RESOURCES SUPPORTING THE GREAT SOUTHERN FOREST'S SUBMISSION TO THE NSW DEPARTMENT OF PRIMARY INDUSTRIES ON EXPIRATION OF THE REGIONAL FOREST AGREEMENTS

"This is the only sensible way forward on forests."
Dr Judith Ajani, Economist, Australian National University, Fenner School of Environment and Society.

Photo 1: Bega River mouth to Mumbulla and Gulaga mountains, the late Richard Green

"This work looks really impressive and important. I admire your work in this area immensely."
Professor Tim Flannery, Chief Director, Climate Council

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Acknowledgement of Country

We acknowledge the peoples of Yuin and Wiradjuri Nations and Ngarigo, Walbunga, Dharawal, Gundungurra and Ngunnawal tribal people, who are the Traditional Owners of the Country that is the subject of the Great Southern Forest. We pay respect to the Elders past and present of these Nations and extend that respect to other Aboriginal people who read it.

About these resources

This supplement to the Great Southern Forest Brief contains material which draws on forest history, research of ANU and global scientists and economists, wildlife experts and local forest knowledge. It has been written in various voices by conservationists of the southeast region of New South Wales. It is their story, their campaign, and expresses their directive to bring a new dawn, and new order to native forest management based on genuine wildlife and habitat protection, new truly sustainable job opportunities and real benefits to climate mitigation.

GSF acknowledgements

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Photographers: Dave Gallan, Sam Davis, Larry Dunis, Bronte Somerset.

Appreciation is extended to people who have contributed to this GSF proposal either in talent, word or support. It stands as a record of the need to protect our environment and will remain as a testament that the current Regional Forest Agreements are an inappropriate form of management and bring suffering to the natural world because of the insidious practice of logging for woodchips which contributes to the interruption of millennia of natural ecological evolution of flora and fauna.

To Chris Allen, whose dedication and surveys improve our knowledge of local koalas are of inestimable value, thank you for constantly bringing us into the light. Your work is embedded in these documents. We acknowledge conservationists who are no longer with us: the scientific work of Dane Wimbush and the tireless passion of John Hibberd, still inform and inspire.
To my family and friends; thank you for surviving my tediousness. BJS

Warnings:

Please note there may be images of Aboriginal people in this document who may no longer be living. There are pictures and writing about native species and their habitat which may cause distress. These very low-resolution images are unsuitable for reproduction.

Photo 2: Trees which survived logging, most of which have now died, in Glenbog State Forest, 2015. Dave Gallan

THE TRUTH

Transcript from the movie Corunna Forest[a] *by David Gallan*

> It's the power of local communities in the future that is going to be a critical factor in environmental campaigning. Governments have lost the plot. Our elected representatives no longer care. Everything's on short term economic growth. All we get now is whether the economy is growing at 3% or 2% or 1.8%. They never look beyond that and they never will. It's up to local people to fight for their own areas.

Kim Taysom, Economist

> The whole concept of logging in native forests is really…it's against all reason; both economic and biological.

The late Dane Wimbush, CSIRO Ecologist

PREFACE

Preface: Kim Taysom & Bronte Somerset

This supplementary document proposes alternative management of the southern forest region of New South Wales. Enactment of its recommendations will support Australia's commitment to climate action, commitment to reducing our endangered species rate (Appendix A), commitment to respecting the land's Indigenous heritage, commitment to protecting our precious and unique biodiversity, and commitment to preserving the beauty of our natural environments.

These materials justify creation of a large-scale connected landscape in south east NSW; the Great Southern Forest. This is driven by the need to remediate degraded forests, to allow optimal carbon capture and to genuinely protect native species and wildlife habitat in perpetuity. This imperative considers the locally threatened southern koala as a flag bearer for all forest-dependent species in our region.

The Great Southern Forest presents a theoretical and practical response to the critical situation where change needs to be the driving force behind survival of all life. The three sub-regions South Coast, Eden and Tumut are the subject of the Great Southern Forest.

[a] https://vimeo.com/258959910

The objectives of the Great Southern Forest are:

- To protect 432,757 hectares (ha) of the State's native forests for a healthy future for people and nature
- To regenerate multispecies habitat and begin to restore connective corridors for vulnerable and threatened wildlife
- To respect Aboriginal land and create more opportunities for Indigenous people to bring traditional knowledge into land and forest management
- To contribute to planet health by having these forests managed for carbon capture and storage advantages
- To weaken the impact of wildfire by supporting a return to moist forests
- To benefit local communities and businesses by protecting water catchments and reducing soil erosion
- To help improve health by creating physical and learning opportunities for children and youth via improved access to forests
- To boost jobs in forest restoration, pest, weed and fire control, and ecotourism
- To help increase tourists' lengths of stay by creating the environment for a world class ecotourism and cultural tourism industry capitalizing on the increase in the Asian growing middle-class tourist market.

We need to consider whether Australia is committed to achieving an even more ethical measure over and above negotiated targets or do just enough to make the grade. Therefore, we strongly urge the Commonwealth and the NSW State Governments to terminate the current Regional Forest Agreements (RFAs) and end native forest logging; support forest management practices to connect, protect and begin to restore the south east forests and unique wildlife; plan a transition from this declining sector into a future which avoids emissions and recognises native forests as the best land-based carbon store; and develop a funding mechanism to invest in jobs in tourism, in wildlife protection, and in forest restoration.

People protect their histories and return to them for generations: we need to leave a history of honour for the future generations to be proud of—one that showed we determined not to perpetuate a problem which we inherited from the unwise decisions of others. The essence of custodial responsibility embedded within this document will stand as a legacy for future generations of Australians who will review the judgments made by these authors and the conviction we demonstrated in our will to protect Australia's natural native forests.

A CASE FOR CHANGE IN THE SOUTH EAST FORESTS OF NSW

A case for change in the south east forests of NSW: Kim Taysom & Bronte Somerset

> *…citizens have right to live and flourish. Government, elected by the people, has a duty to protect the natural systems required for their survival: forests, wildlife, soil, water and air. Christina Woods*[1]

This section addresses problems facing the natural environment in the south east region of NSW and presents a new approach for managing natural native forests in perpetuity. Creation of the Great Southern Forest as a large-scale integrated landscape will unify National Parks and State Forests in the southern region of NSW.

CONSERVATION BENEFITS

By altering management regimes of the State Forests to generate large protected areas, this outstanding conservation initiative will pave the way to restore degraded forests; protect threatened species; connect koala clusters; preserve water, carbon and soil; help mitigate climate change; and, has the potential to create an economic boom from carbon storage, truly sustainable jobs in forest regeneration, fire control, and ecotourism. These opportunities will breathe new life into the way we have traditionally used our State Forests for extractive purposes, and will correlate with other Great Eastern Ranges conservation initiatives: The Great Northern Koala Park, NSW, and The Great Forest National Park, Victoria.

The Great Southern Forest paves the way for native forest use which is congruous with best practice in other countries. Compelling evidence was presented at the International Union for Conservation of Nature (IUCN) World Parks Congress (WPC)[2] from representatives from countries whose decision makers overcame huge environmental challenges, connected fragmented landscapes, started to restore degraded ones and watched wildlife return. Given the influence of climate change, and our extensive land clearing and native species extinction rate, the world is now watching Australia. We need solutions which counter the problems which have propelled Australia's wildlife and habitat into such a degraded state.

Members of local conservation organisations, such as the far south coast branches of the National Parks Association and National Trust and the South East Region Conservation Alliance Inc., are mindful of a range of issues across land-based and marine parks with a current focus on the Great Southern Forest. We believe that the convergence of the following factors proves that a critical review of the management of native forests in south east NSW is appropriate.

KOALA—THE FLAG BEARER

The koala has been a catalyst in this process, much as the campaign to save the Leadbeaters possum helped start the Victorian Government's forest enquiry. Hundreds of thousands of koalas once roamed these south east forests; yet now, the south east region's koala population (best estimate 70–80 animals) is precarious and requires extensive areas of forest for dispersal and connection with the larger Shoalhaven and Southern Tablelands populations. Given the tenuousness of the situation, National Parks & Wildlife Services (NPWS) is attempting a koala recovery program which includes relocating healthy koalas from Victoria. A major determining success factor is the extent to which the management of the forests can be weighted towards biodiversity protection rather than the current priority of pulpwood production. We thus need to focus on protecting the fragile population of koalas inhabiting the southern region's forests by safeguarding them from further destruction. Our koalas need one last fighting chance to survive. Putting an end to industrial logging of forests which were once occupied by koalas and which they now do not occupy—will support this last chance.

UNCERTAINTY IN THE MARKET

A consideration in support of this recommendation is that the market for native forest timber has declined sharply and its importance to the regional economy and employment has been displaced by the expanding plantation industry. Over 80% of NSW sawn timber now comes from softwood plantations [3]. Native forest log production in the Eden Region declined by 36% between 2007–2013 due to plantation competition and a contracting Japanese market.

In past years, the native forest hardwood divisions of Forestry Corporation NSW (FCNSW) made multimillion dollar losses[4] at taxpayers' expense. NSW Government subsidies have amounted to about $40 million over the past three years.[5]

The Great Southern Forest has the potential to expand local employment and incomes in sustainable sectors and jobs, thus stabilising higher value and longer-term employment than the current short-term destruction of forests for wood chipping. As plantation timber jobs increase, jobs in the dying native forest logging and woodchipping sector are decreasing. In 2014 the woodchipping and logging employment figures were 300 people, with only about 30 people at the mill, and these numbers are shrinking.

OPPORTUNITIES

With the creation of the Great Southern Forest under an environmentally, economically and culturally responsive management model, jobs could multiply in forest restoration and reconnection, forest weed, pest and disease eradication, and ecotourism. Ideally, isolated threatened colonies of koalas could be given special protection against fire and predators.

Tourism is a main industry of the southern region of NSW and currently employs 58,500 people. The number of annual visitors to the southern rivers area is increasing and the growing middle-class of Asian visitors seeking natural eco-tourist activities can be capitalized on. NSW has the potential to project a clean, green image as successfully done by New Zealand which now earns $11.8 billion per year from tourism which is primarily based on the natural experience. Natural landscapes and scenery are the top factors for visitors choosing to visit New Zealand[6]. By ending native forest logging in south east NSW, attention will turn to promoting activities which allow tourists to engage with the beauty of nature, unimpeded by the offensive sight of empty logged coops and trashed forests.

Thus, tourism offers a viable economic alternative to failing commercial forestry, with its declining output, diminishing employment and increasing non-acceptance by the public. The region's native forest logging activities have even been described as 'a welfare-based industry'. As new reputable industries are generated, so would jobs in the consequent flow on of other commercial industries and essential service providers.

The Great Southern Forest will support carbon sequestration and climate mitigation targets. In the short to medium term, ending logging in the 432,757ha of the southern forest region[7] will result in between 1.2 and 1.5 million tonnes of avoided emissions per year. Were a mechanism available for native forest to benefit from carbon sequestration, at a price for carbon of, say, $13 per tonne, this could earn between $15.6 million and $19.5 million per annum in this region. At a median wage rate of $70,000 pa this would generate up to 278 full time equivalent jobs.

MORAL RESPONSIBILITY

On a global and national front, the emergence of climate change and emissions reduction offer the potential for an alternative funding model for native forest management. Proper recognition needs to be given to the carbon stored in standing native forests and the role it could play in a national carbon emissions reduction scheme.

This will require innovative and progressive political leadership. In his essay *The Land Ethic,* conservationist Aldo Leopold articulated the need for, and the ethical basis of, a new relationship between people and the land. He imagined the awakening of an ecological conscience that redefines humanity as part of nature, rather than as its external conqueror. The dire conservation challenges he observed—soil erosion, water pollution, and wildlife loss—require solutions based not merely on ecological expediency, but on ethical conviction.[8]

Given that the RFAs for the southern forest region expire in 2019 and 2021, it is essential that the RFAs under a 'business as usual' model is not acceptable. National Parks Association members at local, state and national levels strongly support an end to the expiring RFA regime.

The RFAs for the southern forest region were signed in 1999 and 2001 before climate change emerged as an additional and compounding threat to habitats, to biodiversity and to nature's ability to store carbon. We have the capacity to address these threats by not using our natural resources for any extractive purpose and by using true renewable energy sources which would honestly help mitigate a changing climate. Scientists have commented: "In some respects, the RFAs must be viewed as being the antithesis of economic and environmental success"[9].

Financial Irresponsibility

Confidence in forestry's decision-making capacity is low. For example, in 2013, FCNSW revealed a loss to taxpayers of $765,000 in 2010-2011 by having undersold 480,000 tonnes of hardwood logs, or about 240,000 mature eucalypts from the southern forest region. Instead of being sold as millable hardwood, 80-90% of these trees were chipped and exported by South East Fibre Exports (SEFE), who then ran the native forest woodchip mill at Eden on the far south coast.

Cultural ignorance

Authors of this submission have witnessed first-hand how logging can destroy the heritage of Indigenous people. In early 2010, logging took place on designated sacred Aboriginal ground and koala habitat in Mumbulla State Forest.

The Aboriginal Boards of Management of the Biamanga and Gulaga National Parks made urgent representations to the Minister for the Environment and to FCNSW to stop the logging of sensitive forest coops. However, FCNSW logged these coops within weeks of these representations. Community protest, a 'walk in' led by Traditional Owners to reclaim the land, and representations to Government, brought an end to the logging after much damage and offence was experienced. These compartments formed a vital wildlife habitat for koalas and other native animals and contained several important sacred sites. Recent logging and proposed logging continues to fragment and break connections between forests. The Great Southern Forest would stop this type of insensitivity to Indigenous culture and sacred lands and protective wildlife corridors.

Conclusion

Enactment of this large-scale integrated landscape would conserve all native forests in the southern region of NSW. Examples of benefits to the natural and human worlds by the creation of the Great Southern Forest include that:

- supporting carbon sequestration will help Australia meet climate mitigation commitments
- jobs can be generated in this economically depressed region, helping replace those being shed in the dying native forest logging sector

- degraded, fragmented and disconnected forests can begin to be restored
- isolated and highly endangered koala clusters can be given the opportunity to connect
- increased protection can be afforded to many other endangered species in these south east State forests
- water can be conserved and degraded soils protected to improve forest health
- valuable fishing and oyster farming industries can be protected against frequently suffering from polluted run-off from logged catchments
- jobs in the mainstream tourist industry, a main employer in the region, can be protected and expanded and new dynamic commercial opportunities, including ecotourism, can be developed.

The Great Southern Forest would provide an internationally acknowledged model to complement those already being developed or implemented in other countries. The uniqueness of this imperative is defined by the characteristics and nature of the southern region of NSW; hence, this proposal responds to those requirements.

By adopting a connect, protect and restore approach to forest management, the Great Southern Forest will regenerate forests, which will help them to regain resilience from drought and fire and restore them to their naturally occurring beauty, supporting all life, from the mountains to the coastal seas, their soils, water and carbon stores.

The time has come for action to ensure the future of the koala, and other forest dwellers, by establishing the GSF as part of the national conservation initiative. This belief has proven to be justified by the compelling evidence presented at the IUCN's World Parks Congress (WPC) from many countries which have overcome huge environmental challenges; connected fragmented landscapes, restored degraded ones and watched wildlife return.

The GSF will focus global attention on Australia for having the world's largest protected habitat conservation area of 432,575ha of public land in south east NSW. The GSF will improve Australia's appalling extinction rate reputation by saving hundreds of faunal and floral species. The GSF will also help repair Australia's, and in particular, this State's reputation as having some of the world's most degraded landscapes.

RECOMMENDATIONS

The proponents of the Great Southern Forest recommend that, within the southern forest region of NSW, the State and Commonwealth Governments:

1. Do not renew the RFAs and stop logging (and burning) native forests, and convert all the State Forests into connected, protected and restored landscapes.
2. That the Australian Government emulate the six principles of the Maruia Declaration (circa 1977) which helped to bring an end to native forest logging in New Zealand that:

   a. Native forests, wherever they remain, need recognition and protection in law.
   b. The wholesale burning of indigenous forests and wildlife has no place in a civilized society.
   c. The logging of virgin forests should be phased out by 1978 (it ended in 2002).
   d. Our remaining publicly owned native forests should be placed in the hands of an organization that has a clear and undivided responsibility to protect them.
   e. To reduce commercial pressures on native forests, the growing of fine quality exotic and native timbers on land not presently forested should be given encouragement.
   f. It is prudent to be conservative in our consumption of these forest products, especially newsprint and packaging paper, which make heavy demands on our precious resources of land, energy and water[10].

3. At least match the New Zealand's Government's 'end native forest logging $120 million fund' to establish other industries for regional jobs such as in forest restoration and ecotourism.
4. Develop adjustments for a State Forests and National Parks & Wildlife Service package for a new management structure in consultation with stakeholders and scientific advisers.
5. Create culturally sensitive areas for the purposes of conservation-related activities, environmental services, carbon accounting and ecotourism.
6. Establish a restructuring and retraining package for displaced workers and some regional assistance.
7. Consider suitable packages for workers under principles of Just Transitions.
8. Develop agreements with private forest owners for cooperation on developing protective corridors across tenures.
9. Embrace the spirit and intent of the World Wildlife Fund to:
   a. Promote sustainable forest management practices that provide an economic alternative to forest conversion.
   b. Establish expanded, strengthened and well-connected networks of protected areas.
   c. Remove unsustainably produced agriculture and forestry products from global supply chains.
   d. Strengthen and clarify land use rights.
   e. Establish mechanisms that place greater value on ecosystem services like water quality, soil stabilization, erosion control and climate change mitigation.

Victoria's *Great Forest National Park* commissioned a study to be conducted into the economic benefits available from stopping logging the State's native forests. The NOUS [11] report detailed an analysis of additional economic contribution. This resulted in creation of

an estimate of economic benefits over ten years with recommended strategies including: change in tenure (not necessarily suitable for NSW's State Forests); park management and visitor expenditure, publicly funded attraction or private investment, plus ecosystem services from biodiversity preservation, water provisioning and carbon sequestration. It is recommended that the Federal and State Governments commission a similar study for the southern forest region of NSW.

Figure 1: Great Southern Forest promotional banner

RETHINKING FOREST MANAGEMENT

The economy is a wholly owned subsidiary of the environment. Whether at a national or global level, the economy exists inside the environment—the ecosystem. It's a box inside a circle, if you like. All human activity—all our producing and consuming—depends directly on the natural environment. The air we breathe, the water we drink, the food we eat, the clothes we wear, the shelters we build and the energy we use all come from the ecosystem that surrounds us.

Much of our economic activity involves misusing, overusing and abusing the natural environment. We've done great damage to our soil, rivers and aquifers, we've destroyed much habitat and many species, and now the world's overuse of fossil fuels is playing havoc with the climate.[12]

INITIATING A PARADIGM SHIFT

Ideals of a GSF-led management approach outclass a State's native forest logging management approach by accepting the following principles:

- forests are most productive if left in the ground 13
- forests should be valued for water, soil conservation, wildlife habitat and aesthetic qualities
- native forest jobs could relate to ecotourism, connection, protection and reforestation, and weed, disease and feral animal eradication
- Australia can improve its ranking of 7th in terms of habitat conversion, 10th for natural forest loss 14 and improve its poor rate as a carbon emitting country
- loggers recognise that some State forests have been logged too many times to recover
- logging practices destroy wildlife habitat
- a dollar value can be measured for carbon sequestration.

Around the world, native forests are being protected, tree nurseries are being created to restore degraded forestlands and increase seed production, mangroves are being innovatively re-established to help purify waterways, wildlife is being monitored, forests are being connected, seed banks of resilient species are being established, tourists are paying to see the new restored landscapes and wildlife, extraction industries are being discarded, Indigenous people are adapting practices to counter the effects of climate change, and youth are being drawn into conservation activities.

RESTORING FORESTS FOR WILDLIFE

Speakers at the World Parks Congress, Sydney, 2014, admonished that we should not give up on distressed ecosystems but push for conservation, push for connectivity using examples from other countries, and focus on restoration of degraded landscapes. Dynamic and practical methodologies for environmental protection involve: expediting conservation programs; learning from Indigenous people's land management practices; attracting volunteers; understanding the conservation lexicon; using more efficient wildlife tracking technology—even satellites; and, creating smarter economic models. Ecotourism has successfully replaced logging industries in many countries. IUCN Congress evidence showed that Australia may be the last country on earth to stop logging native forests.

An approach to sustainable jobs in forest restoration and wildlife protection, saving carbon emissions from not logging for climate benefit, and tourism would give mutually beneficial and complementary outcomes. Principles of the GSF would expand employment and incomes in sustainable sectors and jobs in the south east region of NSW. In 2014, the entire southern forest region logging sector employed only about 300 people including contactors,

and this number is shrinking. On the other hand, Tourism employs 58,500 people in the southern region.

The GSF advocates investment in a new critically needed forest restoration industry in public forests. Apart from restorative jobs which would be easily identified by the people who work in native forests, we suggest jobs would be required for:

- creating multispecies tree nurseries and silviculture for connecting fragmented landscapes
- caring for critically endangered small isolated colonies of koalas
- installing breeding boxes for hollows-dependent species, including birds, whose habitats have been destroyed[15]
- controlling pests, weeds and feral animals (dogs, cats, foxes, etc.) and fighting diseases [b]
- implementing fire management strategies and fire trail maintenance
- installing signs
- grading and repairing roads
- managing vegetation on roads/trails/walking tracks
- installing and maintaining fencing.

ECOSYSTEMS SERVICES

Ecosystems Services: Rosemary Beaumont

> *Ecosystem services are the benefits provided to humans through the transformations of resources (or environmental assets, including land, water, vegetation and atmosphere) into a flow of essential goods and services e.g. clean air, water, and food.*[16]

Recognition is given to the value of ecosystems services from the natural environment benefitting society, the economy and people. Estimation of the monetary benefits of ecosystems needs to be aligned with guarantees of 'no harm'. The potential harm threats to ecosystems services include: the implicit cost of damaging them; consequences of increased fire risk with logging; and, transgression of international, national and state legal agreements.

[b] Such as the destructive post-logging fungus ***Armillaria luteobubalina***
https://en.wikipedia.org/wiki/Armillaria_luteobubalina

Ecosystem services generally consist of four categories per the Common International Classification of Ecosystem Services (CICES)[17]:

- Provisioning services: Tangible goods and services that can be exchanged, traded, consumed or used directly by people e.g. food, clean water, raw materials, and agriculture and aquaculture.
- Regulating services: Ecosystem's role in controlling or modifying the parameters that define the environment; these ecosystem outputs are not consumed but affect individuals, communities and populations and their activities e.g. climate regulation; watershed regulation such as purification and flood control; and biological processes such as pest control, pollination and genetic diversity.
- Cultural services: Intangible ecosystem outputs that have symbolic, cultural or intellectual significance e.g. recreational services; spiritual and cultural connection; landscape amenity; health services; social cohesion and involvement.
- Supporting services: Services within or between ecosystems e.g. maintaining soil health and enhancing habitat for native species.

The establishment of management systems for our State Forests that ensure on-going and improving ecological integrity is critical. Ecosystems services need to be based on the understanding that ecological integrity is inseparable from Life and a positive human future. The public native forests in south eastern NSW offer a perfect coalescing of factors to pioneer a far-sighted approach to managing our forests to ensure perpetuating patterns of ecological integrity and activating the regional economy with new money and jobs.

CARBON COULD FUND JOBS

Carbon could fund jobs: Frances Perkins, Bronte Somerset

The price of carbon at the April 2015 Federal Government auction fell from $23 to $13.95 per tonne and to $12.25 per tonne at the November 2015 auction. However, even at this lower figure, the, say, 1.2 to 1.5 million tonnes of carbon emissions, Perkins and Macintosh[18] estimate could be saved by ceasing logging the southern region and could earn between $14,700,000 to $18,750,000 per year at this lower carbon price. At a median wage in the southern regions' shires, of $70,000, this carbon credit income could be used to generate up to 267 full time equivalent sustainable jobs. Innovation driven by new opportunities would enable the creation of a broader base of jobs in small to medium sized businesses away from the mindset which connects places like Eden to the sole business of woodchipping.

While softwood plantation timber employment increases, only about 30 jobs remain in the native forest woodchip mill at Eden. With the creation of the GSF, the potential $18,750,000 of carbon credit benefits per annum could fund investment and jobs in forest restoration.

Based on actual and projected tourism employment the preserved forests also could be expected to create additional jobs in eco and mainstream tourism, and protect the jobs already in this sector in the Bega and Eurobodalla Shires, see Table 1.

Employment outcomes under the carbon capture scenario also are superior to the projected current logging scenario after 2020 as shown in Table 2 [19]. While employment in the native forest logging and processing sector is declining, and likely to fall further in future due to the sector's poor financial outlook, employment from the carbon capture scenario already almost matches its 2012 level and could be expected to grow in future years, as international carbon prices recover.

Table 1: Employment generated in Southern Forestry Region from native forest logging activities (Full Time Equivalent)

Harvesting scenarios	H1: Chipping and saw logs 2011-12	H2: Chipping and saw logs end 2012	H3: Saw logs only est. 2013
Processing – chip and saw milling	188	159	139
Logging and haulage	139	91	25
Total industry	327	250	164
FNSW personnel	79	75	30
Total including FCNSW	406	325	194

Table 2: Employment generated in Southern Forestry Region from carbon capture activities unlogged from native forests (Full Time Equivalent)

Scenario CC 1: Carbon capture, potential employment funded by Australian Carbon Credit Unit income					
	2014	2015	2021	2025	2032
Carbon assessment, forest management, weed and feral animal control, wildlife preservation	205	205	205	205	205
Fire and walking trails, tourist roads, other infrastructure	51	51	120	120	120
Health & educational personnel	-	-	75	75	75
Total	256	256	400	400	400

Table 2 shows that employment generated from ACCU income from not logging the State Forests of the southern forest region would level off at about 400 full time equivalent jobs in forest management, and health and educational personnel alone. This does not include the boost to tourism which would result from a focus on using the regenerating forests for attracting visitors and the consequent return of wildlife as has been experienced in other

countries which have ceased logging native forests. The Great Southern Forest holds great potential for the future of forests and the planet.

These opportunities would breathe new life into the way we traditionally have used our forests, transitioning from short term extraction to best practices forest management compatible with other Great Eastern Ranges conservation initiatives: The Great Northern Koala Park, NSW, and The Great Forest National Park, Victoria.

Photo 3: Looking east towards Wallaga Lake with Gulaga (Mt Dromedary) on the left, the late Richard Green

FOREST MANAGEMENT FOR SPECIES UNDER THREAT

This section describes the reasons for decimation of the koala population in south east Australia, location of remnant populations, and the Governments' well-intentioned but practically ineffective attempts to manage koala populations alongside industrial logging of native habitat. It highlights the opportunity to create large scale interconnected landscapes such as the GSF promotes in the southern region of NSW, to support connectivity for all wildlife; an endeavour which takes into account specific contextually driven management challenges such as translocation options.

