

TOWARDS ZERO DEFORESTATION

A plan to end deforestation and excessive land clearing in NSW



Nature
Conservation
Council




Wilderness
Society
Life. Support.



In the spirit of respecting and strengthening partnerships with Australia's First Peoples, we would like to acknowledge the spiritual, social, cultural and economic importance of lands and waters to Aboriginal peoples. We offer our deepest appreciation and respect for the First Peoples' continued connection to and responsibility for land and water in this country, and pay our respects to First Nations Peoples and their Elders past and present who hold the authority, memories, knowledge and traditions of living Aboriginal cultures.

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EXECUTIVE SUMMARY

Nature in NSW is in crisis. Eastern Australia is one of the world's top 11 deforestation hotspots, alongside the Amazon, Borneo, and the Congo¹. At least 1000 species of plants and animals are facing extinction, and the destruction of their habitats is the leading threat.

It is estimated there are now fewer than 21,000 koalas left in NSW², a tiny fraction of the millions that are thought to have occupied the state's forests and bushland at the time of European settlement 230 years ago³. Koala numbers plummeted 33% between 1990 and 2010⁴, and the species is now listed as vulnerable to extinction at the state and national levels⁵.

Today, NSW biodiversity laws are weak and problematic, and have recently been altered to allow large agribusinesses, developers and private landholders to clear important wildlife habitat. As a result of these new laws, 99% of identified koala habitat on private land can be bulldozed⁶. A mere 9% of NSW remains in a healthy, near-natural condition, and now a staggering 8 million hectares of forest and bushland has no protection from deforestation⁷. Policy analysts and ecologists predict a rapid increase in habitat destruction but the true extent of clearing is hidden from view because of the lack of publicly available data.

The impacts of deforestation and land clearing extend far beyond wildlife. The destruction of trees and bushland causes carbon emissions, accelerates soil loss, pollutes streams and rivers, harms human health and wellbeing, and reduces soil fertility and farm productivity for generations to come. For Aboriginal peoples, the traditional custodians of the lands and waters of NSW, destructive land-clearing practices are a continuing effect of colonisation⁸.

This devastation is firmly within our power to stop. NSW urgently needs strong legislation to conserve and enhance biodiversity. We need new laws that allow nature to thrive by encouraging and financially rewarding landholders to protect and restore native vegetation. We urgently need this reform so deforestation and land clearing become a thing of the past.

This report outlines the state of nature in NSW, describes the harm deforestation does to wildlife and communities, and provides positive policies the NSW Government can implement to preserve NSW landscapes, plants, and animals. Adherence to these policies would fulfil our duty to pass on our unique natural heritage to the future generations of our state.

TABLE OF CONTENTS

KEY FACTS AND FIGURES



PART 1:

The State of Nature

Our forests, bushland and wildlife matter
The extent of clearing
The top 20 deforestation hotspots
Why the current system is failing



PART 2:

The Impacts of Deforestation

Living Aboriginal cultural heritage
Wildlife
Forests, bushland and waterways
Climate change
Agriculture
Human health



PART 3:

A Plan for Healthy Forests and Wildlife

Benefits of conservation
Importance of habitat restoration
Supporting landholders to protect and repair landscapes
Need for timely, reliable data
Policy actions

REFERENCES

A NOTE ABOUT TERMS

Deforestation means the destruction, logging and loss of forest⁹. Land clearing is a distinctively Australian term that refers to the destruction of vegetation to make way for agriculture, plantations, mining or urban development. This often involves attaching a heavy chain between two bulldozers and dragging it across the land, and is commonly followed by burning. The term “tree clearing” is also used to refer to bulldozing forests and bushland to develop land for agriculture and urban development, but excludes forestry logging.

In this report we use the phrase “forests and bushland” to cover all vegetation communities. This incorporates the malleable Australian term “bush”. Forests refer to the technical Australian definition where there is a 20%

vegetation canopy cover, and trees with the potential of growing to two metres¹⁰. Bushland refers to all other vegetation, including sparse woodlands, shrublands or grasslands (i.e., non-forest vegetation).

We use “high conservation value” (HCV) according to the HCV Resource Network international definition, which includes (but is not limited to): state- and federally-listed threatened ecological communities, areas of outstanding biodiversity value, coastal wetlands and littoral rainforests and other coastal environments, non-coastal wetlands, travelling stock reserves, mapped koala habitat, riparian areas (including streams, lakes, and springs), steep or highly erodible land, and National Heritage areas.

KEY FACTS AND FIGURES



Eastern Australia (Queensland and NSW) is **one of 11 global deforestation hotspots**, including the Amazon and the Congo, and the only area in a developed nation on the list¹¹.

99% of identified koala habitat on private land in NSW is now at risk of being cleared¹².

Only 9% of native vegetation in NSW remains intact. 52% is uncleared but degraded by land use, principally grazing, while the remaining **39% is cleared or converted to intensive land use**¹³.

Eight million hectares of land in NSW has been put at risk of clearing by just one new code¹⁴.

Koala numbers have declined 33% between 1990 and 2010¹⁵.





Between 1990 and 2016, at least **2 million hectares of forest and bushland in NSW have been destroyed**, according to the National Carbon Accounting System¹⁶.

Laws controlling deforestation were repealed by the NSW Government in 2016. These laws reduced clearing and had **prevented the deaths of an estimated 116,000 native mammals a year**, including koalas, gliders, wallabies and spotted-tail quolls¹⁷.

Rates of clearing around Moree and Collarenebri in **northern NSW have almost tripled in one year** since the new land-clearing laws came into effect¹⁸.

In one year under the new laws, **5,246 hectares of koala habitat were bulldozed** around Moree and Collarenebri¹⁹.





Photo: WIRES | Eastern Grey Kangaroo joeys

The state of nature



OUR FORESTS, BUSHLAND AND WILDLIFE MATTER

Australia has unique and rich biodiversity, with many species found nowhere else on earth²⁰. Indigenous peoples' sustainable management of Australia's forests and bushland over tens of thousands of years has helped shape our wildlife and plants²¹.

Our forests and bushland are a fundamental part of our landscape, with an array of distinct and varied plants that provide habitat and food for a wide variety of wildlife. From towering *Eucalyptus* forests and verdant rainforests, to hardy bushland and dense mangrove communities, forests and bushland are central to our livelihoods and wellbeing, and a major source of recreation, cultural meaning and pride²².

Our forests and bushland are essential to our survival, purifying the air we breathe and the water we drink²³. They maintain the health of our soils and waterways, provide an important source of food and medicine, and act as a buffer in natural disasters like floods and cyclones, lessening impacts on our farms, towns, cities and infrastructure. They regulate local climate and rainfall, protect the marine environment from excessive sediment and nutrient loads, and store vast amounts of carbon, thus helping slow climate change²⁴.

