



The international organisation dedicated
to saving the Koala and its habitat

Hon. Gabrielle Upton
Minister for Environment
PO Box A290
Sydney South,
NSW 1232

3 February 2017

Dear Minister,

On behalf of the Australian Koala Foundation (AKF), I am writing to express deep concerns on recommendations of *The Report of the Independent Review into the Decline of Koala Populations in Key Areas of NSW: December 2016*.

I have assumed that you will be following through on the former Minister's announcement and would be very pleased to brief you on our concerns for Koalas in New South Wales.

I have asked Dr Douglas Kerlin, AKF's Chief Ecologist to specifically address a number of the recommendations made by the Review. His letter (attached) will be given to all NGO's and Koala groups around the country.

It is important for you to understand that the AKF has now completed Koala Habitat Mapping for Queensland, Victoria, and South Australia. Attempts to do the same for NSW have been fruitless because of the shocking lack of state-wide vegetation mapping.

Suitable mapping data has been found from other sources as outlined in Dr Kerlin's letter, which I trust comes as good news to your Department, given that policy decisions made on incorrect data would have disastrous long term effects. It is hard for me accept that any recommendations arising from the Review have any real potential outcomes when the NSW Government does not have the necessary data to produce state of the art mapping which is the only way to lead to feasible outcomes that can protect koala habitat.

For many years, the state and federal governments have only offered platitudes about protecting the koala and only politically favourable actions have been taken. The Koala

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was listed under the Federal EPBC and I have great concern that the promised Federal Recovery Plan, due for completion in late 2014 has not even been started.

Land clearing in New South Wales has to stop and the only way to do that fairly is to have good maps.

The Australian Koala Foundation over our 30 year history has watched numerous reviews, changes of legislation and sadly a Senate Report of 2011 stating that "the States were incapable of protecting the Koala". It is disturbing for me to read that your Government appears to not have involved the Federal Government in this report. I am not sure how that is possible, given the Federal listing nearly 3 years ago. I am hoping that you will take the concerns raised by myself and Dr Kerlin in the decision-making for these issues. There has been an astounding lack of consultation with the AKF by the NSW Chief Scientist in developing the outputs of this Review.

It is difficult to fathom, why the AKF which is the largest independently-funded koala research organisation in the country and has expended significant resources toward protecting a national icon was not consulted.

Dr Kerlin would be available for your officers at a suitable time and our maps are available on a commercial basis via Omnilink, a company that regularly provides data to your Government.

Yours sincerely,

A handwritten signature in black ink that reads "Deborah Tabart". The signature is written in a cursive, flowing style.

Deborah Tabart OAM
Chief Executive Officer
Australian Koala Foundation



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The Hon Gabrielle Upton MP
Minister for the Environment
GPO Box 5341
SYDNEY NSW 2001

3 February 2017

Dear Minister,

On behalf of the Australian Koala Foundation (AKF), I am writing to comment - and raise our concerns - about a number of aspects of The Report of the Independent Review into the Decline of Koala Populations in Key Areas of NSW: December 2016. I believe the best way to address these concerns is to initially go through each of the recommendations made by Professor Mary O'Kane, Chief Scientist and Engineer to the Government of New South Wales.

Before we make comment on the recommendations, it is important to note that the AKF has now finalised Koala Habitat Atlas (KHA) mapping for Queensland, Victoria and South Australia (maps attached). The completion of KHA mapping for NSW has been impossible to date because it is hampered by the lack of State-wide vegetation mapping in the State (Letter to Premier Baird dated 29 June 2015 attached).

Despite this shocking lack of data, AKF's Landscape Ecologist Dave Mitchell has been working to find suitable data from other sources. As a result, the AKF has been able to complete a KHA map for approximately 65% of NSW, and is currently planning to have complete mapping by the end of 2017. We hope this is good news to you and your Department.

This NSW mapping has only been possible because of more than 25 years of mapping expertise over the eastern seaboard of Australia. The AKF has 2000 field sites, 100,000 individually measured trees and some 30,000 man hours in the field. This has allowed us a confidence that desk top mapping does not provide. This data

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has been collected over 25 years and I am sure you can appreciate that it would be very hard to replicate our work in a hurry.

