

## CASE STUDIES OF SPECIES UNDER THREAT

### SUMMARY

This section describes the reasons for decimation of the koala population in southeast 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 opportunities to use a large scale, interconnected reserves project such as the GSF in the southern region of NSW, to support connectivity for all wildlife; one which takes into account specific contextually driven management challenges such as translocation options.

### Protecting our Iconic Koala from Extinction in Southeast NSW

#### 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 gunman... And he has been almost blotted out already from some areas.<sup>1</sup>*



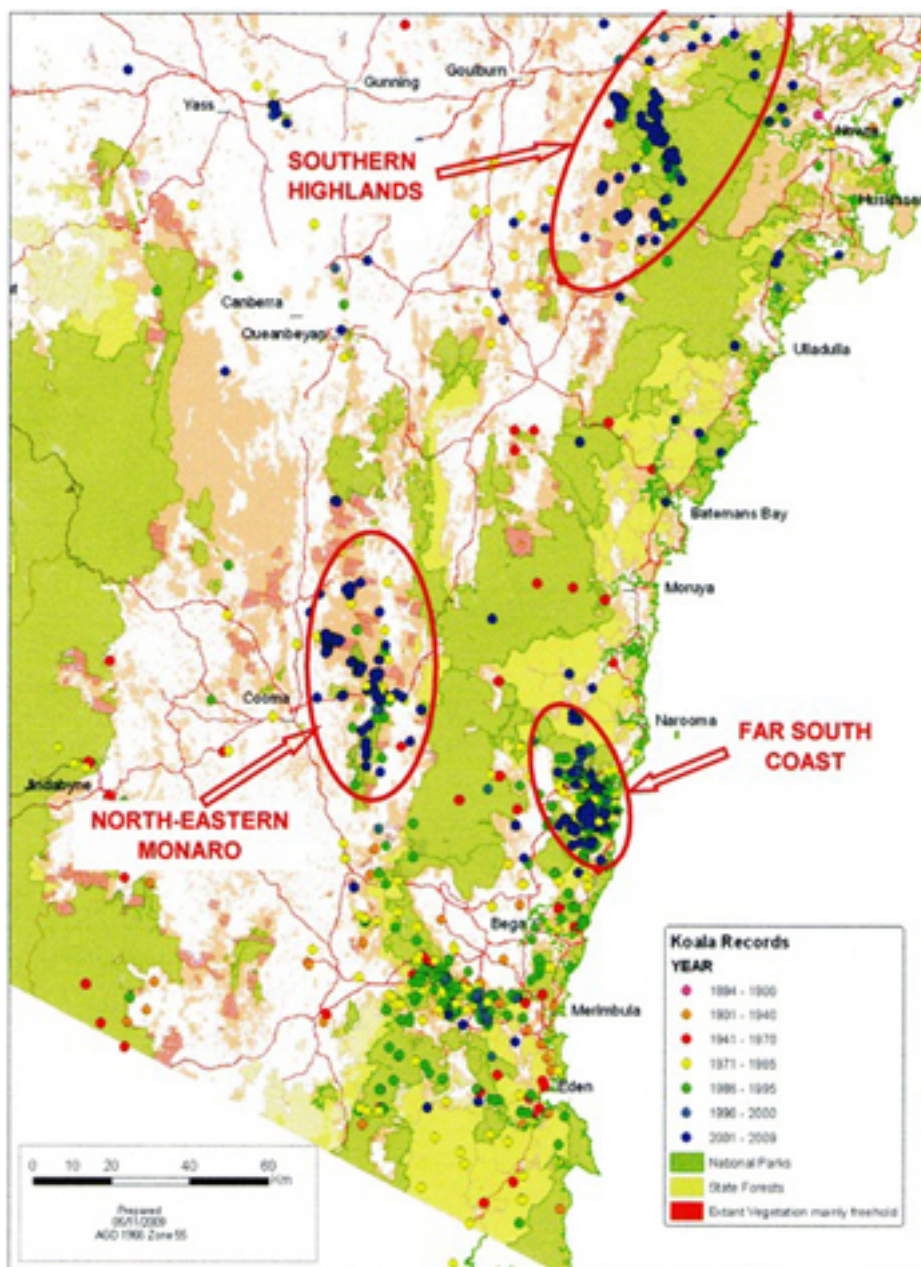
Table 1: Australia-wide Koala Population Trends <sup>2</sup>

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.

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Table 2: Koala Population estimates in Southern NSW presented to DEWHA workshop <sup>3</sup>

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 southeast NSW, colour-coded by decade, and approximate boundaries of the three known koala populations, from 1894 to 2009.

