The Fate of Kate's Leaf-tailed Gecko

Dailan Pugh, North East Forest Alliance, June 2026

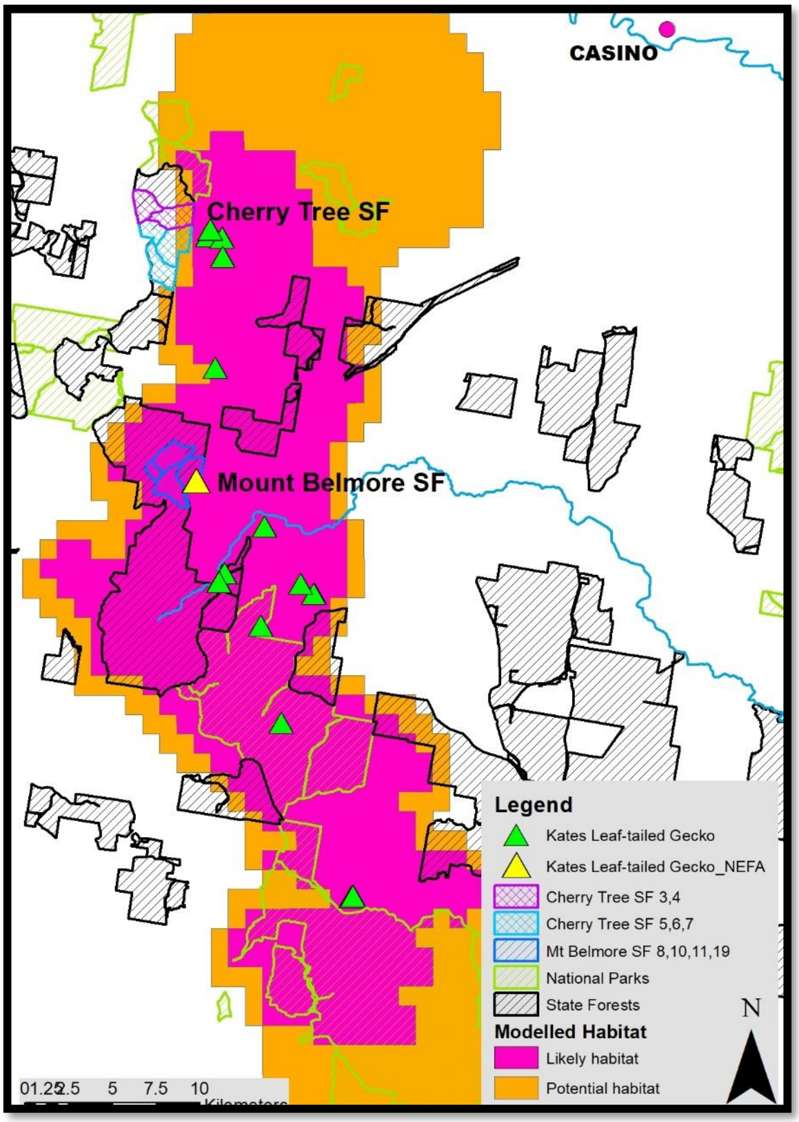
Saltuarius kateae (Kate's leaf-tailed gecko) was listed as Endangered under Federal legislation in 2023, because of its restricted distribution, "*substantial (>30%) decline due to the 2019–2020 bushfires*", and "*ongoing threats from future fires, consequent changes in habitat quality and potentially, poaching for the pet trade*" (DCCEEW 2023). NSW followed suit by listing it as Endangered on 9 August 2024.

Leaf-tailed geckos originated in the rainforests of Gondwana over 60 million years ago. In 2008 a genetic analysis of leaf-tailed geckos identified two new species, including *Saltuarius kateae*, Kate's Leaf-tailed Gecko, only found on the southern Richmond Range, within the vicinity of the proposed Richmond River Koala Parks (Couper *et. al.* 2008). Divergence between the various species of *Saltuarius* likely occurred over 20 million years ago (Couper et. al. 2008). As rainforests retreated and fragmented due to climate change so did the leaf-tails, with some finding refuges in rocky outcrops.

The Forestry Corporation have been undertaking logging operations in modelled habitat of Kate's Leaf-tailed Gecko, identified in the Federal Government's Conservation Advice (DCCEEW 2023). Logging in **potential** habitat is *"temporarily paused"* in compartments 3 and 4 of Cherry Tree State Forest and is "*active*" in compartments 5 ,6 and 7 of Cherry Tree State Forest. Roading and weed spraying has been undertaken in **likely** habitat in compartments 8, 10, 11 and 19 of Mount Belmore State Forest, with operations now identified as *"temporarily paused"*.

While little is known about Kate's Leaf-tailed Gecko, it is known to be adversely affected by wildfires, tree death, encroachment by weeds (lantana) and collecting for the pet trade. Critical habitat includes rock outcrops and cliffs >10m^2, vegetation around the outcrops that maintains a suitable microclimate and is used for foraging, trees used as habitat, buffers to breeding habitat, and habitat necessary for dispersal. Logging threats include:

- physical damage to smaller rock outcrops
- removal of trees around rock outcrops impacting habitat suitability by changing solar exposure and the microclimate
- removing trees potentially used as habitat
- creating hotter and drier microclimates, regrowth and debris that increase the likelihood and intensity of fires
- canopy opening and soil disturbance increasing weeds such as lantana that can smother and shade habitat, while also increasing fire risk
- creation of roads and tracks facilitating the ingress of feral cats and foxes that may predate on geckos, while also enabling greater access for poachers.



Modelled habitat and records of Kate's Leaf-tailed Gecko. **Source:** Base map Geoscience Australia; species distribution data Species of National Environmental Significance database. Records from Bionet, iNaturalist, and NEFA. Note the identification of potential habitat with compartments 3-7 of Cherry Tree State Forest and the records less than a kilometre away, and the recent record by NEFA within the logging area in Mount Belmore State Forest.

As Kate's Leaf-tailed Gecko was only identified as Endangered in August 2024 it is not considered in the Coastal Integrated Forestry Operations Approval (CIFOA). The Ecology Reports for Cherry Tree SF predated the listing of Kate's Leaf-tailed Gecko as Endangered, though that done for Mount Belmore was dated 14/11/2024, three months after its listing in NSW on 9/8/2024, and ignored Kate's Leaf-tailed Gecko despite there being modelled habitat and 2 recorded localities in Mount Belmore SF. Similarly nothing was done about Kate's Leaf-tailed Gecko in Cherry Tree SF after its listing as Endangered, despite records made in 2021 within a kilometre of the logging operation. None of the relevant harvesting plans mention or consider Kate's Leaf-tailed Gecko, even though they have all been prepared or amended since its listing.

Neither the Forestry Corporation nor the Environmental Protection Agency (EPA) have taken any action to provide Kate's Leaf-tailed Gecko with the protection it deserves since its listing as Endangered. They have not done due diligence, nor adopted a precautionary approach by undertaking surveys for them before commencing or recommencing logging operations, despite the presence of modelled habitat, suitable habitat and records nearby. Basically, if they don't look for Kate's Leaf-tailed Gecko then they can ignore it. What you don't know won't hurt you.

From the Commonwealth's model, a more detailed model in Greenlees and Jago (2022), and records, NEFA considered that it was obvious that Kate's Leaf-tailed Gecko would occur in Mount Belmore State Forest. To verify its presence, NEFA undertook a brief visit on 3 June 2026, and within an hour after dark identified 3 adults and 2 juveniles on a rock outcrop within the net harvest area. Once again citizen science surveys have had to identify the presence of an Endangered species because the government agencies entrusted with their protection failed their responsibilities.

The CIFOA Protocols specify:

> *21.1 A **forestry operation** must not commence in an **operational area**, or if already commenced must immediately cease, if before or during a **forestry operation**:*
>
> > *(a) any of the following are identified or recorded within 100 metres of the boundary of an **operational area**:*
> >
> > *(i) any **threatened species** other than those listed in **Part 1, 2 or 3** of **Protocol 31: Matters covered by the approval**; …*

Despite being listed as Endangered Federally in 2023 and in NSW in 2024, Kate's Leaf-tailed Gecko is not listed in Part 1, 2 or 3 of Protocol 31, therefore it is not covered by the CIFOA. The CIFOA thus requires:

> *21.2 If any **species**, **records** or observations described in condition 21.1(a) or 21.1(b) are identified or recorded, **FCNSW** must apply in writing to the **EPA** to obtain a **site-specific biodiversity condition** in accordance with condition 31.3 of **Protocol 31: Matters covered by the approval**.*
>
> *21.3 The **forestry operation** must not commence, or recommence, in the **operational area** identified in condition 21.1 until:*
>
> > *(a) the **EPA** has provided **FCNSW** with a **site-specific biodiversity condition** for either the **record**, site or **species**, and for a particular type or types of **forestry operations**, or **forestry operations** generally; or*

*(b) the **EPA** has otherwise provided written notice to **FCNSW** authorising the commencement or recommencement of the **forestry operation** in that **operational area**.*

Kate's Leaf-tailed Gecko is not listed in Part 1, 2 or 3 of CIFOA Protocol 31, therefore it is a threatened species not covered by the CIFOA that has been recorded in a logging area. In accordance with clauses 21.2 and 21.3 of the CIFOA Conditions the Forestry Corporation must stop forestry operations in compartments 8, 10, 11 and 19 of Mount Belmore State Forest until the EPA has provided FCNSW with a site-specific biodiversity condition for Kate's Leaf-tailed Gecko.