It is gratifying to see that the report recommends Koala mapping. AKF regards a ranked mapping methodology as the precursor for any successful Koala Strategy. Without good mapping, any planning decision is a bad decision and it is impossible for the AKF to believe that any of these recommendations are realistic when the NSW Government simply lacks the data required to achieve a decent Koala habitat map.

So to our concerns about the recommendations in the report:

Recommendation 1: That Government adopt a whole-of-government koala strategy for NSW with the objective of stabilising and then starting to increase koala numbers.

AKF: This is a platitude and it has been echoed in both State and Federal Government documents for years. And even if the intention is genuine, by when?

Recommendation 2: That Government initiate a program to improve data on the number, location and occurrence of koalas in NSW, including trends over time, taking advantage of new sensor and communication technologies and data analytics within 12 months of receipt of this report.

AKF: There is no need to prioritise further evaluation of the status of the Koala. Koalas in NSW are already listed as “vulnerable” under the NSW *Threatened Species Conservation Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and require protection. The Koala is listed federally under the EPBC Act and needs a Federal Recovery Plan which should have been finalised in 2014 as a result of the listing of the Koala in May 2012 by then Federal Environment Minister Tony Burke.

The AKF currently estimates there are between 8,610 and 11,250 Koalas left in NSW and this was assessed by the amount of habitat available to the Koala (map attached)



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We are very confident that the figure of 36,000 animals quoted by the Chief Scientist is inaccurate. We would also argue the Chief Scientist has ignored the context in which that figure was generated. It was not generated from data; rather it was generated from opinion. The Chief Scientist has also failed to communicate the high level of uncertainty surrounding that figure. The actual population estimates range from 13,825 all the way to 73,015 Koalas; statistically this says that while there could be twice as many Koalas in NSW as quoted by the Chief Scientist, there could be as few as a third of the number.

In contrast, AKF estimates are based on a solid methodology, combining AKF habitat mapping and population models, with extensive fieldwork to validate the figures; an early iteration of the methodology supporting our numbers was presented to and published by the 2011 Senate Inquiry into the Status of the Koala. Our 2009 estimates, generated using this early method, were also presented to the Federal Government Expert Workshop on the Status of the Koala, where other participants present were invited to provide feedback. One NSW OEH officer present who did provide feedback informed us that he felt we were pretty close.

I also urge caution before embarking on a new Strategy focussed on 'new technologies'. Like sightings, drones and sensors only provide a snapshot of Koala habitat utilisation. They do not provide a long-term picture of how Koalas are using the landscape. By stressing visual sightings of Koalas, there is a significant risk that areas of Koala habitat will be declared empty, because the Koalas-in-residence happened to choose the survey day to occupy parts of their range outside the selected search area.

The AKF uses a faecal pellet survey based methodology, because Koala scat does persist in the environment, and can demonstrate Koala habitat utilisation even if the Koala is not present at the survey site on the day of the survey.

Similarly Koala sniffer dogs may not provide a full picture of Koala habitat use. A well trained dog can tell you whether Koalas are present or absent, but will not provide the fine detail such as Koala tree species preference data to translate into Koala habitat mapping.



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Citizen science, whilst politically favourable, is not without its scientific concerns. Whilst we appreciate that Citizen Science may have a role to play in providing information about the location and occurrence of Koalas, past efforts to transform citizen science into estimates of Koala numbers have proven woeful. The South Australian Great Koala count ended up providing an estimate of between 114,000 and 200,000 Koalas in the Adelaide Hills. This is demonstrably wrong. *The original South Australian Koalas were hunted to extinction by the fur trade – all Koalas currently found in South Australia have been translocated to the State from Victoria – and the Koalas in the Adelaide Hills are the descendants of 1,105 koalas translocated to the area in 1997. It is essentially impossible for a population of 1,105 Koalas to grow to a population of 114,000 Koalas in 15 years. At the fastest population growth rates recorded for Koalas in Australia, the population would be lucky to have reached 28,000 animals. AKF believes there are no more than 13, 870 Koalas in South Australia. I urge you to be cautious in developing any policy using citizen science.*

AKF has monitored all these sorts of projects over the years and they are not consistent and difficult to apply over a large landscape, such as the State of NSW.

Recommendation 3: That Government publish a state-wide predictive koala habitat map within three years of receipt of this report, with immediate priority given to improving coverage of the north coast.