Australians love the forests and bushland that are central to our culture and home to the wildlife that are an intrinsic part of our national identity, including the koala, kangaroo, quoll, wombat, lyrebird and emu.

Decades of mismanagement has put the forests, bushland and wildlife in NSW at grave risk. Australia has the worst mammal extinction rate of any country on earth over the past 200 years²⁵. In NSW more than 1000 plant and animal species are now threatened with the same fate, and for many land clearing is the leading threat²⁶.

The complex web of life is unwinding around us as the unique Australian landscape is transformed for agriculture and intensive development. All Australians share a responsibility to protect our forests and bushland for future generations, and for the survival of our native plants and wildlife.

WILDLIFE IN THE SPOTLIGHT

Koala (*Phascolarctos cinereus*) Vulnerable to extinction²⁷

The koala is an iconic, stocky Australian tree-dwelling marsupial. The koala spends much of its life in host eucalypt trees, sleeping through the day and spending a few hours feeding on leaves, typically during the evening. Koalas are expert climbers and usually only descend from the canopy to find new host trees, to breed or to disperse. They are often very particular about host tree species and reluctant to switch between eucalypt hosts, which can make translocating individuals problematic.

Koala populations have complex social structures. They breed from spring to early summer when males emit loud, distinctive territorial bellows. Females give birth to a single joey that remains in the pouch for its first six months. The joey stays with its mother until it is 12 months old, often riding on her back.

Koalas are widespread in NSW but their distribution is very fragmented, their numbers are declining, and many populations are isolated from one another. Koalas are threatened by clearing of food and shelter trees and by forest fragmentation that exposes them to higher mortality from vehicle strike, dog attack, stress and disease.

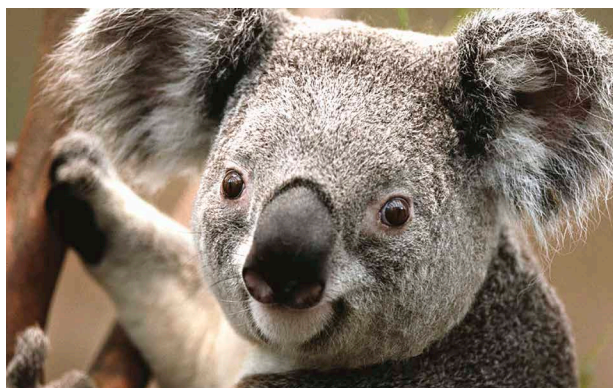


Photo: Ale Flo

Australian painted snipe (*Rostratula australis*) Endangered²⁸

A recently described species, the Australian painted snipe is a medium-sized wading bird with a distinctive pinkish bill and large eyes. Females are more brightly coloured than males and have a striking white eye “mask” and chestnut head. Individuals are typically found alone or in pairs and usually only flock at breeding times.

Their nest is a simple scrape on the ground, into which three or four eggs are laid. The male incubates the eggs and provides most of the parental care to hatchlings. The Australian painted snipe is an early morning and dusk forager and feeds by probing soft mud in search of invertebrates, or by pecking seeds from grasses.

The endangered bird occurs in wetlands, on stream banks, and in shallow ponds in low numbers across NSW. At least half of their original habitat has been destroyed. The size of the total population is unknown, but is thought to be in decline. Small numbers have been found in northern NSW.

The Australian painted snipe is threatened by clearing and modification of its wetland habitat, such as through drainage and diversion. Its habit of roosting and breeding on or near the ground makes it vulnerable to predation by cats and foxes.

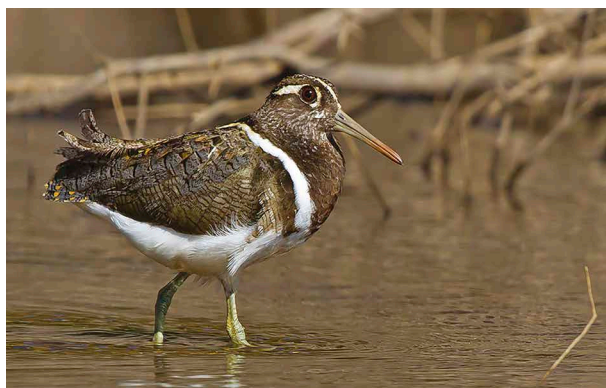


Photo: Patrick Kavanagh

THE EXTENT OF CLEARING

NSW is a heavily cleared landscape. Almost 40% of native forests and bushland has been removed since European settlement, and only 9% of remaining vegetation is in close-to-natural condition²⁹. Eastern Australia is today one of the world's top 11 deforestation hotspots, along with the Amazon, Borneo and the Congo³⁰. Retaining and restoring forests and bushland is essential to stem the tide of wildlife extinctions and land degradation. The below four maps and charts paint a picture of the health of our living landscapes.