PROTECTING OUR ICONIC KOALA FROM EXTINCTION IN SOUTH EAST NSW

Protecting our iconic koala from extinction: Kim Taysom, Bronte Somerset

TIMELINE OF THE KOALA (PHASCOLARCTOS CINEREUS) IN AUSTRALIA

"The shooting of our harmless and lovable native bear is nothing less than barbarous... No one has ever accused him of spoiling the farmer's wheat, eating the squatter's grass, or even the spreading of the prickly pear. There is no social vice that can be put down to his account...He affords no sport to the gun-man... And he has been almost blotted out already from some areas." [20]

Photo 4: 'Sapphire' southern long haired koala from Potoroo Palace, Merimbula, NSW

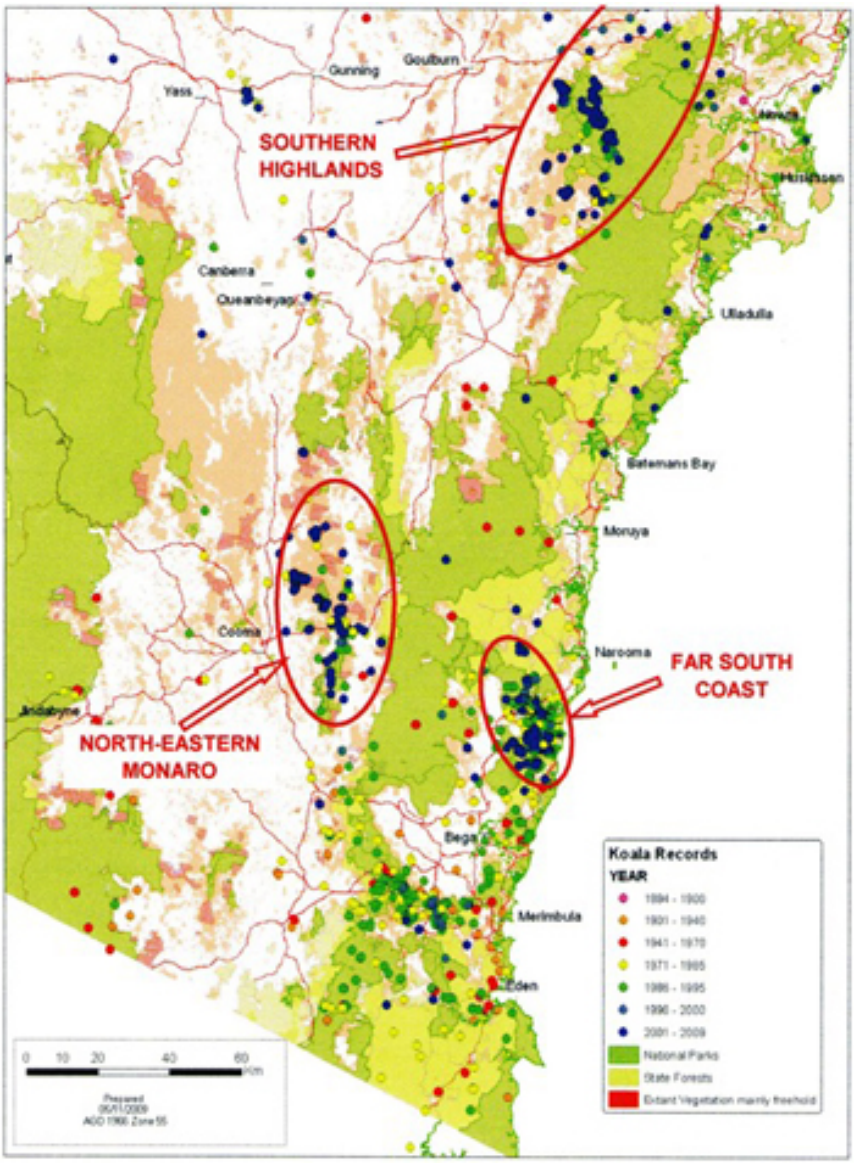
Table 3: Australia-wide Koala Population Trends [21]

14 million years ago	Millions of koalas existed in Australia
During late 19th century	300,000 koala pelts PER YEAR were sent to London
1898	Legislation passed in Victoria to stem killing but not enforced
1908	57,933 koala pelts exported
1919 to 1921	208,677 koala pelts sold in the US fur trade
1927	584,738 koala pelts sent to the US. Population devastated & President Hoover banned import of koala pelts to the US
By 1940	0 in South Australia 200 in NSW 2-3,000 in Victoria 10,000 in Queensland but declined when habitat destroyed.

Thus, koalas have moved across the Australian landscape for millennia; the Southern Koala—the largest koalas on Earth—originated on the NSW south coast and was once found from the border of Queensland to South Australia.

Table 4: Koala Population estimates in Southern NSW presented to DEWHA workshop [22]

Region	Tentative estimate	Possible Recent Trends
Southern Highlands	200 - 500	Stable
NE Monaro	150 - 400	Stable
Far South Coast (NE of Bega)	25 - 50	Stable
Far South Coast (Kooraban NP)	Probably similar	Unknown



Map 1: Koala records in south east NSW, colour-coded by decade, and approximate boundaries of the three known koala populations, from 1894 to 2009.

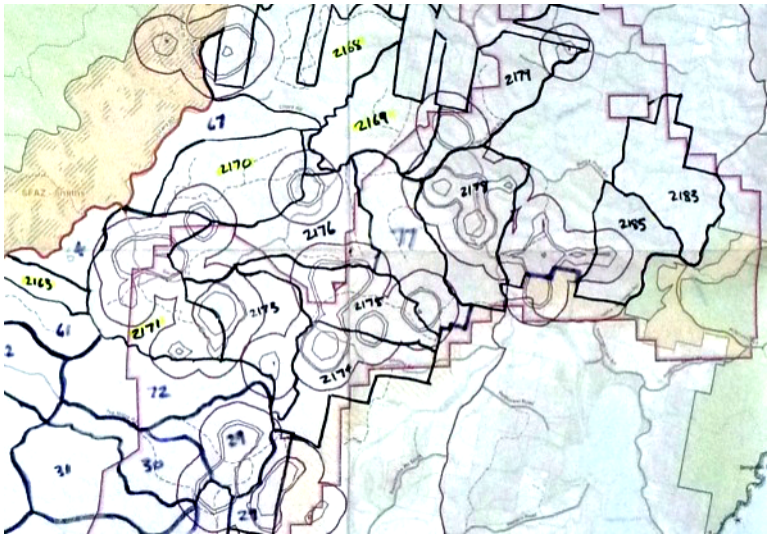
BACKGROUND

Since 1788, nearly 65% of the koala forests of Australia have been cleared—over 116 million hectares. The remaining 35% (41 million hectares) remains under threat from land clearing for agriculture, urban development and unsustainable forestry. Existing forests play a vital role in carbon sequestration and storage; eucalypt forests are some of the most valuable carbon sinks in the world. Australia could lead the world by protecting these forests for their immense carbon value. If the remaining koala forests of Australia were to be cleared, we would need to plant 22 trillion saplings to remain carbon neutral. These saplings would cover three times the area of Australia.[23]

Historical records indicate that the koala population of the far south coast of NSW and the Bega Valley was at a high level from the 1860s to the end of the century, with the fur trade reaching its zenith during the 1870s and 1880s. No significant reduction in the koala population was recorded before 1905 and yet by 1910 koalas were not commonly seen and a sighting was considered noteworthy. The population crash was due to the cumulative impacts of the progressive clearing of the forests of the Bega Valley and co-occurring factors such as drought, fire and disease.

In the 1980s, with industrial scale integrated logging (woodchips and sawlogs) reaching areas of known koala habitat, the need for koala protection increased. Koalas were located in areas threatened by logging, and as a result of surveys undertaken by members of the public, in 1990 the NSW government promised a plan of management to ensure the regional conservation of the koala.

There followed a period of koala surveys and research, often conducted in an atmosphere of conflict between various government agencies responsible for forest management. A major area of contention was whether koalas in State Forests could be effectively managed by site-specific protection within logging operations. Following adjudication by independent koala experts, a patchwork of management compromises emerged which included periodic moratoria in areas of particular sensitivity. The practical application of this attempt is obvious: who told the koalas? Throughout this period, as is the case today, koala conservation was incongruously managed alongside industrial scale logging.



Map 2: Example of Forest Corp's inadequate exclusion zones in koala habitat—feint penciled circles in logging coops in south east State Forests in NSW

CURRENT KOALA SITUATION

It is clear that the dramatic decrease of koalas in the south east forests of NSW since colonization is due to past land clearing, koala hunting, and disease. It is an embarrassing national shame.

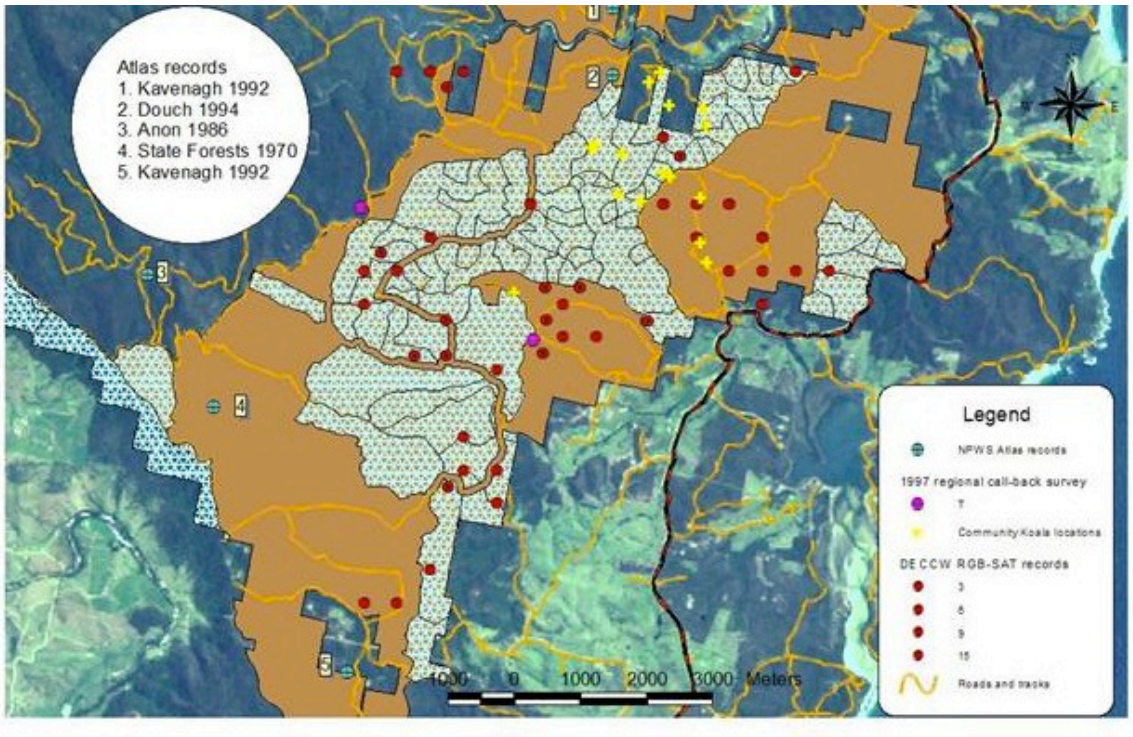
The forests of south east NSW are some of the most carbon rich in the world. Obliviously, and in denial of the environmental national crisis, Forest Corp NSW sends 2,500 to 3,000 logs daily to the Nippon owned Eden Chipmill. Consequently, grave losses are routinely incurred in native forests in terms of habitat, endangered floral and faunal species, carbon, water and soil. Continuing evidence of forest destruction and consequent degradation of biodiversity includes: loss of species; loss of carbon storing advantages; and, fragmentation of landscapes. For decades, forest ecosystems have been substantially modified due to industrial logging for exporting woodchips. All NSW southern forests were at times, and are potentially: koala habitat.

Recently announced threatened species status of koalas does little to protect these southern koalas in State Forests, because those forest and thus, their wildlife, remain vulnerable to logging activities, as the subsequently devised logging exclusion zones give inadequate protection to these unique and precious koala habitats. The provisions of the Environment Protection and Biodiversity Conservation Act (EPBC) do not apply in State Forests. This is a travesty which makes no logical sense.

Today the critically small Bega Valley koala population is recovering, albeit from a very fragile base of about 70-80 animals. They extend over approximately 30,000 hectares between the Bega and Bermagui rivers with a few outlying koalas hanging on in the Kooraban National Park to the north. This area is mainly public land, including Biamanga National Park, with the highest concentration of koalas in Mumbulla State Forest (Map 3).

Expanding numbers are being recorded in forests where logging and bushfires have not occurred in the past 30 years.

Logging and fire are the two main threats to these last healthy population groups. Koalas require deep-rooted, tall trees and logging compromises their ability to disperse and connect with other populations, say, in the Southern Highlands and Southern Tablelands.



Map 3: Logging coops and Koala records, Mumbulla State Forest, NSW up to 2015.

In 2012 the NSW Government received $1.935 million from the Commonwealth Biodiversity Fund for a cross-tenure landscape management project to assist the conservation of koalas in the region. The result of detailed assessment of more than 1,000 sites across the coastal forests study area points to the koala holding its own and perhaps even increasing in numbers in certain areas. However, surveys in the escarpment forests of Tantawangalo and Yurammie to the southwest, where a population persisted into the 1990s, have not detected any koalas and suggest a localised extinction.

SIGNIFICANCE OF THE FAR SOUTH COAST KOALAS

Although small in numbers, these far south coast koalas could play a key role in the total spectrum of koala conservation.

- Firstly, the far south coast koalas reside in forests providing an important link between it and the other two known populations in south east NSW. The Southern Highlands population, centred in the Shoalhaven area west of Nowra, is thought to number at least several hundred koalas. The Southern Tablelands

population, east of Cooma, occupies a series of ranges that run north/south (Map 1) and is thought to number in excess of 500 koalas. There is also the potential for the Far South koalas to link up southwards to the Mallacoota population in northern Victoria. These connectivities will be central to the long-term success of koala recovery.

- Secondly, the forests of south east NSW do not face the high level of development and population encroachment facing northern NSW. This could provide significant management advantages over the longer term.
- Thirdly, the coastal forests of NSW will assume greater significance in terms of koala management as inland areas of NSW are more severely impacted by climate change. A hotter, drier landscape will demand a re-appraisal of our approach to koala management.

The koala species is recognised by the International Union for Conservation of Nature (IUCN) as being highly vulnerable to climate change, with little capacity to avoid weather extremes. A study of koalas in the Gunnedah region of inland NSW showed that drought and extreme heat killed 25% of the population in a single year. This episode should act as a harbinger of what is to come as climate change evolves.

As inland habitats in NSW become climatically unsuited to koalas, there will be increasing need to protect the more mesic (moderately wet) forest habitats closer to the coast.

MANAGEMENT CHALLENGES

Research into the far south coast koalas illustrates the challenges involved in studying such a low-density population, in terms of actually locating animals and gathering base-line information. Applying standard and mathematical techniques appropriate for higher density species cannot solve these problems.

Koala populations arrange themselves in reasonably stable home ranges in a complex and vulnerable social system. While there is long-term fidelity to the home range, maintained by dominant individuals, sub-adults are very mobile. Young males in particular, are known to travel long distances. It is these dispersal patterns and the connectivity between isolated populations that prevent inbreeding and are crucial to long term recovery. This is what makes effective koala management so difficult in multiple use forests. It is simply not viable to ring fence known koala populations inside conservation zones without protecting dispersal and interaction across a broader landscape.

The efficiency of multiple-use management strategies in koala conservation remains contentious. There is still insufficient information to simply integrate production forestry and koala conservation. How does logging effect the social interactions between koalas and the overall viability of koala populations in the long term? History tells us that cumulative impacts over long periods can lead to the sudden and dramatic collapse of koala populations.

The disturbance and fragmentation of the forests continues. However, at what point the area of logging becomes a critical threat or a tipping point is not known. In short, the current logging regime represents a risk, albeit an unquantifiable one. The highly fragmented nature of forests in the region dictates that this small remaining population should be treated conservatively. The precautionary management of koalas is warranted.

KOALA TRANSLOCATION

Given the tenuous state of the far south coast population, a decision was made to try to relocate koalas from Victoria to the area. This would have been a slow and gradual process as the various procedures and protocols would need to be addressed, and acclimatization and monitoring programs are established. However, selecting participants in this translocation proposal has been hampered by disease. This obstacle makes it even more imperative for the forests of south east NSW to become safe havens for fragile existing koala colonies.

The Victorian koalas would have been settled to the southwest of current known populations, partly due to historical factors and also because dispersal of animals over a wide area offers a greater chance of survival. As things stand, a major wildfire burning in the forests between the Bega and Bermagui rivers could lead to the regional extinction of the koala.

The success of any koala recovery program is by no means assured. A major factor would be the extent to which the management of the forests can be weighted towards biodiversity protection rather than the current priority of pulpwood production.

The principles of the Great Southern Forest are the only option, within the capacity of legislation to control, to give this population a fight chance.

LEGAL ANOMALIES

The Great Southern Forest responds to present anomalies in law. The Australian Government has changed the koalas' status from 'vulnerable' to 'threatened'[24]. This is commendable as koalas have the same charismatic reputation enjoyed worldwide as pandas and polar bears, yet they struggle to survive in some parts of Australia.

Conservation advice from the Department of Environment and Heritage for local councils, government agencies and non-government organisations is for the protection of koalas on a regional level. It includes the recommendation to protect areas containing koala populations or which could support them in the future[25]. This conservation edict states that any development or project activity that is deemed to have an unacceptable impact on the Environmental Protection and Biodiversity Conservation (EPBC) [26] Act-listed koala populations would not be approved under national environment law [27].

Yet Forest Corporation claims it is exempt from the EPBC 1999 Act, the principle of Commonwealth Law. Section 2.7 Forestry and National Park Estate Act (1998/2008) of the Recovery Plan for the Koala [28] still provides for logging to be undertaken in State Forests that fall under Integrated Forestry Operations Approvals [29]. Forest Corporation is exempt from the full weight of the threatened species directive as logging is permitted within koala habitats subject to the observance of 'exclusion zones' in known habitats. Koala experts consider that these zones will not ensure their survival because their capacity for territorial expansion and connectivity will be lost. Thus, the remnant unique longhaired Southern koalas in south east forests remain at risk. Native forest logging concessions spell the death knell for these koalas plus other species inhabiting logging coops.

Photo 5: Children protecting their local State Forest

HOLLOWS-DEPENDENT SPECIES

SPOTTED-TAIL QUOLL (DASYURUS MACULATES)

Spotted Tail Quoll: David Gallan

The Spotted-tail Quoll, also known as the Tiger Quoll, is mostly nocturnal and is about the size of a domestic cat, with irregular white spots on its back and tail, and a pale belly. It is classed as vulnerable in NSW and is an endangered animal nationally.

An excellent climber, the tiger quoll consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects. It also eats carrion and takes domestic fowl. The range of the tiger quoll has been reduced in size considerably and it is now found only on the east coast of NSW. The tiger quoll lives within a range of habitats, including rock outcrops, rainforest, open forest, woodlands, coastal heath and inland

riparian forest, from the sub-alpine zone to the coastline. Quolls travel along densely vegetated creek lines. Individuals make their dens in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces.

Loss, fragmentation and degradation of habitat are the main threats to the spotted-tail quoll. Accidental and deliberate poisoning, shooting and trapping are also of concern, and the quolls compete for food with introduced predators such as cats and foxes. The most important safeguard is to retain and protect large, forested areas with hollow logs and rocky outcrops, particularly in areas with thick understories or dense vegetation along drainage lines. [30]

SEARCH FOR THE SPOTTED-TAIL QUOLL

Search for the Spotted-Tail Quoll: David Gallan

Being an apex native predator on the mainland, the elusive spotted tail quoll is found in patches of old growth forest supporting higher densities of aboreal mammals. In many regards, it is an indicator species of the health of a forest. An agile climber and aggressive ambusher, the quoll, with its attractive white spots, is a remarkable animal.

For the film, *UNDERSTOREY,* (Synopsis Appendix D) attempts were made over two years to record the spotted tail quoll in native forests. Five infrared motion video cameras were set in various places, on private forested land where farmers had lost chickens to quolls and in far south coast national parks: South East Forests National Park (Coolangubra, Yurammie and Tantawangalo sections), Mimosa Rocks National Park, Deua National Park, Wadbilliga National Park, Gurrock National Park and Monga National Park.

There's little doubt that quolls live in all the stated parks according to oral and written records. But the animal has a huge range and is hard to detect. And quolls are not as densely distributed here as they are on the north coast. After consultation with an honours student from University of Wollongong (Team Quoll) it seemed it would be quite a challenge as their success rate was between 2% and 3% for set cameras.

For two years many foxes, feral cats and dogs were recorded but no quolls. Another tip off from a farmer living near a National Park (who nearly lost a small dog to a quoll) gave encouragement and three different quolls were recorded for the film between November 2015 and February 2016.

The quoll is a nocturnal hunter but pleasingly, the quolls recorded are also quite active during the day, mainly between 8:30 and 10:30 am and, at times, during the middle of the day, and this resulted in colour video footage of them exploring through the undergrowth and bounding along logs. The results suggest that feral animal control (though not through aerial baiting) and old growth forest preservation are vital for the ongoing viability of the spotted tail quoll in the SE.

UNDERSTOREY (Synopsis Appendix D) also features several Superb Lyrebird clips of bathing, mound maintenance, calling, displays and courtship. The courtship sequence recorded from two angles is extremely rare and shows the various calls the male makes to win over the female as she observes from a branch or is herded in circles around the mound while the male is in full display with his tail lowered over his head.

Photo 6: A rarely sighted Spotted Quoll. Dave Gallan

GREATER GLIDER (PETAUROIDES VOLANS)

The Greater Glider: David Gallan

The Greater Glider, as the name implies, is the largest gliding possum native to Australia and can measure over a metre from its nose to end of the tail. It is found in east coast eucalypt forests from Queensland to Victoria up to an altitude of 1,200 metres above sea level.

As the greater glider feeds on eucalypt leaves it does not have far to forage when it emerges at night from its den in a tree hollow. Being silent they can be harder to detect but if close, observers may hear them defecating from branches soon after dusk. They can glide 100 metres to another tree when the need arises by stretching the membrane connected to their elbows. Their eyes are very reflective and makes it possible to spotlight them even in the forest canopy.

According to the Australian Museum the greater glider "is extremely variable in colour, ranging from dark chocolate to white even in the same area." [31]

Here is a photo of a dark phase greater glider moving through a viminalis feed tree in Wadbilliga NP under the full moon.

Photo 7: Greater glider moving through a viminalis feed tree in Wadbilliga NP under the full moon. David Gallan

IMPACT OF FORESTRY ON THE GREATER GLIDER

Impact of Forestry on the Greater Glider: Harriett Swift

The greater glider the longest glider in the world, but also one of the clumsiest. The greater glider communicates using scent, instead of sound, and is notable for its large, furry ears and its ability to glide up to 100 metres. NSW has one endangered population of the greater glider – in the Eurobodalla region, on the south NSW coast. It is not listed as a threatened species in NSW, but it should be.

Although they can glide more than 100 metres they are highly territorial and require large hollows in eucalypts that generally only form after 160 years. Even if Forestry Corporation staff searched for it in pre-logging surveys, it would be very hard to find. It does not vocalise so it is very difficult to detect.

When a den tree is felled, many will be killed by the fall. If a glider is lucky, it may escape but will almost certainly either be taken by a predator or starve to death.

After decades of logging, Greater Glider populations have crashed and it is not hard to see why. Reflecting on his early life as a forester in south east NSW, RA Curtin wrote:

> "I admit that we got some entertainment out of watching the Greater Gliders Petoroides Volans volplane to the ground, climb the next tree only to have it cut down again. I did not give thought to the survival of the gliders because it seemed to me there was a lot of similar forest available to them. The important work of Tyndale-Biscoe and Smith had not yet been undertaken. This demonstrated that these animals

did not survive once their home range was destroyed. Unfortunately, I did not become aware of this work until the mid-1970s."

Curtin was writing of events 60 years ago and there is still nothing to protect these extraordinary animals from logging in NSW.

Photo 8: A greater glider killed in logging, Errinundra Plateau, East Gippsland. January 2016

BURROWS-DEPENDENT SPECIES

Burrows-dependent Species: Marie Wynan, Wildlife Carer, Jarake Sanctuary

BARE-NOSED WOMBATS *(VOMBATUS URSINUS)*

This account of recent logging in Glenbog State forest demonstrates the need for wildlife protection in all State Forests, whether wildlife carers live next to them or not.

> We live next to the Glenbog State Forest and were notified from NSW Forest Corp. that Glenbog State Forest was about to be logged. On behalf of Wombat Protection Society and Wildlife Rescue Far South Coast (as a Director on the Board of WPSA and Wombat and Macropod coordinator of WRFSC) we wrote to the Forestry Corporation of our concerns. A meeting was held at "Jarake Sanctuary" (our home) with the Forestry Office planner who told us of their "non-duty of care to consider the Bare-nosed wombats or their burrows and it was just matter of collateral damage".
>
> We GPS recorded 150 Bare-Nosed Wombat burrows and marked them with yellow high visual paint and yellow survey tape within the compartments proposed for 'harvest'. We were concerned because the entrances would be blocked and the burrows destroyed, collapsed and bulldozed over. It would create injury and a slow suffering death, separation of mothers and their joeys, loss of habitat leading to starvation and disease, especially mange.

During the time of scanning the ground and marking burrows, we saw that the area included a disease and mange free healthy population with strong individuals, before trucks, dozers and heavy machinery moved in. Due to the landscape of harder/rocky soil, there were no burrows with multiple entrances.

Roads and dump points had been planned across and above active burrows. We gave Forestry information such as GPS records and photos of high risk threats to burrows, ie active burrows within dump points and along proposed new roads and tracks that needed to be cleared by bulldozer. After many phone calls and emails it was agreed to put the following new clauses into the final Operational Approval Plan:

> Haulage times
> *Truck movements are restricted during the early morning and late afternoon. No haulage may occur in the morning before sunrise or from one hour prior to sunset.*
>
> Injured wildlife
> *Private property (Lot 110) located adjacent to the western boundary of compartment 2321 is owned by…. . If operators identify any wildlife injured during the operation have requested that it be reported to them as soon as possible so that they can collect and treat the injured animal. Call to report any injured animals.*
>
> Common wombat
> *As far as practicable damage to wombat burrows must be avoided. In particular, care should be taken to ensure that burrow entries are not collapsed or obstructed by large woody material, rocks, etc. Approximately 100 wombat burrows have been marked with yellow/black striped paint in the field by local representatives of the Wombat Protection Society to assist machine operators in identifying their location.*

As the logging began, burrows were decimated, bulldozed and flattened, large cut down trees were felled above the entrances to burrows, entrances were blocked by debris, soil, logs and branches. A road was built above an active burrow and tonnes of cut down timber were piled up above another burrow. No consideration for haulage time were met and we never received one phone call regarding injured animals.

As the logging finished each day, we went out to clear debris at entrances and to dig out back filled burrows trying to re-open the burrows for wombats to be able to escape a horrendous slow death.

Eight weeks after ‘harvest’ started we found an injured wombat with head and facial trauma who also had clinical signs of mange (approx. 5 weeks into the mite

infestation) caused by stress of losing its habitat. We found another deceased wombat under logging debris. Mange became wide spread from the stress in the surviving wombats living at the edges of the logging zones. After the contractors finished each section, we followed up with mange treatment and food drops of meadow hay in the remaining 'saved' burrows.

Due to public outrage, pressure from media and the Environmental Protection Authority, an internal investigation commenced and the Forestry started to improve their practices and many burrows were then saved. A dump point was moved to a section without burrows, a road was slightly relocated 'around' an active burrow instead of above it. NSW Forestry is currently doing a trial in a different section of the Genbog State Forests to locate and GPS record burrows within dump points and road work.

Photo 9: Ignored wombat burrow, blocked by logging debris. Glenbog State Forest 2014. BJS

ENDANGERED SPECIES

"Expired, unfinished or undeveloped: conservationists call for more transparency and accountability in species management systems. Less than 40% of Australia's nationally-listed threatened species have recovery plans in place to secure their long-term survival.

And close to 10% of listed threatened species are identified as requiring plans to manage their protection but the documents are either unfinished or haven't been developed, according to data published by the Department of Environment and Energy.

Other critically endangered, endangered and vulnerable species have plans that are years or decades out of date and contain no detail on what actions have been taken to ensure a species avoids extinction.

Conservationists want an overhaul of Australia's national environment laws—the Environment Protection and Biodiversity Conservation (EPBC) Act—to bring transparency and accountability to the country's opaque system of species management.

> *"Nobody seems to have ultimate responsibility for protecting them" Wilderness Society National Director, Lyndon Schneiders.*[32]

CONCLUSION

Conclusion: Paul Payten

Since the 1970s, concerns about logging in south east NSW have been part of the public's consciousness and actions. This long campaign to protect our native forests and their life-giving properties for humans has wrought some compromise along the way when new National Parks were established. Included in this beautiful and diverse landscape is the wildlife within it: arboreal dwellers, those living above, on and under the soil's surface and in the waterways, struggling against high odds to survive.

Bring this campaign into the 21st century seems counterintuitive, as there is now no mystery about what contributes to, and what causes, species extinctions and climate change.

However, the Commonwealth and State Environment Ministers leave unanswered the question of native forest management, and how to best care for State Forests once the regional forest agreements terminate.

How many species of fauna and flora will be extinguished before our natural system breaks down irreparably? This seems to be a question unanswered, yet do we really want to know the answer to this one?

In this context, the Great Southern Forest concept is based on the Precautionary Principle and offers a credible and achievable alternative plan for a healthy and sustainable future for all species, many threatened and most unique, of this region.

