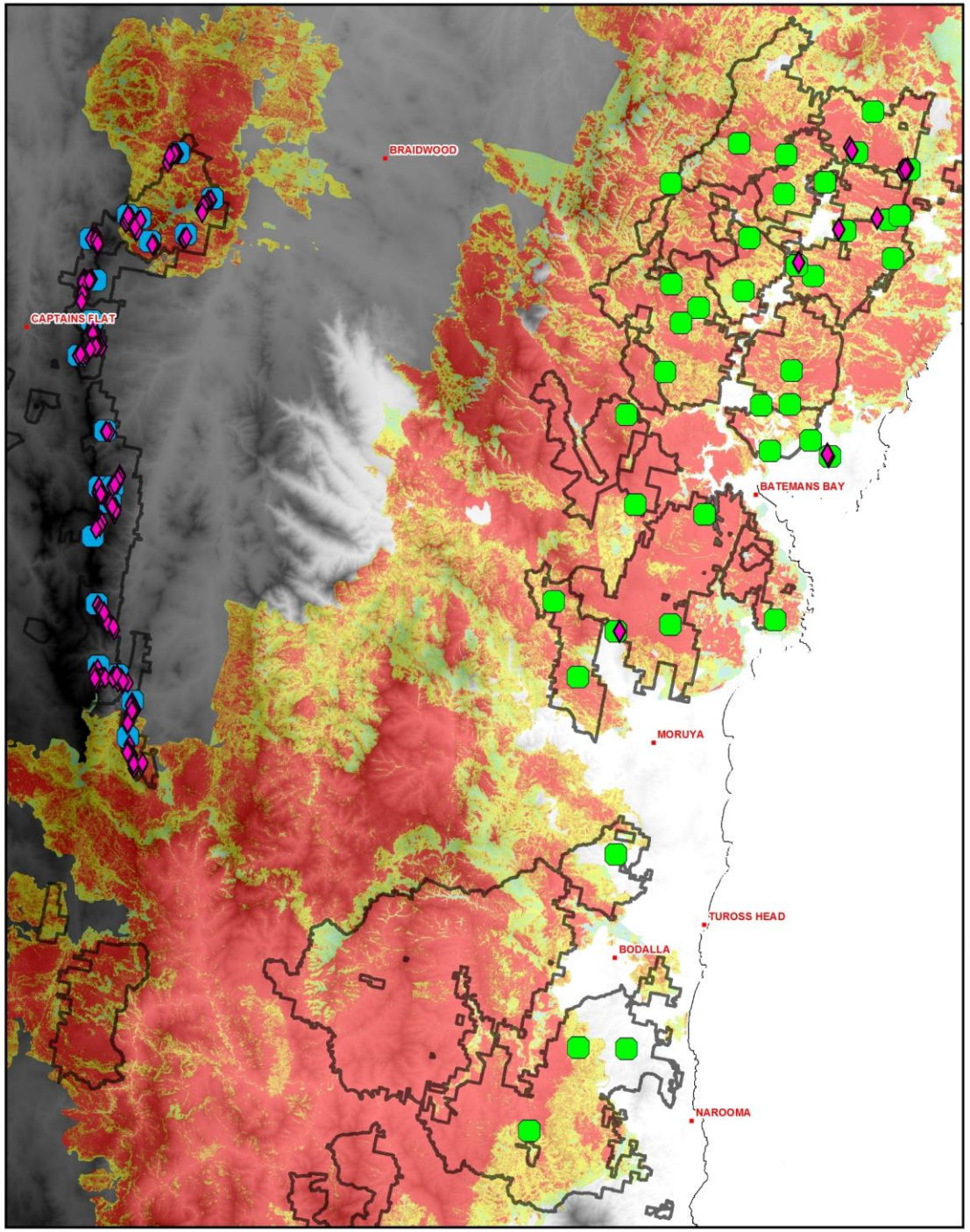
Two post fire survey programs

Tablelands – Large resilient population

- **396 greater gliders**
- **9.1 per km**

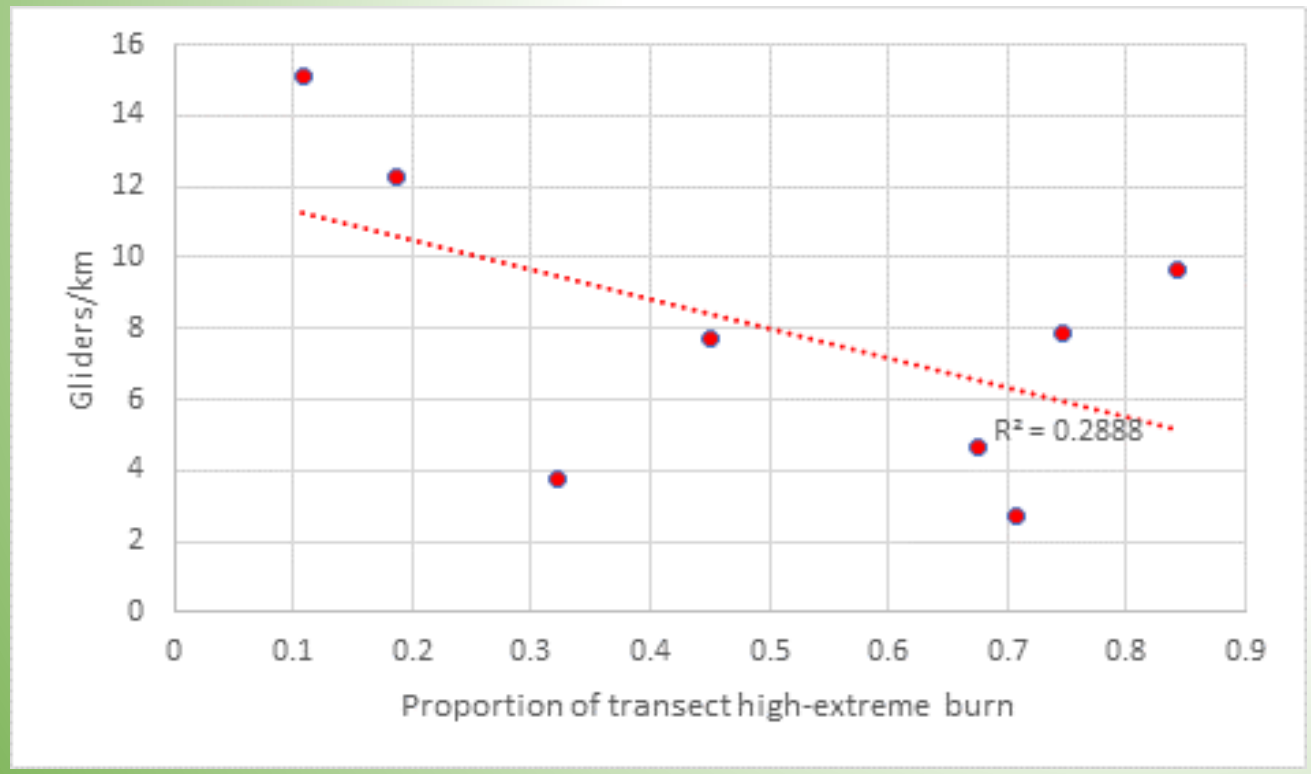