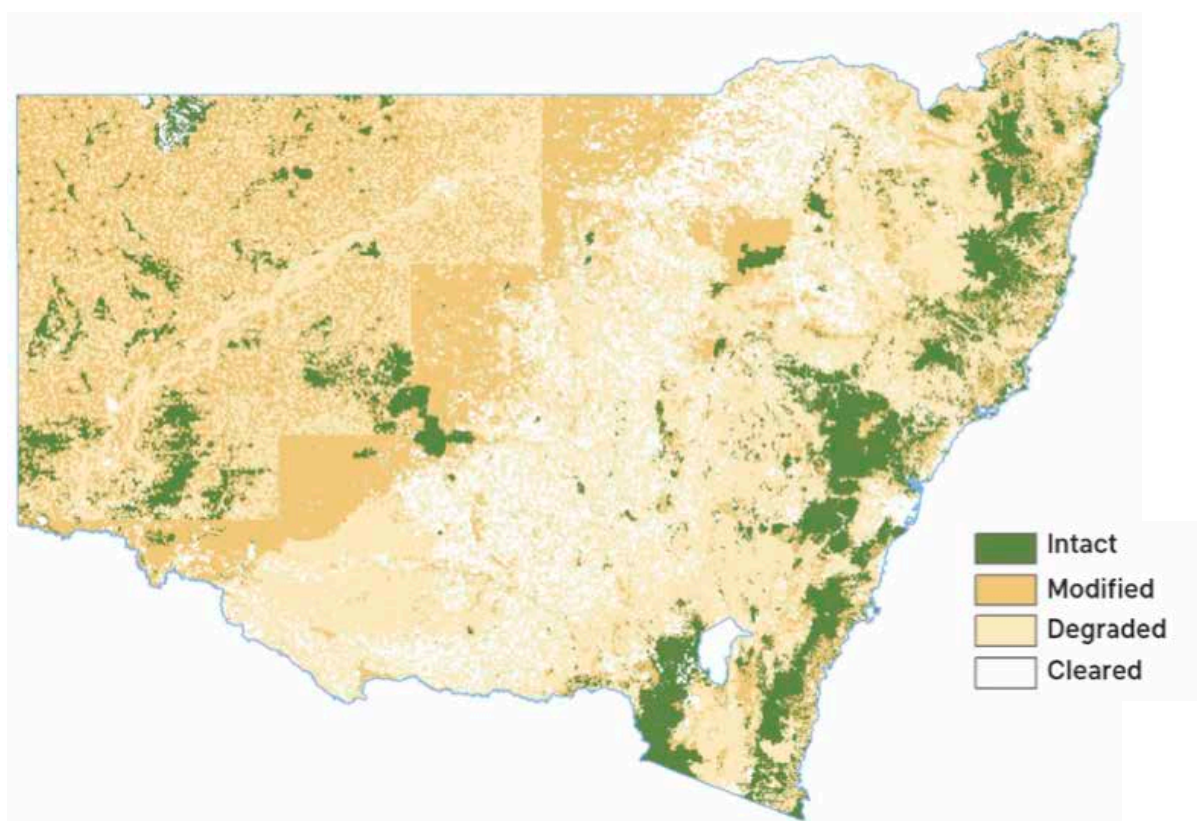


Fig. 1: Vegetation condition map for NSW.³¹ Intact means close to natural condition. Modified means degraded in some way, but the structure is largely natural. Degraded means transformed and structurally non-natural, usually as a result of clearing. Cleared means no vegetation at all.

Amount of clearing

There are two key datasets for annual forest and bushland loss in NSW, both of which use satellite imagery to estimate land-use change:

- the NSW Government’s Statewide Land and Tree Study spatial data (NSW SLATS); and
- the Federal Government’s National Carbon Accounting System (NCAS), which provides tables of primary and secondary forest cleared in NSW.

There are large discrepancies between the two government datasets. The NSW SLATS data show significantly less clearing than the NCAS, despite the fact that NCAS includes only forest cover loss (foliage cover of 20% or more), not loss of bushland with sparser tree cover (Fig. 3).

The NSW Government also swapped methodology in 2009-2010 to one that uses SPOT5 satellite photos rather than the Landsat photos used earlier. This was

accompanied by a sudden drop in areas of clearing reported, which raises concerns with accuracy (Fig. 3). These two data sources are compared here to demonstrate that there is, unfortunately, no “single point of truth” for deforestation statistics in Australia. This situation, and the fact that the release of government data is always over a year behind actual events, has prompted the NSW Nature Conservation Council and WWF-Australia to do their own highly reliable, up-to-date detection of clearing activity in a restricted area of NSW using labour-intensive visual inspection (Fig. 4).

The NSW Environment Minister was warned by the NSW Office of Environment and Heritage that clearing rates would dramatically increase as a result of the significant weakening of protection for forests and bushland in 2017³². This prediction has now been confirmed as accurate, as is explained in the next section.

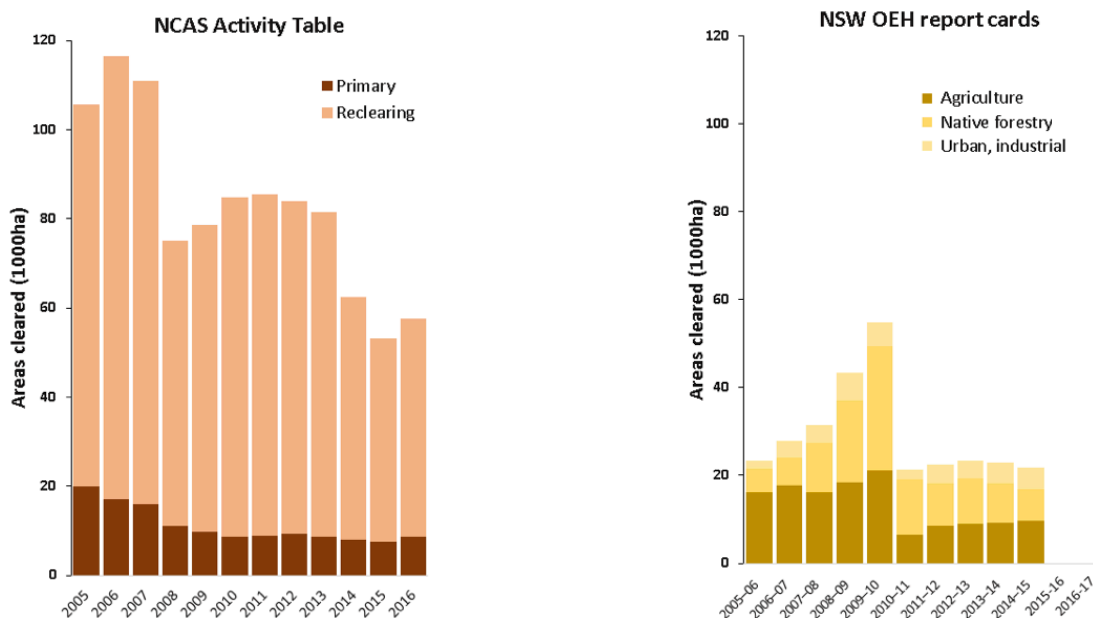


Fig. 2. Areas cleared annually in NSW 2005-2016 according to federal and state government sources. Left: Australian Government National Carbon Accounting System (NCAS) Activity Tables for Land Use, Land Use Change and Forestry (LULUCF) for primary conversion clearing of forest and re-clearing of regrowth forest respectively³³. Right: NSW Office of Environment and Heritage (OEH) *Report on Native Vegetation 2014-2016*, after removing plantation harvest from forestry figures to leave only native forestry clearing³⁴.

Note: 2016 in the NCAS dataset means approximately from Jan/Feb 2016 until Jan/Feb 2017³⁵.

Bulldozing our bushland: Case study of northwest NSW

Since the repeal of the *Native Vegetation Act* in August 2017, habitat fully and partly cleared almost tripled in one year in parts of northwest NSW³⁶. A joint WWF/NCC analysis focused on a 22,173 km² area around Moree and Collarenebri and compared clearing rates for 2016-17 and 2017-18 using systematic, double-checked visual comparison of satellite imagery. Annual clearing rates jumped from 2,845 ha in 2016-17 to 8,194 ha in 2017-18. Bulldozing in these areas has destroyed habitat for 247 native species, including 5,246 ha of koala habitat and 6,942 ha of painted honeyeater habitat³⁷.