Photo 10: Endangered Swift Parrott, Larry Dunis

Photo 11: The vulnerable Powerful Owl, David Gallan

FOREST MANAGEMENT FOR CARBON AND CLIMATE

> *Carbon sequestration policies remain at a higher level of abstraction, stating merely strategic objectives, possibly because these markets are only emerging and remain political and highly uncertain.* [33]

This section discusses the nature of carbon and its influence in the southern region's State Forests. It discusses the nature of carbon, losses, benefits and solutions and introduces a carbon pilot project. It outlines global strategies designed to mitigate carbon emissions as a defence against climate change.

It discusses the concept of funding new forest management in the Great Southern Forest from carbon credits as providing a practical opportunity for emissions reduction in State forests of the southern forest region. It emphasizes the mitigation solution involving stopping logging of native forests and highlights the destructiveness of biomass burning.

CARBON PROTECTION

Carbon: chemical symbol C is a non-metal that has two main forms, diamond and graphite. It is also found in its impure form in charcoal, coal and soot.

Carbon dioxide: chemical symbol CO_2 is a colourless odourless gas produced by burning carbon and organic compounds and by respiration. It is naturally present in air, about 3%, and is absorbed by plants during photosynthesis.

The Great Southern Forest is the southern region's community vision for beyond the 1990's RFAs which did not take into account current science regarding carbon benefits. It recognises the carbon carrying capacity of our southern region's forests and potential global market forest carbon credits programs.

Strategic approaches to native forest use now, as compared to 20–100 years ago, should be redefined. Given our new scientific and empirical knowledge of climate change and carbon emissions [34], if Australia doesn't form a new theory-to-practice approach to forest management, it would seem that we are denying what is happening around us.

Carbon accounting for forests is mandatory under the Kyoto Protocol[35]. As a signatory, the Commonwealth is internationally bound to meet emission reduction targets. This requires that all signatories shall implement protection and enhancement of sinks and reservoirs.

Since the discussion regarding a carbon price, the definition of the term 'forest use' has been turned on its axis. Potential and already realized opportunities afforded by a price on

carbon, and the influence of climate change, should throw a whole different light on decision making for forest use. Australia's governing bodies must endeavour to emulate the global ideologies which drive the need for conservation, restoration and protection of our native forests and all they contain [36].

The emergence of climate change and emissions reduction, as both global and national issues, offers the potential for an alternative funding and working model for native forest management. Proper recognition needs to be afforded to the carbon stored in standing native forests and the role this could play in a national carbon emissions reduction scheme. This will require innovative and progressive political leadership.

What may not be recognized, is that the sense of urgency is not just hype. Scientific evidence to supports that emissions in the near future are potentially more damaging than deferred emissions and future sequestration does not compensate for emissions now. Therefore, it is a priority to protect the stores of carbon in existing native vegetation, especially old growth and mature forests, because it takes decades or centuries for all the emitted carbon to be recaptured.[37]

CARBON LOSS

Trees create the oxygen-rich atmosphere essential for life on Earth. It is estimated that temperate forests absorb between 10 and 20 tons of carbon dioxide per hectare each year, through photosynthetic conversion into starch, cellulose, lignin, and wooden biomass. Photosynthesis captures the sun's energy and converts CO_2 into green carbon in plants which release oxygen. With brown and blue carbon, green carbon in trees is a perfect carbon capture and storage device.

Eucalypts evolved as this island continent dried, and fossil fuels were buried after ancient forests collapsed. Digging up coal, oil and gas and burning these fuels releases greenhouse gases. The natural hardwood forests in south east Australia are among the most carbon-dense forests in the world; typically, twice the carbon density of tropical forests.[38]

Australia entered the Anthropocene period as 19th century colonial expansion saw relentless clearing of forests for farmland, firewood and building. During the 20th century, logging was accelerated and climate change became partly attributed to clearing and degradation of native forests because carbon storage systems were being destroyed.

SOLUTIONS TO CARBON LOSS

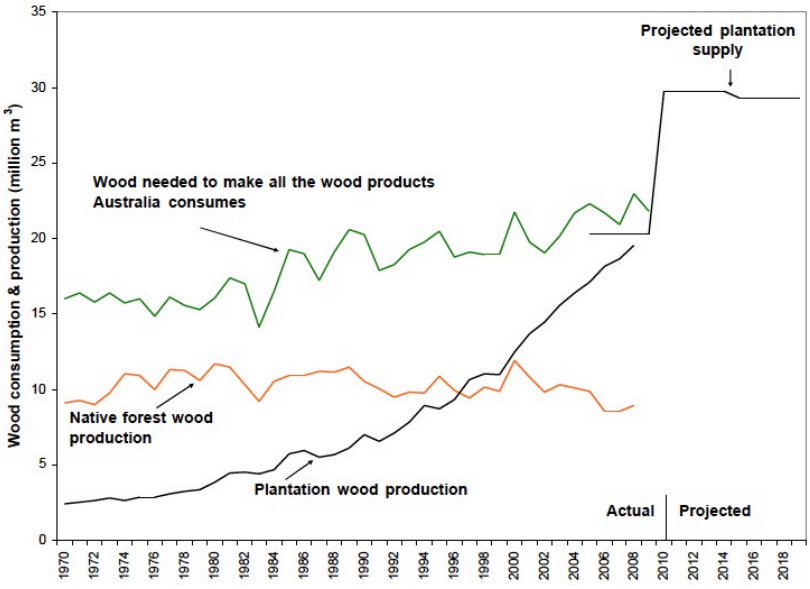
Planting trees is restorative but young trees capture negligible carbon in the first decade according to Emissions Reduction Fund (ERF) graphs [39] so the Australian Government created an ERF option for Avoided Deforestation for native forests [40]. The ERF has three

elements: crediting emissions reductions, purchasing emissions reductions, and safeguarding emissions reductions. If one were to wade through the methodological determinations and satisfy the requirements, projects to reduce emissions by protecting native vegetation from being cleared should provide an opportunity for generating carbon credits under this, the Government's own plan.

STOPPING EMISSIONS FROM LOGGING

Today, Forestry Corp. trucks 80%-90% of the native forest it logs to the Eden Woodchip Mill from the southern forest region of NSW. The traditional loss-making logging contracts, still applicable to native forests in State Forests of the southern region, could be converted into profit from carbon credits. This opportunity could be realized by stopping the massive avoidable up-front pulse of carbon pollution/emissions caused by logging and post-logging burning of the region's native forests. In support of this initiative, logging our native forests is unnecessary as Australia can meet nearly all its domestic timber needs from plantations as Graph 2 shows. Logging native forests causes immediate emissions (around 60% of forest carbon in these forests is lost in logging) which cannot be recovered except over decades to centuries (an estimated 53 years to recover 75%, 152 years to recover 90%)[41].

Appendix B shows CO_2 emissions from logging native forest on the South Coast of NSW for the 2006 to 2007 year, Table 5. These statistics incorporate sub totals from actual logging, machinery use, roading and vehicle use, chipmill operations and Forest Corp (formerly FNSW) operations. Leaving trees to grow maximizes carbon sequestration as re-growth approaches its full carbon carrying capacity beyond 100 years. Will the Australian Federal and State Governments measure State Forest carbon emissions to enable authentic evidence-based decisions?



Graph 1: Australia's existing plantations can meet our wood needs—an opportunity for major native forest protection with forestry growth[42]

BENEFITTING FROM OF OUR CARBON RICH FORESTS

The Australian Greenhouse Office and the Intergovernmental Panel on Climate Change have underestimated the amount of carbon held in native eucalyptus forests and soils by up to 400%. According to Australian National University (ANU)[43] researchers, native eucalypt forests across south east Australia store far more carbon than previously thought, and this has far-ranging implications for climate change policy. 'There is much more carbon in our natural forests than we thought', said Professor Brendan Mackey who led the research group. 'This means the potential amount of avoided emissions is much larger, and therefore there's much more to be gained from protecting them from logging. It follows that the risks of logging are greater than we thought'[44]. Another ANU study showed that unlogged forests contain three times more carbon than a logged forest.[45]

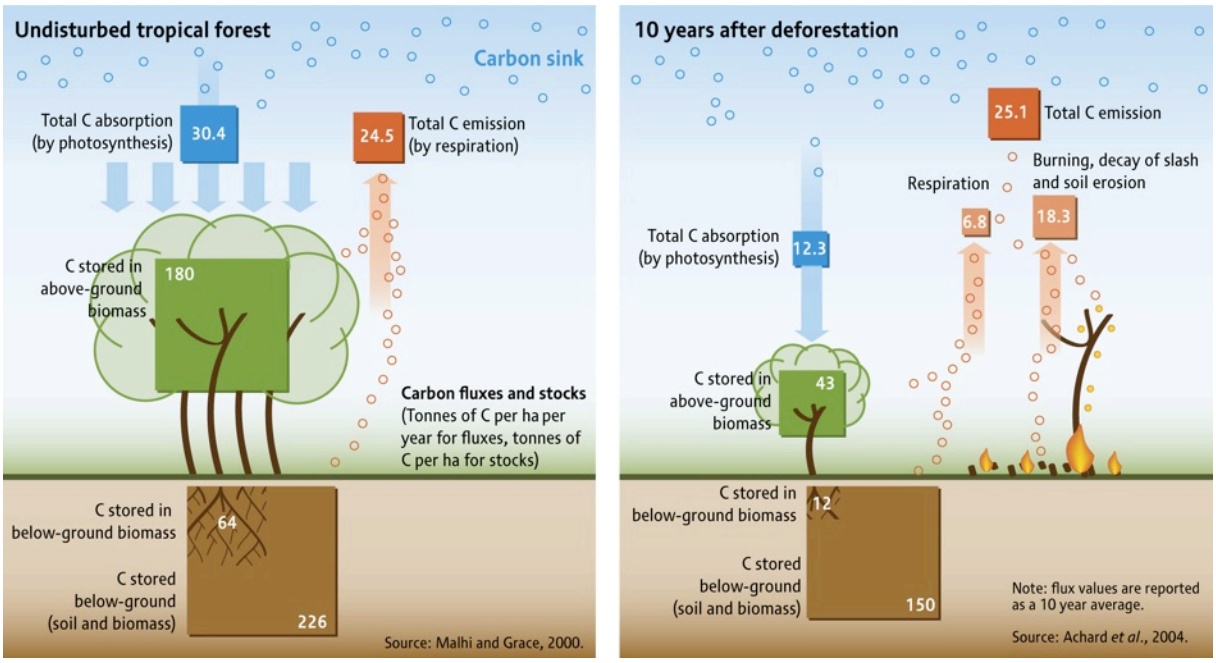


Figure 2: Carbon storage in an unlogged and a logged forest

ANU researchers estimate that the eucalypt forests of south east Australia could remove about 136 Mt (mega tonnes) CO_2-e (carbon dioxide emissions) per year (on average) for the next 100 years (Mackey, 2011). This estimate is based on several key assumptions, including both the cessation of logging and controlled burning over the 14.5-million-hectare study area[46].

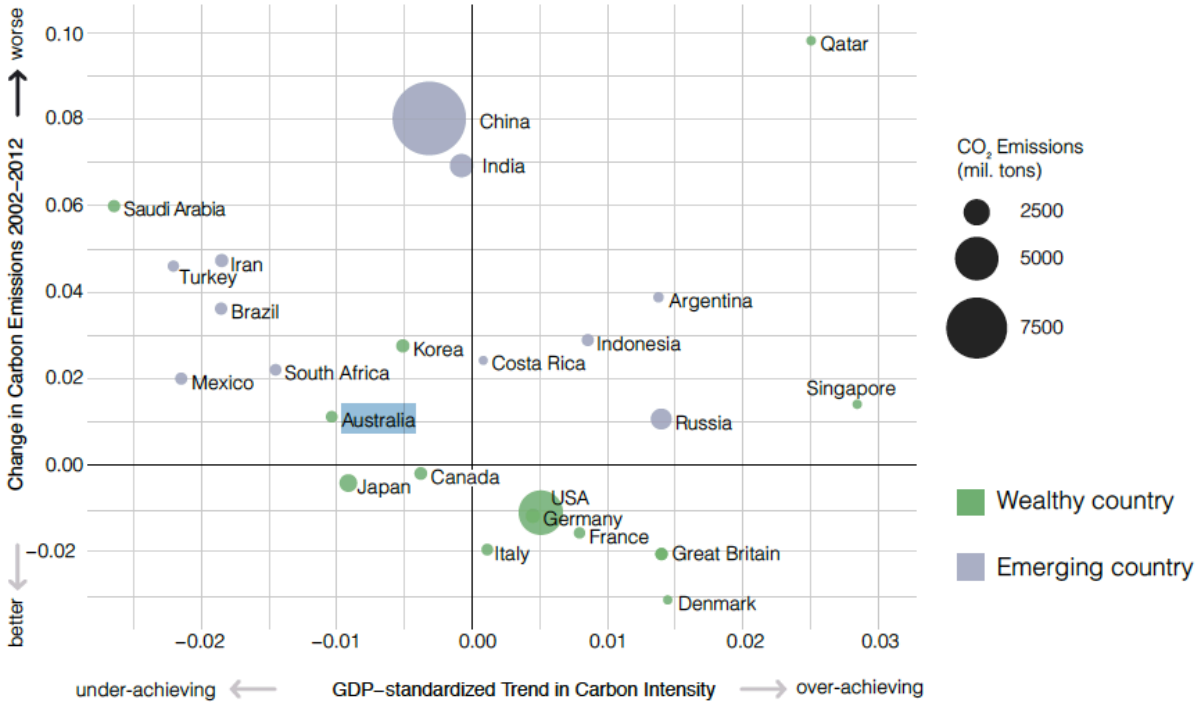
In the study *Under What Circumstances Do Wood Products from Native Forests Benefit Climate Change Mitigation?*[47] Heather Keith and her colleagues demonstrate that changing native forest management from commercial harvesting to conservation can make an important contribution to climate change mitigation. The findings of their study were derived from mixed-eucalypt forest in New South Wales (and Mountain Ash in Victoria) scenarios, so are particularly relevant to the intention and ambit of the Great Southern Forest. They found

that conservation of native forests results in an immediate and substantial reduction in net emissions relative to a reference case of commercial harvesting. They also found that over the 100-year simulation period, total carbon stocks were lower in harvested forests than in conserved forests. This fact has been overlooked in forest management decision-making. International forest-related policies, including negotiations under the United Nations Framework Convention on Climate Change (UNFCCC), have failed to recognize fully the mitigation value of native forest conservation.

CONSIDERING CARBON'S FUTURE

As a long-anticipated counter measure, Minister for the Environment, The Hon. Greg Hunt, announced that the ERF could stop logging in a Victorian State Forest and indicated a new wave of environmental innovation. Australia established targets for 2030 and started stretching commitments to action against climate change. Forest carbon measurement methods such as RET[48], FullCA[49], NGERS[50], NCAS[51] and ERF[52] will be tested by markets and the United Nations.

Yet, due to failure of optimizing carbon benefits, whether we like it or not, according to Yale's Environmental Performance Index 2016 Report [53], our carbon emissions record is worsening and Australia is still keeping company with Mexico, South Africa and Korea in terms of climate change performance. Graph 3 shows our performance is ranked as under-achieving and getting worse according to the GDP-standardised trends in carbon intensity and trend in carbon emissions.



Graph 2: Australia's carbon emissions record is worsening and under-achieving

CARBON PILOT PROJECT

As of 7th February 2017, The National Parks and Wildlife Service (NPWS) had commenced work on the rehabilitation of five sites in the National Park estate, and was finalising plans for an additional five to six sites for the same purpose. All of these projects generate Australian Carbon Credit Units (ACCUs) under the ERF and, subsequently, revenue for NPWS. The confirmed sites for the initial pilot projects are within Gwydir Wetland State Conservation Area, Brindabella National Park, Kosciuszko National Park, Willi Willi National Park and Tinderry Nature Reserve.

The planned works are part of a broader pilot project which has been funded by the NSW Climate Change Fund and was deemed eligible for participation in the ERF. At present the project is centred on multi-hectare environmental planting activities at geographically dispersed sites within the NPWS estate. In the future, the project will be expanded to include human-induced regeneration (HIR) activities such as enhanced pest control, construction of boundary fencing and patch burning. A contactor was engaged to implement all of these activities and is overseen by the NPWS Landforms and Rehabilitation Team and local area staff. In real terms between three and five million trees will be planted over the next three years.

The work taps into the ERF and involves selling carbon credits to the Australian Federal Government. The HIR activities are structured to enhance growth for drawing down carbon, converting carbon yield into carbon units (ACCUs), and selling the units via the Clean Energy regulator. Money from the ACCUs is used to fund public land management across priority areas within the NPWS estate which will potentially include Kosciuszko National Park.

As of 7th February 2017, the project had generated approx. $700,000 from the sale of projected ACCUs to the Australian Government (through the Clean Energy Regulator). The view is taken that these NPWS activities will have significant benefits to the environment not the least, as they relate to biodiversity and habitat. Six sites form the original pilot encompassing a total of 580ha. Other projects are currently under planning consideration and will involve the rehabilitation of a further 1000ha through a combination of environmental planting and HIR activities. The cost of this work will be in the order of $4 million with payments to the contractor made over a five-year term. The current and planned activities take into full account site preparation, planting and post-planting maintenance requirements.

Apart from its obvious conservation and biodiversity benefits, the NPWS project to sequester carbon from the atmosphere is having a positive impact on reducing greenhouse emissions. The type of trees and shrubs to be planted under the project will be subject to soil condition, the vegetative composition of the surrounding landscape and plant viability. It may not be possible for NPWS to completely emulate the surrounding

landscape; however, over time additional trees and shrubs may be planted to closer meet pre-European conditions.

GLOBAL STRATEGIES INDICATE ECONOMIC OPPORTUNITIES

Australia needs to cut its CO_2 emissions by 236 million tonnes to meet its current 2020 mitigation target of -5% below 2000 levels. The 2015 Global Goals agreed to by the UN include taking more 'urgent action to combat climate change'.

Via the UN, the 2015 Paris Agreement, signed by 196 nations, allocated a separate Article[54] to forests in recognition of the role they play as critical global carbon sinks. As the country with the most carbon-dense forests in the world[55], Australia should set a global example and lead the way in forest management for carbon by ending native forest logging. We should apply more intense periodic scrutiny and the stronger safeguards which were initially designed for developing countries to Reduce Emissions from Deforestation and Forest Degradation (REDD+). These safeguard amendments and new forest measurement methods should improve the capacity of the Australian Emissions Reduction Fund and open it to compatible global market forest carbon credits programs.

In early November 2015, the ERF Auction set an average price on carbon in State Forests of $12.25 per tonne of abatement: 129 contracts were awarded committing to purchase 45,451,010 tonnes of abatement; contracts were awarded to 77 contractors covering 131 projects; the total value of contracts awarded was $556,875,549. The largest single contract was for 2.5 million tonnes of abatement and the smallest for 15,333 tonnes.[56]

Despite this, Australia's 2020 climate targets are still out of reach after second emissions auction[57]. We have spent almost half of the A$2.55 billion allocated to the ERF and some 92.8 million tonnes of emissions reduction have been 'bought' at an average rate of almost A$13.12 per tonne of CO_2.

The impact of the creation of the Great Southern Forest's whole of landscape protected area would automatically reduce emissions and thus improve Australia's chances of meeting its carbon reduction targets which are currently under threat. By continuing to log the sub-regions of the southern forest region of NSW's 428,008 ha of State Forests, carbon reduction benefits are being wasted. Thus, using carbon benefits from these forests to help meet climate targets seems logical. Given the industries' subsidies, not using them is wasteful. In addition, using such benefits as a viable income for jobs in wildlife and forest restoration and tourism are valid alternatives to destroying the natural environment.

Figure 3: The woodchip pile at Eden superimposed over Sydney city streets to scale

BIOMASS BURNING: A PERVERSE WAY TO MEET RENEWABLE ENERGY TARGETS

There is an immediate and critical need to reconsider legislative and policy settings around wood fired power. Security of the native forests is threatened by conversations relating to the concept of burning native forests for electricity generation. Carbon accounts prove that considering burning woodchips as renewable energy is a perverse argument as this practice would emit more CO_2 than coal-fired power stations.

Native forest biomass burning would involve major depletion of forest carbon stocks. Thus, this practice should not be considered to be an eligible renewable energy fuel for electricity generation as it is dirty energy and not genuinely renewable as are wind, solar, tide and geothermal. The purpose of the Renewable Energy Targets (RETs) is to encourage the reduction of greenhouse gas emissions. Burning native forest biomass for electricity generation is contrary to this purpose as both the logging and the burning result in large CO_2 emissions.

The Department of Primary Industries admitted that no Australian studies have been conducted on the cost or the financial viability of burning native forest trees for electricity generation. The findings from American studies [58], that burning native forest biomass for electricity produces more emissions than coal (estimates vary from 1.5 times to 6 times more), are likely to be compounded by specific factors relative to the Australian context. Burning timber from south east native and old growth forests of NSW, with world renown high carbon storage, would encounter an even larger carbon debt. This makes it less likely that emissions reductions from burning wood would be creditable in any meaningful timeframe.

It has been advocated that Australia should follow European bioenergy practices. Yet, most European forests are plantations, not natural forests. Other fundamental differences are: different geographies, climates, water supplies, and industry economics. Promoting such pro-biomass burning arguments based on European practices are refuted in research findings from a study conducted in Sweden.[59] These researchers recommend that management should consider the carbon displacement effect of using forest biomass for bioenergy and other purposes. They state:

> The public and private sectors are advised to consider information from comprehensive analyses that provide insights about energy and forest systems in the context of evolving forest product markets ...

They promote 'sustainable forest management, considering other ecosystem services of the forest such as air quality improvement, water purification, soil stabilization and biodiversity conservation, and social services such as employment and recreation'. These considerations are discussed in relevant sections of this document.

Biomass burning for electricity generation is definitely not a 'one size fits all' situation. In the specific Australian context, renewable energy credits from biomass burning would only give perverse incentives on top of the large subsidies already required for native forest logging. It would be like getting into more debt to pay an existing one—the debt would double and the immediate carbon deficit from forest loss would exacerbate the problem.

Forest management decisions should follow a global trend away from bioenergy production from a source which, managed for carbon, water, soil and wildlife, would generate optimal revenue. The principles of the Great Southern Forest would guarantee such optimal revenue.

Photo 12: Post-logging burn. Judith Deland

FORESTS: A PATTERN CHANGER FOR CLIMATE ACTION

Forests: a pattern changer for climate action: Rosemary Beaumont

Forests are vital to climate action. Forests are living, breathing entities drawing down atmospheric carbon dioxide and storing it as terrestrial carbon, and breathing out oxygen. Globally, forests are depleted to 1/8th their size from the beginning of the Industrial Revolution (Walter Jehne). Forests are living planetary organs which ensure homeostasis and so the conditions for Life.

The magnificent carbon and biodiversity dense forests of south eastern NSW are facing a critical moment, the catalyst being the re-evaluation of the 20-year Regional Forest Agreements (RFAs) in 2019 and 2021 for either further destruction for another 20 years or—with an enlightened and pragmatic orientation—our forests are preserved and valued for their life-giving contributions to carbon storage, water, air, soil and diversity. The key is switching the management of forests from logging, (read wood-chipping), to carbon sequestration.

Management of the SE native forests has been prescribed by RFAs with attendant myths of 'sustainable logging' and using 'waste wood'; the overwhelming majority of trees felled go to Australia's oldest woodchip mill at Eden. When the RFAs were negotiated two decades ago, climate change and carbon economics were not commonly recognised. Now mature plantations meet all of Australia's timber needs and locally, state-owned mature plantations at Bombala are in production. Most timber workers are employed in plantations (CFMEU). Forestry Corporation NSW reports show its native forest operations lost $79 million in 7 years. Private loggers and millers lost a further $1.4 million in 2012 despite accessing publicly subsidised logs. Clearly, managing native forests for timber/woodchips is outdated economically and environmentally.

All forests sequester carbon. However, there is a gross reduction in carbon stocks due to logging as unlogged forests are known to contain three times more carbon than logged forests. Logging contributes to greenhouse emissions. Ceasing to log SE native forests could save up to 2 million tonnes of carbon dioxide emissions per year. At a conservative auction price of $10-12 per tonne, these avoided emissions could earn NSW a gross income of $20-40 million a year. The ecosystem service of carbon sequestration (the metric used by the Clean Energy Regulator) has a value for climate change mitigation both nationally and internationally. This service is accounted under the mandatory Kyoto and Paris Agreements, and priced under the Emissions Reduction Fund.

The Great Southern Forest (GSF) proposal is a deeply researched plan for the SE forests supported by a coalition of state environment groups, academics and activists. GSF is a solutions-focussed model to manage public native forests in SE NSW for carbon capture rather than woodchipping, funded by carbon emission abatement credits. GSF would generate new revenue, increase regional employment, protect biodiversity, connect

fragmented landscapes, enable Indigenous partnerships, consolidate social cohesion, encourage nature-based tourism and importantly, mitigate climate disruption. This new model is relevant and transferable nationally and internationally. The GSF can reduce forest fragmentation by linking existing state forests, national parks and private forests thereby equipping forests as a whole with the connectedness and resilience to withstand and ameliorate a changing climate.

Forests exuberantly celebrate the intimate interconnectedness of Life. Deep ecologists, Arne Naess and John Seed speak forests' ability to permeate and entrain the human mind to the visceral experience of connectedness. Interconnectedness is the foundational, organising dynamic of Life – we are not and never can be separate from each other and our enfolding environment. Yet, separateness is the metaphysical base of our present form of government leading to dissociated decisions, war mentality and resultant climate change. Interconnectedness as-an-experience is the key to the change in consciousness to do politics differently - and hence wise and compassionate exercise of democratic power. As the inner state of being changes, so do thinking, thence behaviours and in turn social institutions. Forests model and activate the psyche required for stabilising our climate and peace on Earth.

CONCLUSION

The evidence given in this section supports ending native forest logging as substantiated by establishment of the GSF. Not at any time in our history has the public had such a great awareness of, and better understood, the science and impact of carbon emissions.

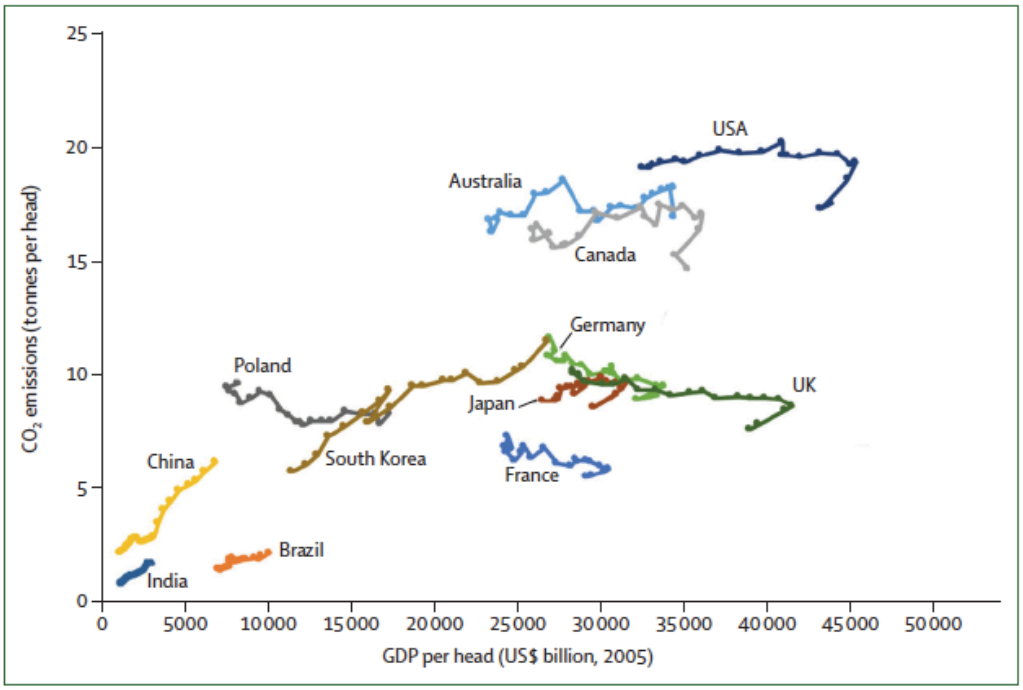
Communities of the southern region of NSW have seen the damage to our forests from logging for woodchips, destroying their capability to sequester carbon. Global research on the impact of carbon loss from forests is trustworthy because what has been proven scientifically with theory and logic, equates to our own local empirical evidence. Given this wealth of knowledge and understanding; it is therefore imperative that the ideals of the Great Southern Forest be initiated—the future health of our nation depends upon it.