Based on the review of habitat and threats presented below, issues the EPA need to account for in developing a site specific biodiversity condition include:

1) Undertaking surveys across the gross area of compartments to identify distribution and habitat requirements of Kate's Leaf-tailed Gecko to determine specific requirements for their conservation
2) Current CIFOA requirements only protect 20m around rocky outcrops >1,000m^2 and cliffs that are >3x10 metres, which likely fails to protect many outcrops used by Kate's Leaf-tailed Geckos.
3) Protecting all habitat critical to the survival of the Kate's Leaf-tailed Gecko including:
   a) all rocky outcrops and cliffs >10m^2
   b) vegetation on the slopes around the outcrops which provide for foraging and dispersal and a ground cover for safe dispersal
   c) vegetation on the flats below outcrops which act as important buffers to breeding habitat and which are used for dispersal and potentially foraging
   d) suitable habitat for dispersal between rock outcrops
4) Excluding logging within at least 100m around occupied and potential habitat to reduce identified threats caused by:
   a) removal of trees impacting habitat suitability by changing solar exposure and microclimate, removing trees potentially used as habitat, and increasing fire threat
   b) increases in weeds such as lantana that can smother and shade habitat, while increasing fire risk
   c) creation of roads and paths to facilitate the ingress of feral cats and foxes that may predate on geckos
5) Removing lantana from within 100m of rocky outcrops to improve habitat and reduce fire threat.
6) Avoiding constructing and re-opening roads in the vicinity of localities of Kate's Leaf-tailed Gecko to reduce access for collectors.

NEFA is also concerned that Forestry Corporation may be actively logging localities of Kate's Leaf-tailed Gecko in compartments 3-7 of Cherry Tree State Forest due to the identification of modelled potential habitat within those compartments, the presence of cliffs and rock outcrops, and records less than a kilometre away. We therefore ask that logging also immediately stop in Cherry Tree State Forest until comprehensive surveys for Kate's Leaf-tailed Gecko are undertaken to determine whether they are present.

Saving our Species' (2026) current proposal to 'Help save the Kate's Leaf-tailed Gecko' is a farcical process of monitoring and managing two locations in Mount Neville Nature Reserve and Banyabba Nature Reserve. The majority of their population is apparently expendable, and the impacts of logging on the species irrelevant. This approach is monitoring species into extinction.

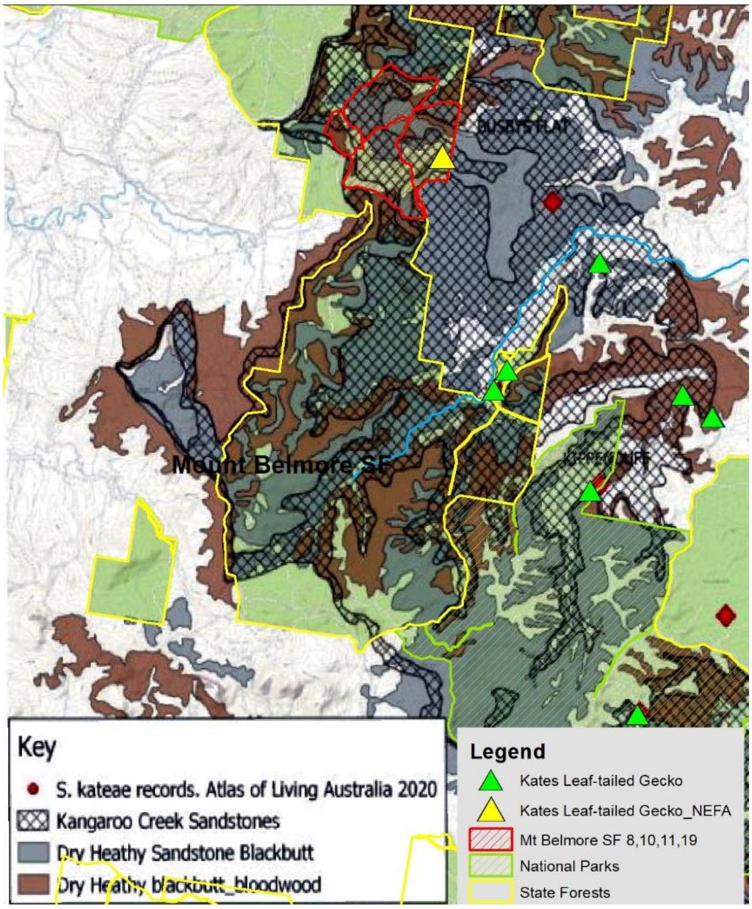
1. HABITAT

Kate’s Leaf-tailed Gecko has been found in sandstone outcrops, and surrounding areas up to 300m from sandstone outcrops, though little is known about its habitat requirements.

In relation to Kate’s Leaf-tailed Gecko, NSW Scientific Committee (2019) note that as at 2019:

> *The species has been recorded at only four sites (Atlas of Living Australia; S. Mahony in litt. September 2018). Two sites (both around Wyans Creek Road) are located on private land adjacent to state forest, one site is within Mt Neville Nature Reserve, and one is within Banyabba Nature Reserve. …*
>
> *No specific studies of the habitat requirements of this species have been undertaken. … It is unknown if the species is restricted to the rock faces alone, or also extends into the surrounding woodland (other Saltuarius species in NSW such as S. moritzi inhabit trees as well as rock faces) (G. Shea in litt. February 2018).*
>
> *… No information is available on the species’ ability to disperse, but it is possibly very limited particularly if it is restricted to rock habitat (R. Sadlier in litt. October 2018).*

The surveys by Greenlees and Jago (2022) improved knowledge of the distribution of Kate’s Leaf-tailed Gecko and its use of rocky outcrops, though as their surveys targeted rocky outcrops, they failed to gain any insights as to whether they also use trees as habitat or their dispersal requirements.



Habitat map for Kate’s Leaf-tailed Gecko from Greenlees and Jago (2022) overlaid with State Forests and records from Bionet, iNaturalist, and NEFA. Note the widespread area of potential habitat in compartments 8, 10, 11 and 19 of Mount Belmore State Forest, and the Atlas of Living Australia record nearby, making it obvious that Kate's Leaf-tailed Gecko was likely to occur.

Greenlees and Jago (2022) found:

> *All habitat associated with surveyed rock outcrops was consistent with the description of Clarence Dry Sclerophyll Forest and Northern Gorge Dry Sclerophyll Forest with Pink Bloodwood (Corymbis intermedia), Broad-leaved Apple (Angophora subvelutina) and Blackbutt (Eucalyptus pilularis) dominating the canopy on the slopes around the outcrops with Allocasuarina species a feature of the understory and Turpentine (Syncarpia glomulifera) frequently on the flats below (Keith 2004). Notably, at all sites where Saltuarius kateae was detected, and several sites identified as potential habitat that were surveyed Port Jackson Fig (Ficus rubiginosa) – a dry rainforest indicative species (Keith 2004), was present. …*

In their Conservation Advice DCCEEW (2023) identify:

> *Important habitat attributes for Kate's leaf-tailed gecko are:*
>
> *• Sandstone escarpment and associated rock outcropping and boulder fields which provide crevices and caves for refuge, breeding and foraging.*
>
> *• Clarence Dry Sclerophyll Forest and Northern Gorge Dry Sclerophyll Forest with a dominant canopy of Corymbia intermedia (pink bloodwood), Angophora subvelutina (broad-leaved apple) and Eucalyptus pilularis (blackbutt) on the slopes around the outcrops which provide for foraging and dispersal and a ground cover for safe dispersal.*
>
> *• Similar woodlands/forest on the flats below outcrops which have an understory of Allocasuarina species and Syncarpia glomulifera (turpentine) which act as important buffers to breeding habitat and which are used for dispersal and potentially foraging.*

DCCEEW (2023) clearly identify that all of the above within modelled habitat should be considered critical habitat:

> *All habitat occupied by the Kate's leaf-tailed gecko, including areas within the modelled distribution of the species (Map 1) that have the habitat attributes identified above, are habitat critical to the survival of the Kate's leaf-tailed gecko.*

Greenlees and Jago (2022) note:

> *… we were informed of three instances of geckos utilising man-made structures, presumably during dispersal events. One account came from a property located in a riparian corridor … approximately 150m from the nearest rock outcrop. The other two records both came from … approximately 200-300m from the nearest rock outcrop. … These records are also promising in providing an indication that dispersal between sites may not be reliant on continuous outcrop.*

DCCEEW (2023) note "*These records suggest that dispersal between sites may not be reliant on continuous rock outcrop and indicate surrounding woodland /forest environments on slopes and flats are just as important as sandstone escarpment environments (Greenlees & Jago 2022)*".