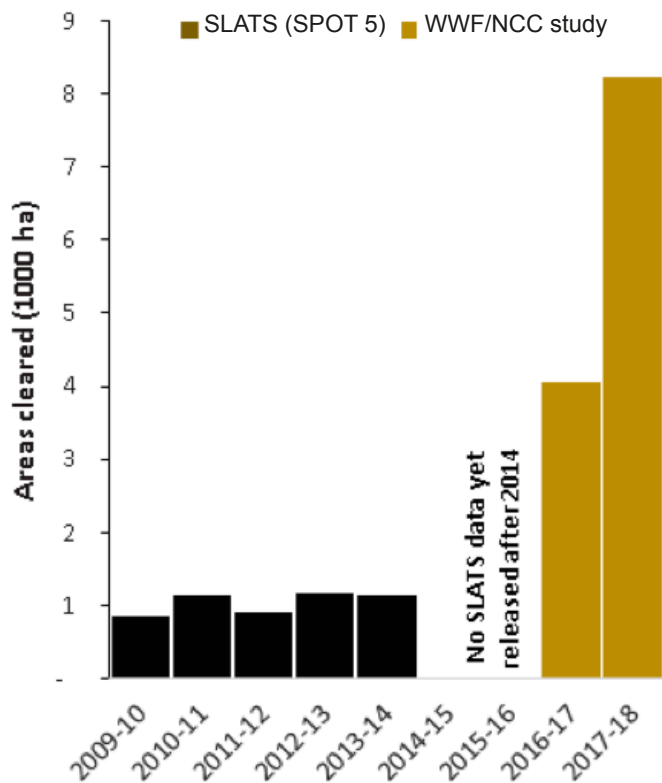


Fig. 3. Areas cleared per annum in the Moree and Collarenebri study area NSW SLATS 2009-2014³⁸ and WWF-Australia/NCC study for 2016-18³⁹.

THE TOP 20 DEFORESTATION HOTSPOTS

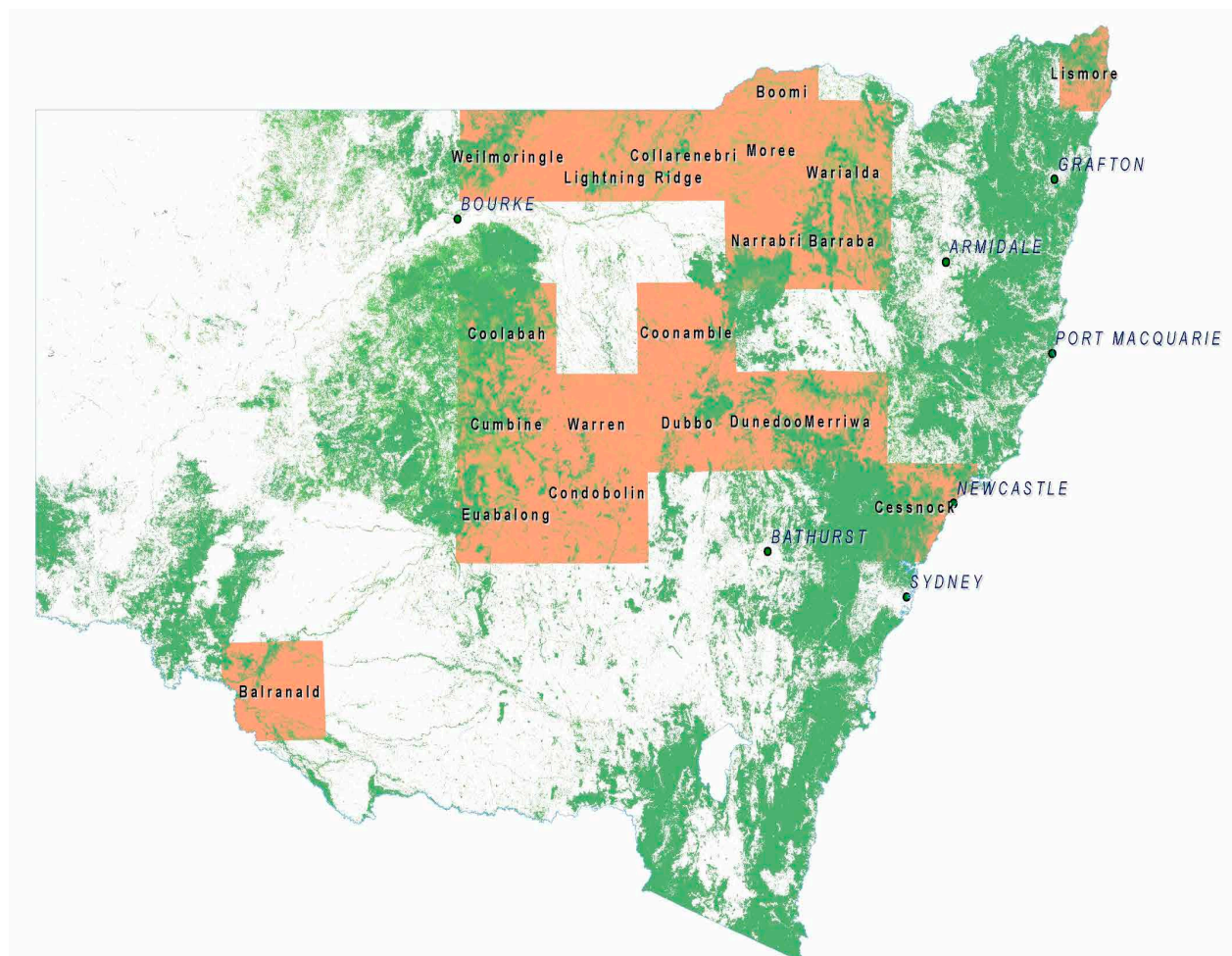


Fig. 4. Top 20 clearing hotspots in NSW, 2009 to 2014. Clearing hotspots (orange) detected using Sentinel-2 satellite images and NSW SLATS data. Forest and woodland (green) based on National Carbon Accounting System 2009.

Analysis of Sentinel-2 satellite imagery and NSW SLATS data shows the top 20 deforestation hotspots are in the state's central west and northwest, with outliers on the north coast, in the Hunter Valley and southwest. Overlaying Australian Department of Environment and Energy Species of National Environmental Significance data shows 17 of the 20 hotspots contain almost 7 million hectares of koala habitat. High rates of deforestation in areas that include koala habitat poses a significant risk for the species, especially west of the Great Dividing Range where the negative impacts of climate change on koala populations is most acute.

List of hotspots

- | | | | |
|-------------------|-------------------------|----------------------|------------------|
| 1. Balranald (K) | 6. Dubbo (K) | 11. Coonamble (K) | 16. Merriwa (K) |
| 2. Euabalong (K) | 7. Dunedoo (K) | 12. Collarenebri (K) | 17. Cessnock (K) |
| 3. Cumbine | 8. Coolabah | 13. Narrabri (K) | 18. Barraba (K) |
| 4. Condobolin (K) | 9. Weilmoringle (K) | 14. Moree (K) | 19. Wyallda (K) |
| 5. Warren (K) | 10. Lightning Ridge (K) | 15. Boomi | 20. Lismore (K) |

K = Koala habitat

WHY THE CURRENT SYSTEM IS FAILING



Excessive deforestation is allowed

Broadscale land clearing can now occur under *self-assessable codes*. Under the *equity code*, depending on farm size and location, landholders can clear up to 625 ha every three years until just 10% of native vegetation remains⁴⁰. Eight million hectares of land is at risk of being cleared due to just one new code⁴¹.