FOREST MANAGEMENT FOR OUR HEALTH

> *It is not so much for its beauty that the forest makes a claim upon men's hearts, as for that subtle something, that quality of air that emanation from old trees, that so wonderfully changes and renews a weary spirit. Robert Louis Stevenson*

This section balances the findings of the multidisciplinary and international Lancet Commission on Heath and Climate Change[60] with the occurrence of native forest logging in the southern region of NSW.

The Commission declares that "the effects of climate change are being felt today, and future projections represent an unacceptably high and potentially catastrophic risk to human health". The Commission's graph shows that, based on purchasing power parity, Australia has the second highest level of emissions among the countries which they represented, see Graph 4. Based on a study of emissions from native forest logging and infrastructure in the southern region of NSW, 26,383,239 tCO_2e occur in one year alone. (Appendix B and explanation). Stopping logging of native forests would mean that these emissions would be omitted from Australia's carbon emission tabulations.



Graph 3: Per head CO_2 emission trends in relation to income for a selection of countries (1990–2008) Based on purchasing power parity.

Universal health benefits from carbon sequestration must not be underestimated. Even though the multiple, strong scientific, common sense, empirically and economically based claims made in this Great Southern Forest initiative justify that stopping native forest logging

will contribute to a healthy environment and a healthy planet, the Lancet Commission on Heath and Climate Change states that, "achieving a decarbonised global economy and securing the public health benefits it offers is no longer primarily a technical or economic question—it is now a political one" [emphasis added]. Thus, the outcomes and recommendations identified and elaborated upon in this GSF initiative can only be realized by a strong commitment by the Federal and State Governments to end the multiple environmentally destructive influences of native forest logging.

The Lancet Commission affirms that many mitigation and adaptation responses to climate change are 'no-regret' options, such as have eventuated in countries such as Brazil, New Zealand and Mozambique post stopping logging of native forests, which led to direct multiple economic and environmental benefits. Stopping logging of native forests in southern region of NSW would guarantee a 'no-regret' option. This outcome needs to be tested by a positive policy response by the Federal and State Governments for it to be realised.

The Commission's list of high impact mechanisms for climate mitigation includes afforestation and reforestation and maintains that these processes have a globally potential mitigation effect of 183 Gt of carbon by 2060[c]. This approach concurs with Heather Keith and colleagues' (2015) conclusion that: "…we found that the greatest mitigation benefit from native forest management, over the critical decades within the next 50 years, is achieved by protecting existing native forests" [61]. Much more carbon can be sequestered by afforestation and reforestation initiatives. For these initiatives to become a reality in countering the impact of an increasingly carbon laden atmosphere, depends upon the ability and will of our political leaders to recognise the critical role which carbon plays in securing healthy forests and a healthy planet.

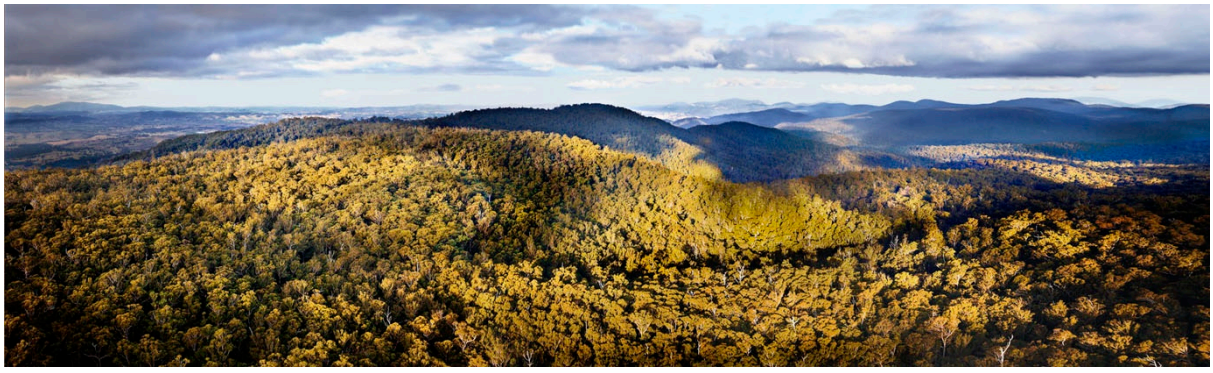


Photo 13: South east forests, Richard Green

[c] The Commission obtained these values of CO_2 emission mitigation for renewable energy from the Intergovernmental Panel on Climate Change (IPCC) special report on renewable sources and climate change mitigation. The ranges represented the minimum and maximum values from four future energy scenarios.

FOREST MANAGEMENT FOR TOURISM

This section highlights that the far south coast has unexplored tourism opportunities which could be generated by focussing on the holistic beauty of the region; uninterrupted by vistas of environmental damage caused by unsightly industrial logging of native forests.

The New Zealand experience is exemplary. When native forest logging ceased in 2002, the Government created a $120 million fund to develop ecotourism industries. As native forest logging ceased, wildlife and habitat gradually returned, as in other parts of the world. New Zealand now earns $11.8 billion per year from tourism which is primarily based on the natural experience[62].

With careful management, new industries in south east NSW can bring economic growth from increased demands by tourists seeking the thrill and excitement of immersion in nature, trails, coastal experiences, explorations, music events, heritage; Indigenous lore, culture, crafts, bush tucker and histories, and glimpses of our unique and precious fauna.

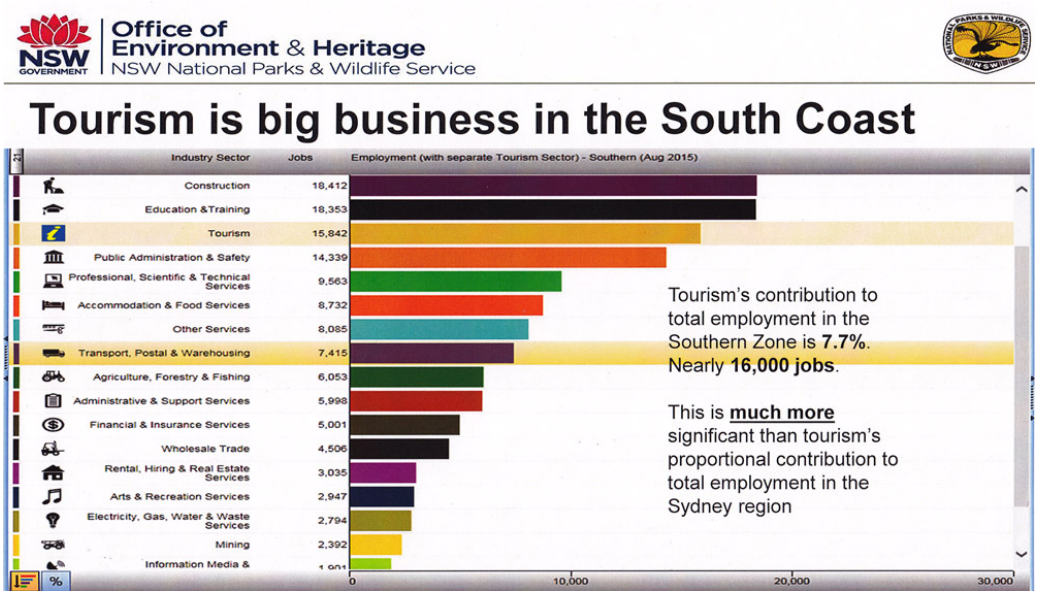
Photo 14: The unique, fragile, mimicking and beautiful lyrebird

POST-LOGGING TOURISM INDUSTRY

In the Bega Valley and Eurobodalla Shires, tourism contributes more economic benefit than the combined traditional resource-based industries of forestry, fisheries and agriculture[63]. Growth in tourism in both Shires well exceeds growth projections for national domestic tourism. These Shires, with Shoalhaven, the Monaro and East Gippsland (Victoria), work in partnership to deliver nature-based tourism experiences.

Tourism Australia's[64] research has repeatedly identified 'immersion in nature' as the primary motivator for travel, across all of Australia's inbound and domestic markets. The natural beauty of the southern region forms the heart of the tourist experience.

Given that research shows the primary motivator for attracting tourists is having a direct experience of nature and opportunities to visit pristine environments, the cessation of logging in the south east State Forests would have a direct benefit for tourism in the region. The lure of natural attractions of the region would counter the economic and environmental deficits of native forest logging. Tourism is already a primary employer in the region, with potential for expansion particularly into the international tourism market through promotion of the region during off-peak seasons. In the Bega Valley and Eurobodalla Shires, tourism contributes more economic benefit than the combined traditional resource-based industries of forestry, fisheries and agriculture[65], see Graph 5.



Graph 4: Comparison between jobs in Tourism (3rd) and Forestry (9th with Agriculture and Fishing) on the south coast NSW

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Tourism Australia's[66] research has repeatedly identified 'immersion in nature' as the primary motivator for travel, across all of Australia's inbound and domestic markets. The natural beauty of the southern region forms the heart of the tourist experience. The rapidly expanding cruise market, based in Eden Port, is also a significant development in presenting the region to the world; but people need eco-tourist experiences to entice them to stay longer.

TOURIST ACTIVITIES WITH NEW JOBS

Tourist activities: Rosemary Beaumont

The area forming the Great Southern Forest, NSW, has major tourism assets and unique natural advantages, many due to its location. Hundreds of kilometres of magnificent coastline juxta-position forests, mountains, snow meadows, lakes, rivers, sea pools and estuaries. Much visitor infrastructure already exists with accommodation of various standards in the region which can be increased. Drivers for increased visitation include the proximity to Canberra (a day trip promoted by Tourism ACT) and the Snowy Mountains. The south east corner of NSW is a frequent stop-over for visitors en-route between Melbourne and Sydney. Visitors stay over and spread economic benefits throughout the region.

The NOUS report listed infrastructure changes and attractions which affect visitation rates and resultant economic benefit. Much of the infrastructure is simple and low cost; other requires greater investment, probably private. Each feature is a building block for eco-tourism including increasing:

- signage and interpretation in and around or adjacent to tourist sites
- easier access to places and services for 'grey nomads' and families; advertised appropriately
- accessibility for people with a disability
- day picnic and recreation sites
- signed and listed campsites
- zip line tours
- multi-day and short walks
- treetop walks
- eco-lodges.

The Great Southern Forest, NSW, can realise all of these infrastructure activities. Existing walks include the Wilderness Coast and Gulaga walks, and the traditional path of the Indigenous owners, the Bundian Way, from the sea to the mountains is under development. The further potential for short, day and multiple day walks, access to natural campsites, picnic spots and lookouts is extensive. The rich array of tourist infrastructure in the coastal

and mountain region can be expanded. Because the GSF proposal does not seek national park status, there is far greater scope to allow more varied accommodation and activities.

Both Indigenous and youth unemployment are high in the SE region and the Great Southern Forest proposal offers long term pathways for jobs, careers and further learning. New diverse jobs include horticulture, nursey work, fire management and works, road and track maintenance, pest and weed control, visitor management, research, liaison, school and tour guides etc.Indigenous employment programs enable Working on Country with the spiritual, psychological, social and economic benefits which flow from this relationship.

Under the Great Southern Forest proposal new management costs would not be more than current ones, because relocating funds from existing forest management budgets would reflect the aims and transitional outcomes.

TOURISM BENEFITS IN OTHER COUNTRIES POST NATIVE FOREST LOGGING

NEW ZEALAND

> *From this saddle, we look across river upon river of green bush then burnt bush russet colour—blue distance—and a wide cloud flecked sky … at the head of the great valley the blazing sun uplifts itself … it is all so gigantic and tragic—and even in the bright sunlight it is so passionately secret. Katherine Mansfield*

As in the southern forest region of NSW, contention between the social and economic considerations of the industry and conservationists' ideals in the South Island of New Zealand's (NZ) logging history was inevitable. Yet, pressure from conservation groups in NZ was influential in forest protection.

Two large pulp and paper mills began production in the South Island of New Zealand in the 1950s. By 1960, more exotic sawn timber was being produced than native timber, and despite this, logging of native forests continued. In some cases, the Forest Service completely cleared areas of native forest, which regenerated slowly, and so faster-growing exotic forests were planted in their place.

In the early 1970s, the Forest Service planned to log beech forests and the logs would be made into chips for the Japanese pulp sector. Some areas would be allowed to regenerate, but others would be clearfelled and replanted with exotics. This logging gained government support but was opposed by conservationists.

Conservationists correctly argued that trees could not be selectively logged without damaging the complex structure of the surrounding forest. The Forest Service stopped logging kauri, but insisted that other native forests were still needed for timber. There were

clashes, first over beech forests on the West Coast and in Southland, then over the central North Island podocarp forests at Pureora and Whirinaki. Public opposition to logging swelled. *The Maruia Declaration,* calling for the protection of native forests, had 341,159 signatures when it was presented to Parliament in 1977.

The Labor Government was elected in 1984 and supported both conservation concerns and deregulation. Although the production of exotic timber exceeded that of native species by 1960, and continued to increase, native forests were still logged steadily into the 1970s but, from 1975 to 1987, production of native timber from publicly owned forests declined dramatically. Political change then led to a further decline, and now only a minuscule amount of native timber is now produced in New Zealand. [67]

The West Coast Forest Accord of 1986 aimed to ease the transition from logging native forest in the region. Some native forest was reserved, but clearfelling was to continue in North Westland and Buller until the exotic forests there had matured. This compromise was unacceptable to some conservationists, and there were protests. In 1999, the Labor Government announced that logging would end by 31 March 2002.

To compensate locals, a $120 million fund was set up to create other local industries and jobs, such as in ecotourism.

The paper *Impacts and effectiveness of logging bans in natural forests* in New Zealand by Alan Reid describes that:

> …studies on the contribution from tourism to employment in the West Coast region [of New Zealand] show that, in 1992, about 8% of the local full-time jobs in the West Coast region were supported by tourism. Figures also indicate that expenditure on tourism in the region increased substantially between 1987 and 1994, suggesting equivalent increases in employment. By 1994, the tourism sector in the region, in terms of total numbers employed, was second only to pastoral farming and was substantially ahead of forestry. [68]

Eco tourist operator and Conservation Ambassador for Forest and Bird, NZ, Dr McSweeny reflects:

> We have lived here for 22 years and in the last 13 years we have noticed a major increase in larger bird species such as NZ pigeon, kaka, kea, falcon, tui, whio/blue duck and morepork. Perhaps the most striking increase has been in the number of small birds such as bellbird, tit, fantail, rifleman and warbler. We guide dawn bird walks with our eco tourists every day. We are therefore acutely aware of changes in bird diversity and abundance. The regeneration response seen in vulnerable plant species such as rata, fuchsia, mistletoe and wineberry has been equally spectacular where deer numbers have been controlled. [69]

Ecotourism has boomed in many other countries after logging of native forests stopped.

MOZAMBIQUE

At the World Parks Congress in Sydney in 2014[70], Greg Carr told how the Gorongosa National Park, Mozambique was destroyed by war, mines, guns and bombs, so species destruction was extensive. Restoration was spearheaded by the public sector. Recently, rangers in helicopters counted 72,000 animals roaming the park. This project proved that distressed ecosystems can be restored and attract tourism. Greg proved that ecotourism is a powerful force which helps conservation. "If you visit Gorongosa, you help save it!" Mozambique now boasts it is one of the world's top five most biodiverse ecosystems.

BRAZIL

> *Brazil has already achieved a reduction in global warming pollution comparable to the reductions that both the United States and the European Union have only pledged to achieve by 2020.*

Brazil has reduced deforestation in the Amazon enough over the past five years to lower heat-trapping emissions more than any other country on Earth [71]. This success demonstrates the enormous potential of reducing emissions from deforestation and forest degradation as well as conserving and re-growing tropical forests (the international effort known as REDD+). Between 2005 and 2010, Brazil nearly met its goal—a full decade ahead of schedule. Data from 2009–2010 showed that Brazil's area of deforestation, which averaged 19,508 square kilometers (km2) per year during the baseline decade of 1996–2005, had dropped 67 percent, to just 6,451 km2. The Union of Concerned Scientists' analysis of this change, using a formula for converting deforested area to CO_2 emissions based on the work of the research institute IMAZON, estimated a reduction in Brazil's global warming pollution of nearly 1 billion tons. Brazil has achieved this success while simultaneously increasing agricultural production and significantly reducing hunger and poverty.

Brazil's dramatic reduction in deforestation is attributed to agreement by both state and federal levels of government. The country greatly expanded its network of Indigenous reserves and protected areas (including sustainable-use reserves), which now encompass more than half of Brazil's Amazon forest. Indigenous people control more than 20% of the Brazilian Amazon.

TAMAN NEGARA

The sight of logging activities has a detrimental effect on the tourism industry. In the Taman Negara, Titiwangsa Mountains, Malaysia, the local people called for a stop to logging to their ancient rainforests, because of the negative impact the sight of logging trucks had on

the local tourism industry[72]. Pahang National Park Tourism Operators Association chairman Abdul Jalil Rahman said although the logging was outside Taman Negara, the effects were turning tourists away. He continued:

> From the feedback I received from tourists, they already got a negative impression upon entering Taman Negara because they had seen so many trailers carrying logs. The tourists expected to see a pristine rainforest but they left disappointed, complaining that they did not even see any animals. In the past, some tourists would even cry when they left Taman Negara but these days, repeat visitors are rare.

Photo 15: Pahang National Park Tourism Operators Association protest against rainforest logging

BENEFITS AND OPPORTUNITIES

The remainder of this section by Heather O'Connor

Tourism is the most rapidly expanding sector of regional economies, employing more people and providing more economic value than the declining native forest logging sector. For example, it is estimated that in the Eden area, jobs in tourism outweigh those of native forest logging ten-fold. Furthermore, tourism has the potential for growth, particularly through the expansion of the international market, which is still underdeveloped in regional Australia, where 96% of visitors comprise the domestic market. A modest total of 22,000 international visitors indicates that expansion into that market is feasible provided that their preferences for nature experiences become the centerpiece for marketing strategy.

'Nature' is the number one driver of visitors to Australia, and is in the top five factors taken into consideration by potential tourists when selecting a tourist destination (along with

beauty, safety, security and value for money). The region is well placed to compete for the local and international tourism dollar, given that the strength of Australia's Coastal Wilderness lies in its largely undeveloped natural environment, including pristine parks and coastal areas.

An analysis of what is already available for both local and international tourism in the region reveals a broad range of nature-based experiences plus a developed network of cultural and historical events which are organized throughout the region. Amongst these are a diverse range of music festivals (classical, jazz, blues and folk).

The state-of-the-art Four Winds Amphitheater and Windsong Pavilion at Barragga Bay invites world-class musicians and supports local ones as well. The Pavilion is the only purpose built, indoor recital hall in south east NSW, seats 160 people, is equipped with cutting edge acoustic capabilities and has flexible space for performances and workshops.

Photo 16: Four Winds outdoor amphitheatre at Barragga Bay, 9km south of Bermagui.

Historic and heritage attractions such as the Montreal Goldfields (Bermagui), the Eden Whale Museum and Annual Whale Festival, and the Tilba National Trust Village are favourite haunts for regular visitors. There is a Killer Whale Tail in Eden, comprising day trips to sites relating to whale history. Regional food and wine are celebrated through the Oyster Festival at Narooma, the Bega Cheese Factory and a growing winery trail. There are now well-recognised art gallery trails from Bateman's Bay to Victoria, and increasingly, professionally organized local and specialized museums specific to the region's history.

There are innumerable nature experiences such as visits to the Pamboola wetlands, whale and dolphin watching, visits to National Parks, bushwalking and bird-watching, aquatic activities in the ocean and network of lakes and rivers in the region. Environmental education opportunities are currently provided for local and international students through The Crossing Land Education Trust (Bermagui) and through the Sapphire Coast Discovery Centre in Eden. Opportunities for hands-on encounters with animals are provided by the Mogo Zoo, Montague Island Nature Reserve and the Potoroo Palace Native Animal Sanctuary at Merimbula.

EXPANSION

Strategic plans are in place to build on the strengths already identified and designed to increase the number of visitors, extend the length of their stays and encourage return visits. For example, a recent initiative is the production of materials relating to four distinct journeys within the Wilderness Coast, focusing on walking tours, visits to National Parks, heritage tours and earth history. Plans are underway to capture more of the lucrative short cruise market, with short trips organized to the port of Eden. Other initiatives include forming partnerships with the ACT and the Alpine region with the objective of extending visitor nights and building up the off-season trade. To facilitate ease of planning and bookings, more online resources are being developed and better use is planned of social media. Another potential growth area is through the promotion of the Sydney-Melbourne coastal drive.

Each of these potential growth areas rely heavily on sustainable land management, support for recreational industries rather than those related to the exploitation of native forests, and above all, responding positively to the expressed desire for tourism to be based on nature, coastal experiences, journeys of exploration, events and heritage tourism.

CHALLENGING ISSUES

As with all sectors of the economy, tourism faces some formidable challenges. One is the competition with other regions for the tourist dollar, hence the need to maximize the advantages of relatively undeveloped nature of the region. A second challenge is the lack of public transport into the region, and the high cost of air travel. A third is how to balance strong demand for accommodation and services during peak periods with relatively quiet times in the winter (hence the need to build partnerships with, for example, the Alpine region).

The over-riding challenge is the need to shift from an economic base reliant on exploitation of forests and fishing, and maximize all the advantages the region has in terms of its pristine nature.

CONCLUSION

Conclusion: Paul Payten

This section demonstrates the numerous and unique opportunities that can be initiated and then promoted to new and existing markets. The far south coast could be a destination much sought by emerging audiences across the world seeking 'back to nature' experiences. The GSF approach has a strong emphasis on identifying and caring for the resources to make these opportunities come to life. The recommendations herein outline credible ways to achieve the economic and reputational benefits to the region and Australia as a whole: we hold respect for nature and its part in our health, wealth and prosperity.

FOREST MANAGEMENT FOR BIODIVERSITY

> *If business as usual continues, we will see more Australian species disappear as well as the continuing decline of our water, topsoil and local and regional climate. WWF-Australia CEO Dermot O'Gorman*

This section proposes the certainty that the Great Southern Forest in south east NSW would help to halt Australia's increasing rate of native species extinction. It presents a snapshot of national, state and local faunal extinction problem; shows where Australia sits comparatively on the global deforestation front; reports on advice from the WWF; presents accounts of local changing forest integrity; discusses the need for connectivity; explores Environment Pollution Licence breaches and the impact of logging on downstream health.

HABITAT AND SPECIES LOSS

AUSTRALIA ON THE WORLD STAGE

The Australian Wildlife Conservancy (AWC) states that Australia is one of the most important nations on Earth for biodiversity. In fact, Australia is one of only 17 'megadiverse' nations and is home to more species than any other developed country. Most of Australia's wildlife is found nowhere else in the world, making its conservation even more important. 87% of our mammal species, 93% of reptiles, 94% of frogs and 45% of our bird species are found only in Australia. The southern forest region hosts many endangered hollows-dependent fauna, such as the Yellow Bellied Glider and the Powerful Owl. When the fragile and defenceless Greater Glider loses its home tree it gives up, goes to ground and a predator takes it. Native forest logging destroys this essential wildlife habitat and rotation lengths are too short to allow hollows to form. Hollows don't form in eucalypts younger than 100 years and some species such as the endangered Swift Parrot need hollows-bearing trees older than 150 years.

Ironically, the Commonwealth opposes firewood harvesting because Red-tailed Black-Cockatoo, Swift Parrot, and Superb Parrot live in hollows-bearing trees[73], yet condones logging of hollows-bearing trees in native forests for woodchips. Mature and old hollows-bearing trees also provide flowers, nectar, fruit and seeds and a complex substrate that supplies diverse habitats for invertebrate populations[74].

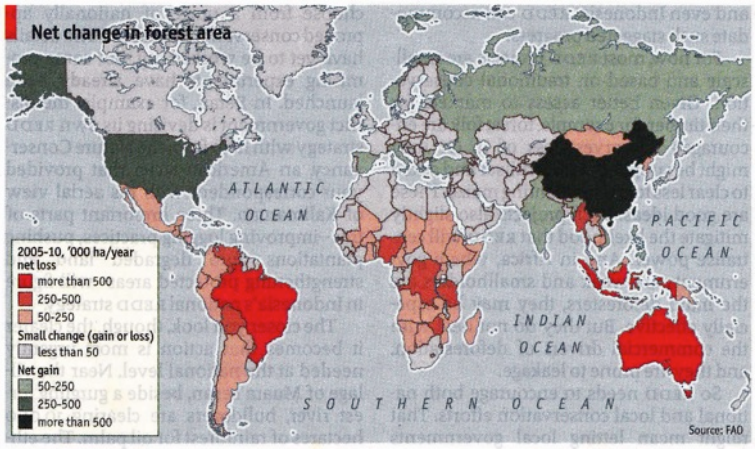
Australia is facing an extinction crisis. Australia has the worst mammalian extinction rate in the world: 30 native mammals have become extinct since European settlement. To put this in a global context, 1 out of 3 mammal extinctions in the last 400 years have occurred in Australia. More than 1,700 species of animals and plants are listed by the Australian

Government as being at risk of extinction. Around 30% of our surviving (non-bat) mammal species are threatened with extinction.

The primary factors causing this loss of wildlife include:

- feral cats and foxes, for example, feral cats kill an estimated 75 million native animals every night across Australia.
- feral herbivores; pigs, goats, rabbits, donkeys, horses, camels, buffalo and cattle.
- changes in fire regimes, especially an increase in the extent and severity of wildfires.
- clearing native vegetation and weeds. [75]

Australia continues to use forest and landscape management practices which the world acknowledges are counterproductive to the health of the planet. Fifty percent of our forests have been degraded since colonisation. Waterways have been silted, soil has been lost, forests have become dryer, species have become extinct, imported species have taken over and caused havoc. Natural wet forests (well over 100 years old) are being reduced to more fire-prone dry forests (under 50 years old). Australia's unique hollows-dependent animals are in decline because hollows don't normally appear in Eucalypts younger than 100 years and some species need hollows in trees to be more than 150 years old. Smith's [76] study on forest loss complements the AWC's findings that Australia has the highest mammalian extinction rate in the world.



Map 4: Net changes in forest area 2005 to 2010 shows Australia's forest loss is one of the world's worst.

In April 2015, the World Wildlife Fund's (WWF) listed Australia as "one of 11 places around the world that will account for 80 per cent of global forest loss by 2030". [77] Thus, eastern Australia joins other deforestation fronts in the Amazon, the Atlantic Forest and Gran Chaco, Borneo, the Cerrado, Choco-Darien, the Congo Basin, East Africa, Greater Mekong, New Guinea and Sumatra. This appalling statistic is a direct reflection of Australia's failure to conserve our natural heritage. 227,864 ha of State Forests in the southern forest region are

logged. Only 18% of temperate forests and rainforests in NSW and Queensland are protected.

WWF-Australia's CEO, Dermot O'Gorman, said the WWF report puts Australia right up there with the worst places for deforestation in the world. It is ironic, given community sensitivity about using products derived from plantations (and orangutan habitat loss) in Borneo for palm oil, that there is less government responsiveness to Australia's native forest loss for woodchips (and koala habitat loss). Barcode scanners for identifying products from palm oil plantations are available. A scanner Ap for identifying products from Australia's native forests may alter consumers' purchasing choices.