AKF: The NSW Government simply lacks the data required to achieve a decent Koala habitat map within three years.

The strength of the Koala Habitat Atlas is that it shows ranked Koala habitat. If there is good habitat (Primary habitat is marked red on our maps) - as defined by the KHA - Koalas can live at medium to high densities, but if the habitat has few or no Koala food trees in it then there cannot be any Koalas in significant numbers. Our field research and studies conducted by other researchers confirm this fact.

The key to predictive Koala habitat mapping is therefore high quality vegetation mapping, and the NSW Government lacks the data required to achieve a decent Koala habitat map.



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As already mentioned, the AKF wrote to Premier Baird in June 2015 to raise the issue of the inadequacies of vegetation mapping in NSW. Nothing has changed since that time. Vegetation mapping in NSW is still a shambles.

AKF just accepted that it was up to our team to produce the maps necessary and since 2015 AKF has been working to evaluate over 400 NSW datasets – sorting out the piecemeal data available - to develop a Koala Habitat Atlas for NSW. With AKF's expertise and prowess in Koala habitat mapping, we have already completed mapping for 65 per cent of New South Wales. We estimate we will have a completed Koala Habitat Atlas by the end of the year. This augers well for your strategy if you choose to understand what we have achieved. The methodology underpinning these maps has been used in the development of a number of CKPoMs (Campbelltown, Port Stephens, Lismore, Greater Taree, Tweed and Richmond Valley) throughout NSW, and was endorsed by SEPP 44 Planning Circular B35.

It was therefore of great concern that we saw that the Chief Scientist has held up the 'predictive Koala habitat mapping', produced by industry for the Queensland Government many years ago as some sort of Gold Standard. Had she looked a little closer, she might have seen all is not as great as it appears.

Rather than focus on vegetation available for the Koala, this industry mapping was based on Koala sightings. The problem is that sightings are notoriously biased; sightings do not actually represent the true distribution of Koalas. A person has to be present to record the sighting, so a map based on Koala sightings would actually predict that Koalas most commonly occur along roads or in open parks, not in large patches of Eucalypt forests where there are fewer people to spot Koalas, and Koalas are harder to see. It is a major flaw.

More importantly it has been acknowledged by the Queensland Government that this industry mapping is simply wrong. It fails to identify key areas of important Koala habitat, for instance waterways dominated by *Eucalyptus tereticornis*. To use the vernacular, Koala habitat mapping that forgets to highlight the importance of areas of *E. tereticornis* is like leaving the lamb out of a lamb roast.



This mapping project did not go to tender. The project is reported to have cost nearly \$1million and was awarded to a private company that was employing an ex-Government biologist (who had little mapping experience). Our CEO wrote to the Premier in August 2009 asking why the project had not gone to tender; of course we received no reply.

The predictive mapping recommended by the Chief Scientist has not worked for Queensland's Koalas: the current maps are wrong. Worse still, Queensland lawmakers have failed to translate the maps into workable planning instruments. In comparison, AKF's Koala Habitat Atlas has proven to be far more useful for planners, and have been endorsed under both SEPP 44 in New South Wales and the Victorian Koala Management Strategy.

Recommendation 4: That Government improve outcomes for koalas through changes to the planning system, &

Recommendation 5: That Government improve outcomes for koalas through the Biodiversity Conservation Bill and associated Regulations.

AKF: How can these recommendations be taken seriously when rather than strengthen protections for Koalas and Koala habitat, recent changes to NSW Government policy have weakened laws to protect Koalas and Koala habitat to pave the way for more and more development.

Changes to logging laws have granted landholders greater freedom to clear their land, while the announced a review into State Environmental Planning Policy 44 (SEPP 44), appears to be aimed at making it easier, rather than harder, to develop areas of Koala habitat. And while it has been far less reported in the media, the past year has seen moves by Forestry regulators to reduce or remove requirements for surveys for Koalas before clearing commences.

The details surrounding changes to SEPP 44 are very vague at this point, but the planned panacea appears to be more Comprehensive Koala Plans of Management (CKPoMs). CKPoMs were introduced under SEPP 44, and removed the need for developers to provide individual Koala Plans, by instead allowing local councils to prepare plans for the entire shire.