The ecological value of regrowing forests is ignored

The *continuing-use code* allows trees and bushland to be cleared if it has regrown since 1990. This ignores the value of regrowing forests and bushland to biodiversity and for carbon storage. Important forests and bushland should be protected regardless of age.

Vital woodland patches and paddock trees face the chop

The *farm plan code* allows clearing of small woodland patches and paddock trees that are vital stepping stones and wildlife refuges in extensively cleared agricultural landscapes.

Vulnerable and endangered ecosystems can be cleared

Only *critically endangered* ecosystems are off limits to code-based clearing. This will accelerate the decline of vulnerable and endangered ecosystems. Habitat that

supports threatened species, including the koala and malleefowl⁴², can be cleared with no consideration of the impacts. Ninety-nine per cent of identified koala habitat on private land in NSW is now at risk of being cleared⁴³.

The entire system relies on offsetting, which is deeply flawed

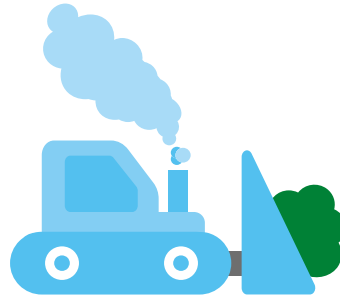
Biodiversity offsetting allows one area of habitat to be cleared in exchange for protecting another. It is now being used to allow clearing of habitat that used to be protected. Setting aside existing habitat to clear other areas results in a net loss of forests and bushland. Offsetting has a host of documented flaws⁴⁴ and should be avoided.

The laws exacerbate known problems

The Environment Protection Authority recognises retention of native vegetation as key to sustainable farming and for soil erosion control⁴⁵. The loss of hollow-bearing trees that results from clearing is also driving species to extinction⁴⁶.



The Impacts of Deforestation



Deforestation and land clearing have multifaceted consequences that reach far beyond the area cleared. Forest and bushland destruction is pushing native animals and plants to the brink, decimating koala habitat, and wiping out plant communities. Higher sediment and nutrient loads from land clearing are polluting waterways and damaging coastal habitats. We are destroying forests and bushland across NSW, which has devastating impacts on human health, ignores traditional ecological knowledge that has survived thousands of years, and risks access to sustainable food and water sources by current and future generations.

IMPACTS ON LIVING ABORIGINAL CULTURAL HERITAGE

For tens of thousands of years, Indigenous peoples have managed Australian forests and bushland, including through the use of fire-stick farming, which has shaped the biodiversity, ecology and character of our forests and bushland⁴⁷.

Destructive and disruptive changes to Australia's environment came with European arrival⁴⁸. When Aboriginal burning practices abruptly stopped in many places, it changed the structure of forest and bushland ecosystems⁴⁹. In addition, rapid deforestation was a feature of early colonisation, as forest and bushland were removed for timber, farmland, towns and cities⁵⁰.

Personal and community connection to forest and bushland remains embedded in Indigenous culture. Aboriginal peoples view heritage at the landscape level, so deforestation and land clearing causes losses beyond specific, known, or recorded sites of significance. Colonisation continues today with the ongoing degradation of the landscapes, waterways and marine environments to which Aboriginal peoples in NSW have never relinquished sovereignty⁵¹.

Indigenous peoples have been managing and conserving biodiversity for millennia, and they are custodians of valuable traditional ecological knowledge⁵². Ensuring Aboriginal peoples are recognised as the traditional custodians of the lands and waters in NSW is fundamental to nature conservation in NSW⁵³. Indigenous peoples must be part of land management decisions across the state, including through the return of lands to Traditional Owners and their involvement in the management of public lands.

'As Aboriginal people, our lands and waters are central to our being. Land and water are essential to the spiritual, social, cultural and economic survival of our communities. We must ensure that lands and waters are well managed so as to protect the vital importance they have to Aboriginal people.'
- NSW Aboriginal Land Council⁵⁴.

IMPACTS ON WILDLIFE

Half of all the native species listed as threatened with extinction under federal environmental law are at risk from habitat loss caused by deforestation and land clearing. More species are heading towards the endangered or critically endangered categories, and hence towards extinction⁵⁵.

1. Kills wildlife and accelerates extinction

Deforestation and land clearing kill millions of animals every year and are pushing wildlife towards extinction. In NSW, 59% of mammals, 34% of amphibians, 30% of birds, and 18% of reptiles are threatened with extinction⁵⁶. Land clearing is a leading cause of habitat destruction, which is driving extinctions⁵⁷.

2. Causes unnecessary animal suffering

When bulldozers flatten forests and bushland, many mammals, birds and reptiles are crushed to death by the machinery. Most survivors die soon after from injury, starvation or predation because they have lost shelter and access to food⁵⁸. When fleeing the devastation, animals are frequently hit by vehicles, attacked by other animals, or become tangled in fences. While some may find new habitats, these can be occupied by similar species who fight to keep the newcomers out, who leads to more deaths⁵⁹.

3. Destroys koala habitat

One of the animals worst affected by deforestation and land clearing is the koala, whose populations are declining rapidly. About 84,000 ha of critical koala habitat was destroyed between 2013 and 2015 in Queensland and NSW⁶⁰. As a result of recent changes to the NSW land-clearing laws, more than 8 million hectares, including over 2.2 million hectares of koala habitat, has been made available for clearing⁶¹. This means 99% of identified koala habitat on private land in NSW is at risk of being cleared⁶².

4. Removes wildlife corridors

Much of the state's remaining intact forest and bushland is in isolated patches, cut off from other vegetation communities by heavily cleared and degraded land. Ongoing habitat fragmentation and degradation leaves wildlife at risk of death and population decline, as the small remaining patches are vulnerable to additional pressures such as fire and invasive species⁶³.

"I have released animals into good habitat and returned months later and it was completely flattened, the animals killed or lost. It is soul-destroying. We as a community are at a turning point. The decisions we make today will affect not only our native species but our own wellbeing."

- Vickii Lett, NSW WIRES wildlife rescuer and carer since 1988.



IMPACTS ON FORESTS, BUSHLAND AND WATERWAYS

Many plant species are threatened by deforestation and land clearing, as well as by invasive weed species⁶⁴. Clearing combines with other unsustainable farming practices to have devastating impacts on our waterways and marine environment as increased sediment and nutrient runoff pollutes waterways.

1. Wipes out plant communities

A total of 74 ecological communities in Australia are threatened by deforestation and land clearing⁶⁵. Virtually all of these threatened communities coincide with areas of high, current or historic deforestation and land clearing⁶⁶.