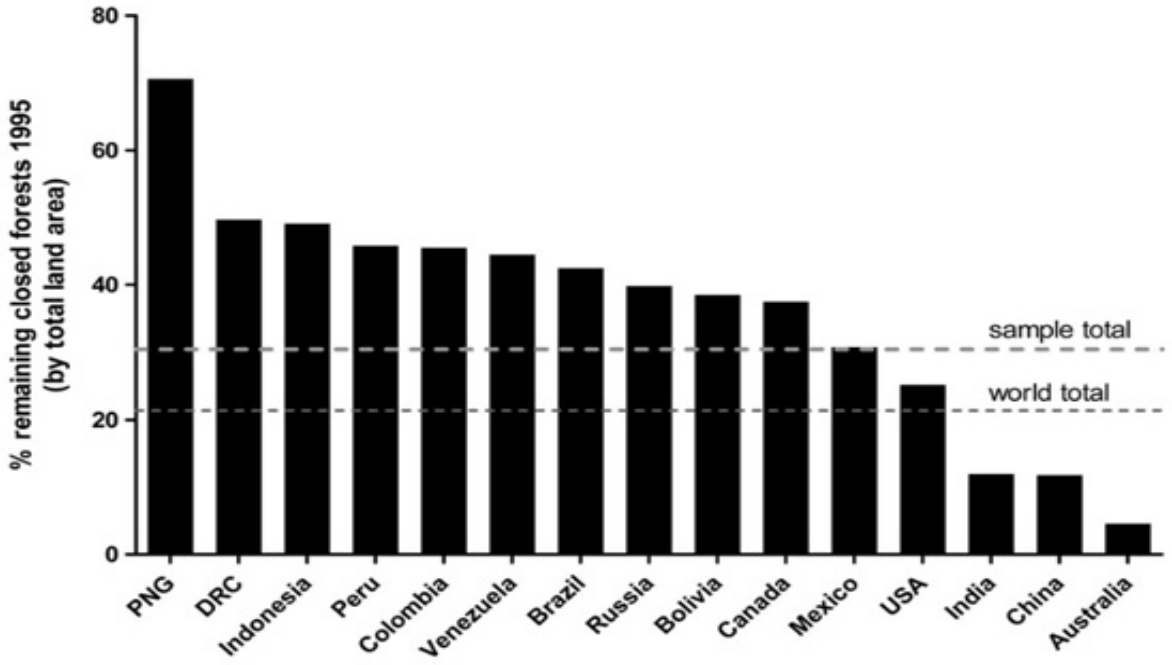
O'Gorman praised the release last year of the Australian Government's draft Asia Pacific Rainforest Recovery Plan, which aims to provide a regional commitment to reduce rainforest loss in places like Borneo. He stated:

> But we also need to tackle deforestation in our own backyard. With better planning, management and collaboration at a landscape scale, we can sustainably increase production and meet local development needs, while conserving critical ecosystems. [78]

Victoria's Great Forest National Park (GFNP) aims to protect the critically endangered Leadbeaters Possum by protecting State Forests of Mountain Ash habitat. The State Labor Environment Minister is keen to help. Federal Liberal Member The Hon. Greg Hunt suggested funding with Emissions Reduction Fund (ERF) money and twice called on the Victorian Government to take action.

The Great Southern Forest responds to these ideals by proposing State Forests become large protected areas. Forest management would then be driven by climate sensitive ideals based on economics, jobs, tourism, carbon, forest restoration, habitat and wildlife.

Graph 6 [79] shows that Australia has the lowest remaining closed forest areas as a percentage of total land area (4.6%) and is much lower than the sample (30.4%) and world (21.4%) totals. DRC = Democratic Republic of Congo; PNG = Papua New Guinea.



Graph 5: Percentage of remaining closed forests by country for 15 countries sampled in 1995

New South Wales

Being one of the first regions settled by Europeans and having generally a higher human population than most other parts of the country, much of the removal and damage to forest ecosystems of NSW happened during the 19th century. The most expansive and rapid initial damage occurred on the most fertile soils where agriculture was most favoured, with the less-productive ecosystems within the sandstone and poorest soil areas being left largely intact[80]. Even as late as from 1995 to 2005, NSW had the second highest aver-age proportional land-clearance rates among Australia's states and territories, and as of 2009, it is estimated that the State had a total remaining 26,208,000 ha of native forest or 33% of its total area. [81]

Habitat loss throughout NSW has resulted in koalas disappearing from 75% of their former range. NSW has over 1,000 threatened species. The WWF report states that the NSW Government—which has elsewhere 'committed to enhancing the State's biodiversity for the benefit of current and future generations'[82]—is repealing clearing protections, which could re-ignite the single biggest threat to native species in that state.

Photo 17: Koalas were recently listed vulnerable to extinction due to deforestation. World Wildlife Fund Report, 2015

THE CHANGING INTEGRITY OF STATE FORESTS

It has been 230 years since European settlement in Australia. The eastern forests have changed from wet temperate to dry as we progressively logged, cleared and disconnected these once magnificent, ancient forests. Forests need to function as One Big System. The loss of diversity of all species has exacerbated the forests' inability to literally turn themselves over, to enrich soils, to sequester carbon, to produce rain, to support oxygen, to store water and stop downstream erosion affecting shell and fish stocks in the ocean.

SOUTH EAST NSW

The WWF Report[83] recommends a range of solutions for stopping deforestation which complements the ideals of the Great Southern Forest and should be applied to protect the State Forests in south east NSW. These include to:

- promote sustainable forest management practices that provide an economic alternative to forest conversion
- establish expanded, strengthened and well-connected networks of protected areas
- remove unsustainably produced agriculture and forestry products from global supply chains
- strengthen and clarify land use rights, and
- establish mechanisms that place greater value on ecosystem services like water quality, soil stabilization, erosion control and climate change mitigation.

Within our carbon rich forests of south east NSW, decades of native forest destruction and consequent harmful effects on biodiversity including soil, water, carbon and wildlife; habitat trees not regrowing after logging; fragmentation of landscapes; canopy reduction increasing susceptibility to wildfire; and, emergence of degraded and uninhabitable

ecosystems support Smith's [84] study on forest loss that Australia has the highest mammalian extinction rate in the world.

Bega Valley

An historical review of the ecological impacts of post-European settlement in the Bega district, NSW, Lunney and Leary (1988) explained that:

> Most native mammal populations of the Bega district are now confined to the forests on the hilly, least arable country with low-nutrient soils. It is not surprising that most species are currently uncommon or rare. The accumulated evidence demonstrates that European settlement resulted in a decline of all native mammal populations, and the [local] extinction of at least six species of mammals: the eastern quoll *Dasyurus viverrinus;* a rat kangaroo, probably *Bettongia gaimardi;* two 'pademelons', *Macropus parma* and *Thylogale thetis*; the wallaroo *Macropus robustus* and the brush-tailed *phascogale Phascogale tapoatafa*. Four other species of mammals—the koala *Phascolarctos cinereus*, the southern brown bandicoot *Isoodon obesulus,* the spotted-tailed quoll *Dasyurus maculatus*, and the little red flying-fox *Pteropus scapulatus*—have become rare and are threatened with extinction in the Bega district.

Most of the regional losses and declines of mammal species documented by Lunney and Leary for the Bega district were the result of habitat loss and introduced species (in particular, hares, rabbits, and foxes). Lunney and Leary also noted that:

> …any initiatives which resulted in reclamation of parts of the valley, such as marginal farmland, for conversion to original forest, would benefit many species. Most importantly, an imaginative wildlife management programme…could do much to halt the loss of original habitat…

The Bega district story has been replicated throughout eastern Australia. [85]

Eyewitness account of the Murrah State Forest

Eyewitness Account of the Murrah State Forest: Suzanne Foulkes

An eyewitness describes the general situation of how our forests were and how they have now become in a witness to forest change over 30 years.

> I am not a scientist but I would like to speak to you as an eyewitness who has lived in Murrah State Forest for over 30 years.
>
> When we first went there we were besieged by wildlife. The abundance was just amazing. Nothing we planted survived the possums, wallabies, and parrots. The bandicoots dug things up and the wombats caved in the best of fences. We kept bees at the time and the sugar gliders; several kinds came in groups at the first sniff of

honey, and the bush rats and mice moved in, and bats. We could not leave the windows open in summer because of possums at night, and goannas by day. The bird life was abundant, and hugely varied. The bush just hummed with life. The river had a stony bottom and lush aquatic plant life, small fish and deep pools with eels and redfin, bass, the native cray, and the marron.

Sleeper and mine prop cutters had been through and there had been selective logging. We found huge old stumps. The integrity of the forest had survived these earlier incursions. They had been moderate. Then came the logging for woodchips. After only a short time the river began to silt up. It was gradual at first. Then after a heavy rain event massive amounts of soil came off the slopes. The logging went on relentlessly and the river just filled with sand, over the next 15 years.

There are no more deep pools and mostly the water is not even visible but runs deep under the sand which is all moving inevitably to the estuary. The wildlife is now so diminished that I can leave home at 6 am and not see one living creature. The poisoning of wildlife after a coop is logged to stop the regrowth being eaten has been very successful. The flocks of parrots that came in hundreds are now less than a dozen. We only rarely hear the owls and gliders at night. The koala colony in the gully behind us vanished after ForestsNSW demolished their habitat. Of course, the follow up burning would have made certain.

Many eucalypt-dependent species like potoroo, Christmas beetles, and cicadas have also gone. The diversity of the forests tree species has been intentionally reduced to a virtual monoculture of silver top ash ***(e. sieberi)*** and the highly volatile forest casuarinas which outcompete other eucalypt species in a mixed forest. FNSW and DECC knew full well of the presence of those koalas. Just as they know full well that koalas are in the Bermagui compartments now targeted for logging. [The Bermagui compartments have been logged since this was written.] This is a very sorry tale to tell and in the time frame of just 30 odd years. It is just a moment in the life of a great ecosystem. It is a modern tragedy and an environmental crime. This is the story of virtually all our coastal forests and water catchments. [86]

MURRAH FLORA RESERVES PROTECT KOALAS, BUT AT WHAT COST?

Murrah Flora Reserve: Bronte Somerset

Between July 2012 and June 2015, a huge community-based endeavour saw survey teams of contractors, volunteers, Aboriginal Land Council and agency staff, search for koala pellets under more than 30,000 trees at more than 1,000 grid-sites across the 30,000 ha Bermagui to Murrah study area. The results were encouraging, with a population estimated of 30–60 animals[87], up from the 23–47 estimated from a similar survey undertaken between 2007 and 2009[88]. Given the scattered nature of the koala

activity, the risk of intensive logging impacting on what was clearly still a small and vulnerable population, was clear to all.

On 1 March 2016, the Minister gave Bermagui south of the Bermagui River, Mumbulla, Tanja and Murrah State Forests a reprieve. They became protected and known as the Murrah Flora Reserves[89]. This act makes an important contribution to the viability of the remnant population of koalas and hollow-dependent species left in these forests. “Let's be clear about this”, said David Shoebridge MLA[90], “this is a real win for nature and this crucial koala habitat in the south east Forests, and it has only come about because of the long-term activism of forest protectors”.

Sustained community blockades and protests occurred in Mumbulla Forest and Bega during logging in 2010. Aboriginal elders led community marches into the prohibited logging zone and people were arrested. After almost two months the logging was abandoned after it was found to be illegal. The logging contractor was compensated $18,000 for not being able to finish the operation. The Aboriginal community received nothing for damage to their heritage.

Creation of the 11,800 ha Reserves to protect these koalas confirms what the sector has been hesitant to admit; that logging degrades koala and other wildlife habitat. It also proves that, the Government has the power to stop loss-making, habitat-destroying, climate-insensitive logging for woodchips, the Government has heeded empirical evidence, and has responded to conservationists’ steadfast claims that woodchipping degrades the environment.

The Aboriginal neighbours, who own the adjoining Biamanga National Park and co-manage it with the NSW National Parks and Wildlife Service (NPWS), were initially side-lined as creation of the Reserves was not made from culturally sensitive considerations. However, the Environment Minister invited the Biamanga Board to manage the Reserves with the NPWS and assured their perpetual protection.

It is said that ‘greenies are never happy’ and why should they be? Over 400,000 ha of State Forests in south east NSW are still at risk of being logged for woodchips. There was no commercial sacrifice. To compensate for the 11,800ha rendered unavailable for logging, the State Government granted Forestry Corp. $2.5 million from the Environmental Trust Fund (ETF) to permit logging further up the coast until the endpoint of the subsidy in 2019[91]. National Parks Association Far South Coast branch (NPA FSC) President, Dave Gallan, said: "…there is something perverse about using Environmental Trust money to subsidise fuel for log trucks".[92]

It is also quite perverse that the ETF’s $2.5 million dollars was earned from commercial and suburban polluters in the Sydney Basin for rubbish tip charges to be paid to the logging sector to help it meet a woodchip quota which was not reduced to

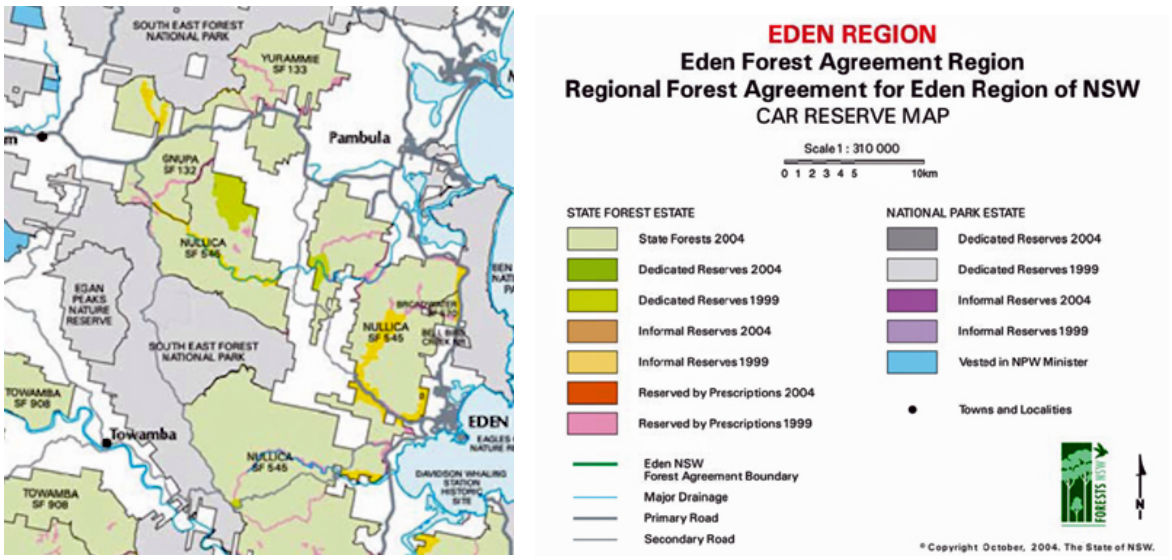
compensate for not logging the protected Reserves. Knowing that logging pollutes and creates a carbon deficit, simply put: the big city polluters fund their country forest collaborators. Compartments north of the Bermagui River were excluded from the Reserves. One provides a koala corridor between Biamanga and Gulaga National Parks. It was partially logged in 2012 and, despite a Ranger having recently seen a koala near there; this compartment could now be hit hard again.

So, what incentives would persuade the State Government to protect all our native forests? The Regional Forest Agreements (RFAs) for the southern forests expire in 2019 and 2021. Climate change threats and competing overseas eucalypt plantations were not significant factors when the RFAs were written. The Australia Institute[93] determined that native forest logging by Forestry Corp. generated losses of $79 million over the last seven years. Obviously, it would be economically and environmentally efficient to stop logging State Forests.

The Great Southern Forest (GSF)[94] campaign suggests that the Government could fund protection all our ancient forests in perpetuity from carbon credits via an Emissions Reduction Fund. Thus, the carbon-dense State Forests of south east NSW could be worth about $19.5 million pa[95]. This benefit could be used to create, or boost, jobs in climate-sensitive industries such as plantations, forest restoration, wildlife protection, pest and weed eradication, fire preparedness, and eco and nature-based tourism.

The logged forests of the southern region may never return to their halcyon days of even 30 years ago. Today, government has a moral imperative to base management decisions on protecting, connecting, and beginning to restore these degraded forests. Creation of the Murrah Flora Reserves is a welcome beginning, but the survival of all native forest-dwelling species is tenuous in light of the unknown occurrence of wildfire and the impact of climate change. Insuring our native forests against any detrimental contingency can only be achieved by stopping logging all native State Forests forever.

FOREST FRAGMENTATION



Map 5: This map extract shows how landscapes are fragmented by the State Forests

> *…It's all connected. We connect everything together. It wouldn't be a story; we wouldn't talk about it if it weren't connected.*[96]

The need to connect fragmented landscapes is essential for wildlife. Maps 2 and Photos 9 indicate that the land tenure and logging events contribute to a jigsaw puzzle type of landscape.

Clearing of native vegetation results in fragmentation, the process by which initially contiguous areas of habitat are separated into a number of smaller areas. Fragmentation impacts include the creation of small isolated populations with limited gene flow between populations, leading to species inbreeding, depression and reduced potential to adapt to environmental change.

Fragmentation also leads to the loss or severe modification of the interactions between species, including those interactions that are important for the survival of species. Small isolated populations may be subject to local extinction from stochastic events. The hostility of the surrounding (cleared) environment is a major factor in limiting movement of organisms between patches. The physical environment within patches may be altered as a result of creation of edges and anthropogenic influences.

Important variables that must be considered in assessing the impacts of fragmentation include the distance apart of the fragments, the area of the fragments and their shape. Increasing the edge/area ratio increases the impacts of edge effects such as changed microclimate and susceptibility to invasion by non-indigenous species. This response of

particular species to fragmentation is affected by the mobility of the species (both as adult and in dispersal stages) and the scale of the fragmentation relative to the environmental scale of the species habitat. [97]

A work by Corey J. A. Bradshaw, *Little left to lose: deforestation and forest degradation in Australia since European colonization* [98] gives insight into the causes and outcomes of forest degradation.

As European colonists expanded in the late 18th and the early 19th centuries, deforestation occurred mainly on the most fertile soils nearest to the coast and much of the native vegetation remaining is highly fragmented.

Graph 6 shows that, of fifteen countries studied, Australia has the least amount of closed forest areas left and the most losses have been sustained in eucalypt forests "much of the remaining forest cover is severely fragmented into small patches, especially in south eastern Australia… isolating existing fragments to the point that much of their biodiversity potential is severely compromised" [99] to the point where many plant and animal species have already gone extinct or are in immediate danger of extinction. [100] [101]

Results of Bradshaw's research shows that, "without clear policies to regenerate degraded forests and protect existing tracts at a massive scale, Australia stands to lose a large proportion of its remaining endemic biodiversity". The State and Federal Governments need to be very mindful of Bradshaw's conclusions that:

> "The most important implications of the degree to which Australian forests have disappeared or been degraded are that management must emphasize the maintenance of existing primary forest patches, as well as focus on the regeneration of matrix areas between fragments to increase native habitat area, connectivity and ecosystem functions".

The significance of these findings add weight to the relevance of the solutions proposed by the Great Southern Forest.

LOGGING BREACHES

CASE STUDY, ENVIRONMENT POLLUTION LICENCE (EPL)

> *There's plenty of paper protection, and that is great, but it is not being adhered to on the ground. We have endangered ecological communities being logged we have rocky outcrops being logged, we have, you know, breach after breach after breach.*

The following post-logging interview by an Australian Broadcasting Commission journalist, with two conservationists at Tantawangalo State Forest, highlights the nature of breaches of the EPL in logging operations. It was held in a now desolate logged compartment in south east NSW where post-logging erosion had caused a logging truck roadway to collapse.[102] The interview demonstrates that the native forest logging sector's on-ground operations are not squeaky clean. The actual process of destroying a tree is exacerbated by the consequential damage caused by the need to access it and the damage left after its extraction.

This interview by the ABC with South East Forest Rescue describes multiple breaches of the EPL in just one logged coop. The conservationists being interview would be hard pressed to say that 'this logging coop is a one-off situation".

See also: Appendix C: ForestNSW. Allegations, Failings and Penalties

Photo 18: Stills from Video clip

Female voice echoes across a hollow treeless 'amphitheatre' which was once a forest:

/… A1: **968 EPL breach!**

ABC Q:What are we looking at here?

A1: It is an EPL breach, a breach of the pollution licence that ForestNSW (FNSW) log under. When we find a breach we GPS the coordinates and write them down as well and take a photo and then send that in to the Office Environment & Heritage (OEH), the NSW regulator.

Q: And what is the nature of this particular breach here?

A1: It is erosion, it is washed away and obviously the alleged measures FNSW put in place to stop this kind of erosion happening have failed. So we have failure of the actual road itself.

A2: Oh yeah, they'd probably argue that "the storm washed it away and that it didn't have the usual planning capacity to cope, so it is just an unfortunate occurrence that the road is washed away" and the road is also washed away down there at the creek crossing which wasn't even sort of a mapped crossing of any description according to the harvest map.

A1: But these compartments were designated 3BC for water catchment, surely they have some sort of you know measures in place for big storm events.

A2: It does show there's some design flaw in what they do.

Q: Would it be the need to do with lack of follow up after rain events?

A2: Obviously they haven't followed up to try to remediate the episodes here.

A1: That happens quite often so we go into a compartment and we find this and we tell the regulator and the regulator tells forestry and then maybe forestry will come and fix the road.

A1: OK so we've found some tracks that may or may not be Spotted Quoll tracks they [camera clicking] are endangered on the EPBC Act List, they are nationally endangered. On the harvest plan according to FNSW there were no animals in this compartment; however, we did find Flame Robins when were here last time with the OEH, so its interesting. Sometimes I wonder if you don't look for something you wont find it.

A1: So I'm taking a photo of this orchid. I mean the reason that rocky outcrops are important is because there are five flora that specifically only like to live around a rock; they've got to

be kept cool and moist. Basically, what we do is that if we find stuff that looks interesting we give it to botanists, ecologists or the OEH and ask them, what is this thing?

A1: So we go into a compartment and we look for things like debris around the retained trees. So Forestry must keep a certain amount of habitat trees or recruitment trees in case the habitat tree dies and what is happening in every compartment we have been in so far is that there is debris pushed up against trees that have been retained. Now that must not sound like much…well, so what? However, once forestry have logged then they burn and if debris is pushed up against a tree it will catch fire. So quite often these habitat trees that they have marked to be retained end up dying.

Photo 19: Logged debris pushed against a tree which caught fire. Bermagui State Forest. 2010.

Of course, the other issue is that we've found quite often that trees haven't been marked up—there's no marking up in the compartment. FNSW currently say their rotation times are between 5 and 30 years. Some compartments they are going into again and again and again and they say that is because the State Forest Officer got the markups wrong or you know…yeah, it is definitely quite a lot of breaches that we've found in lots of compartments. Things like logging in creeks, things like rocky outcrops. It is well worth going and having a look at the regulations and seeing what they can and what they cannot do.

Q: Do you see evidence of the prescriptions to some degree do work?

A1: As you can see by this compartment, and this one is no different to really any other compartment we've been in, I don't believe that the prescriptions are being adhered to. I don't think that there is much protection for our forests on ground. There's plenty of paper protection, and that is great, but it is not being adhered to on the ground. We have endangered ecological communities being logged we have rocky outcrops being logged, we have you know breach after breach after breach.

Q: But is the percentage of breaches greater the more remote the operation is?

A1: Absolutely, absolutely. However, and what is interesting is that in compartments that say were quite, or are quite, in the public eye—quite close to you know residences, say Bermagui 2001 2002, Mumbulla and with people on ground every day, it would be my understanding that if you had so much you know, of the spotlight on those compartments you would try to ensure that you did adhere to the prescriptions. However, even in those compartments where we had, say in Bermagui 2001 2002, they are surrounded by the Black Lagoon Marine sanctuary zone, and the marine sanctuary zone is the highest kind of protection that a marine area can have, but FNSW gave it a hard 50m buffer. However, they breached that and that is with people on ground saying "don't log".

Photo 20: Logging too close to Wallaga Lake at Bermagui

So you know there's debris around retained habitat trees um I just find it really it is quite not understandable why it keeps happening. You know if penalties are low and if you are in a remote area and chance of being caught are low, then people will take risks so, I believe that you know, the penalties must be increased. Look basically what it comes down to is, whether they are abiding by the law or not, really is almost a moot point at this stage because what we know about climate change, the facts and the figures and the science says forest logging land degradation must stop if we are to protect the planet and protect our future. We can't eat money. So basically, that's the bottom line for me. It is unsustainable.

Q: Let's talk about the question of sustainability and whether logging is sustainable.

A1: State forests are publicly owned, we the people of the State own the forests and they are held in trust by the government and they are supposed to be managed for the benefit of the public. We've been watching the Auditor General's (AG) Report year after year. And the AG has shown that the loss that FNSW are making, the economic loss has been increasing. So we went from, say, in 2008 to a $14 m loss in the native forest logging sector, to a $16m loss the year after that. Surely if an industry is running at such a loss, I would state at this stage that FNSW in their native forest logging sector is haemorrhaging money. That can't be in the public interest.

Obviously, any kind of logging should be sustainable. I don't believe native forest logging as we have it can be sustainable. FNSW were legislated, required to do their sustainable yield audits which means that they were required to provide data on what they could and couldn't log by 2004 in the Eden Region and by 2006 in the Southern Region, and they haven't done that. They are operating in the dark, so you know, from what we've seen on the ground, the forest is not regenerating, the devastation is quite immediate, once a forest is logged, it is never going to be the same.

A1: These RFAs were to be reviewed from enactment in 2004 and 2006 and that didn't happen. They weren't reviewed. What the Government did was roll both Eden and Southern into one review process and that started in 2009 and it still hasn't been finalised. And now the AG has been requesting FNSW since 2009 for required data that still hasn't been provided to the AG so that's why I say that FNSW, whenever they make a statement about how sustainable they are, or how good the logging is, or when a minister makes a statement about how robust the RFAs are, whether it is a Commonwealth Minister or a State Minister, I would say they are erroneous because they are operating in the dark the data has not been provided. Not only have you started with a flawed process then, to build on that it hasn't been reviewed and again I would suggest it is like surveys…if you don't want to find something…you don't look for it.

Q: Should Australia be sustainable in its timber supply and if so, what's the method?

A1: Our group's objective is to end native forest logging. With what we now know about the link between climate change and deforestation and land degradation, the time is over for business as usual. We need to stop native forest logging…there's enough plantation in Australia to service Australia's needs, both softwood and hardwood. …/

WATER, SOIL AND DOWNSTREAM MARINE HEALTH

There is evidence that logging is having a severe impact in the Eden and Southern RFA areas on water flows in rivers and tributaries.[103] This is consistent with studies which have demonstrated that logging practices can have serious impacts on the hydrology of forest ecosystems and water quality in some areas, resulting in downhill movement of disturbed soils, muddying of watercourses and the silting of lakes and dams.[104] Water is the highest value product that can be obtained from the native forest estate and so re-growth forests should be managed towards achieving their old growth state. [105]

In cases where post-logging supports the growth of young trees, they have a transpiration rate which is three times as high than mature forests. High transpiration rates in immature forests starve the soil, streams, lakes and other vegetation of their 'normal' water supply for up to 150 years.

The removal of vegetative cover and litter lowers infiltration thereby increasing surface run-off. This is further increased by heavy machinery used in logging compacting the soil. Modern intensive logging practices, including extensive construction of roads, tracks, clearing for log-dump sites and clearfelling logging methods expose the soil surface. This increases evaporative losses in the upper layer which forms a dry crust resistant to wetting.

Logging in south east NSW typically results in up to 25% of a site being heavily disturbed and partly compacted, with at least 5% of the site so badly compacted that no regeneration can occur naturally. When forests are cut, the salinity of the soil can greatly increase. As a result, saline water draining from such areas can affect downstream or downslope water quality. Some slopes that are too steep for machinery are still being logged by other methods. The result of such practices includes:

- massive downhill movement of disturbed soils
- muddying of watercourses
- silting of lakes and dams
- death of scale fish and shellfish
- increased water supply costs from filtration and chlorinating.

Catchment studies have shown that discharge from run-off increases immediately after logging. For years later, a dense cover of even-aged regrowth vegetation uses far more water than a mature forest, and discharge is reduced. Studies in the Yambulla and Wallagaraugh catchments in south east NSW indicate that water yield initially increased as a result of industrial logging, for up to six years, and then declined steeply for about 20 years, only returning to pre-logging levels about 100 years after logging.[106]

A 16-year study of water yields in Eastern Australian forests of predominantly Sydney Blue Gum *(Eucalyptus saligna)* and Silvertop Ash *(E. sieberi),* showed water yield reductions of

up to 600mm a year after 16 years in logged and regrowth forests compared with pre-logged forests.[107] Another study of *E sieberi* stands, demonstrated that a 14-year old forest will transpire three times as much water as a 160-year old *sieberi f*orest. [108] These high transpiration rates in immature forests starve the soil, streams, lakes and other forms of vegetation of their 'normal' water supply for up to 150 years.

In the Eden area, the Nullica River and its many tributaries in the Nullica State Forest now rarely flow. In the Southern RFA area, the Tuross River also ceases to flow during prolonged droughts. Given the dependence of coastal communities on hinterland catchment for reticulated water, continued integrated logging has significant implications for the maintenance of water supplies.