Coastal –Small and declining population

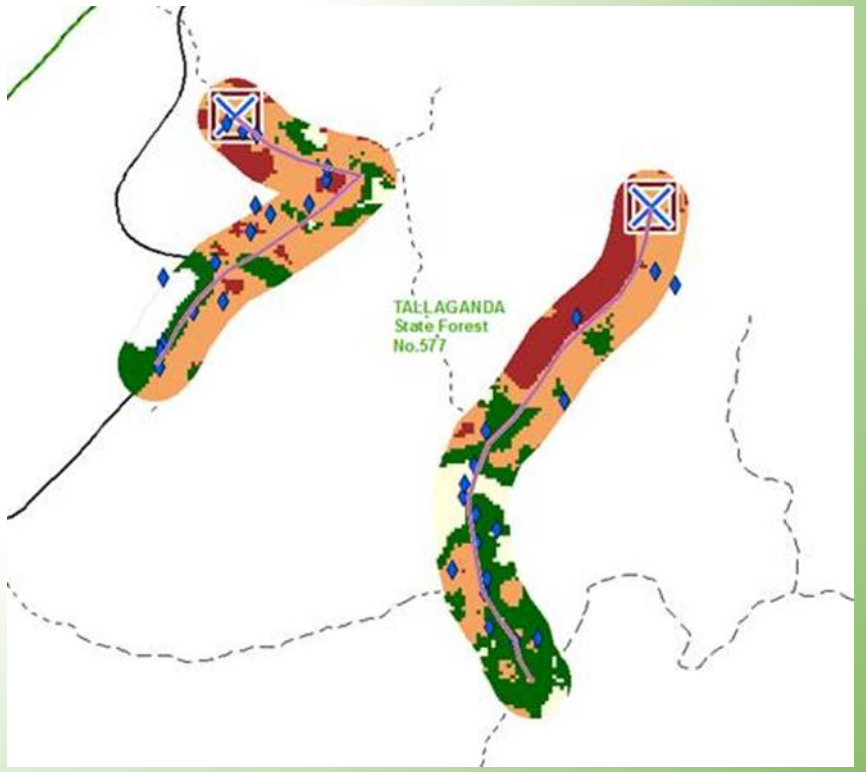
- **13 greater gliders at 6 sites**
- **0.33 per km**
- **Not detected at 16 historic sites**