To the north its sibling species *S. swaini* is found in subtropical rainforests, often in association with strangler figs and the buttressed roots of large trees (Couper et. al. 2008). To the south its sibling species *S. moritzi* is found on the base of trees in subtropical rainforests and wet sclerophyll forests, as well as rock outcrops (Couper et. al. 2008).

Because of the paucity of records little is known about the habitat requirements of Kate's Leaf-tailed Gecko. There were only four known localities by 2018 (NSW Scientific Committee 2019). In their surveys Greenlees and Jago (2022) targeted rock outcrops, so failed to gain any insights as to whether they also use trees as habitat. Though the fact that they have been found over 250m from rock outcrops, and the use of trees by sibling species, suggests that they are likely to utilise trees as habitat and an aid for dispersal. Particular focus needs to be on dead and alive trees with hollows and decorticating bark.

2. THREATS

In 2019 the NSW Threatened Species Scientific Committee found Kate's Leaf-tailed gecko to be ineligible for listing as Threatened as "it is Data Deficient under all Criteria", recognising "*survey effort has been inadequate to determine distribution and habitat requirements. In addition, there is no information on threats to the population or habitat of this species. There are no data available on population size or trends*".

This opinion changed when the 2019/20 wildfires burnt out its entire range, resulting in an estimated population decline >50% (Greenlees and Jago 2022), leading to its being listed as Endangered under Federal legislation in 2023 and State legislation in 2024.

The Greenlees and Jago (2022) and DCCEEW (2023) assessments do not acknowledge that Kate's Leaf-tailed gecko occurs on State forests or private lands subject to logging, and do not consider this threat. They consider wildfires to be the most significant known threat, therefore any activity, such as logging, that increases the risk and intensity of wildfires is a direct threat. An associated threat is considered likely to be the promotion of lantana and shading of rock outcrops as a result of burning, though the canopy opening and soil disturbance associated with logging is also known to promote lantana. The other identified threat is poaching for the pet trade which will be facilitated by opening up of logging roads. The ingress of feral predators, cats and foxes, may also be facilitated by roading.

It is unknown what use geckos make of trees in the vicinity of rock outcrops or for dispersal, though it can be expected that living and dead trees with hollows or decorticating bark are likely to be of particular importance (Couper et. al. 2008).

Greenlees and Jago (2022) comment

> *In late 2019, the entire area this species was known to occur, and all of the habitat in which it had been recorded, was burned during the fires. This made Kate's leaf-tailed gecko the only known vertebrate species in Australia whose entire range was affected by the fires that spring and summer (Legge et al. 2021)*

In their surveys for Kate's leaf-tailed geckos after the 2019 wildfire, Greenlees and Jago (2022) found less geckos than expected on known sites, and none present on some potential sites, leading them to conclude "*If the results of these surveys are compared to expected densities and occurrence, the fires may (conservatively) have removed at least 50% of the population*".

Before the fires, the NSW Scientific Committee (2019) considered that:

> *The impact of fire on this species is unknown. The crevice habitat it occupies would offer some protection against the direct effect of fire, although high intensity fires in the eucalypt forest around the rock outcrops could result in population declines. Possible causes of*

declines include: direct mortality during the fire, loss of adjacent understory vegetation and increased exposure of rock faces (possibly limiting foraging area, reducing invertebrate prey densities and increasing predation risk post-burning) (R. Sadlier in litt. October 2018).

Greenlees and Jago (2022) considered the loss of canopy and trees near some apparently suitable rock outcrops due to the fires was likely to have had a significant impact on their habitat suitability, noting:

At some sites where the habitat appeared suitable, there were a number of factors that may have affected either survivorship or persistence at the sites post fire. Firstly, in some areas, the canopy scorch was so extreme that trees were killed entirely and the canopy had not re-grown. This factor could have changed the micro-habitat and thermal environment for the geckos considerably, either (a) increasing solar exposure to the sites, making them 'too hot', or (b) following removal of the canopy, weeds or other pioneering vegetation had grown up at the rock face, covering it (e.g. Fig 8). In doing so, the weeds may shade the rock face excessively, making it 'too cold', or limiting foraging opportunities for geckos.

Table 2 Risk Matrix

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain			Direct harvesting / poaching for pet trade	Weed encroachment on habitat	
Likely				Direct mortality, habitat loss and modification from increased fire frequency/severity	
Possible		Predation by introduced *Vulpes vulpes* (European red fox) and *Felis catus* (feral cat)			
Unlikely					
Unknown					

Risk Matrix legend/Risk rating:

Low Risk	Moderate Risk	High Risk	Very High Risk

DCCEEW (2023) Risk Matrix

DCCEEW (2023) consider "*Climate change is expected to increase the frequency and intensity of bushfires and those occurring in 2019-20 demonstrate unequivocally that the entire distribution of Kate's leaf-tailed gecko may be affected by a single event*".

DCCEEW (2023) note "*interacting threats include invasion of habitat by weeds and exacerbation of the impact of feral predators*".

DCCEEW (2023) also identify poaching as a significant threat, noting "*Kate's leaf-tailed gecko was available to European hobbyists by 2011, just three years after the species was described (Marshall et al. 2022)*".

Such impacts would be replicated by logging removing trees near outcrops, with soil disturbance promoting lantana, and roading facilitating ingress by feral predators and collectors.

DCCEEW (2023) ignore logging, though do note:

> *Undertake research into habitat use by Kate's leaf-tailed gecko to determine specific requirements in order to:*
>
> > *− enable a more informed approach to surveys and monitoring; and*
> >
> > *− determine the potential impacts of weed encroachment on changes in habitat quality following fire and whether this affects habitat use.*

2.1. Protection of Rock Outcrops During Logging

The logging rules for State forests (CIFOA) requires a 20m exclusion zone must be retained around each rocky outcrop >0.1 hectare (1,000m^2) and each cliff that is three metres high or more for at least 10 metres.

For their surveys for Kate's Leaf-tailed Geckos, Greenlees and Jago (2022) note that they targeted rock outcrops >10m^2, one hundredth of the size required to be protected in logging operations: *"surveys were only undertaken where there was a substantial amount of exposed rock present (greater than approximately 10m^2 within a 10m^2 area".*

It is apparent that many of the smaller rocky outcrops and cliffs used by Kate's Leaf-tailed Geckos will not be protected in logging operations by a buffer, and may be subject to direct damage.

2.2. The Effects of Logging in Promoting Fire.

Logging makes forests more vulnerable to wildfires by increasing temperatures, reducing humidity, drying them, increasing fuel loads, promoting more flammable species, and changing forest structure. This includes increasing the risks of canopy fires by reducing canopy height, increasing tree density and increasing fuel connectivity from the ground into the canopy.

Numerous studies have found that regrowth is more flammable than mature forests because of combustible dense lower canopies and a drier microclimate (Gill and Zylstra 2005, Lindenmayer *et. al.* 2009, Cohn *et. al.* 2011, Taylor *et. al.* 2014, Zylstra 2018, Lindenmeyer *et. al*. 2021, Bowman *et. al.* 2026).