The loss of soil's water-holding capacity following logging, and the loss of leaf cover due to vegetation removal and burning, result in logged forests drying out to a greater degree than unlogged forests. They are therefore more at risk from fire. Wildfire and post-logging burning are recognised as the greatest precursors to changes in water chemistry in logged catchments. The greater density and homogeneity of crown height in a regrowth forest also increases fire hazard.

From a water supply perspective, the intensive clearfell logging practice in the Eden and East Gippsland RFA areas fails to make economic sense. Research undertaken in the Melbourne water catchment in the 1990s demonstrated that logging activities were providing much lower economic returns than the value of water lost as a result of that logging.[109] The principles illustrated by the Melbourne study are particularly relevant to south east Australia where population growth and tourism are pushing water supplies to their limits.

From studies in NSW it is reasonable to speculate that the magnitude of catchment water yield is dependent on mean annual rainfall. [110] It is therefore unacceptable that the NSW and Australian Governments continue to jeopardize the scarce and highly valuable water resource by continuing uneconomic logging of the region's native forests, particularly given occurrence of severe and prolonged drought, climate change, and the expected increase in the NSW South Coast population by 74,000 over the next 25 years. [111]

Photo 21: Looking east towards Wallaga Lake with Gulaga (Mt Dromedary) on the left, Richard Green

CONCLUSION

Conclusion: Paul Payten

It is clear to see from the empirical, scientific and anecdotal evidence that the current practices of logging are not working towards conserving the biodiversity of the environment. In fact, quite the opposite is obvious. The natural diversity of fauna and flora is that which regenerates health in any native ecosystem. A quick recap of the impacts shows massive downhill movement of disturbed soils, muddying of watercourses, silting of lakes and dams, death of scale fish and shellfish, not to mention increased water supply costs from filtration and chlorination.

State forests are publicly owned, in Commons, which means that our interests are paramount and determined by our input. Preservation of our natural biodiversity sustains the health of our communities and our planet. Consideration of the principles of the Great Southern Forest would light the way for the solutions to the problems which logging of native forests causes for water and water catchments. All logging of native forests needs to cease.

SOCIAL DISCONTENT IN THE SOUTHERN FORESTS

This section outlines a history of the woodchipping sector and presents an overview of the inadequacy of the Regional Forest Agreements to meet critical climate and environmental conservation needs, as well as community cohesion and security Beyond the facts and figures quoted, this section illustrates the genuine long standing concerns and passion for nature and beauty of the local and broader communities, Indigenous and non-indigenous people, and how they have not been considered through the unreasonable application of the NSW Forestry Act. Also explained is the blatant disregard for the rightful ownership of the forests by residents of NSW.

In 1929, Sir Arthur Streeton, painted Our Vanishing Forests as a warning against damaging the natural environment.

Photo 22: Sir Arthur Streeton (1867-1943) Our Vanishing Forests, 1929, oil on canvas, 63.5 x 76.5. Private Collection

START OF WOODCHIPPING

From The Peoples' Forest Collection *recorded by Gregg Borschmann.*[112] *Bronte Somerset.*

By 1965, the Crown's District Forest Director, Ray Hammond, had 35 years' experience in native forests and timber plantation development. The Crown told him they had a buyer for woodchips and asked him to call for tenders to commence woodchipping in south east NSW. Hammond had a pivotal meeting with a Harris Holdings representative and indicated that the cost of woodchips should be 7/6d. (75c) per 100 super feet (0.2360 cubic meters) from saw mill timber waste and forest waste.

Harris (later Daishowa) won the tender against Australian Paper Manufacturers, and the agreement was made that 5,000 tons per year for five years would be felled from the south east native forests of NSW and sold to Daishowa, a Japanese paper producer. At that time, 'waste' was defined as the heads and butts and damaged or hollowed timber from trees felled for sawmills. Initially, very strict guidelines were enforced so that good quality logs went to sawmills and not to the chipmill, and cutters lost jobs if regulations were breached. Because of his tenacity to adhere to this practice, Hammond became sidelined and lost the power to overrule or modify operational decisions.

Hammond's conscientious vision of woodchipping did not transpire. From an economic perspective, he believed that conservative logging for woodchips could have worked for NSW. But, under the proposed regime, saw-logging and woodchipping were incompatible because the chipmill would demand a larger volume of unmillable timber than orders for sawmill timber could guarantee. He foretold the environmental impact as he witnessed a runaway situation develop. Five years stretched into perpetuity which he perceived:

> *Guaranteed supply of the unborn forest financed by the unborn children of tomorrow.*

In 1971, Japan's biggest paper maker, Nippon Paper, and Daishowa with which it merged in 2003, took control of the Eden chipmill and traded as South East Fibre Exports (SEFE). Commonwealth and State Governments enacted the State's Regional Forest Agreements (RFAs) for native forest management. The Eden RFA was signed in 1999 and the Southern RFA in 2001. Economic and environmental pain followed.

Woodchipping was established in other states, became politically powerful and the governments approved vastly increased exports. Protection of the forest by the acquisition of timber under the original definition of 'waste' was ignored and whole logs were supplied to the SEFE chipmill. Today, 90% of timber from Australia's native forests is used for woodchips. *(At the time of writing in 2012)* SEFE exports about 850,000 tonnes of woodchips annually. Each day 2,500–3,500 logs enter their woodchip mill at Eden from heavy logging of carbon dense forests south, north and west of Eden and into East Gippsland.

Australia has logged 50% of forests since colonisation. Woodchipping in south east NSW has thus historically created dilemmas between its stakeholders and the community. The major political parties support continued logging of native forests for woodchips, and it is clear operations would not survive without government financial support.

Everything in a forest is integral to its survival. The environmental damage from logging is severe and extensive and it destroys beauty, habitat, and fragile and

unique ecosystems. Hammond maintained that the beauty of the forest was taken for granted and that the foresters didn't foresee that logging old growth timber would be detrimental to the environment. He stated that:

> *The Forestry Act will tell you to…look after flora, fauna and soil.*[113] *You can't muck around with the Act but it is the reasonable application of it that runs foul of politicians and forestry heads now.*

Hammond believed implicitly that 'the forests of NSW belong to the people of NSW' and this is legally correct. It still grieves him that his knowledge and experience-based foresight were ignored.

Hammond's knowledge and prescience aligns with a problematic legacy which is neither economically nor environmentally sustainable. Our optimal legacy for 'the unborn children of tomorrow' will be secured by preservation of old growth forests and cessation of logging our native forests.

INADEQUACY OF THE REGIONAL FOREST AGREEMENTS

Countries throughout the world have developed regional and international criteria and indicators that can measure and monitor success in achieving sustainable forest management. The seven main indicator initiatives of this, the Montreal Process[114], are:

(1) conservation of biological diversity;
(2) maintenance of productive capacity of productive ecosystems;
(3) maintenance of forest ecosystem health and vitality;
(4) conservation and maintenance of soil and water resources;
(5) maintenance of forest contribution to carbon cycles;
(6) maintenance and enhancement of long-term socio-economic benefits to meet the needs of societies; and
(7) development of legal, institutional and economic framework for forest conservation and sustainable management.

It is hard to imagine how any of these standards are complied with when one witnesses the degradation caused by logging in south east NSW such as this image portrays.

Photo 23: Devastation in Gnupa State Forest which was an industrial 'mistake'. 2010. BJS

The RFA regions in south east NSW are Eden, South Coast and Tumut. The Department of Agriculture and Water Resources[115] states that:

> Regional Forest Agreements (RFAs) are 20-year plans for the sustainable management and conservation of Australia's native forests. … The RFAs seek to balance competing economic, social and environmental demands on forests by setting obligations and commitments for forest management that deliver:

- certainty of resource access and supply to industry—building investment confidence
- ecologically sustainable forest management—ensuring forests are appropriately managed and regenerated
- an expanded and permanent forest conservation estate—to provide for the protection of Australia's unique forest biodiversity.

Yet, given the image above, one can see these undertakings are lacking on an operational level. RFAs disregard the interdependence between soil, carbon, water and habitat. Tree hollows only begin to appear in eucalypts when they are between 80—100 years old, and logging destroys over 70% of hollows in high conservation value native forest areas.[116] Scientists maintain that a forest's ability to store carbon should be protected.[117] Fire studies undertaken since Black Saturday in Victoria, show that canopy-dense moist native forests inhibit bushfire.[118] Wildlife organisations work against native species loss as logging disconnects landscapes. Marine environments and aquaculture also suffer from silt washed down from logged areas. Environmentalists from the community take on the responsibility of identifying breaches of RFAs by logging companies.

Today, woodchipping and logging is at a crossroad. Global markets have changed, plantation woodchips are preferred, and new producers are supplanting Australia.[119] Native forest woodchipping for paper production appears to be in decline.

The practice of logging native forests on State and privately owned land for woodchips creates a conundrum of national importance, as both jobs and forests need protection. Timber plantations can support nearly all of Australia's domestic timber needs and woodchips are increasingly being produced from eucalypt plantations grown specifically to produce high quality fibre for papermaking. The hectares for extracting the same amount of timber from a plantation is one tenth of that from a native forest.

In theory RFAs were meant to protect the environment as well as provide certainty of supply. Some areas were put into national parks, but the environmental prescriptions that should have been applied to logging were not adhered to, and the unrealistic and unworkable outcomes were not achieved, nor were they able to be. The current aim to maintain 2013 levels of wood supply and protect the environment (to the unsatisfactory 2013 level) is unachievable. It would require around double the area of State forest to be logged to maintain supply, and this would be devastating for wildlife, the forest ecosystems and their water supplies.

Photo 24: A winter vigil at Bermagui State Forest. Sam Davis

CONTENTIOUSNESS OF LOGGING OF NATIVE FORESTS

The struggle to protect the forests of south east NSW is decades old. It is driven by the passion of people who love and respect forests and nature for no gain other than for them to not be cut down—it is that simple. Many men, women and children campaign against their destruction, for their beauty and for preservation of their wildlife habitat.

Communities protest in logging areas close to their townships, and experience how natural water catchments are threatened by logging and need protection.[120] Campaigners' infringements are usually dismissed when dealt with by courts.[121] Indigenous communities want heritage rich forestlands protected.[122] Young people are educated about, and are

eager to preserve our natural wildernesses, yet current forestry practices permitted by the RFAs contradict these ideals.

Campaigns are waged by writing submissions, letters and briefs to politicians and State and Federal Government departments, and by letters to local, state and national newspapers. Campaigns are waged on the ground by stopping logging trucks and disrupting logging activities. Indigenous people have received penalty infringement notices for trying to protect their sacred Aboriginal land. People with the courage of their convictions have locked on to gates and machinery, been arrested, attended court to defend their actions, and the majority of these cases have been dismissed. For them, the risk of penalty is a small price to pay to make a point about the wantonness of native forest logging.

Forest protests have been supported by people from many walks of life: professional people have called in to blockades on their way to work; children have held up 'Save the Koalas' placards; pensioners and families have rallied; musicians have played in the path of logging trucks; communities have held silent vigils by the roadside and held street marches; and theatrical enactments, and choirs, have performed in logged coops.

The Internet means that people have easy access to scientific research. Some people tire of the struggle and some have passed away before seeing resolution. Despite this outpouring of opposition from the community, nothing has overturned the RFAs which permit the needless destruction of native forests and all they hold.

Photo 25: String quartet and Mozart block logging truck route – still from video, Mumbulla 2010.

- The South East Region Conservation Alliance (SERCA) played a lead role in opposing Renewable Energy Certificates from potentially being issued to the woodchip mill for biomass burning.
- SERCA groups supported a 50-day Mumbulla sustained community protest because of logging activities which disregarded Aboriginal heritage and threatened biodiversity including koalas and other known native species. About 30 charges were laid against activists during the Mumbulla Forest campaign and only two people were convicted.

- South East Forest Rescue (SEFR) systematically records breaches of forestry logging operations and tables these with the Environmental Defenders' Office (EDO). (SEFR has been the ONLY source of data for the EDO over the past decades—the EDO is not resourced to conduct post-logging inspections.) The Nature Conservation Council of NSW commissioned the EDO to compile a statewide report demonstrating how ForestsNSW fails to comply with its legal obligations.
- Chipstop instigated a campaign against the owners of the Eden Woodchip mill, Nippon paper, to draw attention to the abuse of native forests for paper production.
- The Tanja residents' group negotiated a compromise with FNSW to have an environmentally significant compartment excluded from logging activities and for logging in the Tanja State Forest to be restricted to sawmill logs only.
- SERCA was one of four groups appealing against the State and Federal Governments' approval of a gold mine at Dargues Reef, Majors Creek. SERCA became the first group to lodge its appeal with the EDO regarding this environmentally damaging gold mine.
- The Five Forests group campaigned against the logging of the Cathedral of Trees over-hanging the road entrance to Bermagui Village. The Cathedral at least was saved but the surrounding forests were logged.
- As at time of writing, 27th February, 2018, the Bermagui State Forests are due to be logged again.

Photo 26: Silent protest at the last round of logging at Bermagui State Forest

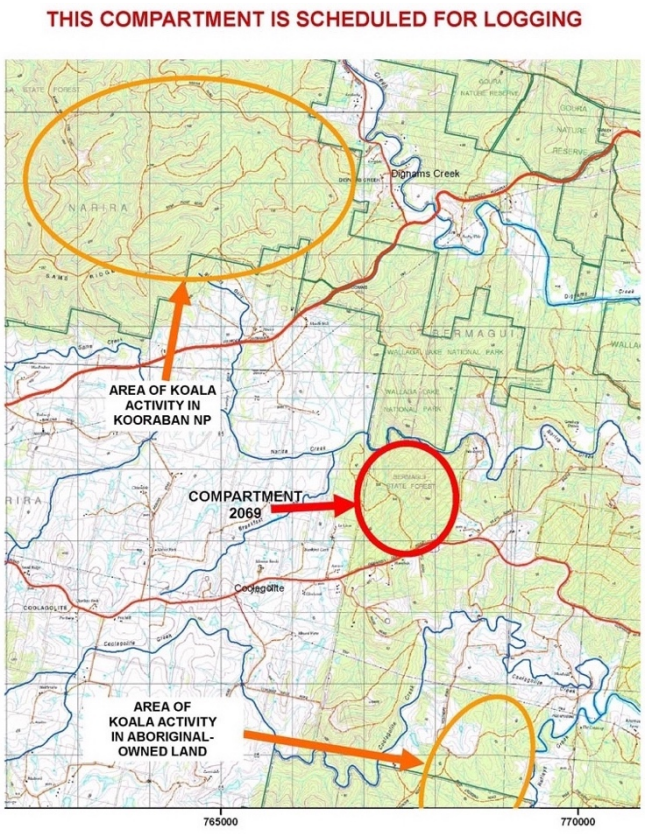
CASE STUDIES

SPOTTY GUMS OF BERMAGUI BALE OUT VICTORIA

Thanks to Sean Burke for this information and Map 6.

This situation indicates the willfulness of the logging sector to get what it wants, when it wants and from where it wants it without considering impact on wildlife and community opinion. Local conservationists condemn rushed plans to log Bermagui and Corunna State Forests due to a shortfall of timber to a Victorian sawmill. The community's beautiful and beloved forests of Bermagui, (Compartment 2003) and Corunna (Compartment 3058, both sides of the Princes Highway between Central Tilba and Mystery Bay) will pay the price for mismanagement by that sawmill operation.

Compartment 2069 is also due to be logged and is particularly vulnerable because it is the only public land that provides a habitat corridor link between Murrah Flora Reserve/Biamanga National Park and Kooraban/Gulaga National Parks. The eastern and western sides were decimated a few years ago and this operation would remove the heart of that corridor, killing any chance of koala movements between these reserve areas. These three threatened coastal compartments provide food and shelter for the critically endangered Swift Parrot on its migration through this area in autumn. They also provide habitat for other threatened and endangered species including the endangered Southern



Map 6: Location of recently confirmed koala activity—orange circles; and Compartment 2069—red circle, scheduled for logging

Brown Bandicoot, and the Yellow Bellied Glider, Long-Nosed Potoroo, White-Bellied Sea-Eagle, Sooty and Masked Owls, Gloss Black-Cockatoo, Gang-Gang Cockatoo and Eastern False Pipistrelle—all of which are classified as vulnerable.

The rush to harvest these local forests comes from the demand for spotted gum timber at the Heyfield Mill in Victoria. Managing Director of Australian Sustainable Hardwoods (ASH) Vince Hurley told ABC Radio: *"What we've done is identify alternative, or traditional,*

feedstocks that can also go into the manufacturing plants, particularly the spotted gum resource from New South Wales."

Local coast spotted gum forests will pay the price for overlogging and bad management in Victoria as well as here in NSW. Trucks hauling these logs for a round trip over 1,000km can't be justified as sustainable, economically or environmentally.

Anybody who has seen the destruction caused by the industrial logging of our native forests knows that the damage isn't consistent with good ecologically sustainable forest management as required by the RFAs.

The pride the community holds for their beautiful spotty gum forests and ability for the thousands of tourists who visit Bermagui each to appreciate and photograph these forests in their natural beauty is inconsequential. The mill in Victoria must reach its quota! The community's last resort is on the ground campaigning.

The fate of Myrtle Creek catchment, Wyndham Community Hall

Myrtle Creek Catchment: Bronte Somerset

A recollection of a 'consultation' session between FNSW and the community at a meeting arranged to discuss logging of native forests in their local water catchment.

> Residents of Wyndham and the Myrtle Creek catchment area had campaigned vigorously against proposed logging in Yurammie State Forest[123], so Forests NSW (FNSW) agreed to a public consultation session on the evening of 11th May 2010.
>
> Wyndham Hall overflowed with local people, families, children, ring-ins, loggers and truckies, Shire Councillors, FNSW's CEO, their regional planning manager, a hydrologist, a soil specialist, and an ecologist. A condition of the meeting was that the public should not speak or ask questions during FNSW's hour and a half presentation.
>
> Their data may have intended to bamboozle with acronyms, figures and graphs. Why was I thinking 'smoke and mirrors'? Predictions were made regarding future conditions yet disregarded climate change. Black numbers on blazing white digital screens used to justify the destruction of a living breathing forest were incongruous.
>
> Each topic was disconnected from the next. It was as if the 'bones, flesh and blood' of the forest were being dissected and evaluated independently and not on how they interacted. I thought that Suzuki's 'sacred balance' was ignored. It seemed to be thought that the integrity of the forests would remain intact despite removing part of its flesh and exposing its bare bones, disconnecting the blood and nerve flow and expecting that the body of the forest would not alter or suffer.

FNSW's translucent maps showed overlapping areas of incidence of native species and the proposed logging area. They stated that some areas were designated as being less valuable because only swamp wallabies, lyrebirds and wombats were observed there. I thought about what chance each would have against man and machine as their habitat was lost.

Finally, as local knowledge and passion were pitched against data, whiteboard, and forestry employees: heated debate ensued. Questions flowed from people who were already well aware of the impact of logging on the catchment area. The residents knew that eight threatened species, (Koala, Yellow-bellied Glider, Potoroo, Sooty Owl, Powerful Owl, Barking Owl, Glossy Cockatoo and Giant Burrowing Frog), rainforest, swamps and stands of old growth and mature forest were in the threatened forest.

They pointed out that the February 2010 rains were not indicative of typical seasons yet were included in FNSW's hydrology figures and predictions. FNSW commented that if the water flow was affected post logging, they would consider rebuilding a new water supply, in tanks. It was irrational to them that the existing naturally occurring water supply should not be threatened. I thought the opposition won the debate by not only having a comprehensive and clear understanding of water catchments, and in some cases a lifetime of knowledge of the area; but by their expressions of love and passion for the beauty of the land, the forests and its wildlife.

The residents' lost their appeal: the catchment was logged. The forestry sector could tick the 'consultation' box. In truth, had the catchment been protected, some other area would have been logged anyway to compensate for 'their loss'. This sort of confrontation between the corporation and the local residents should not have to happen.

Photo 27: Stop logging native forests rally in Bega, NSW

MUMBULLA CAMPAIGN

> *… and what people should know is that without one's ceremonies, which are at the core of our culture, one cannot understand the importance of our land as they both make us whole. John Mumbler* [124]

Mumbulla mountain is an important heritage site for the Yuin people and is also koala habitat. The logging of it by Forest Corp is a perfect example of failure to protect Indigenous values.

In 2010 Compartments 2135 and 2135 of Mumbulla State Forest near Bega were approved for logging which proceeded against strong community protests, uniting the local Indigenous and wider communities. Local Koori Elders led walks into the prohibited zone, marches and public rallies in Bega in support of stopping the logging and protecting the forest on the mountain. Many arrests occurred, but many convictions were avoided because of the acknowledged illegality of the logging.

The logging contractors finally withdrew on 27th March 2010 after the Forestry Corporation had been presented with evidence that the area had been gazetted as an Aboriginal Place in 1984. An official inquiry was conducted and this acknowledged the error. Following the admission of the illegality of the logging, the contractor (LW&CK Cocks) received $18,000 compensation for 'loss of resource', but the Koori community received nothing. The approved Harvest Plan is still on the Forestry Corporation website.[125]

Photo 28: Local Indigenous Elders and youth protect their sacred land from logging. Mumbulla State Forest, 2010. Sam Davis

TANJA STATE FOREST

Tanja State Forest, Harriett Swift

This Forest was approved for logging, but these plans have been postponed twice. FCNSW conducted routine pre-logging surveys for koalas before the first approval, but found none. It was only after koala sightings and community protests against the logging that FCNSW conducted more intense surveys which found koalas, and the community has seen more since.

Due to strong community campaigning and discovery of a new koala population, one compartment has been permanently removed from the logging schedule.

The Tanja State Forest is an example of the inadequacy of the Biodiversity Fund Project, "Corridors and Core Habitat for Koalas". In spite of there being a known koala population there, it was not included in the 5-year moratorium area, and the estimated woodchip yield from Tanja was actually increased to make up for the logging moratorium in the neighbouring State Forests of Mumbulla and Murrah.

Community members and residents have been seeing koalas in the forest; this includes a sighting by an off-duty Forestry Officer. In spite of all this, the approved Harvest Plan remains on the FCNSW website. So, it is apparent that FCNSW intends to log this forest.

CONCLUSION

Conclusion: Paul Payten

It is time for the contentiousness to end. The opinions of men, women and children of our communities, demand respect. We the people speak for the forests: we speak for the wildlife whose homes are destroyed, for the loss of natural carbon capture, for the degradation of soil and waterways, for the destruction of wildlife connective corridors and for the loss of the integrity of and respect for the land we all stand on—Aboriginal land. We require our State and Federal Governments to recognise the fact that the community is very much at odds with the way our environment is being treated.

Communities cannot thrive on internal division and the imposing of uncaring, destructive and short-sighted practices on their ambience, culture and amenities. The Great Southern Forest would go a long way to ending the woes of the forest and their communities. It proposes solutions to the problems which the world now faces. The global view has undergone a change of heart and mind which now perceives the dire need to protect not destroy our environment, especially in view of the knowledge we now have about a changing climate. We don't have another planet. We owe our very existence to this planet, our home.

THE IMPACT OF LOGGING ON FOREST FIRE

> *Conflicting objectives…from burning everything to burning nothing and everything in between, and always at the wrong time.*

This section discusses the impact of post-logging fire on the quality of forests in south east NSW and the interrelated problems affecting human and natural environments. Empirical and scientific evidence is here offered that; historically, forests are capable of self-managing, and that human interference over the past two and a quarter centuries has caused dramatic problems in the forests of the south east region of NSW. Further, it is proposed that the ideals and management practices of the Great Southern Forest will help remediate these problems for the forests and adjacent townships and communities. Of course, it is not claimed here that logging is the sole cause of more damaging fires as climate change is accepted as exacerbating these problems.

LOGGING AFFECTS THE SUSCEPTIBILITY OF FORESTS TO FIRE

> *Traditional people all over Australia base their burning on the same principles. If we can get these principles to work in our Country, we can start to get back to our traditional ways. If we all come together to learn from each other, we can start doing our burning in better ways.*[126]

The foremost question is whether the quality of forests is improved or disadvantaged because of industrial fire—post-logging and hazard reduction burning. It is established that forests sequester carbon, fire releases carbon dioxide into the atmosphere, opens forests' canopies, creates dryer forest understories and floors, and that fire destroys wildlife habitat.

It has been argued that 'industrial logging was a source of almost unprecedented holocausts…'. [127] Despite claims by Australian forestry to the contrary, global studies show that post-logging changes to the forest landscape make it more susceptible to wildfire.

To the best of their knowledge David Lindenmayer and his colleagues [128] agree that to date, there has been no detailed published review of how industrial logging policies and practices can alter fire regimes. In their paper *Effects of logging on fire regimes in moist forests,* they outline interrelated ways whereby logging in native forests (not plantations) can change forest wildfire frequency, extent and/or severity. Their study found that selective logging reduces the number of dry days needed to make a forest more combustible than uncut native forests. This supports empirical knowledge that the natural microclimates in

the temperate forests of south east NSW have been greatly affected by logging, rendering them dryer and therefore more fire prone.

Studies in south east Australia show that logging alters the structure and species composition of forests and the nature of inter crowning, and creates a less complex vegetation composition which is dryer and hence, more fire prone. Logging alters fire regimes by changing the amount, type and moisture content of fuels. Clear-felling of moist forests in southern Australia has led to the development of dense stands of regrowth saplings creating more available fuel.

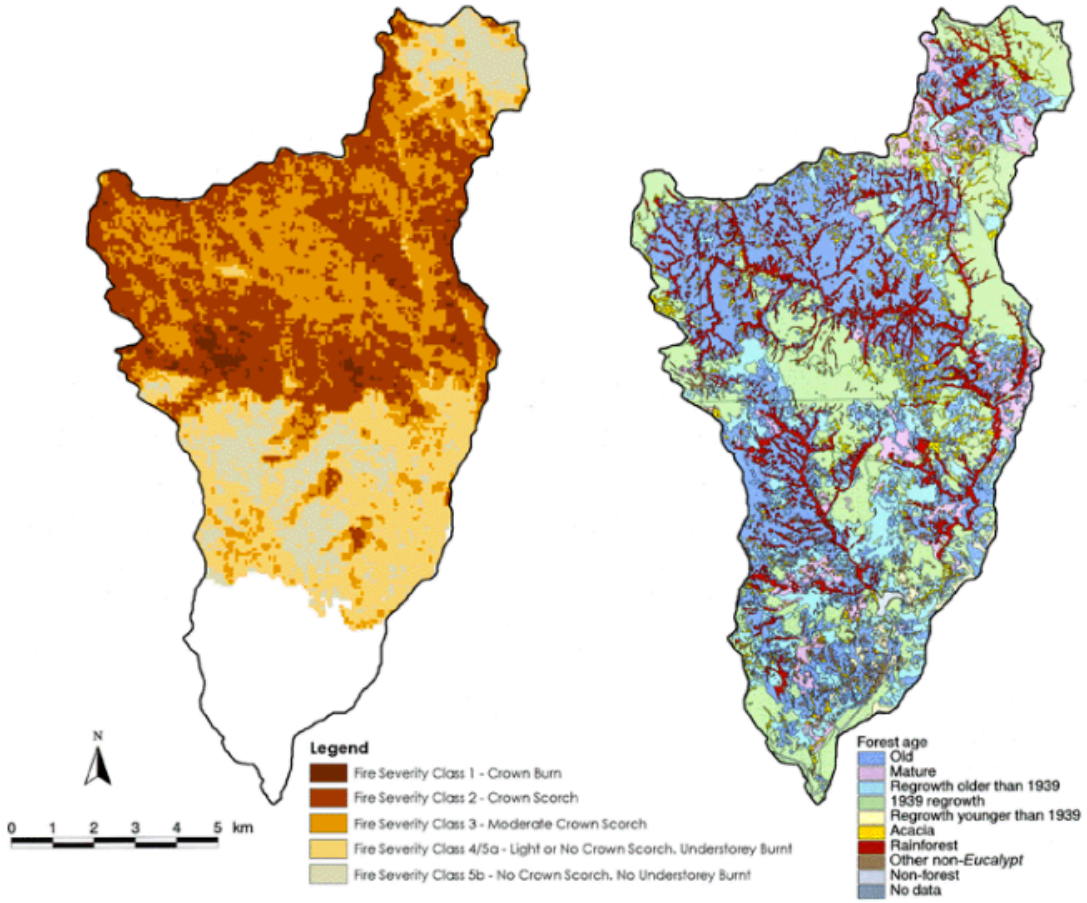
Building of logging truck routes increases the number of ignition points for fires. Lightning strikes are attracted to post-logging fine fuel loads which take from 10-30 years to become less inflammatory following logging. Logging operations change the patterns of how forests are naturally interrelated. Creation of unnatural forest edges facilitates entry points for fires burning in adjacent forests. Forest logging truck roads create the same effect.