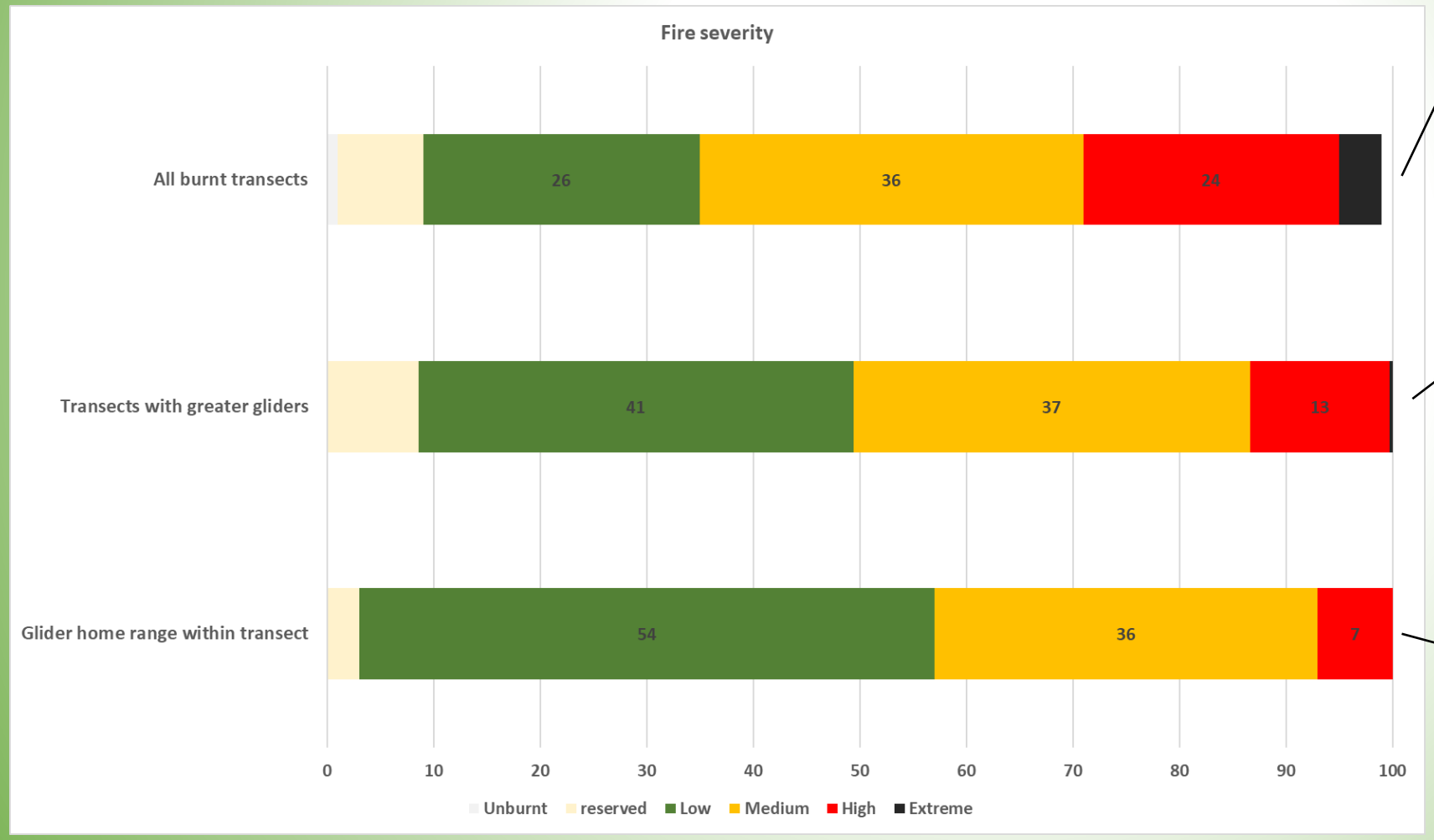
Tablelands greater gliders – Tallaganda SF

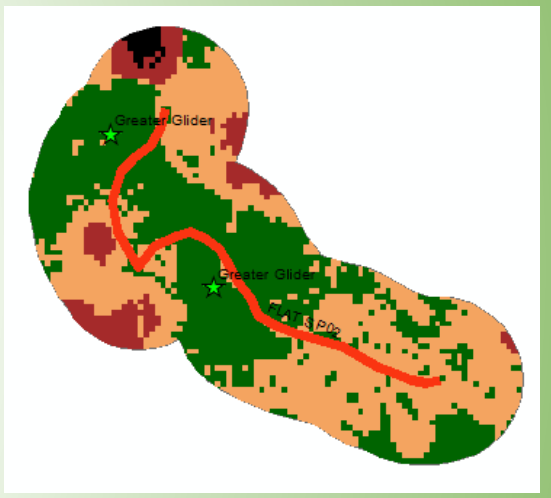
	# transects	Survey length	Total gliders	Gliders per km
Total	19	43437m	396	9.1
Burnt areas	8	16667m	117	7.1
Unburnt areas	11	26770m	279	10.4