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But Local Councils have dropped the ball; to date we are only aware of three CKPoMs in effect: Coffs Harbour, Port Stephens and Lismore. Several more have been prepared (Ballina, Bellingen East, Byron Bay, Campbelltown, Greater Taree, Gunnedah, Kempsey, Port Macquarie-Hastings, Richmond Valley, Tweed, and part of Clarence), many of these having been languishing in filing cabinets for more than a decade. Greater Taree for instance had a CKPoM developed in collaboration with the AKF ready to be passed by Council in 2002-2003, but one Councillor backed out at the last minute; that CKPoM has sat on the shelf ever since.

There are no incentives for Councils, they merely see CKPoMs as a roadblock for development. SEPP 44 was a model for Koala protection, but a lack of support has seen it fail to protect Koalas.

Meanwhile, NSW Government Departments (OEH and EPA) have abandoned any investigation and prosecuting of land clearing affecting Koala habitat. Why? Because they have had no success to date. Legal actions are expensive, dangerous for field staff to pursue, and the culprits ignore any enforcement actions like restoration of habitat. But more fundamentally, how can you prosecute when you have no habitat maps in the first place? The Government appears to have gone to water on this issue – the will required to see stronger laws for Koalas enacted and enforced is entirely absent.

Stronger legislative protection will be critical to stop the extinction of the Koala, and needs to be a priority for any Koala Strategy. The AKF has been working with lawyers in both Australia and the United States of America, to draft the Koala Protection Act (KPA). The KPA is strong legislation, and focusses on protecting both Koalas and Koala habitat. AKF believes no other strategy will work. While the Act has been written for the Parliament of Australia, it can provide a model for better legislative protection for Koalas and Koala habitat. The AKF would be pleased to provide you with a briefing on the KPA.

Recommendation 6: That Government investigate models for guiding and incentivising collaborative best practice for new development and ongoing land use



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occurring in areas of known koala populations across tenures, industries and land users.

AKF: Many of these models already exist and the AKF is disappointed they were not included in the Chief Scientist's report:

- 1) Koala Beach was established in 1994 as a Koala-friendly urban development. It is located in Pottsville on the Tweed Coast. A 20 year review conducted in 2014 found that Koalas are still present at the site (now subdivided into 500 residential lots), and that biodiversity values at the site match those observed at the nearby Pottsville Environment Park. In the 2009 Federal Senate Inquiry into the status, health and sustainability of Australia's koala population, Koala Beach was recognised by the Property Council of Australia as a model for successful restoration of Koala habitat, and the 'coexistence of wildlife and humans.' Despite this, it is interesting to note that Tweed Council has removed all signs to the development to appease the development industry who fear its implementation.
- 2) 'Planning Guidelines for Koala Conservation and Recovery: A Guide to Best Planning Practice' was developed and funded by AKF in collaboration with the University of Queensland, the NSW Department of Environment and Conservation in 2006 and several local councils in New South Wales and Victoria. The guidelines provide important insights for planners gained from AKF research. Has your Department sighted them or even aware of them?
- 3) The Ecolabel project was created, in collaboration with Dr. Lester Pahl at the Queensland Department of Primary Industries and Fisheries, to provide incentives for primary producers to protect Koala habitat values. Farmers were educated about how to manage their land to best support local Koala populations, and AKF provided market recognition of the adoption of these 'koala-friendly' management practices. Reports are available.



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- 4) AKF has an extensive background working in the plantation forests of Victoria. The Report 'Use of Blue Gum plantations by Koalas' was written by AKF field officers in collaboration with a number of plantation operators in Victoria, and supported recommendations for the selection of sites and design of new plantations and harvesting regimes for the long-term management of koalas in plantations at a landscape scale. Unfortunately, not one recommendation was taken up by the Green Triangle companies in Western Victoria, because they fear loss of production, and several Koala deaths have occurred (<http://www.abc.net.au/7.30/content/2013/s3808542.htm>)**

Recommendation 7: That Government agencies identify priority areas of land across tenures to target for koala conservation management and threat mitigation.

AKF: Koalas currently occur across more than 65% of the State of NSW. It is nonsense to believe that protecting a 'priority area of land' here, a 'priority area of land' there, will provide a long-term solution. And it is not possible to identify these priority areas without good mapping. And even as a good idea, is not possible without ranked vegetation data.