Lindenmayer *et. al.* (2009) note:

> *Logging can alter key attributes of forests by changing microclimates, stand structure and species composition, fuel characteristics, the prevalence of ignition points, and patterns of landscape cover. These changes may make some kinds of forests more prone to increased probability of ignition and increased fire severity*

Conversion of natural multi-aged forests to predominately regrowth increases their vulnerability to burning by:

- increasing transpiration and loss of available soil moisture (Vertessy *et. al.* 1998, Lindenmeyer *et. al*. 2021)
- reducing canopy density, changing the microclimate and causing drying of understorey vegetation and the forest floor (Chen *et. al.* 1999, Lindenmayer *et. al.* 2009, Lindenmeyer *et. al*. 2021, Bowman *et. al.* 2026)
- changing forest structure by creating a more horizontally and vertically continuous fuel layer - increasing shrub cover, increasing stocking densities, reducing inter crown spacing, reducing canopy base-height (Gill and Zylstra 2005, Lindenmayer *et. al.* 2009, Cohn *et. al.* 2011, Taylor *et. al.* 2014, Zylstra 2018, Lindenmeyer *et. al*. 2021, Bowman *et. al.* 2026)
- natural self-thinning of post-fire regrowth creating large amounts of fine fuels from suppressed plants in the early stages of regrowth (Taylor *et. al.* 2014, Zylstra 2018, Lindenmeyer *et. al*. 2021),
- changing the understorey vegetation composition by removing mesic elements, opening the canopy and increasing disturbance adapted species (Gill and Zylstra 2005, Lindenmayer *et. al.* 2009, Zylstra 2018, Lindenmeyer *et. al*. 2021)
- spreading lantana and increasing understorey flammability (Fensham 1994, Gill and Zylstra 2005, Murray *et. al.* 2013)
- logging slash fuelling fires (Lindenmayer *et. al.* 2009, Lindenmeyer *et. al*. 2021)
- increasing wind speeds (Chen *et. al.* 1999, Lindenmeyer *et. al*. 2021)

Forest canopies create their own microclimate by moderating temperature extremes and enhancing humidity Davis *et. al.* (2019) found "*microclimate buffering was most strongly related to canopy cover*", Kovács *et. al.* (2017) found "*The midstory and the shrub layer play key roles in maintaining the special microclimate of forests with continuous canopy-cover*", and for Tasmania Bowman *et. al.* (2026) quantified the differences: "*Regrowth forests had warmer and drier fire season (October–March) microclimates than mature forests before the fire (16.4°C vs 14.6°C), with this effect larger after the fire (20.3°C vs 16.8°C)*".

Logging changes the structure of forests and thus increases ground temperatures and reduces humidity (Brosofske *et. al.* 1997, Chen *et. al.* 1999, Dan Moore *et. al.* 2005, Bowman *et. al.* 2026), as identified by Chen *et. al.* (1999) "*Patches that have been recently disturbed by human-induced or natural processes tend to have higher daytime shortwave radiation, temperature, and wind speed than undisturbed patches; in addition, these variables show greater spatial and temporal variability*".

Stand age has a significant effect on hydrological processes in forests, with regrowth significantly increasing transpiration and rainfall interception by canopy trees, which in turn creates a drier microclimate and increases drying of soil and litter. This in turn influences litter decomposition and the build up of surface fuels.

Vertessy *et. al.* (1998) have attempted to quantify the different components of rainfall lost by evapo-transpiration, identifying them as: interception by the forest canopy and then evaporated back into the atmosphere; evaporation from leaf litter and soil surfaces; transpiration by overstorey vegetation; and transpiration by understorey vegetation. All of these have been measured as declining with increasing forest maturity, with the exception of understorey transpiration which becomes more important as transpiration from the emergent eucalypts declines.

Rainfall interception is the fraction of gross rainfall caught by the forest canopy and evaporated back to the atmosphere. This is water lost to the understorey and groundwaters, as noted by Vertessy *et. al.* (1998):

rainfall interception rate rises to a peak of 25% at age 30 years, then declines slowly to about 15% by age 235 years. If we assume a mean annual rainfall of 1800mm for the mountain ash forest, stands aged 30 years intercept 190 mm more rainfall than old growth forest aged 240 years.

Evaporation is also greater from soils and litter in regrowth forests.

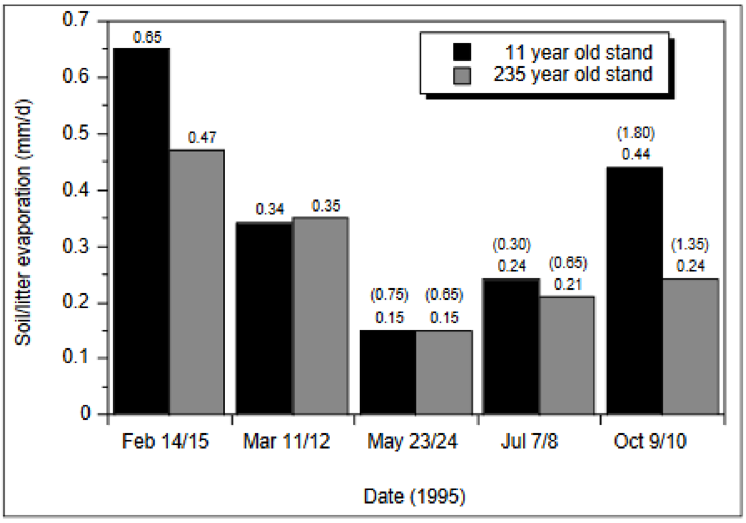
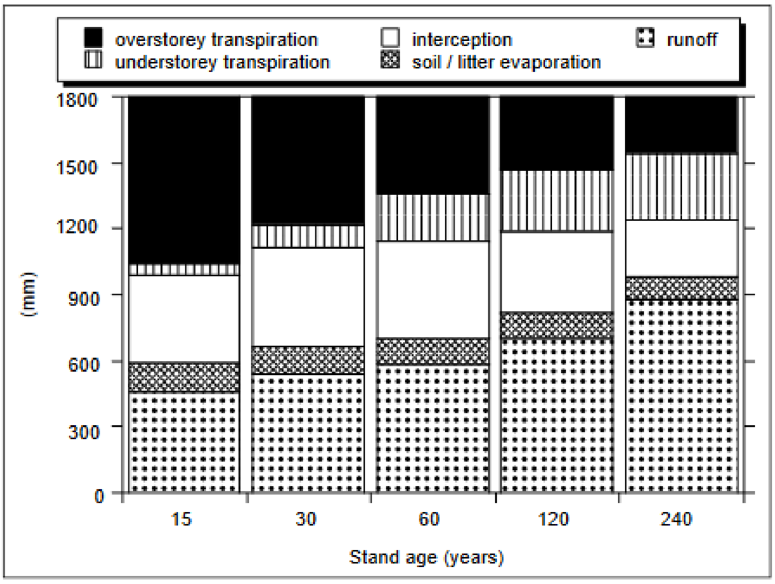


Figure 22 from Vertessy *et. al.* (1998): Comparison of soil/litter evaporation estimates beneath 11 and 235 year old mountain ash forest stands.

Reduction of oldgrowth forests to regrowth thus clearly dries out the forest and thereby increases the flammability of leaf litter.



***Water balance for Mountain Ash forest stands of various ages, assuming annual rainfall of 1800 mm* (Figure 24 from *Vertessy et. al.* 1998)**

Flammability of surface fuels in forests is influenced by their nature and structure, though moisture content of living and dead fuels is the most fundamental constraint on biomass flammability. Forests which have denser canopies result in microclimates characterized by higher humidity, lower wind velocities, cooler temperatures, reduced evaporation and hence reduced fire risk compared to more open-canopied forests. From their comparisons of temperate rainforests and eucalypt forests, Clarke *et. al.* (2014) found "*there was no evidence of higher flammability of litter fuels or leaves from frequently burnt eucalypt forests compared with infrequently burnt rainforests*", concluding "*the manifest pyrogenicity of eucalypt forests is not due to natural selection for more flammable foliage, but better explained by differences in crown openness and associated microclimatic differences*".

Lindenmayer *et. al* (2009) observe "*logging in some moist forests in southeastern Australia has shifted the vegetation composition toward one more characteristic of drier forests that tend to be more fire prone*".

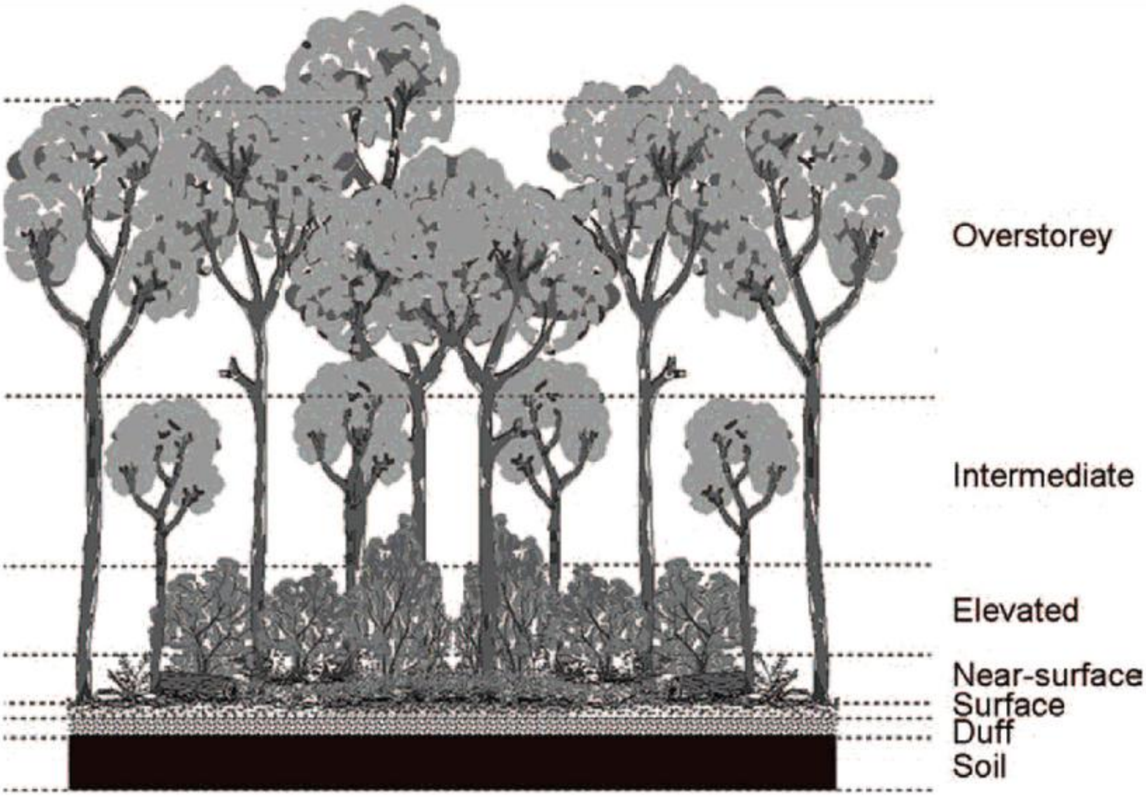


Figure 3.6 from Sullivan *et. al.* (2012) showing categories of forest fuel strata.