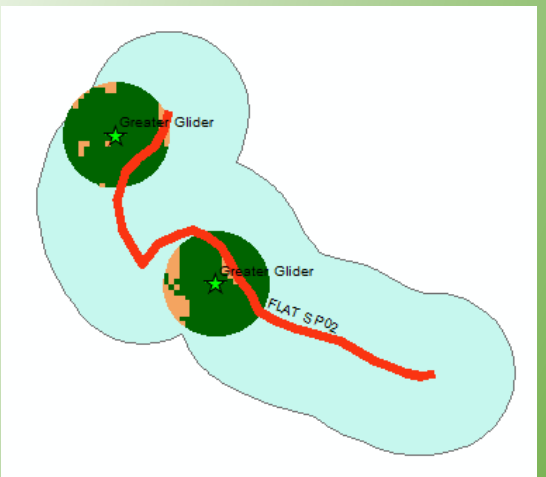




Coastal greater gliders – Batemans Bay



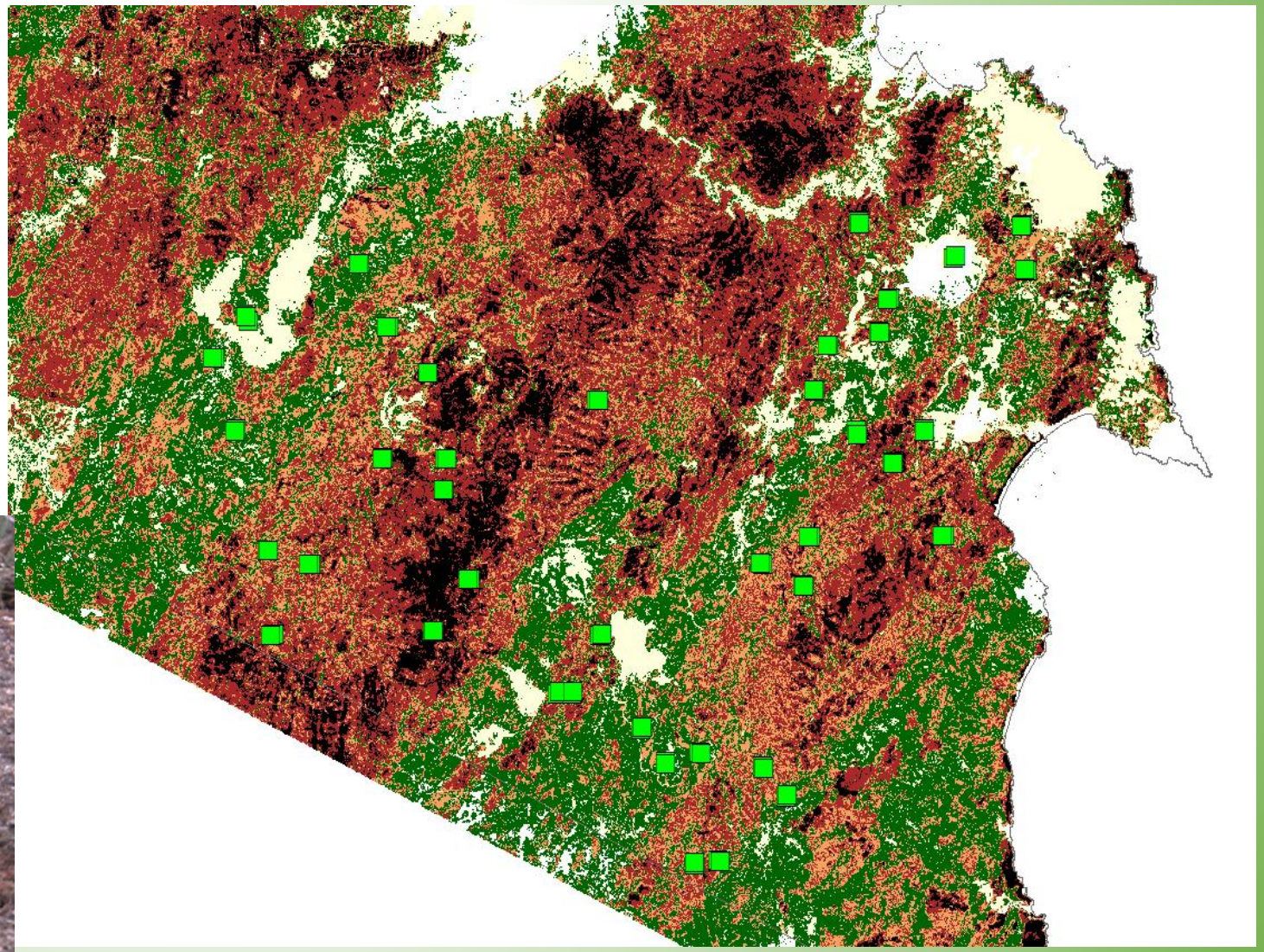