What is needed is strong legislation that protects Koalas and Koala habitat – wherever they occur - in conjunction with policies to provide enhanced connectivity between habitats and to better manage adverse impacts such as roads and cars.

And if the true objective is "stabilising and then starting to increase koala numbers", a new Koala Strategy must protect quality areas of Koala habitat, even that habitat is at present empty.

Recommendation 8: That Government, through the Office of Environment and Heritage, convene two symposia within 12 months of receiving this report: one for scientists active in koala research and land managers to develop a koala research plan; and one focussed on koala rehabilitation to identify actions to optimise the delivery of and support for the network of koala rehabilitation groups and carers.



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AKF: This has all been suggested before. The AKF was a member of the Steering Committee that drafted the National Koala Conservation and Management Strategy (NKCMS) 2009 – 2014. The NKCMS was supposed to deliver everything that has been suggested here, and more (including a National Recovery Plan for Koalas) - and it was all to have been finalised by 2014.

Here we are in 2017, and it is hard to conclude the NKCMS was anything other than a complete failure (please note that NSW had a representative on the committee responsible for implementation of the NKCMS).

Recommendation 9: That Government establish the Australian Museum as a preferred repository for koala genetic samples in NSW, and all data and metadata associated with these samples should be deposited into the SEED Environmental Data Portal (extended if necessary to include flora and fauna).

This is all putting the cart before the horse. It is pointless to talk up genetic analysis with a view to managing NSW Koala populations as metapopulations if there is no mapping to help planning, and no laws in place to protect the Koala trees needed to provide connectivity between otherwise isolated populations.

Instead, isn't this really about ensuring zoos have enough genetic material to keep their populations viable?

Captive breeding has no practical value in ensuring existing wild koala populations remain viable. There have been 400 giant pandas bred in captivity; only five have ever been released back into the wild – and only three of these survived. Worse still the WWF and the IUCN have downgraded the Panda on the endangered species list even though the Panda habitats have not been protected. AKF cannot allow this sort of rhetoric to continue.

Recommendation 10: That Government facilitate the exchange of information among land managers, local government, the research community and the broader community.



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AKF has seen and heard this for over 25 years, and yet the Koala has continued to decline. It is our experience that workshops are held and then recommendations languish and landholders and groups continue to be frustrated. A key component

of any Koala Strategy for NSW must be to explain how the Government will facilitate this information exchange.

Recommendation 11: That Government draws on knowledge and shares information with local community members through a program that supports localised engagement between liaison people and residents and industry.

AKF staff have been providing advice to landholders for years, receiving thousands of emails for requests each year.

On a recent field trip we spoke to landholders about how our science is predicting the death of the Blakely's Red Gum in the area east of Parkes, due to the impacts of Global Warming (attached). AKF predicted these trees would be gone by 2030. Our staff were saddened to be shown huge hillsides of dead trees and a farmer concerned, overwhelmed and in need of solutions.

Are you for instance, considering return Extension Officers to the bush? Our experience is that, with the loss of extension officers, farmers are seeking advice from commercial agribusiness companies and serious science is missing from land management in most parts of the State.

So, if you accept our many concerns above, then where do we go? It is our view that the AKF has a great deal to offer to the development of a Koala Strategy for New South Wales, not least because the AKF has been a leader in Koala habitat mapping for more than 25 years. AKF has many of the answers the Government really needs for Koala recovery: the Koala Protection Act, The Koala Habitat Atlas, and Koala Beach.



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It is unfortunate that our accomplishments have been overlooked by the Chief Scientist of New South Wales in the development of her report. We are not sure why the Chief Scientist failed to speak with AKF during her review, and we are not sure why the Office of Environment and Heritage Protection seemed to think we are a carer group, rather than the largest independent funding body for Koala research in Australia, but there you go.

For the record, I will note that we contacted the Chief Scientist's Office when NSW Roads Minister Duncan Gay announced that the Chief Scientist was to chair a panel to advise on koala matters relating to the planned Woolgoolga to Ballina Pacific Highway upgrade, to offer our services. We did not receive a reply to our offer and our records show that no approach for this report was made from her office.