2. Promotes weed invasion

Invasive species are one of the greatest threats to biodiversity in NSW⁶⁷ and the clearing of forest and bushland facilitates the invasion of weeds⁶⁸. The fragmentation of habitat also increases predation of native animals by feral cats and foxes⁶⁹.

3. Pollutes waterways and the marine environment

As soil is exposed from clearing, it erodes into waterways, increasing sediment and nutrient loads⁷⁰. There is a clear connection between clearing and poor water quality in waterways and marine environments. Farming practices that often follow clearing include the use of pesticides, which also leach into river systems⁷¹.

"I'm deeply concerned these new laws are going to push native plants and animals to extinction in many places. These new laws ignore science and in doing so miss a vital opportunity to protect vegetation that will give our wildlife the protection it needs and the future it deserves."

- Phil Spark, ecologist.



IMPACTS ON CLIMATE CHANGE

The destruction of forest and bushland is bad for our climate on many fronts. When forests and bushland are destroyed, carbon dioxide is released as vegetation decomposes or is burnt. Deforestation also destroys a carbon sink by removing vegetation that would otherwise draw down and store carbon from the atmosphere. Loss and degradation of forests and bushland account for at least 10% of Australia's carbon emissions, second only to the energy sector⁷².

1. Shrinks global carbon drawdowns

Forests and bushland play a vital role in stabilising the world's climate by drawing down and storing large amounts of carbon out of the atmosphere that would otherwise contribute to dangerous climate change. On the global scale, there are an estimated 1,474 billion tonnes of carbon stored in forests and bushland⁷³. This is almost 40 times the carbon emitted globally from coal, oil and gas each year.

2. Increases greenhouse gas emissions

Deforestation and land clearing releases carbon and other greenhouse gases into the atmosphere as trees are burnt or left to decompose. The greenhouse gas emissions from deforestation and land clearing (including native forest logging) in Australia are equal to about half of all of our coal-fired power stations emissions⁷⁴.

3. Undermines our commitment to the Paris Climate Agreement

There is an urgent need to address the threat of climate change by reducing our carbon pollution, as articulated through the development of the Paris Agreement in 2015 and agreed to by 196 countries⁷⁵. Given the major impacts that climate change will have on Australia (lower rainfall, more heat waves, longer fire seasons), it is extremely concerning that NSW has wound back deforestation laws.

"The biodiversity crisis and climate crisis are equally serious and must be solved together. Safe, long-lived carbon storage in land and forests depends on ecosystem resilience. Biodiversity confers resilience. Climate action in land and forests is only effective if it ensures ecosystem integrity and protects biodiversity."

- Virginia Young, Director International Forests and Climate



IMPACTS ON AGRICULTURE

Program, Australian Rainforest Conservation Society.

The loss of trees affects not just wildlife but also the productivity and long-term health of agricultural land. Tree cover is critical for sustaining local rainfall, controlling salinity levels, and maintaining water and soil quality, all vital for a sustainable and productive farming future, as well as providing protection from natural disasters such as fires and drought⁷⁶.

1. Increases the risk of drought

Tree cover is critical for maintaining local rainfall. The loss of tree cover leads to longer-lasting and more severe droughts due to the loss of rainfall capture⁷⁷. Trees and vegetation hold water, transpiring moisture into the atmosphere which creates localised cloud cover and rainfall. The loss of vegetation reduces the moisture available to make rain clouds and the heat-reflecting benefits of leaves, exacerbating drought at local and regional levels⁷⁸.

2. Causes dryland salinity

As forest and bushland is destroyed, water that was once soaked up by tree roots now penetrates deeper down into the bedrock. It accumulates in the bedrock, raising the underlying water table and carrying vast amounts of salt to the surface. The water then leaves large salt scars on the land where most plants cannot grow. Millions of hectares of land and thousands of farms in Australia are affected by salinity, with predictions of 17 million hectares being damaged by 2050⁷⁹.

3. Pollutes our river systems

The soil erosion and salinity caused by deforestation and land clearing affects water quality, temperature,

sediment and nutrient loads of river systems, and reduced tree canopy cover on stream banks exacerbates the problem⁸⁰. Soil erosion and salinity not only pollute our rivers, wetlands, and lakes, they change the physical characteristics and the type of habitat these ecosystems provide, threatening species that depend on clean water, as well as our own water sources⁸¹.

4. Accelerates soil erosion

When vegetation is bulldozed and destroyed, soils are exposed to erosion from wind and water. This process removes topsoil and can create large rills and gullies where the land is washed away by surface water flows⁸². This depletes soil fertility, agricultural productivity, water quality, and inhibits restoration of healthy habitats.

5. Reduces natural disaster buffers

Forests and bushland are a buffer to natural disasters. At a river catchment level, less vegetation means more, faster runoff and more severe floods⁸³. Clearing of vegetation makes the effects of droughts more extreme by reducing local rainfall and increasing temperatures⁸⁴. Disturbance associated with clearing increases local drying, changes forest structure, and increases the frequency and severity of destructive wildfire, which has many negative effects for wildlife, communities and farmland⁸⁵.

"We seem to forget about all the services nature provides – we're taking it all for granted as we clear more and more trees for agriculture. There is nothing we need more than the rainfall-producing, cooling effects of healthy vegetated landscapes. I encourage everyone to realise we're in this journey to restore a healthy planet together."

- Glenn David Morris, NSW farmer and climate action advocate.



IMPACTS ON HUMAN HEALTH

Human health depends on forest and bushland⁸⁶ for the services they provide: filtering the air we breathe and the water we drink; storing carbon; shading our homes; providing medicines; and improving our wellbeing⁸⁷.

1. Destabilises the global climate

Removing trees and bushland reduces local and global carbon sinks, reduces rainfall, increases air temperatures and contributes to climate change, a major health threat of this century⁸⁸.

2. Increases air pollution

Clearing can increase the frequency and severity of dust storms, particularly during dry periods. This can lead to eye and throat irritation and worsening of respiratory problems such as asthma⁸⁹. When the cleared trees are burnt, soot, dust and other air pollutants are released, which have further impacts on respiratory health.

3. Reduces drinking-water quality

Excessive clearing increases runoff and pollution of rivers⁹⁰ that can increase the risk of pathogens entering water supplies and of algal blooms that contain toxins⁹¹.

4. Decimates health-supporting biodiversity

Over half of all medicines in use today have been developed from substances sourced from natural ecosystems⁹², many from forest species. This makes forests and bushland an important current and potential resource for therapeutic compounds. Forests and bushland are also important for the survival of crop pollinators (insects and birds) that are critical for food production.