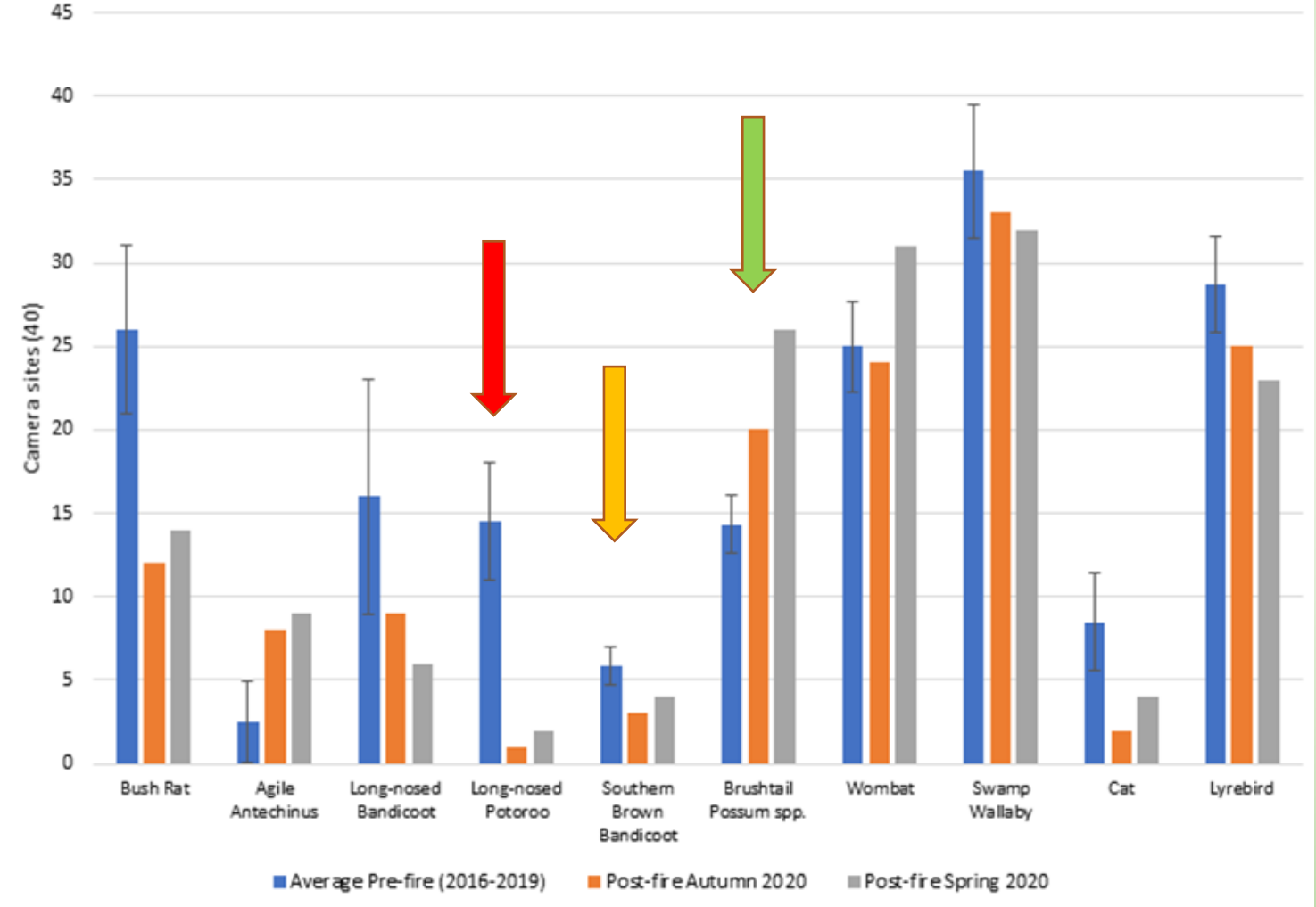
Bandicoots, Potoroos and others critters

- Species management plan for southern brown bandicoot
  40 sites from 2009 – 2021