Relationships between logging and fire regimes are contingent on forest practices, the kind of forest under consideration, and the natural fire regime characteristic of that forest. Such relationships will influence both the threat of fire to human life and infrastructure, and biodiversity conservation. [129]

Logging therefore has a great influence on the character and fabric of forests. One of these influences is the development of their incendiary propensity. Fire regimes and forest practices are interrelated and mismanagement may affect a forest's finely balanced biodiversity.

Melbourne scientist Dr Chris Taylor's research into the Black Saturday fires in Victoria studied the impact of catastrophic fire on different classes of forests said: 'Logged forests are highly fire-prone for 5-25 years after logging. Mature forests repel fire and recover quickly'. [130] Following the catastrophic Black Saturday fires of 2009, Taylor presents evidence from this research that the most intense fires occurred in grassland, plantations and logged forests, and that unlogged forests were the most resistant to fire and were where the fires finally halted. Map 7 demonstrates this in one water catchment area.

> (Map 7) … shows as the fire progressed into old and mature stands of forest intensity decreased from Severity Class 1 and 2 to Class 3. The mapping shows the tree crowns in these areas are moderately scorched. The fire decreased again to Class 4 in a core rainforest community. On the northern slopes of Mount Ritchie, where younger trees originating from the 1939 fires occur, the fire severity was higher (Class 2), with some parts of the crown entirely consumed (Class 1). Further south, fire severity decreased significantly to Classes 4 and 5, with light scorching or no scorching of the crown and some or no fire impact to the understorey.



Map 7: O'Shannassy Water Supply Catchment, Victoria. Left: Fire Severity map (Source DSE, 2009) Right: Age classes of forests and rainforest communities. (Source Mackey et al, 2002)

Dr Taylor visited logged south east forests around the Nippon Paper chip mill at Eden where up to 90% of trees are chipped for export to Japan. He said that the logging was some of the worst he had seen, with mono species Silver Top Ash taking over the forests, and it was on par with current logging in Victoria where montane Ash forests comprise less than 1% of the original forests.

FIRE HAS AN IMPACT ON SPECIES' SURVIVAL

The cumulative effect of 45 years of industrial logging and associated burning in south east NSW has contributed to a drastic reduction in animal and plant species and numbers, and some are now close to regional extinction.

A worldwide objective of biodiversity conservation is to avoid population extinctions due to inappropriate fire regimes. Wildfires, post-logging and hazard reduction burning affect floral and faunal species and thus the rate of extinction in forests in south east NSW. Individual statistical evidence of the impact of these three occurrences upon species in south east NSW is lacking. Yet, many species have been lost. Thirty-year Murrah State Forest resident, Suzanne Foulkes, witnessed:

> The koala colony in the gully behind us vanished after their habitat was demolished by Forests NSW. Of course, the follow up burning would have made certain…

Floral and faunal species play a vital part in making forests more resistant to bushfire. Biological processes which provide resilience against bushfire should be taken much more seriously. The roles of bandicoots, lyrebirds, oecophorid moths, bugs, beetles and other organisms are essential for reducing and recycling litter on the forest floor. This natural cycle is broken when they are wiped out in control burns. The NSW State Government's Scientists agree that:

> Clearing of leaf litter and fallen logs, often associated with clearing and/or burning of the understorey for clearing, removes habitat for a wide variety of vertebrates and invertebrates which live in the leaf litter and in the fallen logs—including reptiles, small mammals, invertebrates, for example, spiders, molluscs, millipedes, ants, etc. These impacts may affect ecological functioning. Loss of the leaf litter also exposes bare soil which will be susceptible to soil erosion and drying, and hence affects the soil biota, and may make sites more vulnerable to weed invasion. [131]

The research paper *Choice of biodiversity index drives optimal fire management decisions*, by Giljohann and colleagues, describes how dynamic programming based on random probability occurrence was used to model changes in vegetation in the presence of both planned and unplanned fires. This research used an extensive data set based on the occurrence of birds, reptiles, and small mammals in different states in semiarid Australia. The researchers concluded that:

> … using the extinction risk objective, we show that a policy to annually burn 5% of the landscape could increase the average probability of extinction for the modelled species by 7% over the next 100 years compared to the optimal management scenario. [132]

Results of this research highlight the need for careful consideration when specifying an objective to represent overarching conservation goals. Five percent is the amount of fire reduction carried out on public lands each year in NSW. Just as the 5% target is an inefficient method for minimising the impact of major bushfires on human life and communities, it also has negative consequences for the resilience of natural ecosystems. It's time to drop the simple 5% target. It is a blunt tool, and a risk-based approach more effectively focuses fire protection where it's most needed to safeguard people and wildlife.

IMPACT OF POST-LOGGING BURNING ON TREES LEFT STANDING

Research into the impact of slash burning and the mortality and collapse of trees retained on logged sites in south-eastern Australia [133] compared rates of mortality and collapse among trees retained on logged sites that were routinely treated with a high-intensity slash-

burn, with those on logged sites treated with a low-intensity slash-burn. All observations were made 2–5 years after logging.

The study found that 37% of trees retained on logged sites were more likely to die and collapse if the site was treated with a high-intensity slash-burn; however, 14% of trees were also more likely to die if the basal area of trees retained on the site was relatively low and the site had a northerly aspect. Mortality rate was similar among all diameter classes on sites treated with a high-intensity slash-burn.

The conclusion was that some of the objectives of retaining trees on logged sites, such as perpetuating hollow-bearing trees for wildlife, were compromised after high-intensity post-logging slash-burns.

Forestry must keep a certain amount of habitat trees or recruitment trees in case the habitat tree dies. In every compartment surveyed by local conservationists, they found that debris has been pushed up against retained trees. This wouldn't necessarily be a problem, but when forestry log then burn, obviously debris pushed up against a retained tree, it will also catch fie. So quite often these habitat trees that forestry have marked to be retained end up dying with consequent loss of wildlife habitat.

LOGGING NEAR TOWNS INCREASES FIRE RISK TO COMMUNITIES

Science has well established the risk to townships of logging close by. The effect of this was especially evident in the Black Saturday fires in Victoria in 2009. Researchers Lindenmayer and Taylor established that logging practices can 'greatly increase the severity of fires' in extreme weather conditions such as Black Saturday. They examined hundreds of thousands of trees burnt in the bushfires in Victoria on a day of extreme temperatures and high winds. They found that the increased fire risk began about seven years after an area had been logged and lasted for another 50 years. Lindenmayer's advice was 'We need to let those forests recover and we need to develop the wet forests...which do have a fire suppressive effect'. [134]

During the Canberra bushfires in January 2003, fire raced up from the Murrumbidgee River Valley eastwards to Canberra over grasslands at breakneck speed with the wind behind it. The land had been cleared for pine plantations and livestock grazing. Fire destroyed property in the suburb of Duffy and over 20 lives were lost. If the native, more moist, native forests had been standing, they may have slowed the progress of the fire which would have resulted in time for warnings and evacuation.

The ongoing practice of logging close to south east NSW townships threatens life and homes and creates an insurance risk. Retaining our native forest to allow them to become moist ones is the best insurance policy against fire. Local communities are very concerned that, with the southern regions' forests running out of supplies of contracted timber, logging is now coming close to towns and villages such as Bermagui, Tanja and Tathra. This

logging puts residents at increased risk from wildfires. For example, in 2010, logging took place within 300m of Bermagui residents' properties and the dense 'Cathedral' of trees abutting residents was only saved after community protest.

CONCLUSION

Conclusion: Paul Payten

As demonstrated, logging has a devastating and unexpected effect on the fires that follow it, as well as fires that naturally happen in unlogged forest. To avoid even greater disasters to nature and townships, including loss of human life, the continuation of this process cannot be contemplated.

From the information provided, it is obvious that all elements of the south east are impacted by more intense and frequent forest fire incidents: from the community residents and property, entire forest inhabitants, to all species of flora that sustain life: clean water, healthy soil, bird life, bees and other pollinators and CO_2 absorption. Indeed, the forestry industry itself is threatened as its resources are more frequently destroyed before being harvested, even if future logging was to being allowed in native forests.

A new vision for our future is needed and a change of approach to land and forest care in general be adopted. The Great Southern Forest is the indisputable response required to ameliorate the current state of the south east and ensure a viable and responsible environment in the region.

Photo 29: Post-logging fire out of control on Gulaga. 2010. BJS

RECOGNISING THE BEAUTY OF NATURE

Recognising the beauty of nature: Prue Acton

On the power of beauty

It is physical; it literally takes one's breath away.

Whatever we feel when we see a beautiful sunset, a magnificent forest, a glorious creature in full health, or the most minute of organisms on the forest floor or sea bed or from the greatest human endeavours: whether art, music, poetry or scientific or philosophic understanding, we are amazed.

And motivated.

Everyone, not just scientists and artists, are immersed in the complexity of what we are seeing and at some level we are aware of how the parts come together in one glorious whole.

So it is with this ancient land of Australia; long isolated, this landscape is as diverse, as complex in its nature as any—and one we, as universal citizens, must look after for the resilience of life on earth and not just for our own sake.

On the power of forests

Perhaps the most critical ecosystems on the planet, breathing out oxygen, making rain, recycling life into healthy soils, sequestering carbon, protecting an abundance of life forms

Australian forests, unique forests of the world's tallest flowing plants—the long living, hollow bearing eucalypts—along with the great pine trees of the Americas are/were the tallest trees of all.

From the top order—great eagles and owls, here koalas and gliders, pollinating flying foxes to the ground level lyre birds to the connected underground micro-organisms—all transferring nutrients that run the whole business of a forest—the soils that allow growth and carbon storage (sequestration).

So how can we not love our forests? How can we see them only as valuable if supplying a few jobs for loggers now largely displaced by plantations and hence fail miserably to preserve their integrity since European occupation? So, what's the answer?

Take species loss seriously—koalas are key indicator of loss of biodiversity! This is catastrophe—once koalas are gone they are gone forever, along with the thousands of other known and unknown species that are critical to the resilience of our Eastern forests.

And with them goes the beauty of this ancient and unique and most exquisite example of the power of the diversity of nature.

And an opportunity

Beauty is a vision of the diversity of life, for the potential of evolution here and globally.

So, beauty is the motivating idea, a thousand-year vision, for the Great Southern Forest project—recognising the integrity of this vast landscape from the mountains to the coast; and how if we can connect, protect, and begin to restore this once pristine system, we can help to save the koala, make our forests safer, our climate more liveable; and we will contribute to the beauty of nature, of life on this blue planet.

Photo 30: Forestscape. Judith Deland

CONCLUSION

By adopting a connect, protect and restore approach to forest management, the principles of Great Southern Forest will regenerate forests, which will help them to regain resilience from drought and fire and restore to their naturally occurring beauty, supporting all life, from the mountains to the coastal seas, their soils, water and carbon stores.

The time has come for action to ensure the future of the koala, and other forest dwellers, by establishing the GSF as part of the national conservation initiative. This belief has proven to be justified by the compelling evidence presented at the IUCN's World Parks Congress (WPC) from many countries which have overcome huge environmental challenges; connected fragmented landscapes, restored degraded ones and watched wildlife return.

The GSF will focus global attention on Australia for having converted industrially used forests into the world's largest protected habitat conservation area of over 400,000 hectares. The GSF will improve Australia's appalling extinction rate reputation by saving hundreds of faunal and floral species. The GSF will also help repair Australia's, and in particular, New South Wales' reputation as having some of the world's most degraded landscapes.

APPENDICES

APPENDIX A: THREATENED FAUNAL SPECIES AND EXTINCT FAUNAL SPECIES

Threatened species list - threatened amphibians, bats, birds, marine mammals and marsupials of south east coastal plains CMA sub-region

Map 8: South East Coastal Plains CMA sub-region

This shows the area from which this list of threatened species is taken. It is **only a part of** the southern forest regions.

http://www.environment.nsw.gov.au/threatenedSpeciesApp/cmaSearchResults.aspx?SubCmaId=4968

Scientific name	Common name	Type of species	NSW status
1. Heleioporus australiacus	Giant Burrowing Frog	Animal > Amphibians	Vulnerable
2. Litoria aurea	Green and Golden Bell Frog	Animal > Amphibians	Endangered
3. Mixophyes balbus	Stuttering Frog	Animal > Amphibians	Endangered
4. Falsistrellus tasmaniensis	Eastern False Pipistrelle	Animal > Bats	Vulnerable
5. Kerivoula papuensis	Golden-tipped Bat	Animal > Bats	Vulnerable
6. Miniopterus australis	Little Bentwing-bat	Animal > Bats	Vulnerable
7. Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Animal > Bats	Vulnerable
8. Mormopterus norfolkensis	Eastern Freetail-bat	Animal > Bats	Vulnerable
9. Myotis macropus	Southern Myotis	Animal > Bats	Vulnerable

Scientific name	Common name	Type of species	NSW status
10. Pteropus poliocephalus	Grey-headed Flying-fox	Animal > Bats	Vulnerable
11. Scoteanax rueppellii	Greater Broad-nosed Bat	Animal > Bats	Vulnerable
12. Anseranas semipalmata	Magpie Goose	Animal > Birds	Vulnerable
13. Botaurus poiciloptilus	Australasian Bittern	Animal > Birds	Endangered
14. Burhinus grallarius	Bush Stone-curlew	Animal > Birds	Endangered
15. Calamanthus fuliginosus	Striated Fieldwren	Animal > Birds	Endangered
16. Calidris alba	Sanderling	Animal > Birds	Vulnerable
17. Calyptorhynchus lathami	Glossy Black-Cockatoo	Animal > Birds	Vulnerable
18. Charadrius mongolus	Lesser Sand-plover	Animal > Birds	Vulnerable
19. Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Animal > Birds	Vulnerable
20. Esacus magnirostris	Beach Stone-curlew	Animal > Birds	Critically Endangered
21. Falco hypoleucos	Grey Falcon	Animal > Birds	Endangered
22. Glossopsitta porphyrocephala	Purple-crowned Lorikeet	Animal > Birds	Vulnerable
23. Haematopus fuliginosus	Sooty Oystercatcher	Animal > Birds	Vulnerable
24. Haematopus longirostris	Pied Oystercatcher	Animal > Birds	Endangered
25. Irediparra gallinacea	Comb-crested Jacana	Animal > Birds	Vulnerable
26. Ixobrychus flavicollis	Black Bittern	Animal > Birds	Vulnerable
27. Lathamus discolor	Swift Parrot	Animal > Birds	Endangered
28. Limosa limosa	Black-tailed Godwit	Animal > Birds	Vulnerable
29. Lophoictinia isura	Square-tailed Kite	Animal > Birds	Vulnerable
30. Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Animal > Birds	Vulnerable
31. Neophema chrysogaster	Orange-bellied Parrot	Animal > Birds	Critically Endangered
32. Neophema pulchella	Turquoise Parrot	Animal > Birds	Vulnerable
33. Ninox connivens	Barking Owl	Animal > Birds	Vulnerable
34. Ninox strenua	Powerful Owl	Animal > Birds	Vulnerable
35. Oxyura australis	Blue-billed Duck	Animal > Birds	Vulnerable
36. Pachycephala olivacea	Olive Whistler	Animal > Birds	Vulnerable

Scientific name	Common name	Type of species	NSW status
37. Pandion cristatus	Eastern Osprey	Animal > Birds	Vulnerable
38. Petroica rodinogaster	Pink Robin	Animal > Birds	Vulnerable
39. Pezoporus wallicus wallicus	Eastern Ground Parrot	Animal > Birds	Vulnerable
40. Ptilinopus superbus	Superb Fruit-Dove	Animal > Birds	Vulnerable
41. Stagonopleura guttata	Diamond Firetail	Animal > Birds	Vulnerable
42. Sternula albifrons	Little Tern	Animal > Birds	Endangered
43. Thinornis rubricollis	Hooded Plover	Animal > Birds	Critically Endangered
44. Tyto novaehollandiae	Masked Owl	Animal > Birds	Vulnerable
45. Tyto tenebricosa	Sooty Owl	Animal > Birds	Vulnerable
46. Anthochaera phrygia	Regent Honeyeater	Animal > Birds	Critically Endangered
47. Pterodroma nigripennis	Black-winged Petrel	Animal > Birds	Vulnerable
48. Pterodroma solandri	Providence Petrel	Animal > Birds	Vulnerable
49. Diomedea exulans	Wandering Albatross	Animal > Birds	Endangered
50. Diomedea gibsoni	Gibson's Albatross	Animal > Birds	Vulnerable
51. Macronectes halli	Northern Giant-Petrel	Animal > Birds	Vulnerable
52. Thalassarche cauta	Shy Albatross	Animal > Birds	Vulnerable
53. Thalassarche melanophris	Black-browed Albatross	Animal > Birds	Vulnerable
54. Callocephalon fimbriatum	Gang-gang Cockatoo	Animal > Birds	Vulnerable
55. Glossopsitta pusilla	Little Lorikeet	Animal > Birds	Vulnerable
56. Petroica phoenicea	Flame Robin	Animal > Birds	Vulnerable
57. Hieraaetus morphnoides	Little Eagle	Animal > Birds	Vulnerable
58. Petroica boodang	Scarlet Robin	Animal > Birds	Vulnerable
59. Circus assimilis	Spotted Harrier	Animal > Birds	Vulnerable
60. Daphoenositta chrysoptera	Varied Sittella	Animal > Birds	Vulnerable
61. Epthianura albifrons	White-fronted Chat	Animal > Birds	Vulnerable
62. Calidris ferruginea	Curlew Sandpiper	Animal > Birds	Endangered
63. Falco subniger	Black Falcon	Animal > Birds	Vulnerable

Scientific name	Common name	Type of species	NSW status
64. Arctocephalus forsteri	New Zealand Fur-seal	Animal > Marine Mammals	Vulnerable
65. Arctocephalus pusillus doriferus	Australian Fur-seal	Animal > Marine Mammals	Vulnerable
66. Dugong dugon	Dugong	Animal > Marine Mammals	Endangered
67. Eubalaena australis	Southern Right Whale	Animal > Marine Mammals	Endangered
68. Megaptera novaeangliae	Humpback Whale	Animal > Marine Mammals	Vulnerable
69. Physeter macrocephalus	Sperm Whale	Animal > Marine Mammals	Vulnerable
70. Cercartetus nanus	Eastern Pygmy-possum	Animal > Marsupials	Vulnerable
71. Dasyurus maculatus	Spotted-tailed Quoll	Animal > Marsupials	Vulnerable
72. Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	Animal > Marsupials	Endangered
73. Petaurus australis	Yellow-bellied Glider	Animal > Marsupials	Vulnerable
74. Petaurus norfolcensis	Squirrel Glider	Animal > Marsupials	Vulnerable
75. Phascogale tapoatafa	Brush-tailed Phascogale	Animal > Marsupials	Vulnerable
76. Phascolarctos cinereus	Koala	Animal > Marsupials	Vulnerable
77. Potorous tridactylus	Long-nosed Potoroo	Animal > Marsupials	Vulnerable
78. Sminthopsis leucopus	White-footed Dunnart	Animal > Marsupials	Vulnerable

APPENDIX B: CALCULATIONS OF ACTUAL LOSS OF CO_2 AND SOIL FROM LOGGING ACTIVITIES

Appendix B: South East Forest Rescue

Table 5: CO_2 emissions of native forest logging on the South Coast, NSW, 2006/07 [d]

Item	Area/Amount	Volume	Time Period	Tonnes CO_2e
native forest loss	14 388 ha	611 594m^3	2006/07	1 730 623
slash	14 388	611 594m^3	2006/07	235 710
Contractors' cars	23 compartments	69 vehicles	276 days	780 327
Sub total logging				**2 746 660 tCO_2e**
machines	3 per compartment	69	276 days	10 529 843
chainsaws		23	138 hrs/276 days	87 900
mechanical harvesters		19	276 days	2 899 522
Total logging tCO_2e				**16 263 925 tCO_2e**
roading for compartments	1770 kms	2 machines/ comp	7080hrs@23L/hr	434 965
jinkers x 75	1.5 million L /2.7kgCO_2	61 159 400t-km	0.024l/t-km	40 50 000
sawmills scope 2	20 700m3 at 1.96GJ/m3	4	207 days	40 153
sawmill vehicles		44	207 days	56 097
SEFE chipmill	6 500 000kWhrs	49 weeks	7056 hrs	5 785
chipmill vehicles	35 km ea way	20	253 days	72 718
bus	6 trips per day	1		13 246
ships		26		610 324
FNSW - electricity		10 069Gj		2 500
Petrol vehicles	9038L	77		20 858

[d] Data from FNSW Implementation Report 2004/05 and 2006/07 on this data it seems one vehicle uses 110L per year; data for logging is from ESRI, harvest plans and Digwood FOI info 2009; 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4: Agriculture, Forestry and Other Land Use, Chapter 2: Generic Methodologies Applicable to Multiple Land-Use Categories- Table 2.5 and 2.6; Chapter 4; Annex 2 Summary of equations:part B equation 2.12, part C; part E; table 4.5 and 4.6; the formulas used for logging are CO_2e =HxBEFxDx(1+R)x44/12 (or 3.667) where H= m3 BEF =1.9 D=0.325tCm3 R= 0.25; for prescribed burning equation 2.27 CO_2e = A x MB x Cf x Gef x 10-3; the liquid fuel formula is CO_2e = (QExEF)/1000 where Quantity consumed or burnt x Energy x Emiss Factor divided by 1000; slash estimates FNSW 50-150t/ha or Ximines figure of 50% pers com to Paul et al below n4; the electricity consumption formula is Y= Q x (EF/1000); Harvesters and log loaders consume 23-38 litres/hr, graders when roading 0.276 L/km, jinkers 1.8L/km, cars -petrol 4WD 4cyl 9L/100km, 6cyl 16L/100km, diesel 4cyl10L/100km, 6cyl 14L/100km, Toyota 4WD 4.12L engine diesel - 12.1L/100km; FNSW state contractors used 10.9M L 2009/2010; BEF means biomass expansion factor, D is density of carbon in hardwood, R is ratio of below ground weight to above ground weight.

Item	Area/Amount	Volume	Time Period	Tonnes CO_2e
Diesel vehicles	71 973L	555		192 248
Gippsland CO_2 estimates				4 620 420
sub total (vehicles & mills)				**10 119 314 tCO_2e**
TOTAL				**26 383 239 tCO_2e**

Item	Area/Amount	Volume	Time Period	Tonnes
soil C loss	14 388ha	611 594m3	2006/07	14 773 023

The NSW government's lack of progress on cutting CO_2 emissions from native forest logging is the reasoning for calculations confined to CO_2.[135] Ideally all six Kyoto GHGs should be calculated.[136] The following assumptions were made (a) native forests on the south coast are logged primarily for pulp; (b) 50% of the biomass of trees remain on site as slash.[137] The South Coast is defined as a temperate system. Flows of GHGs to or from the atmosphere are equal to changes in carbon stocks in the biomass and soils.

While searching for relevant equations, it became apparent that the generic methods used are not all encompassing. The conversion of native forest to dirt does not seem to be a category. Carbon density is .325 x cubic metre x 3.66 = CO_2.

The stock of carbon for intact natural forests in our study area is about 640 t C ha-1 and the average NPP of natural forests is 12 t C ha-1 yr-1 (with a standard deviation of 1.8). In terms of global biomes, Australian forests are classified as temperate forests. The IPCC default values for temperate forests are a carbon stock of 217 t C ha-1 and an NPP of 7 t C ha-1 yr-1 (Mackey et al 2007).

National Transport Commission base B-Double tax on the assumption that trucks travel 210 000kms/year on 2 12 hr shifts. To keep it simple we will assume 611594 m3 is the equivalent number of tones. The assumption that the average haul distance is 100km, although in many instances this is a lot more. As a result the freight task (t X avg haul distance) is 61159400 t-km. The fuel use for the b-double types in that area would be about 0.019 l/t-km or worst case 0.024 l/t-km for jinkers. This gives a fuel use of just under 1.5 million L and every litre of diesel burned produces 2.7 kg of CO_2 or just under 4 million tones of CO_2 worst case.

With harvesting equipment the actual fuel use per hour varies dramatically depending on the machine, as does the amount of wood they handle in an hour. As an example a

harvester will consume between 10 and 25 L per hour (depending on design, size, etc.) and will process between 8 and 28 m3/hr in the conditions you are looking at. Similarly a felling machine will consume 30-40 L/hr and fell between 10 and 80 m3/hr.

Calculations were made using the Stock-Difference Method except for East Gippsland.

NSW native forest volume logged= 1 196 999 m3, FNSW figures under FOI 2006/07 south coast Volume logged = 20 408+59056+10856+324 960+60 053+115 808+11 836+8617 = 611 594 m3, Sth Coast hectares logged = 14 388 Gain-Loss Method (2006-07) = 14 388 hectares logged x 256 x 3.667 = 13 506 764 tCO_2e.

For East Gippsland 4 500ha x 280 x 3.667 = 4,620,420 tonnes of CO_2 (40% of 640 = 256, 40% of 700 = 280) as it is assumed that logged forest is, on average, 40 per cent below carbon carrying capacity (Roxburgh et al. 2006).

APPENDIX C: FORESTSNSW. ALLEGATIONS, FAILINGS AND PENALTIES

Appendix C: South East Forest Rescue

The Office of Environment and Heritage have advised the ABC that between July 2010 and November 2011 OE&H received 27 complaints from the public regarding the Eden region and 19 complaints regarding the Southern region.[138]

These complaints mainly related to:

a. alleged failures to retain and protection Hollow-bearing and recruitment trees
b. alleged failures to undertake adequate threatened species surveys
c. alleged failure to protect threatened species habitat in the field
d. alleged failures to protect filter strips and implement drainage on roads and snig machinery tracks

In response, OE&H conducted eight audits in the Eden Region and identified a total of 50 breaches of the IFOA: 47 of the breaches were in relation to the Threatened Species Licence and three were breaches of the Environment Protection Licence.

Seven audits in the Southern Region identified a total of 19 breaches of the IFOA: five breaches were of the Threatened Species Licence and 14 breaches of the Environment Protection Licence.

OE&H said that breaches across both regions included:

f. Failure to protect landscape features such as rainforest, rocky outcrops and wetlands
g. Failure to conduct surveys and record required information in survey reports in accordance with the conditions of Threatened Species Licence conditions
h. Failure to adequately select and protect hollow-bearing and recruitment trees
i. Failure to construct and maintain road drainage structures in accordance with the Environment Protection Licence specifications
j. Failure to record required information in planning documentation

OE&H requested that we note: "While OEH may investigate a compliant received via an investigation, breaches found on an audit may not necessarily be those that are 'alleged breaches' in a complaint received. OEH regulators may identify other breaches in the field that have not been identified by a complainant."

As a result of public complaints investigated since 1 July 2010, as well as audits undertaken by OE&H independent of complaints from the public, action taken was:

Forests NSW in the Eden region has received four Penalty Infringement Notices, five warning letters, one advisory letter, two Clean Up Notice and one remedial order. In

addition, OE&H has successfully prosecuted Forest NSW for potential harm to an endangered species (the Smoky Mouse).

Forests NSW in the Southern region has received two PINs, three warning letters, two advisory letters and one request to conduct remedial work.

Forests NSW are also required to follow their own auditing process and to self-report breaches to the Office of Environment and Heritage.

In response to the question of how many self-reported breaches by Forests NSW were received across both regions OE&H advised that Forests NSW in Eden region reported two water pollution incidents to OEH in the 2010/2011 financial year.

Photo 31: Illegally felled long-term hollow-dependent species habitat. Glenbog State Forest. 2015. BJS

APPENDIX D: SYNOPSIS OF THE FILM UNDERSTOREY (2016)

Appendix D: David Gallan, Director

Understorey traces the environmental movement in a thematic way from the 1970s to the present day on the far south coast of NSW. The focus is on the south east forests and how people campaigned to protect them. The campaign was long and complex, and not all the events reflected the stereotypical scenarios so frequently reported to the metropolitan news networks.

Through interviews and wildlife recordings, the film gives viewers an insight into the nature of the forests and what it took to protect them from the intensive logging of the wood chipping. Using some of the latest infrared camera technology the film captures rarely seen behaviours of local species such as lyrebirds and spotted tail quolls.