Forests can be separated into strata, with the surface fuels being primarily responsible for most of the fuel consumed and energy released by a fire, though it is the tall shrubs and regenerating trees of the elevated fuel layer that "*has a major influence on flame dimensions, particularly flame height*" and the development of crown fires (Sullivan *et. al.* 2012).

As forests age the gap between canopy and understorey plants and fuels develops, reducing stand flammability and the risk of canopy fires (Cohn *et. al.* 2011, Taylor *et. al.* 2014, Zylstra 2018, Lindenmeyer *et. al*. 2021). As identified by Zylstra (2018) eucalypt forests have evolved the ability to create mature environments that suppress the spread of fire. It is logical that as logging removes mature trees and promotes regrowth that it increases connectivity with ground fuels and therefore the risk of crown fires, though there is strong opposition to any suggestion that such fundamental changes in forest structure can influence crown fires (i.e. Attiwill *et. al.* 2014).

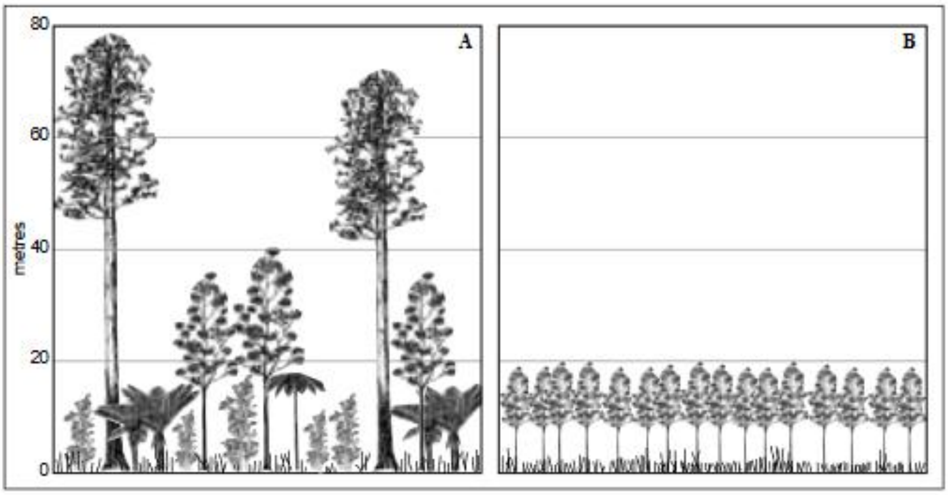


Figure 9 from Vertessy *et. al. 1998*: Comparison of forest structure in (A) old growth and (B) regrowth mountain ash stands. It beggars belief the anybody could deny that the reduced canopy height and increased canopy continuity in a drier forest is likely to result in increased crown fires.

From their studies of the 2009 Victorian fires Price and Bradstock (2012) concluded "*Probability of crown fires was higher in recently logged areas than in areas logged decades before*"

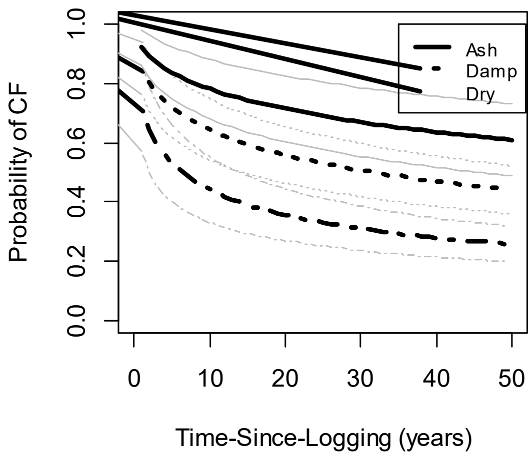
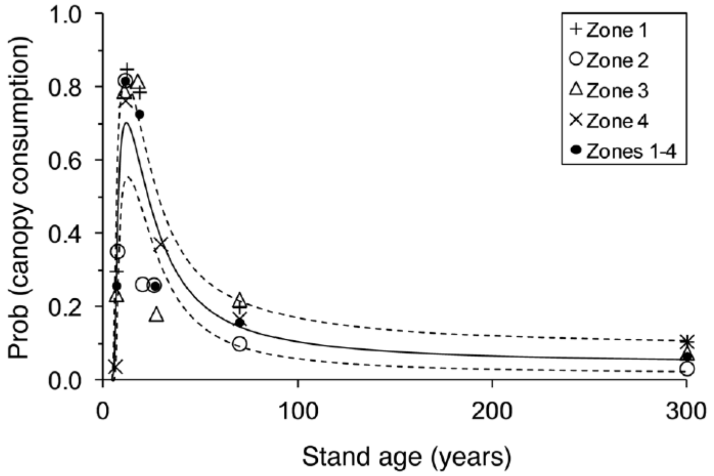


Figure 1 from Price & Bradstock (2012): Model predictions for crown fire against time-since-logging and forest type using the best model. In all cases, the models are for fire weather Moderate, slope = 0, topographic position = 50%, time-since-fire = 25 years, and aspect = East. Confidence limits for predictions for each forest type are shown.

Taylor *et. al.* (2014) assessed the impact of Victoria's 2009 wildfires on Mountain Ash forests, finding "*the probability of canopy consumption increased rapidly with age up to approximately 15 years ... In stands older than 15 years, the probability of canopy consumption decreased with age, such that it rarely occurred in stands aged around 300 years".* They note:

> *... a strong relationship between the age of a Mountain Ash forest and the severity of damage that the forest sustained from the fires under extreme weather conditions. Stands of Mountain Ash trees between the ages of 7 to 36 years mostly sustained canopy consumption and scorching, which are impacts resulting from high-severity fire. High-severity fire leading to canopy consumption almost never occurred in young stands (<7 years) and also was infrequent in older (>40 years) stands of Mountain Ash.*



Probability of canopy consumption versus stand age (Fig 7 from Taylor *et. al.* 2014)

From his study of 58 years of fires in the Australian Alps Zylstra (2018) found "*forests were most likely to experience crown fire during their period of regeneration*", noting:

> *The strongest response was observed in tall, wet forests dominated by Ash-type eucalypts, where, despite a short period of low flammability following fire, post-disturbance stands have been more than eight times as likely to burn than have mature stands. The weakest feedbacks occurred in open forest, although post-disturbance forests were still 1.5 times as likely to burn as mature forests.*

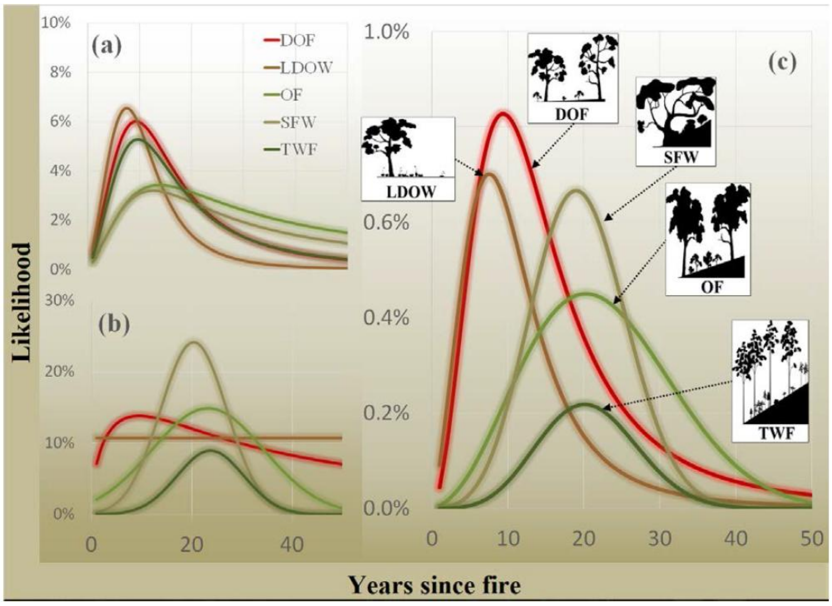


Figure 5 from Zylstra (2018). Flammability trends for each formation, where the *x*-axis gives years since the last fire, and the *y*-axis gives likelihood for (a) fire burning a point (*Lf*), (b) crown fire occurring if that point is burning (*Lcb*); and (c) crown fire occurring at any point (*Lc*). Labels refer to dry, open forest (DOF), low, dry open woodland (LDOW), open forest (OF), subalpine forest and woodland (SFW), tall, wet forest (TWF).