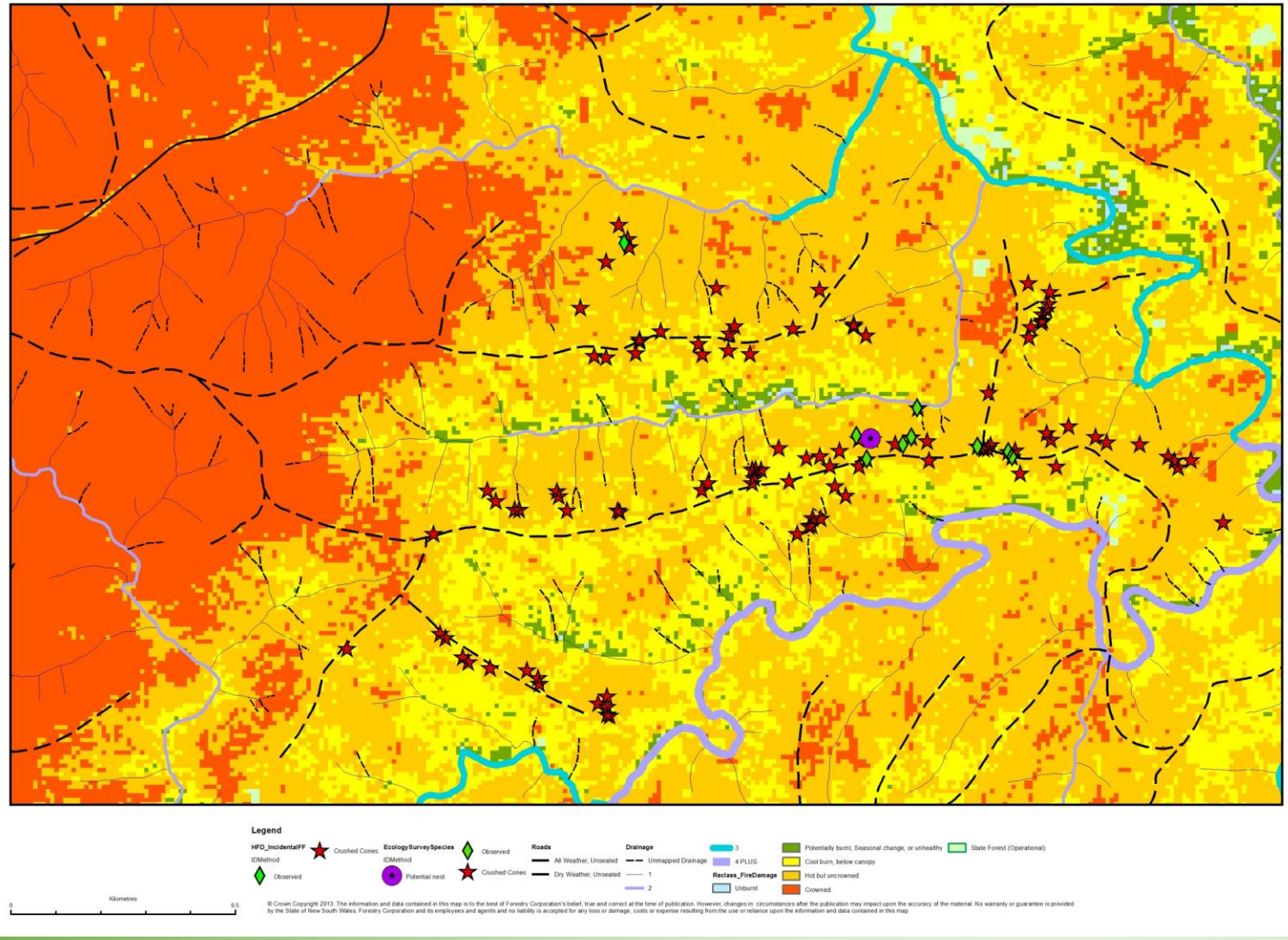
- Post fire
  All 40 sites autumn and spring 2020