Themes include the value of the forests, indigenous custodianship of the land, impacts of wood chipping, forests as water catchments, wilderness, community engagement, the strategies used by the environmental movement and the personal impacts on various campaigners. For some it was very costly and several put their careers at risk in trying to achieve something for the benefit of everyone.

There were well known visitors to the SE such as Sting and Bob Brown but the local campaigners did the heavy lifting during the ’70s, ’80s, ’90s and into the 21st century. They came from all walks of life: teachers, farmers, scientists, artists, a former forester, students and retirees. There were more people arrested in the south east forests than in any other environmental conflict, confirming that land use issues such as logging were a mainstream political concern.

At the end of a long campaign a compromise was reached and new national parks established. The film briefly questions what is the best use of state forests once the regional forest agreements terminate (in the context of climate change) and offers the Great Southern Forest concept as an alternative plan.

REFERENCES

[1] Christina Woods, ***Nature's Trust.*** Tim Flannery. Atmosphere of Hope.

[2] World Parks Congress, IUCN. Sydney Olympic Park, 13-19 November 2014

[3] Ajani, J. (2010) ***Australia's forestry crisis—how it happened and what to do***. Fenner School Seminar Series. ANU.

[4] https://www.audit.nsw.gov.au/ArticleDocuments/292/26_Volume_Nine_2013_Forestry_Corporation_NSW_Trading_as_Forestry_Corporation.pdf.aspx?Embed=Y

[5] Ajani, J. (2014) ***Key Information for NSW Forest Policy Today,*** Australian National University. http://www.serca.org.au/research/2013/Ajani.pdf

[6] Tourism New Zealand, Visitor Experience http://www.tourismnewzealand.com/markets-stats/research/infographics/visitor-experience/

[7] Perkins, F., Macintosh, A. (2012) Logging or carbon credits. Comparing the financial returns from forest-based activities in NSW's Southern Forestry Region. ***The Australian Institute.*** Technical Brief No. 23, June 2013, ISSN 1836-9014

[8] Goldberg, T. L. et al. (2015) The need for a global health ethic. The Lancet, Vol 386, Issue 10007, e37-e39

[9] Lindenmayer, D.B., Blair, D., McBurney, L., Banks, S.C. (2015) The need for a comprehensive reassessment of the Regional Forest Agreements in Australia. ***Pacific Conservation Biology,*** 2015, 21, 266–270. 11.12.2015 http://dx.doi.org/10.1071/PC15042

[10] Alan Reid, Impacts and effectiveness of logging bans in natural forests: New Zealand. in: ***Forests Out of Bounds: Impacts and Effectiveness of Logging Bans in Natural Forests in Asia-Pacific.*** Edited by Patrick B. Durst, Thomas R. Waggener, Thomas Enters and Tan Lay Cheng. Asia-Pacific Forestry Commission. Food and Agricultural Organization of the United Nations. Regional Office for Asia and the Pacific. Bangkok, Thailand. 2001.

[11] NOUS Group. https://www.nousgroup.com/work/

[12] Gittins, R., (2015) ***Economists' concerns with emissions reduction target not what you'd expect***. August 18, 2015. SMH http://www.smh.com.au/comment/economists-concerns-with-emissions-reduction-target-not-what-youd-expect-20150818-gj1h98.html

[13] Dr. Frances Perkins worked as an economist in Canberra for 30 years for Treasury, the Department of Foreign Affairs and at the ANU. Dr. Perkins has launched a critique of the economics of native forest logging ... saying that the forests are more valuable for carbon credits than logged timber. http://www.abc.net.au/radionational/programs/breakfast/forests-more-valuable-for-carbon-ex-treasury-official/5274300

[14] Top 10 Countries Killing the Planet. ***Care 2*** http://www.care2.com/*greenliving*/top-10-countries-ruining-the-planet.html#ixzz3btG9VSYG

[15] Goldingay, R.L., and Stevens, J.R. (2009) Use of artificial tree hollows by Australian birds and bats. Wildlife Research 36, 81–97. http://dx.doi.org/10.1071/WR08064

[16] Costanza R, d'Arge R, De Groot R, Farber S, Grasso M, Hannon B, Limburg K, Naeem S, O'Neill RV, Paruelo J, Raskin RG, Sutton P and Vandenbelt M (1997). 'The value of the world's ecosystemservices and natural capital', ***Nature*** 387:253–260.

[17] CICES. https://cices.eu/cices-structure/

[18] Unpublished extract from Perkins, F., Macintosh, A. (2012) ***Logging or carbon credits. Comparing the financial returns from forest-based activities in NSW's Southern Forestry Region***. The Australian Institute. Technical Brief No. 23, June 2013, ISSN 1836-9014

[19] Unpublished extract from Perkins, F., Macintosh, A. (2012) ***Logging or carbon credits. Comparing the financial returns from forest-based activities in NSW's Southern Forestry Region***. The Australian Institute. Technical Brief No. 23, June 2013, ISSN 1836-9014

[20] Novelist and social critic Vance Palmer, The Courier-Mail. ***Koala: A Historical Biography***. By Ann Mozley Moyal, Michael Organ, CSIRO Publishers

[21] Endangered Species Handbook
http://www.endangeredspecieshandbook.org/trade_koalas.php

[22] A summary of information prepared for the Threatened Species Scientific Committee to assist its assessment on the listing of the Koala as a threatened species under the EPBC Act. Chris Allen. 2015

[23] Australian Koala Foundation. ***Koalas and carbon collide.***
https://www.savethekoala.com/our-work/carbon-and-koalas-collide

[24] Koala ***(Phascolarctos cinereus)*** Listing. Australian Government, Department of the Environment.
http://www.environment.gov.au/biodiversity/threatened/species/koala.html

[25] Conservation advices. Australian Government, Department of the Environment.
http://www.environment.gov.au/biodiversity/threatened/conservation-advices.html

[26] Environmental Protection and Biodiversity Conservation Act Guidelines. Australian Government, Department of the Environment.
http://www.environment.gov.au/biodiversity/threatened/publications/epbc-act-referral-guidelines-vulnerable-koala

[27] Koala species listing. Australian Government, Department of the Environment.
http://www.environment.gov.au/biodiversity/threatened/publications/koala-species-listing.html

[28] ***Recovery plan for the koala*** (2008), Department of Environment and Climate Change NSW.
http://www.environment.nsw.gov.au/resources/threatenedspecies/08450krp.pdf

[29] New (2014) IFOAs permit logging on ranges and logging up to 10 meters from waterways which will increase soil and water loss from forests.

[30] http://nct.org.au/nature-conservation/wildlife/endangered-animals/spotted-tail-quoll.html

[31] Complete Book of Australian Mammals, p. 135

[32] ***'Fantasy documents': recovery plans failing Australia's endangered species".*** The Guardian. Lisa Cox. https://www.theguardian.com/environment/2018/feb/20/fantasy-documents-recovery-plans-failing-australias-endangered-species

[33] Makkonen, M., Huttunena, S., Primmera, E., Repog, A., Hildéna, M. (2015) ***Policy coherence in climate change mitigation: An ecosystem service approach to forests as carbon sinks and bioenergy sources.*** Science Direct. doi:10.1016/j.forpol.2014.09.003

[34] Per capita of greenhouse gas emissions of world countries, Australia ranked 9th in 2000, and 5th in 2005 and 2012.

[35] Kyoto Protocol, Art 2(1)(a)(ii) unfccc.int/kyoto_protocol/items/2830.php

[36] ***Essential Philosophies Drive Global Conservation***, World Parks Congress, IUCN. Nov. 2014
http://www.serca.org.au/research/2015/World%20Parks%20Congress.pdf

[37] Blakers, M. (2008) ***Comments on Garnaut Climate Change Review***: Issues Paper 1 Land-use – Agriculture and Forestry. Green Institute.

[38] Keith, H., Mackey, B. & Lindenmayer, D. (2008) ***Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests.*** The Fenner School of Environment and Society, Australian National University, Canberra, ACT 0200, Australia.
http://www.pnas.org/content/106/28/11635.full.pdf

[39] Australian Government Climate Change Authority. (2014) ***Reducing Australia's Greenhouse Gas Emissions***—Targets and Progress Review. Final Report February 2014. http://www.climatechangeauthority.gov.au/files/files/Target-Progress-Review/Targets%20and%20Progress%20Review%20Final%20Report.pdf

[40] Carbon Credits (Carbon Farming Initiative—Avoided Deforestation 1.1) Methodology Determination 2015. https://www.comlaw.gov.au/Details/F2015L00347/Explanatory%20Statement/Text

[41] Bob Brown Foundation. http://www.bobbrown.org.au/tasmania_s_forests

[42] Ajani, J. (2010) ***Australia's forestry crisis—how it happened and what to do***. Fenner School Seminar Series. ANU.

[43] Most research on the native forests of southern NSW has emanated from the Australian National University.

[44] ***Logging bigger risk than realised***: ***study***. Ben Cubby, Environment Reporter. 05.08.2008 http://www.smh.com.au/news/environment/logging-bigger-risk-than-realised-study/2008/08/04/1217701950056.html

[45] Mackey, B. (2008) ***Untouched forests are carbon warriors***. ABC News in Science. http://www.abc.net.au/science/articles/2008/08/05/2324476.htm

[46] Garnaut, R. (2011). Australia's emissions in a global context, Chapter 7. ***The Garnaut Climate Change Review***. http://www.garnautreview.org.au/pdf/Garnaut_Chapter7.pdf

[47] Keith H, Lindenmayer D, Macintosh A, Mackey B (2015) Under What Circumstances Do Wood Products from Native Forests Benefit Climate Change Mitigation? ***PLoS ONE*** 10(10): e0139640. doi:10.1371/journal.pone.0139640

[48] RET: Renewable Energy Targets: https://www.environment.gov.au/climate-change/renewable-energy-target-scheme

[49] FulCAM: Full Carbon Accounting Model https://www.environment.gov.au/climate-change/greenhouse-gas-measurement/land-sector

[50] NGERS: National Greenhouse Energy Reporting https://www.environment.gov.au/climate-change/greenhouse-gas-measurement/nger

[51] NCAS: National Carbon Accounting Scheme http://www.carbonemissionstrader.com.au/knowledge-base/national-carbon-accounting-scheme-1235897769.php

[52] ERF: Emissions Reduction Fund https://www.environment.gov.au/climate-change/emissions-reduction-fund

[53] http://epi.yale.edu/reports/2016-report

[54] European Commission, Climate Action, Forests and Agriculture. http://ec.europa.eu/clima/policies/forests/index_en.htm

[55] Keith, H., Mackey, B.G., Lindenmayer, D.B. (2015) Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests. ***PNAS***. July 14, 2009 vol. 106 no. 28

[56] Auction by the Clean Energy Regulator: http://www.cleanenergyregulator.gov.au/ERF/Auctions-results/November-2015

[57] Christoff, P. (2015) Australia's climate targets still out of reach after second emissions auction. ***The Conversation***. http://theconversation.com/australias-climate-targets-still-out-of-reach-after-second-emissions-auction-50519

[58] Manomet Center for Conservation Sciences. Biomass Sustainability and Carbon Policy Study Executive Summary. June 2010 and Hudiberg, T.W., Law, B.E., Wirth, C. and Luyssaert, S.

(2011) 'Regional carbon dioxide implications of forest bioenergy production', ***Nature Climate Change,*** Vol 1 October 2011

[59] Cintas, O., Berndes, G., Cowie, A. L., Egnell, G. F., Holmström, H., & Ågren G. I. (2015). ***The climate effect of increased forest bioenergy use in Sweden: evaluation at different spatial and temporal scales***. WIREs Energy Environ 2015. doi: 10.1002/wene.178

[60] Nick Watts, W Neil Adger, Paolo Agnolucci, J ason Blackstock, Peter Byass, Wenjia Cai, Sarah Chaytor, Tim Colbourn, Mat Collins, Adam Cooper, Peter M Cox, Joanna Depledge, Paul Drummond, Paul Ekins, Victor Galaz, Delia Grace, Hilary Graham, Michael Grubb, Andy Haines, Ian Hamilton, Alasdair Hunter, Xujia Jiang, Moxuan Li, Ilan Kelman, Lu Liang, Melissa Lott, Robert Lowe, Yong Luo, Georgina Mace, Mark Maslin, Maria Nilsson,Tadj Oreszczyn, Steve Pye, Tara Quinn, My Svensdotter, Sergey Venevsky, Koko Warner, Bing Xu, Jun Yang, Yongyuan Yin, Chaoqing Yu, Qiang Zhang, Peng Gong, Hugh Montgomery, Anthony Costello (2015) ***Health and climate change: policy responses to protect public health.*** The Lancet Commissions. Published Online June 23, 2015. http://dx.doi.org/10.1016/S0140-6736(15)60854-6

[61] Keith H, Lindenmayer D, Macintosh A, Mackey B (2015) Under What Circumstances Do Wood Products from Native Forests Benefit Climate Change Mitigation? ***PLoS ONE*** 10(10): e0139640. doi:10.1371/journal.pone.0139640

[62] *Tourism New Zealand, Visitor Experience* http://www.tourismnewzealand.com/markets-stats/research/infographics/visitor-experience/

[63] Destination NSW. http://www.destinationnsw.com.au

[64] Tourism Australia. http://www.tourism.australia.com

[65] Destination NSW. http://www.destinationnsw.com.au

[66] Tourism Australia. http://www.tourism.australia.com

[67] Logging native forests. *Sustainable forest management New Zealand.* http://www.teara.govt.nz/en/graph/12901/production-of-sawn-timber-1921-2005

[68] *Impacts and effectiveness of logging bans in natural forests: New Zealand*. Food and Agriculture Organisation of the United Nations. Corporate Document Repository. Alan Reid. http://www.fao.org/docrep/003/x6967e/x6967e05.htm

[69] McSweeney, G., (2011) Saving West Coast and New Zealand Native Forests and Birds. ***NZ Journal of Forestry***, November 2011 Vol. 56 No. 2

[70] World Parks Congress, IUCN. Sydney Olympic Park, 13-19 November 2014

[71] *Brazil's Success in Reducing Deforestation* (2011). Union of Concerned Scientists. http://www.ucsusa.org/global_warming/solutions/stop-deforestation/brazils-reduction-deforestation.html#.VjJkBFtri8E

[72] *Stop the logging around Taman Negara*. Nation. 27 July 2015. http://www.thestar.com.my/News/Nation/2015/07/27/Stop-the-logging-around-Taman-Negara/

[73] Department of the Environment, Continuing net loss of native hollow-bearing trees and coarse woody debris due to firewood harvesting practices.https://www.environment.gov.au/node/14582

[74] *Loss of Hollow-bearing Trees - key threatening process determination.* (2011) NSW Scientific Committee - final determination. Office of Environment and Heritage. http://www.environment.nsw.gov.au/determinations/lossofhollowtreesktp.htm

[75] Australian Wildlife Conservancy. http://www.australianwildlife.org/wildlife.aspx

[76] Smith, B. ***Australia's global footprint one of the worst.*** United Nations' International Year of Biodiversity. May 6, 2010.

[77] World Wildlife Fund's (WWF) *International Living Forests Report: Saving Forests at Risk* (2015) http://awsassets.wwf.org.au/downloads/fl022_living_forests_report_chapter5_28apr15.pdf

[78] World Wildlife Fund's (WWF) *International Living Forests Report: Saving Forests at Risk* (2015) http://awsassets.wwf.org.au/downloads/fl022_living_forests_report_chapter5_28apr15.pdf

[79] Singh, A., Shi, H., Foresman, T. (2001) Status of the world's remaining closed forests: an assessment using satellite data and policy options. *Ambio* 30:67–9.

[80] Braithwaite LW (1996) Conservation of arboreal herbivores: the Australian scene. ***Aust J Ecol.*** 21:21–30.

[81] Bradshaw, C.J.A. (2012). Little left to lose: deforestation and forest degradation in Australia since European colonization. ***Journal of Plant Ecology.*** 5:1

[82] NSW Farming: ***Investing Locally, Connecting Globally – Memorandum of Understanding.*** 25 March 2015.

[83] World Wildlife Fund's (WWF) *International Living Forests Report: Saving Forests at Risk* (2015) http://awsassets.wwf.org.au/downloads/fl022_living_forests_report_chapter5_28apr15.pdf

[84] Smith, B. ***Australia's global footprint one of the worst.*** United Nations' International Year of Biodiversity. May 6, 2010.

[85] Lunney D and Leary T 1988, 'The impact on native mammals of land-use changes and exotic species in the Bega district, New South Wales, since settlement', ***Australian Journal of Ecology*** 13, pp 67–92.

[86] Witness to forest change over 30 years: an eyewitness account. Suzanne Foulkes

[87] Allen, C. D., Pietsch, R. & Saxon, M. (2016) *Corridors and Core Habitat for Koalas. Report on surveys conducted in 2012-2014 for Koalas on coastal forests in the Bermagui/Mumbulla areas of South eastern NSW*. OEH.

[88] Allen C. D., Saxon, M. & McDougal, K. (2010). ***Koala surveys in the coastal forests of the Bermagui-Mumbulla area: 2007-2009.*** An interim report. NSW. OEH.

[89] http://www.abc.net.au/news/2016-03-01/reserves-save-koalas-soth-east-nsw/7211410 (sic)

[90] http://greens.org.au/news/nsw/crucial-south-east-forests-protected-after-years-campaigning

[91] 0853, Primary Industries, Flora Reserves in Bermagui, Murrah, Mumbulla & Tanja State Forests. Questions on Notice, Mr Shoebridge to the Minister for Primary Industries, and Minister for Lands & Water.

[92] http://www.serca.org.au/media-releases/2016/Gallan_Taysom.pdf

[93] Campbell, R. & McKeon, R. (2016) *Money doesn't grow on trees: the financial and economic losses of native forestry in NSW*, The Australia Institute, Discussion Paper, March 2016. http://www.tai.org.au/content/money-doesnt-grow-trees

[94] http://www.greatsouthernforest.org.au

[95] Perkins, F., Macintosh, A. (2012) Logging or carbon credits. Comparing the financial returns from forest-based activities in NSW's Southern Forestry Region. The Australian Institute. Technical Brief No. 23, June 2013, ISSN 1836-9014

[96] Plan of Management, Yuin Mountain Parks. (2014) Office of Environment and Heritage NSW. p.95

[97] Department of Environment and Heritage, NSW State Government. http://www.environment.nsw.gov.au/determinations/ClearingNativeVegKTPListing.htm

[98] Bradshaw, C.J.A. (2012). Little left to lose: deforestation and forest degradation in Australia since European colonization. ***Journal of Plant Ecology.*** 5:1

[99] Gill AM, Williams JE (1996) Fire regimes and biodiversity: the effects of fragmentation of southeastern Australian eucalypt forests by urbanisation, agriculture and pine plantations. For *Ecol Manag* 85:261–78.

[100] Lindenmayer DB (2007) *On Borrowed Time. Australia's Environmental Crisis and What We Must Do About It*. Camberwell, Australia: Penguin Group.

[101] Norton TW (1996) Conserving biological diversity in Australia's temperate eucalypt forests. *For Ecol Manage* 85:21–33.

[102] *Logging the South East Forests*, Part 7. Bill Brown. ABC. 2012 http://www.abc.net.au/local/stories/2011/12/05/3384125.htm

[103] Cornish, P.M. & Vertessy, R.A. 15th February 2001. Forest age-induced changes in evapotranspiration and water yield in eucalypt forest. (2001) *Journal of Hydrology.* 242 (1-2) 43-63 and Roberts, S., Vertessy, R.A. & Grayson, R. Transpiration from *Eucalyptus sieberi* forests of different age. (2001) *Forest Ecology and Management*. 143 (1-3) 153-161.

[104] The Greens. *Saving Southeast NSW Forests* p. 9.

[105] Saving Southeast NSW Forests. Protecting native forests from woodchipping by using the plantation estate.

[106] Nathan, R.J., Hill, P.I., Nandakumar, N., Croke, J., Hairsine, P., Vertessy, R., & Cornish, P., 2000, *Assessment of the Impact of Forest Logging on Water Quantity and Quality*. In: Proceedings of the 10th World Water Congress, Melbourne.

[107] Roberts, S., Vertessy, R.A. & Grayson, R. 2001. Transpiration from Eucalypturs sieberi (L Johnson) forests of different age. *Forest Ecology and Management.* 143 (1-3) 153-161.

[108] Cornish, P.M. & Vertessy, R.A. 15th February 2001. Forest age-induced changes in evapotranspiration and water yield in eucalypt forest. (2001) *Journal of Hydrology*. 242 (1-2) 43-63

[109] Dover, B., 2004. Forest *Water Yield and Logging in Australian and Other Native Forests,* a draft study of relevant scientific literature and other sources, Sydney.

[110] Nathan, R.J., Hill, P.I., Nandakumar, N., Croke, J., Hairsine, P., Vertessy, R., & Cornish, P., 2000, *Assessment of the Impact of Forest Logging on Water Quantity and Quality*. In: Proceedings of the 10th World Water Congress, Melbourne.

[111] NSW Dept of Planning, 2005. *Illawarra and South Coast Regional Strategies Background Paper.*

[112] Somerset, B. (2102) The Rise and Fail of the Woodchip Industry in Southeast NSW. *Nature NSW*. National Parks Association. Autumn 2012

[113] Forestry Act 1916 (NSW).

[114] http://www.mpci.org

[115] Department of Agriculture and Water Resources. http://www.agriculture.gov.au/forestry/policies/rfa

[116] *Threatened Species Conservation Act 1995* (NSW) Sch 3 s 8*;* Loss of Hollow Bearing Trees Key Threatening Process, Office of Environment and Heritage, NSW Threatened Species Website, (online) http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/threat_profile.aspx?id=20079

[117] Will Steffen, The Critical Decade Report, 2010

[118] David Lindenmeyer, T W Norton, and M T Tanton, 'Differences Between Wildfire and Clearfelling on the Structure of Mountain Ash Forests of Victoria and Their Implications For Fauna Dependent on Tree Hollows' (1990) 53 *Australian Forestry* 61.

[119] Alan Cummine, 'Timber Industry's Future Depends on Ordinary Investors' Continued Backing of MIS Sector' Plantation 2020 (online) http://www.plantations2020.com.au/assets/acrobat/AFG_Autumn_2005_MIS_Article.pdf ;

Judith Ajani, 'Australia's Transition from Native Forests to Plantations: The Implications for Woodchips, Pulpmills, Tax Breaks and Climate Change' (2008) 15(3) ***Agenda*** 21, (online) http://epress.anu.edu.au/agenda/015/03/pdf/15-3-AN-2.pdf

[120] Patrick Lane and Stephen Mackay 'Stream Flow Response of Mixed-Species Eucalypt Forests to Patch Cutting and Thinning Treatments' (2001) 143 ***Forest Ecology and Management*** 131; T McAlister, and D Richardson, 'Wonboyn Lake and Estuary - Estuary Processes Study' (2004) http://www.begavalley.nsw.gov.au/environment/estuaries/pdfs/Wonboyn_Processes_Study.pdf J J Drewry, L T H Newham, and R S B Greene, 'An Index-Based Modelling Approach to Evaluate Nutrient Loss Risk at Catchment-Scales' (2008) Integrated Catchment Assessment and Management Centre, The Australian National University, Canberra http://www.mssanz.org.au/modsim07/papers/43_s47/AnIndex-Baseds47_Drewry_.pdf

[121] ***R v Keenan (1994)*** 76 A Crim R 374***; Plumb v Rayner*** (1995) 84 A Crim R 402***; Barnes v Mackenzie*** [2008] NSWSC 455; ***Police v Flint, Daines and McLean*** (Unreported, Deniliquin NSWLC, 2009); Police ***v Betram, Daines, Stone and Whan*** (Unreported, Moruya NSWLC 2010); ***R v Hughes, Davis, Foukes, Fox, McGee, Swift, Stone, Pigram, Whan, Burns, and Reddaway*** (Unreported, Batemans Bay NSWLC 2011); ***Police v Castle*** [2011] NSWLC 22.

[122] Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth) ss 9, 10 Applications- Mumbulla and Gulaga Mountains

[123] Save Myrtle Creek Catchment Petition published by Myrtle Catchment Group on Apr 23, 2010 http://www.gopetition.com/petitions/save-myrtle-creek-catchment.html

[124] Plan of Management, Yuin Mountain Parks. (2014) Office of Environment and Heritage NSW. p.4

[125] http://www.forestrycorporation.com.au/__data/assets/pdf_file/0009/461556/Harvest-Plan-Mumbulla-Cpts-2133-and-2135.pdf

[126] Plan of Management, Yuin Mountain Parks. (2014) Office of Environment and Heritage NSW. p.96

[127] Pyne, S.J. (1982) Fire in America: a cultural history of wildland and rural fire. Princeton University Press, Princeton, New Jersey.

[128] Lindenmayer, D. B., Hunter, M. L., Burton, P. J. & Gibbons, P. Effects of logging on fire regimes in moist forests. ***Conservation Letters.*** 2009. doi: 10.1111/j.1755-263X.2009.00080.x

[129] Lindenmayer, D. B., Hunter, M. L., Burton, P. J. & Gibbons, P. Effects of logging on fire regimes in moist forests. ***Conservation Letters.*** 2009. doi: 10.1111/j.1755-263X.2009.00080.x

[130] Taylor, C. (2010). ***Tracking the Black Saturday bushfires — at the source of ignition.*** Melbourne University. http://wilderness.org.au/articles/summary-and-implications-report-victorian-2009-february-fires

[131] Department of Environment and Heritage, NSW State Government. http://www.environment.nsw.gov.au/determinations/ClearingNativeVegKTPListing.htm

[132] Giljohann, K. M., McCarthy, M. A., Kelly, L. T. & Regan, T. J. (2015) ***Choice of biodiversity index drives optimal fire management decisions.*** Centre of Excellence for Environmental Decisions, The School of Botany, University of Melbourne, Parkville, Victoria 3010 Australia. http://www.esajournals.org/doi/abs/10.1890/14-0257.1

[133] Gibbons, P., Lindenmayer, D.B., Barry, S.C. & Tantond, M.T. (2000) The effects of slash burning on the mortality and collapse of trees retained on logged sites in south-eastern Australia. ***Forest Ecology and Management.*** Volume 139, Issues 1–3, 20 December 2000, Pages 51–61. doi:10.1016/S0378-1127(99)00333-3

[134] ***Logging can 'greatly increase' fire severity for 50 years, researchers say***. 774 ABC Melbourne. Posted 4 Aug 2014. http://www.abc.net.au/news/2014-08-04/logging-greatly-increases-fire-risk-black-saturday-study/5646220

[135] See the Draft Climate Change Bill: Consultation Document 2007, UK Department for Environment, Food and Rural Affairs, London: where only CO emissions where calculated.

[136] Buhaug Ø, Corbett J J, Endresen Ø, Eyring V, Faber J, Hanayama S, Lee D S, Lee D, Lindstad H, Markowska A.Z, Mjelde A, Nelissen D, Nilsen J, Pålsson C, Winebrake J J, Wu W–Q, Yoshida K., Second IMO GHG Study ***Prevention of Air Pollution from Ships,*** International Maritime Organisation, Marine Environment Protection Committee, 2009; one bulk carrier GHGs per anum is 23 474tCO_2-e (online)
http://www.imo.org/includes/blastDataOnly.asp/data_id%3D26047/INF-10.pdf

[137] Blakers M., Green Institute Working Paper 1 Australia's National Greenhouse Accounts: land use, land-use change and forestry (2007) at (online)
www.greeninstitute.com.au;
See contra Paul K I, Booth T H, Elliott A, Kirschbaum M, Jovanovic T, Polglase P, 'Net Carbon Dioxide Emissions from Alternative Firewood Production Systems in Australia' (2006) 30 *Biomass and Bioenergy* 638; National Greenhouse and Energy Reporting System Measurement: Technical Guidelines for the estimation of Greenhouse Gas emissions by facilities in Australia June 2009; of note is the disclaimer 'Neither the Australian Government nor the consultants responsible for undertaking this project accepts any responsibility and each disclaims any liability for the accuracy of, or inferences from, the material contained in this publication' (online)
http://www.climatechange.gov.au/~/media/publications/greenhouse-report/nger-measurement-technical-2009.ashx
Data from sawmills is from Goble D. and Jarvis C., 'Opportunities for Sawmill Residues in Australia' Forest and Wood Products Australia 2007.

[138] *Logging the South East Forests*, Part 7. Bill Brown. ABC. 2012
http://www.abc.net.au/local/stories/2011/12/05/3384125.htm