5. Compromises wellbeing and mental health

Widespread loss of green spaces can lead to reduced wellbeing⁹³ through the loss of opportunities to lower stress, reconnect with nature, and engage in physical activity outdoors⁹⁴. Trees and bushland support mental health by lowering stress and increasing the activity of cells that fight inflammation and infection in the body⁹⁵. For Aboriginal peoples, connection to Country is essential for cultural wellbeing and mental health⁹⁶.

“Forests are essential for human health. They provide us with clean air and water, habitat for species that pollinate our food, protection from climate change, and bioactive compounds for development of medicines. As doctors we support protection of forests and native vegetation because our health depends on healthy ecosystems.”

- Dr John Van der Kallen, Doctors for the Environment Australia, NSW Chair.



We are grateful to Doctors for the Environment Australia for their support and advice about the impacts of deforestation and land clearing on human health.





Photo: Stuart Blanch | Hollow in redgum tree, NSW

A plan for healthy forests and wildlife



BENEFITS OF CONSERVATION

Ending deforestation and land clearing and restoring our forests and bushland will provide many benefits. It will protect water supplies, native wildlife and plant species, as well as preserve soils and improve the quality, productivity and sustainability of agricultural land⁹⁷. It will also improve human health and help mitigate against the impacts of climate change. Here are some key benefits:

- Forests and bushland maintain water and soil quality and improve crop and pasture yields⁹⁸.
- Trees provide shelter for livestock, lowering mortality rates, especially for shorn sheep, young lambs and calves⁹⁹.
- Forests and bushland are habitat for predators of agricultural pests, especially for insectivorous birds¹⁰⁰.
- Native vegetation supports healthy populations of ants, worms and fungi that decompose plant material, aerate the soils and add nutrients¹⁰¹.
- Native plants deliver important ecosystem services, including filtering nutrients from water, stabilising soils, and preventing erosion; removing carbon and releasing oxygen into the atmosphere; and providing food, shelter and breeding habitat for wildlife¹⁰².
- Forests and bushland are critical wildlife corridors between protected areas, providing safe passage for threatened species, including koalas¹⁰³.
- Reconnecting habitat at both regional and continental scales allows animals to better move across landscapes and adapt to a changing climate¹⁰⁴.
- Large stands of trees improve local weather conditions, making it generally cooler and wetter¹⁰⁵. This helps to mitigate local climate change impacts and helps all living organisms better adapt to natural disasters exacerbated by climate change¹⁰⁶.
- Protecting our forests and bushland respects the living cultural connections that Aboriginal peoples have to Country and the value of traditional ecological knowledge¹⁰⁷.

IMPORTANCE OF HABITAT RESTORATION

There is a growing global movement of communities, businesses and governments seeking to repair the damage done to nature by the industrial transformation of our landscapes. In NSW, where a mere 9% of native vegetation remains in a near-natural condition, restoration of degraded land is critical. With 70% of land in NSW privately owned or leased, the responsibility and opportunity to restore our degraded landscapes rests with us¹⁰⁸.

Restoration supports ecosystems to return to a stable, healthy and resilient state, where native plants and animals can once again thrive. Restoration results in the re-establishment of many important functions that intact ecosystems perform to sustain our communities. These include water purification, pollination, soil health, local climate regulation, buffers from natural disasters, and simply providing a pleasant place to be.

Ecological restoration, along with strong controls on deforestation and land clearing, is one of the cheapest

and most effective ways to reduce greenhouse gas emissions and draw carbon out of the atmosphere. At the same time as helping to slow global warming, well-targeted restoration helps plants, wildlife and communities adapt to a rapidly changing climate. And in some circumstances, full landscape recovery is possible¹⁰⁹.

Traditional ecological knowledge has much to offer in terms of ecosystem management because it is an holistic approach to restoration and maintenance of ecological and cultural values¹¹⁰. It also creates opportunities for Aboriginal peoples to continue cultural practices that have been part of the management of the lands and waters of Australia¹¹¹ for at least 70,000 years¹¹².

Funding and supporting ecological restoration at the landscape scale has the potential to create a sizeable restoration economy requiring a range of services and technologies to be provided by new and expanding businesses, particularly in rural areas¹¹³.



Photo: Nature Conservation Council

SUPPORTING LANDHOLDERS TO PROTECT AND REPAIR LANDSCAPES

In addition to strong laws protecting all remnant and regrowing high-conservation-value forest and bushland, landholders should be supported financially to protect these areas including through the establishment of a government-funded \$1.5 billion Land and Biodiversity Fund (the fund).

Significant opportunities exist to support landholders and Indigenous communities to develop revenue streams to repair degraded landscapes, reduce carbon emissions from deforestation and land clearing, and sequester carbon from the atmosphere.

The fund should create jobs and opportunities in sustainable land management in regional NSW. It must drive growth in land-sector atmospheric carbon reduction and enable people to live and thrive in regional NSW by supporting them to conserve forests and bushland and store carbon, rather than remove trees.

To maximise the impact of the fund, it should deliver multiple benefits to landholders, biodiversity and the

climate. It should be modelled on the Queensland Government's nascent \$500 million Land Restoration Fund¹¹⁴ and avoid the mistakes of the Australian Government's Emissions Reduction Fund¹¹⁵.

The fund should be developed through meaningful engagement with landholders, environment groups, and Indigenous and regional communities. It should enable landholders to contract environmental service providers to revegetate cleared areas at the landscape scale. Money from the fund should be available to buy land to create public, private and Indigenous Protected Areas that spur regional tourism and employment.

Such a major funding program must be contingent on the passage of strong environmental protection laws and a compliance regime that protects all remnant and regrowing high-conservation-value forests and bushland. Measures must also be put in place to ensure funds are spent only on lands that are subject to perpetual conservation agreements so benefits of the investment are enduring.



Photo: Nature Conservation Council | Gardens of Stone - Cullen Bullen

THE NEED FOR TIMELY AND ACCURATE DATA

The public has a right to know how forests and bushland in NSW are being managed. Timely and accurate spatial data is critical for understanding deforestation and land clearing, and for monitoring and evaluating the effect of policy responses. An effective NSW deforestation and land-clearing data system must be transparent, accurate, up-to-date, and regularly published in an accessible format. The current state monitoring system falls short of these criteria.

1. Incomplete ecosystem mapping

Statewide comprehensive regional ecosystem mapping in NSW is critical for an accurate understanding of deforestation, yet this has not been completed. By contrast, the Queensland Government has a comprehensive statewide map of regional ecosystems based on vegetation types, soil types and bioregions. The Queensland system also indicates ecosystem condition (remnant, regrowth, etc.) and conservation status¹¹⁶.

2. Multi-year delay in publication of data and reports

The last publicly available Statewide Land and Tree Study spatial data (NSW SLATS) was for 2014-15¹¹⁷. The most recent NSW report on Native Vegetation was also for 2015-16¹¹⁸. Timely analysis and evaluation of policy effectiveness is not possible with such long time lags between clearing and reporting. Nor is there any reasonable justification for these delays.