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### Background

Historical records indicate that the koala population of the Far South Coast/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, 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. Throughout this period, as is the case today, koala conservation has had to be managed alongside industrial scale logging.

It is clear that the dramatic decrease of koalas in the southeast forests of NSW since colonization is due to past land clearing, koala hunting, and disease. 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.

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. Australian landholders 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.<sup>4</sup>

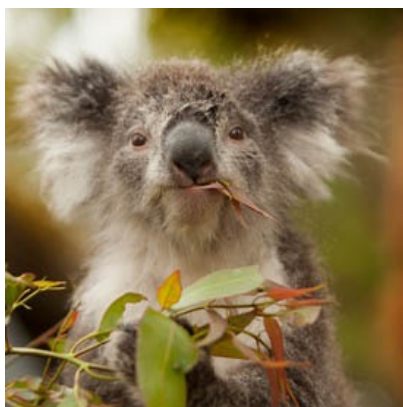
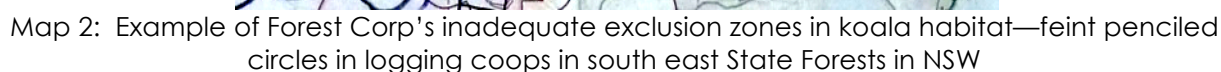


Image 1: 'Sapphire' southern long haired koala from Potoroo Palace, Merimbula



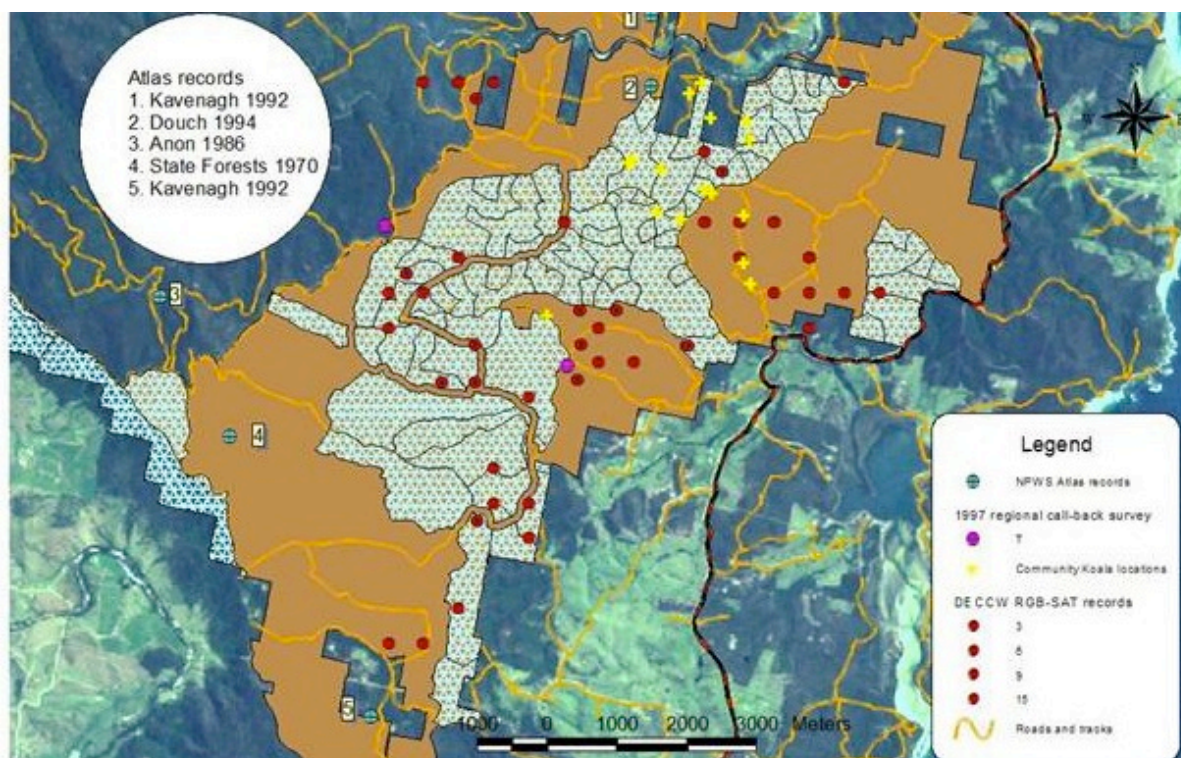


The forests of southeast NSW are some of the most carbon rich in the world. Forest Corp NSW daily sends 2,500 to 3,000 logs to the Nippon owned Eden Chipmill. Grave losses are routinely incurred in native forests in terms of habitat, endangered floral and faunal species, carbon, water and soil. Continuing 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.