In their assessment of the effect of logging on fires, Lindenmeyer *et. al*. (2021) undertook an empirical study that aimed to quantify the factors affecting the severity of the 2019–2020 fires in northeastern Victoria. They found *"There was an increase in the probability of Crown Burn and Crown Burn/Crown Scorch under more extreme fire weather in all forest types, with the effect especially elevated in dry forest. Our analyses also revealed a range of response curve shapes for* *the relationships between time since previous major disturbance and fire severity relationships and these varied by fire weather classes and forest type"*.

They note *"fire severity was generally low in very young and very old forest and highest in stands that were 10–40 yr old … the tallest, oldest forests (100–300+ yr since previous major disturbance) burn at lowest severity".* Postulating:

> *… it is possible that elevated fire severity in some forest types under particular fire weather conditions may be linked with several factors including (1) high stocking density of young stands (Blair et al. 2016); (2) high levels of self-thinning and self-pruning in rapidly growing stands of relatively young forest (10–40 yr old) (Cunningham 1960, Florence 1996) producing additional fine and medium fire fuels.; (3) the ongoing presence slash and debris remaining after previous logging and regeneration burning operations (Slijepcevic 2001); (4) the drying of soils following logging (Bowd et al. 2019) and generally reduced moisture levels associated with high levels of transpiration of young fast-growing trees (Vertessy et al. 2001); (5) the loss of mesic elements such as tree ferns in logged forests (Ough and Murphy 2004, Bowd et al. 2018); and (6) windspeeds that can be strongly affected by stand density (Tanskanen et al. 2005).*

They conclude:

> *Our analyses suggest that forests managed for timber production near settlements may be at increased risk of high-severity fire. This is because logging resets stand age to zero, after which there is a subsequent period of increased probability of high-severity fire, particularly under extreme fire weather conditions. Therefore, policies to maintain cover of older forest near settlements should be considered.*

The same can be said to apply around rock outcrops inhabited by Kate's Leaf-tailed Gecko.

From their detailed assessment of moderate fire impacts on logging regrowth compared to mature stands in Tasmanian wet sclerophyll forests, Bowman *et. al.* (2026) found that fire moving from regrowth forest often self extinguished in mature forest, quantifying significant differences in fire extent, fire intensity, and microclimates,:

> *Regrowth was highly flammable compared to the mature forest, with only 4.9% of the regrowth (in an isolated patch to the south of the fire perimeter) in the study area remaining unburned, whereas 43.6% of the mature forest was unburned.*
>
> *… Only a very small proportion of (3.38%) mature forest in the study area (4790.51 ha) was burned by high (2.22%) or extreme (1.16%) severity fires. By contrast, over 50% of regrowth extent (598 ha) was burned by high (30%) or extreme (20%) severity fires.*
>
> *The dNBR fire severity patterns were very strongly controlled by canopy height, with fire severity decreasing as canopy height increased. …*
>
> *… In burned mature forest, the largest effect of the wildfire was in the near surface layer (<2 m), with some minor change in the forest understorey (<20 m) and forest canopy (>30 m). By contrast, regrowth forests, which are just over half the height of the mature forests (30 vs.50 m), showed a very substantial change through all strata, particularly in the lower half of the profile (<15 m).*
>
> *… Regrowth understoreys, however, had significantly higher mean monthly afternoon temperatures, especially after the wildfire, (pre-fire 16.4°C vs post-fire 20.3°C) than did mature forest (pre-fire 14.6°C vs 17.1°C post-fire) (figure 6(A)). Humidity in the mature and*

regrowth forest was strongly negatively correlated with temperature (r = −0.75 and r = −0.86 respectively), confirming that higher temperatures were associated with a drier microclimate.

Bowman *et. al.* (2026) caution:

> *We have shown that clearfelling of wet Eucalyptus forests can potentially initiate a feedback cycle, whereby highly flammable, even-aged regrowth is frequently prone to severe fire, potentially leading to the loss of these forests and replacement with vegetation better adapted to frequent fire such as Leptospermum scrub (Jackson 1968), a phenomenon that has been described as a 'landscape trap' …*

After logging the large quantities of tree crowns, crushed plants and reject logs make the forest more vulnerable to burning, as noted by Lindenmayer *et. al.* (2009):

> *Large quantities of logging slash created by harvesting operations can sustain fires for longer than fuels in unlogged forest and also harbor fires when conditions are not suitable to facilitate flaming combustion or the spread of fire*

The Forestry Corporation (2022) report '2019–20 Wildfires, NSW Coastal Hardwood Forests Sustainable Yield Review' assessed the impacts of the 2019/20 wildfires, in part by mapping fire severity across all native State forests, which broadly differentiated impacts according to fire severity, with the areas singled out as most severely affected being those most recently or intensively logged:

- 90% of trees killed in stands logged 2015-2019, across 4% of region
- 12,000 hectares converted to even aged regrowth/plantings in *intensive harvest tracts* killed

In the longer term weed invasion can also make the forest more vulnerable to burning. Lantana (*L. camara)* is the most widespread and successful weed throughout north-east NSW, benefitting from logging and other activities that open the forest canopy enough for it to thrive. Lantana now dominates the understorey in tens of thousands of hectares of northeast NSW"s forests. Fire and cattle grazing are significant contributors to the successful invasion of lantana (Gentle and Duggin 1997), and it in turn can increase the flammability of vegetation (Fensham *et. al*. 1994, Gill and Zylstra 2005, Berry *et. al* 2011, Murray *et. al.* 2013, Bowman *et. al.* 2014). Of the 79 species from dry sclerophyll forests tested by Murray *et. al.* (2013), lantana had the third shortest mean time to ignition for fresh leaves.

From their study of the Forty Mile Scrub National Park, Fensham *et. al*. (1994) found "*the proliferation of lantana results in the build up of heavy fuel loads across the boundary of dry rainforest and savanna woodland. Recent fires have killed the canopy trees in a large area of dry rainforest within the Park*". From their study of dry rainforests, Berry *et. al* (2011) concluded that *L camara* was less ignitable than native dry rainforest species, though:

> *Fuel bed depths, leaf litter depths, percentage cover by fuels and amount of medium size class fuels were higher in dry rainforest invaded by* L.camara *than in noninvaded forests. This suggests that the mechanism by which* L.camara *alters the fire regime in dry rainforest is by shifting the distribution of available fuels closer to the ground and providing a more continuous fuel layer in the understory*

The increasing dominance of forest understoreys by lantana in north-east NSW must pose a significant wildfire threat.

2.3. The Effects of Logging in Promoting Lantana

Lantana (*Lantana camara*) is one of the worst invasive weeds in Australia and recognised as a Key Threatening Process since 2006. It invades logged forests aided by canopy and understorey removal, and soil disturbance. It increases with repeat disturbances. It prevents regeneration of native species through mechanisms such as shading, smothering and allelopathy. Where it occurs at high densities it can become self-perpetuating, lead to declines in native flora diversity, reduce foods for fauna and hinder their movements. Lantana increases fire risk and intensity. It is a threat to ecosystem health, community structure and ecosystem functioning. As a result of logging it has infested tens of thousands of hectares of State forests in north-east NSW, and gets worse with each logging. Infestations of lantana, in part due to previous logging, have already had a significant impact on rocky outcrops utilised by Kate's Leaf-tailed Gecko, and impacts will increase with repeat logging.

Greenlees and Jago (2022) identify that the overgrowing of rocky outcrops by lantana may be a significant threat to Kate's Leaf-tailed Gecko, here referring to canopy removal caused by fire:

> *following removal of the canopy, weeds or other pioneering vegetation had grown up at the rock face, covering it (e.g. Fig 8). In doing so, the weeds may shade the rock face excessively, making it 'too cold', or limiting foraging opportunities for geckos.*

Loss of canopy and promotion of lantana is also caused by logging. Within the Mount Belmore logging area, a number of rock outcrops were observed to be partially or wholly overgrown by lantana. As well as shading out habitat it also increases fire risk and intensity, which could significantly impact populations of Kate's Leaf-tailed Gecko.