Bandicoots, Potoroos and others critters

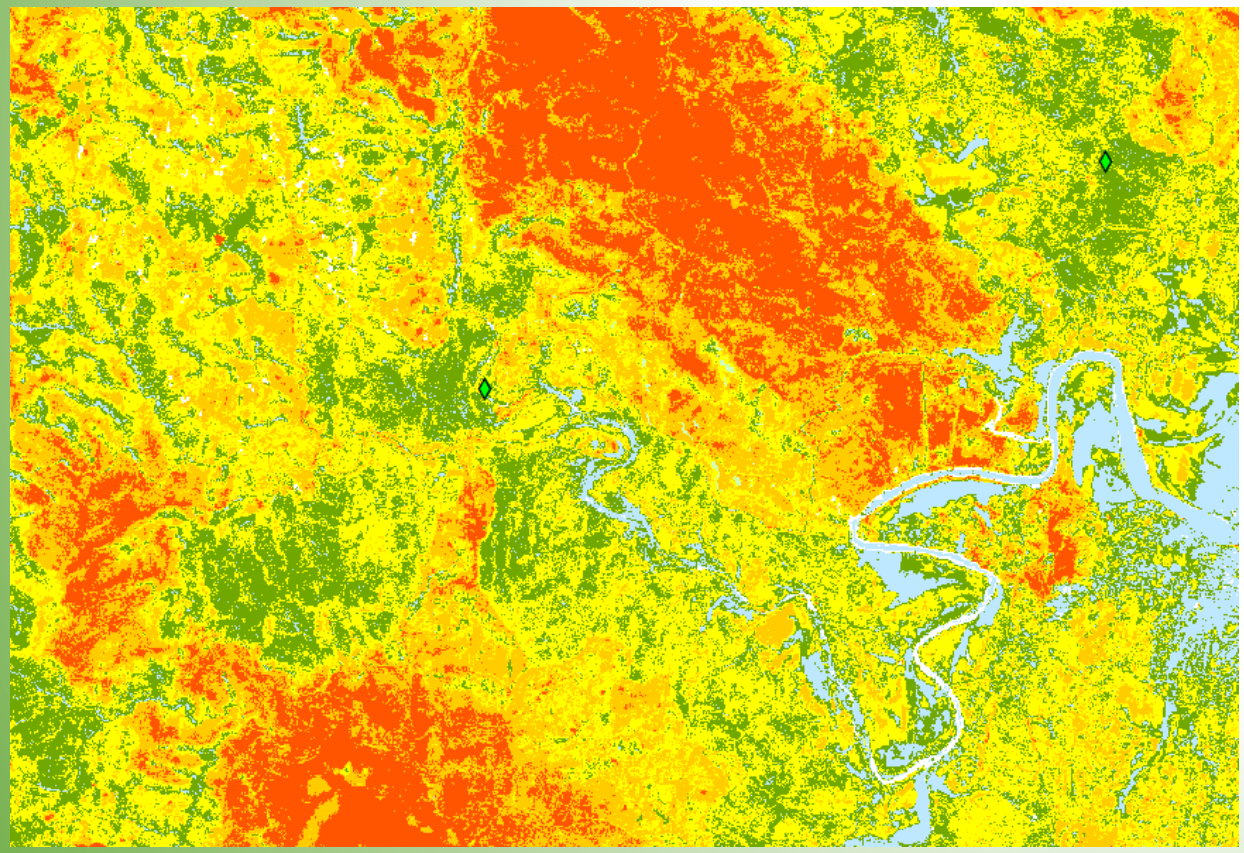


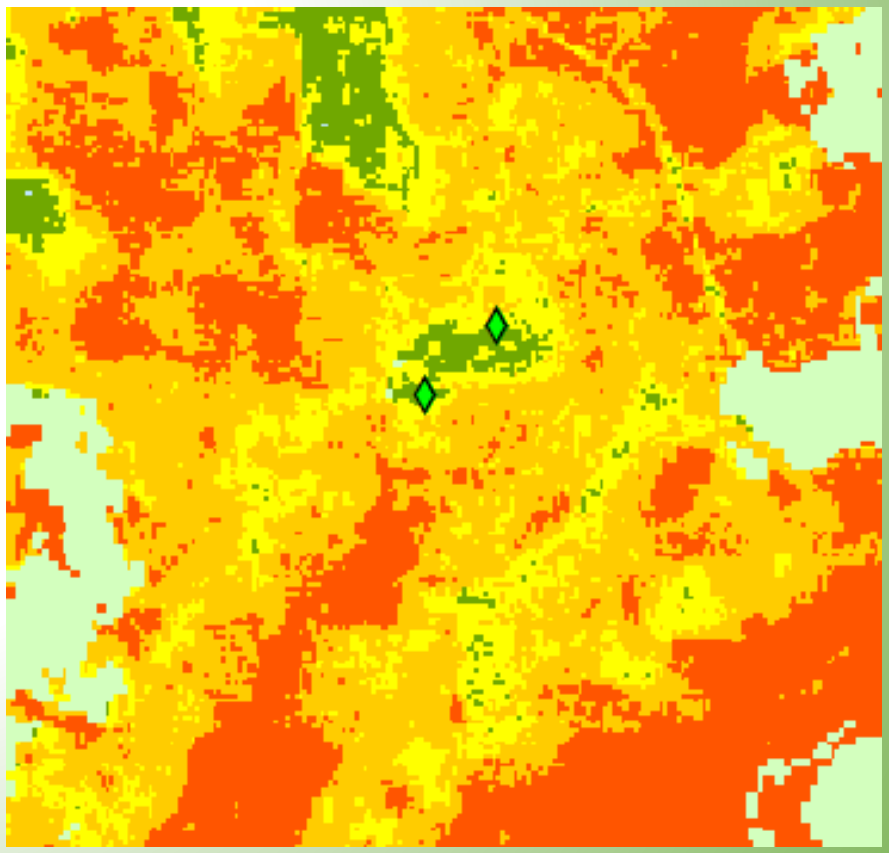
Glossy-black Cockatoos – food shortage



Glossy-black Cockatoo – islands of green

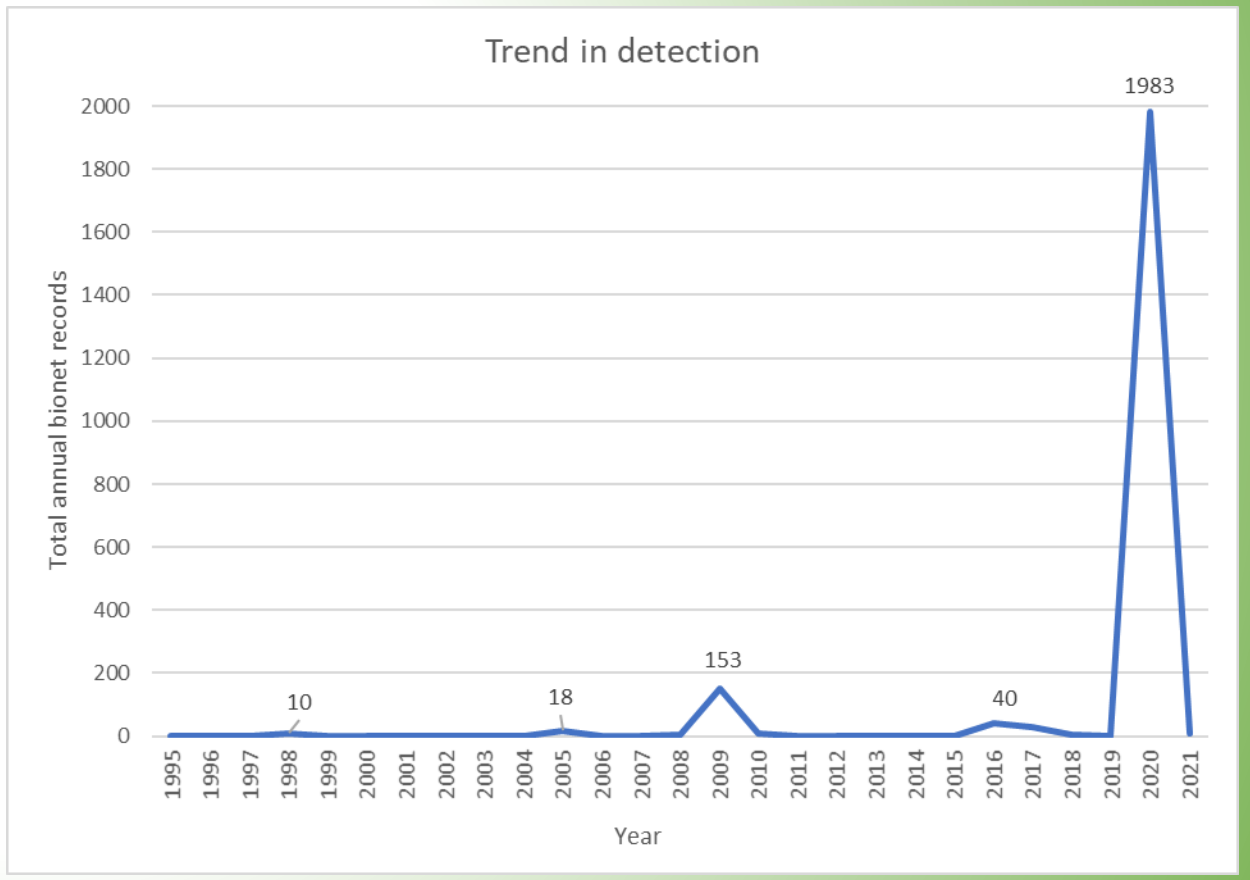
- Careful fire management needs to be considered in remnant foraging habitats
- Implications for hazard reduction burns and Cultural burns





East Lynne Midge Orchid – *Genoplesium vernale*

- Rarely detected
- Cryptic species
- Small distribution



Bodalla Pomaderris – *Pomaderris bodalla*

- Responds well to fire
- High temperature threshold for germination
- Abundant recruitment at many sites

site	prefire population	Fire insensity	Postfire popultion
651	2	Extreme	0
657	1	High	0
662	87	High	37
662	87	High	129
679	191	Extreme	9363
680	8	High	50
683	26	Moderate	59
700	28	Moderate	404
701	4	Extreme	51
702	34	Moderate	287
703	1	High	100
704	70	High	8576

Pomaderris and Genoplesium - Winner and losers

- Flowering and germination triggered by fire
- Fire suppression and recovery activities caused greater impacts

Chefs cap Correa - *Correa baeuerlenii*

- Susceptible to fire
- At risk of competition
- Monitoring a large population with DPIE

Collaboration for conservation

- Thankyou to various contributing staff and organisations
- Tip of the iceberg
- More collaboration and consolidation of data

Forestry Corporation

UNSW SYDNEY

Southern Cross University

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