Today the critically small Bega Valley koala population are 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

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 southeast 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 southeast 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

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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<sup>1</sup> 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 southeast 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

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<sup>1</sup> moderately wet



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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 principle of the Great Southern Forest is 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'<sup>5</sup>. 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<sup>6</sup>. 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) <sup>7</sup> Act-listed koala populations would not be approved under national environment law <sup>8</sup>.

Yet FCNSW claim they are 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 <sup>9</sup> still provides for logging to be undertaken in State Forests that fall under Integrated Forestry Operations Approvals <sup>10</sup>. FCNSW 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 southeast forests remain at risk. Native forest logging concessions spell the death knell for these koalas plus other species inhabiting logging coops.

Kim Taysom & Bronte Somerset

### Hollow-Dependent Species

#### Spotted-tail Quoll (*Dasyurus maculates*)

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 creeklines. Individuals make their dens in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces.

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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 understoreys or dense vegetation along drainage lines.<sup>11</sup>

### Search for the Spotted-Tail Quoll



Image 2: A rarely sighted Spotted Quoll. Dave 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 A) 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.



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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 A) 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.

Dave Gallan

### Greater Glider (*Petauroides volans*)

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." <sup>12</sup>

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

Dave Gallan



Image 3: Greater glider moving through a viminalis feed tree in Wadbilliga NP under the full moon.  
Dave Gallan

## Impact of Forestry on the Greater Glider

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 *Petaurus volans* 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.



Image 4: A greater glider killed in logging, Errinundra Plateau, East Gippsland. January 2016

*Harriett Swift*

## Burrow-Dependent Species

### 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<sup>2</sup> 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

<sup>2</sup> As a Director on the Board of WPSA and Wombat and Macropod coordinator of WRFSC.



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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 Glenbog State Forests to locate and GPS record burrows within dump points and road work.

*Marie Wynan, Wildlife Carer, Jarake Sanctuary*



Image 5: Ignored wombat burrow, blocked by logging. Glenbog State Forest 2014. BJS



Image 6: Illegally felled long-term hollow-dependent species habitat. Glenbog State Forest. 2015.  
BJS

## CONCLUSION

Since the 1970s, public concerns about logging have been part of the south east NSW consciousness and actions. This long campaign to protect our native forests and their life giving properties for we 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 on and under the 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, into the future, 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 one question also 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.

*Paul Payten*

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### Appendix A: Synopsis of the film *UNDERSTOREY* (2016), by Dave Gallan

*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 southeast 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 southeast 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.

David Gallan, Director  
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- <sup>1</sup> Novelist and social critic Vance Palmer, *The Courier-Mail*. *Koala: A Historical Biography*. By Ann Mozley Moyal, Michael Organ, CSIRO Publishers
  - <sup>2</sup> Endangered Species Handbook  
[http://www.endangeredspecieshandbook.org/trade\\_koalas.php](http://www.endangeredspecieshandbook.org/trade_koalas.php)
  - <sup>3</sup> 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
  - <sup>4</sup> Australian Koala Foundation. Koalas and carbon collide.  
<https://www.savethekoala.com/our-work/carbon-and-koalas-collide>
  - <sup>5</sup> Koala (*Phascolarctos cinereus*) Listing. Australian Government, Department of the Environment.  
<http://www.environment.gov.au/biodiversity/threatened/species/koala.html>
  - <sup>6</sup> Conservation advices. Australian Government, Department of the Environment.  
<http://www.environment.gov.au/biodiversity/threatened/conservation-advice.html>
  - <sup>7</sup> 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>
  - <sup>8</sup> Koala species listing. Australian Government, Department of the Environment.  
<http://www.environment.gov.au/biodiversity/threatened/publications/koala-species-listing.html>
  - <sup>9</sup> Recovery plan for the koala (2008), Department of Environment and Climate Change NSW.  
<http://www.environment.nsw.gov.au/resources/threatenedspecies/08450krp.pdf>
  - <sup>10</sup> New (2014) IFOAs permit logging on ranges and logging up to 10 meters from waterways which will increase soil and water loss from forests.
  - <sup>11</sup> <http://nct.org.au/nature-conservation/wildlife/endangered-animals/spotted-tail-quoll.html>
  - <sup>12</sup> Complete Book of Australian Mammals, p. 135