Lantana *Lantana camara* is recognised as a Weed of National Significance, declared a Noxious Weed under the NSW Noxious Weeds Act 1993 and its establishment and spread identified as a Key Threatening Process. It is recognised as a disturbance adapted species, invading logged forests and increasing with repeated logging. It blocks native regrowth (including timber species), out competes and smothers native understorey species, renders some habitats unsuitable for resident animals, hinders dispersal, increases flammability and can lead to ecosystem collapse. It is a major, widespread and persistent problem across the forests of north-east NSW, and while the activities of the Forestry Corporation extend and compound infestations, they do extremely little to remedy their impacts or control infestations.

The Invasion, establishment and spread of Lantana (*Lantana camara* L. sens. lat) was identified as a key threatening process by the NSW Scientific Committee (2006), noting:

> L. camara *readily invades disturbed sites and communities. Various types of sclerophyll woodlands, sclerophyll forests, rainforests and dry rainforests are all susceptible to Lantana establishment (Driscoll and Quinlan 1985; Lamb 1988; Fensham* et al. *1994; Gentle and Duggin 1997a), although in communities with a naturally dense canopy, Lantana colonisation may be heavily dependent on, and limited to, disturbance zones, edges, and canopy breaks. There is a strong correlation between Lantana establishment and disturbance (Stock and Wild 2002; Stock 2004), with critical factors being disturbance-mediated increases in light and available soil nutrients (Gentle and Duggin 1998) … Lantana typically forms dense thickets, suppressing less competitive native vegetation and seedlings through shading (Swarbrick* et al. *1995, ARMCANZ ANZECC&FM 2001), surface-soil nutrient sequestration (Lamb 1988 cited in Swarbrick* et al. *1995; Gentle and Duggin 1998; CRC Weed*

> *Management 2003), smothering ("strangling" - ARMCANZ ANZECC&FM 2001) and perhaps through allelopathy (Gentle and Duggin 1997b; Day* et al. *2003). …*

The NSW Scientific Committee (2006) identifies that Lantana can have a range of impacts on natural ecosystems, it “*may change soil microhabitat through shading, self-mulching, and altered water and nutrient balances*”, “*may adversely affect the richness of some soil faunal assemblages*”, “*inhibit growth of at least some microorganisms*”, can “*arrest vegetation succession for decades*”, prevent the establishment of "*eucalypt seedlings*”, is “*thought to be allelopathic, i.e. able to inhibit or suppress by chemical means the germination and/or growth of at least some competing plant species*”, can cause “*a large (at least 70%) decline in inferred recruitment (number of native tree and shrub saplings present)*”, and “*adversely affects the ability of Koalas to move between trees*”.

From their literature review Silver and Carnegie (2017) observed that lantana can become self-perpetuating, with impacts increasing over time:

> *Lantana can take better advantage of increased resources (nutrients) following disturbance, thus accumulating more biomass and further suppressing native shrub species (Gentle and Duggin, 1998). Gooden et al. (2009b) described a change in vegetation structure whereby increasing invasion of lantana results in a reduction in native species richness, especially of shrub and tree species, leading to a change from tall open forest to an understorey dominated by lantana. Fensham et al. (1994) described areas long-invaded by lantana as having a dense understorey consisting of >5000 lantana plants per hectare, compared to <1000 plants per hectare in newly invaded areas … Invasion by woody weeds, such as lantana, affects native vegetation regeneration, ultimately affecting species diversity, including of understorey, mid-storey and canopy species, thus perpetuating a dense understorey (Gooden et al. 2009a, b; Cummings et al. 2007)*

Lantana invasion is facilitated by anthropogenic disturbance, including soil disturbance and opening of the canopy by logging (i.e. Gentle and Duggin 1997, Day *et. al.* 2003, Wardell-Johnson *et. al.* 2006, Priyanka and Joshi 2013, Mungi *et. al*. 2020, Mondal *et. al.* 2024, Hansda *et.al.* 2024). As noted by Wardell-Johnson *et. al.* (2005) “*the proliferation of dominant understorey weeds, such as Lantana (Lantana camara), in the north-eastern region of NSW has largely been attributed to the disturbance caused by logging and associated activities*”.

Day *et. al.* (2003) note:

> *In disturbed native forests, it can become the dominant understorey species, disrupting succession and decreasing biodiversity. Its allelopathic qualities can reduce vigour of plant species nearby …*
>
> *Lantana in forest communities has the potential to block succession and displace native species, resulting in a reduction in biodiversity (Lamb 1991; Loyn & French 1991). Under conditions of high light, soil moisture and soil nutrients, lantana is a very effective competitor against native colonisers (Gentle & Duggin 1998). Lantana infestations result in marked changes in the structure and floristics of natural communities. One of the obvious changes that occur with the replacement of forest understorey by lantana is a decrease in community biomass and a proportional increase in the foliage component in the vegetation (Bhatt et al. 1994) (Figure 13). As the density of lantana in forest increases, species richness decreases (Fensham et al. 1994). One possible explanation is that allelopathic effects of lantana result in severe reductions in seedling recruitment of almost all species under lantana and a reduction in the girth growth of mature trees and shrubs (Lamb 1982; Gentle & Duggin 1997a). …*

For lantana invasion in dry rainforest–open forest ecotones in north-eastern NSW, Duggin and Gentle (1998) found:

> *Invasion was positively increased with disturbance intensity and increased resource availability. Light at ground level increased from 21.3 to 30.5% of ambient light when the shrub layer was damaged while it increased to 84.3% when the overstorey was damaged. A pattern of increasing plant performance with increasing intensity and number of combined disturbances was evident.*

The Conservation Advice for the EEC Grey box-grey gum wet forest (DCCEEW 2022c), which chiefly occurs on the Richmond Range north from Cherry Tree State Forest, identifies:

> *Lantana camara (lantana) is one of the most common weeds where the ecological community occurs (DECC 2007; DECC 2008b, DECC 2008c). Lantana has been recorded in 95% of vegetation sites surveyed of Grey Box - Grey Gum Wet Sclerophyll Forest (DECC 2008a). Lantana infestation is known to prevent regeneration of native species through mechanisms such as shading, smothering (Lamb 1991) and allelopathy (Gentle & Duggin 1997) and lead to declines in native flora diversity, especially where it occurs at high densities (Gooden et al. 2009). The relatively fertile and moderately well-watered soils supporting the ecological community typically support dense stands of invasive weeds when they establish. The presence of dense weeds can suppress the regeneration of all layers of Grey box-grey gum wet forest. The documented prevalence of lantana within the ecological community and its impacts on ecological succession and understorey development and native flora diversity indicates a very severe reduction in community integrity across most of its geographic distribution.*

Lantana can also increase fire intensity and the risk of wildfire (Day *et. al.* 2003, NSW Scientific Committee 2006, Johnson 2007, Priyanka and Joshi 2013, DCCEEW 2022c). Day *et. al.* (2003) summarise:

> *Lantana can greatly alter fire regimes in natural systems (Humphries & Stanton 1992). Grassy woodlands rarely have sufficient fuel load to produce fires intense enough to penetrate into the surrounding rainforest, but the fuel load provided by lantana has been implicated in a destructive wildfire in northern Queensland (Fensham et al. 1994). The fire hazard provided by lantana in rainforest situations is paralleled in deciduous forests of the northern hemisphere (Anon. 1962). Lantana burns readily during hot, dry conditions, even when green (Gujral & Vasudevan 1983). Lantana occurring on rainforest margins is seen as a major threat to this community as a result of increased inroads of fire into the rainforest. ….*

Berry *et. al.* (2011) found:

> Fuel bed depths, leaf litter depths, percentage cover by fuels and amount of medium-size class fuels were higher in dry rainforest invaded by *L. camara* than in non-invaded forests. This suggests that the mechanism by which *L. camara* alters the fire regime in dry rainforest is by shifting the distribution of available fuels closer to the ground and providing a more continuous fuel layer in the understory. Management should focus on targeting *L. camara* removal around forest edges adjacent to frequently burned savannas and in areas of high conservation value.

The Conservation Advice for the EEC Grey box-grey gum wet forest (DCCEEW 2022c) identifies:

> *Fire is also known to facilitate lantana invasion in vine-forest (rainforest)-open forest ecotones (Duggin & Gentle 1998). In this study it was shown that the increase in light availability, and to a lesser extent nutrient availability, from the disturbance of the shrub and*

canopy layers by fire led to an increase in lantana germination, survival and growth. Therefore, escalating fire impacts from climate change are likely to further facilitate and maintain lantana infestation in the ecological community. This is likely to lead to further losses of the ecological community through suppression of regeneration and succession.