3. Unreliable clearing detection

Large discrepancies between NSW SLATS detections (based on Landsat imagery) and SPOT5¹¹⁹ imagery throws into doubt the reliability of the clearing statistics available in NSW. Total area cleared from 2009-2011 detected using Landsat of 104,700 ha was nearly *double* the 57,400 ha detected using SPOT5¹²⁰. Now that NSW has moved entirely to SPOT5 there are concerns rates of deforestation are being significantly underestimated in government reporting.

4. Inconsistent across jurisdictions

NSW consistently reports less clearing than the Federal Government's National Greenhouse Gas Inventory¹²¹. This is in contrast to Queensland where federal estimates of clearing are consistently much lower than those reported by Queensland SLATS reports¹²².

5. Inadequate presentation of data in reports

The *NSW Report on Native Vegetation*¹²³ obscures the true picture of deforestation and land clearing across the state. There is no analysis of clearing of old-growth versus regrowth forests and bushland, nor whether observed clearing was approved, illegal or unexplained. The Local Land Services public register of clearing is not adequately transparent as it does not identify fine-scale location of clearing, refers to "treatment" rather than change in vegetation cover and does not enable a bioregional or ecosystem-based analysis of clearing.

6. Inadequate compliance technology and systems

There is no system in place to monitor for unlawful clearing in real time, even though up-to-the-minute, high-resolution satellite imagery is available, for example as used by the Queensland Government's Early Detection System¹²⁴.

POLICY ACTIONS

The NSW Government must introduce stronger land-clearing laws and invest in forward-looking solutions to biodiversity conservation and land protection. This will require significant improvements to current laws that go above and beyond the provisions of the now repealed *Native Vegetation Act 2003* and those of the current *Local Land Services Act 2013* and the *Biodiversity Conservation Act 2016*. The NSW Government must enact strong laws and dedicate funds that achieve the following outcomes:

1. Mandate the conservation and enhancement of biodiversity in legislation

Legislation must require decision makers to conserve and enhance biodiversity. This requirement must be achieved at state, regional and local scales, and must address the full range of biodiversity and conservation values, including threatened species, water quality, habitat quality, soil quality and salinity.

2. Protect all remnant and high-conservation-value regrowth vegetation

Legislation must ensure all remnant and high-conservation-value (HCV) regrowth forest and bushland is protected from clearing across all sectors, including agriculture, urban development, infrastructure and mining. This will require targeted changes to biodiversity conservation, agricultural, planning and mining legislation. The definition of “high-conservation-value” should be consistent with the international definition as outlined by the HCV Resource Network. This protection should not be arbitrarily restricted by vegetation age.

3. Protect and restore koala habitat to save the species from extinction

Prohibit clearing of core koala habitat across all land tenures. Strengthen implementation of and compliance with State Environmental Planning Policy 44 by local councils to ensure permanent protection from urban development. Restore effective landscape linkages to enable dispersal of koalas in over-cleared regions, and movement of koalas into climate refugia. Finalise and release koala habitat mapping at state, regional and local scales.

4. Protect and restore forests, bushland and catchments for carbon storage and rain making

Legislation and policies must mandate protection and restoration of trees to enhance storage of carbon in landscapes to support carbon emissions abatement and carbon sequestration. Clearing of trees is linked to declining rainfall and hotter and longer droughts, and this action will therefore improve long-term outcomes for regional communities by generating more rain and keeping temperatures cooler.

5. Restrict code-based clearing

Clearing under self-assessable codes should be strictly limited to small-scale maintenance activities that have low ecological impacts, such as creating firebreaks, fence lines, and critical infrastructure.

6. Protect urban bushland and trees

Urban bushland and trees are vital for human wellbeing and for climate change adaptation by keeping towns and villages cool. Ensure existing urban bushland, trees and green spaces are protected by removing provisions that allow tree clearing to occur under various instruments, such as the Vegetation in Non-Rural Areas State Environmental Planning Policy, Exempt and Complying Development Code and the 10/50 Bushfire Code. The government must mandate robust, uniform tree-preservation rules for councils, provide legal protection for green spaces, and support local governments by investing in increasing green space and expanding urban tree canopies.



7. Put the Environment Minister in charge of tree-clearing decisions.

Where Ministerial approval is required for clearing, it must be the Environment Minister that has primary responsibility for assessing and determining clearing proposals, using an objective scientific assessment methodology. The recent changes to legislation giving the Local Land Services, Minister for Primary Industries and Planning Minister responsibility for clearing decisions must be reversed and responsibility returned to the Environment Minister. The Environment Minister must also be responsible for the monitoring and enforcement of tree clearing laws.

8. Complete and publicly release native vegetation mapping.

The release of native vegetation maps for the whole of NSW was a key component of the government's new regime of land-clearing laws when details were announced, yet these maps have not been completed. Mapping which identifies high conservation areas off-limits to clearing must be completed as a high priority. Maps must be created using a method that can accurately identify vegetation communities (e.g., Digital Aerial Photographic Interpretation), and be ground-truthed by OEH staff. Mapping must accurately and comprehensively identify all remnant and high-conservation-value regrowth forest and bushland.

9. Adequately resource monitoring and compliance.

Adopt an early detection system similar to the Queensland Government system whereby satellite imagery is monitored on fortnightly intervals to identify suspect clearing and allow intervention by environmental officers to prevent further losses.

10. Release prompt, transparent and regular statewide clearing data.

NSW should publish an annual report and data on statewide clearing similar to the Queensland Government's annual SLATS report. The report should clearly state how much remnant and regrowth vegetation has been cleared over 12 months, with a breakdown by bioregion, catchment area, state electorate and local government area. The data should quantify clearing by industry (e.g., grazing, mining, etc.), by type of clearing permit granted and identify clearing locations. Estimates should also be provided of greenhouse gas emissions resulting from clearing.

11. Establish a \$1.5 billion Land and Biodiversity Fund.

Establish a flagship \$1.5 billion Land and Biodiversity Fund to support biodiversity conservation and land-sector carbon projects. The fund should be overseen by an independent committee, with projects required to meet minimum standards. From that fund, \$1 billion should be allocated to support farmers and Indigenous landholders to protect trees and revegetate landscapes, create jobs in land restoration and carbon sequestration in regional and rural areas, and to prevent erosion to protect waterways and water quality. Revegetation targets should be set to guide investments to increase the extent and condition of native vegetation at regional and state levels. In addition, \$500 million should be invested in biodiversity conservation on public and private land. Measures must also be put in place to ensure funds are spent only on lands that are subject to perpetual conservation agreements so benefits of the investment are enduring.



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Photo: Stuart Blanch | Redgum with Callitris pines in dry bed of Flaggy Creek, north of Coonabarabran, NSW



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