In addition, lantana infestations have been known to facilitate fire incursions in dry rainforest (Fensham et al. 1994) -The mechanism by which lantana facilitates such incursions is by introducing more fuel and a more continuous fuel load (Berry et al. 2011). The prevalence of lantana in the ecological community therefore increases the risk of fire to the understorey of the ecological community over significant areas, heightening the risk of loss of the fire sensitive dry rainforest elements of the understorey and therefore the community itself. Taken together, these studies, showing the ability of lantana to promote fire and the ability of fire to promote lantana invasion supports the Fire-Lantana Cycle Hypothesis by Hiremath and Sundaram (2005). This suggests that positive lantana-fire feedback loops may be operating within the ecological community, contributing to its further degradation.

Examples of Lantana invasion from old logging in Cherry Tree SF on the Richmond Range. The patches and scattered rainforest trees indicate that much of this area would have had a rainforest understorey before the last logging event. Lantana is actively suppressing the remnant rainforest understorey and increasing the risk of fire.

3. REFERENCES

Attiwill, P.M., Ryan, M.F., Burrows, N., Cheney, N.P., McCaw, L., Neyland, M. and Read, S., 2014. Timber harvesting does not increase fire risk and severity in wet eucalypt forests of southern Australia. *Conservation Letters*, *7*(4), pp.341-354.

Berry ZC, Wevill K & Curran TJ (2011). The invasive weed *Lantana camara* increases fire risk in dry rainforest by altering fuel beds. *Weed Research*51, 525–533.

Bowman, D.M., Zhao, L., Lucieer, A., Furlaud, J.M., Prior, L.D. and Williamson, G.J., 2026. Landscape-scale experimental proof that tall wet Eucalyptus regrowth burns more severely than mature forest. *Environmental Research Letters*, *21*(6), p.064011.

Brosofske, K.D., Chen, J., Naiman, R.J. and Franklin, J.F., 1997. Harvesting effects on microclimatic gradients from small streams to uplands in western Washington. *Ecological applications*, *7*(4), pp.1188-1200.

Clarke, P.J., Prior, L.D., French, B.J., Vincent, B., Knox, K.J. and Bowman, D.M., 2014. Using a rainforest-flame forest mosaic to test the hypothesis that leaf and litter fuel flammability is under natural selection. *Oecologia*, *176*(4), pp.1123-1133.

Cohn, J.S., Lunt, I.D., Ross, K.A. and Bradstock, R.A., 2011. How do slow-growing, fire-sensitive conifers survive in flammable eucalypt woodlands?. *Journal of Vegetation Science*, *22*(3), pp.425-435.

Couper, P.J., Covacevich, J.A. & Moritz, C. 1993 12 24: A review of the leaf-tailed geckos endemic to eastern Australia: a new genus, four new species, and other new data. Memoirs of the Queensland Museum 34(1):95-124. Brisbane. ISSN 0079-8835.

Couper, Patrick J., Ross A. Sadlier, Glenn M. Shea, & Jessica Worthington Wilmer, 2008. A reassessment of *Saltuarius swaini* (Lacertilia: Diplodactylidae) in southeastern Queensland and New South Wales; two new taxa, phylogeny, biogeography and conservation. *Records of the Australian Museum* 60(1): 87–118.

Dan Moore, R., Spittlehouse, D.L. and Story, A., 2005. RIPARIAN MICROCLIMATE AND STREAM TEMPERATURE RESPONSE TO FOREST HARVESTING: A REVIEW 1. *JAWRA Journal of the American Water Resources Association*, *41*(4), pp.813-834.

Day, Michael D; Wiley, Chris J; Playford, Julia and Zalucki, Myron. P. 2003. Lantana Current Management Status and Future Prospects. Canberra. ACIAR Monograph 102

Department of Climate Change, Energy, the Environment and Water (DCCEEW 2022c) Approved Conservation Advice for Grey box-grey gum wet forest of subtropical eastern Australia. Australian Government. https://www.environment.gov.au/biodiversity/threatened/communities/pubs/181-conservation-advice.pdf

Department of Climate Change, Energy, the Environment and Water (DCCEEW 2023), Conservation Advice for *Saltuarius kateae* (Kate's leaf-tailed gecko).

Department of Environment and Climate Change NSW (DECC 2008) Recovery plan for the koala (Phascolarctos cinereus). https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Recovery-plans/koala-phascolarctos-cinereus-recovery-plan-080450.pdf

Fensham, R.J., Fairfax, R.J. and Cannell, R.J., 1994. The invasion of Lantana camara L. in forty mile scrub National Park, north Queensland. *Australian Journal of Ecology*, *19*(3), pp.297-305.Flint *et. al*. 2004

Forestry Corporation (2020) 2019–20 Wildfires, NSW Coastal Hardwood Forests Sustainable Yield Review. December 2020

Gentle, C.B., and Duggin, J.A. (1997) Lantana camara invasions in dry rainforest – open forest ecotones: the role of disturbances associated with fire and cattle grazing. *Australian Journal of Ecology* 22, 298-306.

Gill, A.M. and Zylstra, P., 2005. Flammability of Australian forests. *Australian forestry*, *68*(2), pp.87-93.

Greenlees, M. and Jago, R. (2022) Surveys for Kate's Leaf-tailed gecko (*Saltuarius kateae*) in the aftermath of the 2019-2020 bushfires. Dr Matt & Russell Jago, Report prepared for Border Ranges – Richmond Valley Landcare Network. March 2022

Hansda, P., Kumar, S., Singh, S. and Garkoti, S.C., 2024. Assessing the influence of invasion of Lantana camara on vegetation attributes and soil properties across varied disturbance gradients in semi-arid forests of Aravali hills, Delhi. *Plant Ecology*, *225*(9), pp.893-906.

Johnson, S. (2007) Review of the declaration of Lantana species in New South Wales. New South Wales Department of Primary Industries.

Lindenmayer, D.B., Hunter, M.L., Burton, P.J. and Gibbons, P., 2009. Effects of logging on fire regimes in moist forests. *Conservation Letters*, *2*(6), pp.271-277.

Lindenmayer, D., C. Taylor, and W. Blanchard. 2021. Empirical analyses of the factors influencing fire severity in southeastern Australia. Ecosphere 12(8):e03721. 10.1002/ecs2.3721. https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.3721

Mondal, T., Dasgupta, S., Bhatt, D. and Krishnamurthy, R., 2024. A structural equation modeling-based approach to identify the determinants of Lantana camara invasion in the Terai Arc landscape, India. *Plant Ecology*, *225*(5), pp.465-478.

Mungi NA, Qureshi Q, Jhala YV (2020) Expanding niche and degrading forests: key to the successful global invasion of Lantana Camara (sensu lato). Global Ecology and Conservation, Volume 23, 2020, e01080, ISSN 2351-9894, https://doi.org/10.1016/j.gecco.2020.e01080

NSW Scientific Committee (2006) The Invasion, establishment and spread of Lantana (Lantana camara L. sens. lat). Department of Planning and Environment.

NSW Scientific Committee (2019) Conservation Assessment of *Saltuarius kateae* Couper, Sadlier, Shea & Worthington-Wilmer 2008 (Gekkonidae). Department of Planning and Environment.

Price, O.F. and Bradstock, R.A., 2012. The efficacy of fuel treatment in mitigating property loss during wildfires: Insights from analysis of the severity of the catastrophic fires in 2009 in Victoria, Australia. *Journal of environmental management*, *113*, pp.146-157.

Priyanka, N. and Joshi, P.K., 2013. A review of Lantana camara studies in India. *International Journal of Scientific and Research Publications*, *3*(10), pp.1-11.

Saving our Species (2026) Help save the Kate's Leaf-tailed Gecko. NSW Government.

Silver, MJ and Carnegie AJ (2017) An independent review of bell miner associated dieback. Final report prepared for the Project Steering Committee: systematic review of bell miner associated dieback

Sullivan, A.L., McCaw, W.L., Cruz, M.G., Matthews, S. and Ellis, P.F., 2012. Fuel, fire weather and fire behaviour in Australian ecosystems. *Flammable Australia: fire regimes, biodiversity and ecosystems in a changing world*, pp.51-77.

Taylor, C., McCarthy, M.A. and Lindenmayer, D.B., 2014. Nonlinear effects of stand age on fire severity. *Conservation Letters*, *7*(4), pp.355-370.

Vertessy,R., Watson, F., O'Sullivan, S., Davis, S., Campbell, R., Benyon, R. and Haydon, S. (1998) Predicting water yield from mountain ash forest catchments. Cooperative Research Centre for Catchment Hydrology, 98/4.

Wardell-Johnson, G. and Lynch, A. J. J. (2005) Landscape processes and eucalypt dieback associated with bell miner habitat in south-eastern Australia. *Australian Forestry* 2005 Vol. 68 No. 4 pp. 242–250

Zylstra, P.J., 2018. Flammability dynamics in the Australian Alps. *Austral Ecology*, *43*(5), pp.578-591.