It is difficult for the Board and CEO of the AKF to not take the view that this new Koala Strategy is a smokescreen created to cover up the fact that recent changes to Government policies – on land clearing, SEPP 44, etc. - have critically reduced protections for Koalas in NSW. There has been an obvious trend developing in NSW. Laws to protect Koalas and Koala habitat are being weakened to pave the way for more and more development. We hope we are not correct in this assessment and our CEO, of 28 years standing, is concerned that the extensive public community consultation process currently underway is just a measure to control dissent.

The AKF has watched this trend over our 30 year history and more so since the Federal listing. It is our view that the Federal Government has abrogated its responsibility to provide a Koala Recovery Plan (due to commence following the expiration of the NKCMS in 2014, but here we are in 2017, and we have yet to even sight a draft plan). Two States, Queensland and NSW, perhaps under the auspices of the 'One-Stop Shop approach', continue to release timid policies that meekly step out of the way of development, and lack the power to actually address the key threatening processes.



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Meanwhile Koalas continue to decline. No wonder the Senate Report of 2011 identified that the States were incapable of protecting the Koala.

The AKF holds grave concerns for the NSW Koala Strategy. The AKF predicts that, like every past attempt, it will inevitably prove inadequate for the task unless better mapping and planning is put in place.

As always the AKF offers our scientific expertise, and our mapping will be available via our data licensing partner, OMNILINK.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Doug Kerlin". The signature is fluid and cursive, with the first name "Doug" and last name "Kerlin" clearly distinguishable.

Dr. Douglas Kerlin
Chief Ecologist
Australian Koala Foundation



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saving the koala and its habitat.

The Hon. Mike Baird, MP
Premier of New South Wales
GPO Box 5341
SYDNEY NSW 2001
29 June 2015

Dear Premier,

RE: Vegetation Mapping in New South Wales

On behalf of the Australian Koala Foundation (AKF) I am writing to urge you to consider the extremely poor state of vegetation mapping in NSW compared to other States, and ask you to give direction and establish dialogue with AKF and others about rectifying this important lack of information.

It is generally acknowledged throughout the user community (government, developer and mining industries, community groups etc.) that the scale of vegetation mapping in NSW is too broad, and that huge areas have not even been mapped, yet this data purports to support policy on some of the more significant sustainability and environment decisions taken by governments. The consequences of the lack of data can sometimes be dire, e.g. the economic, environmental and political fallout from the Regional Forestry Agreements (RFA) which relied on inadequate data for resource determination and allocation. At the moment it is 'like trying to find your way around Sydney using a map of Australia'.

Queensland, South Australia and Victoria have consistent State-wide vegetation coverage which has enabled AKF to complete Koala Habitat Atlases (KHAs) for the entire range of the Koala in these States. AKF has obtained and examined over 400 individual datasets in NSW to assess their utility to produce Koala habitat maps, however even where mapping is available it is generally not fit for the task.

This is not just about Koalas; I imagine industry would share my concerns.

It really beggars belief that a government can believe it is making informed decisions (especially planning and resource-based decisions) based on such inadequate knowledge about its biggest asset – the natural environment. It is incumbent on this generation to ensure that the natural environment is passed onto future generations in a sustainable state, and this is just not possible with current knowledge. A thorough

No Tree No Me

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and comprehensive mapping program should be the benchmark for monitoring our native vegetation into the future.

I seek your urgent response.

Yours faithfully,

Deborah Tabart OAM

Deborah Tabart OAM

Chief Executive Officer

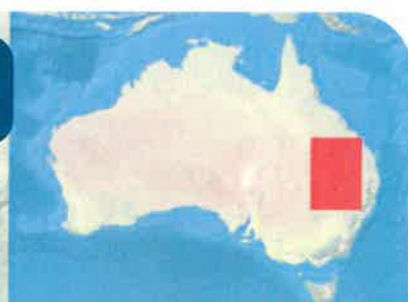
*cc. Minister Greg Hunt
Federal Environment
Minister*



Gunnedah: Climate Change and You

Every Australian loves a sunburnt country, but we should be worried about the future of its beautiful Eastern Coast, a biodiversity hotspot, where the impact of climate change is set to change the way we live dramatically.

2016-2050



Charleville

28.5°C
455.3mm

Roma

27.9°C
546.2mm

675 km

520 km

Gunnedah

25.3°C
616.1mm

Here you can see the climate in Gunnedah in 2050 is projected to be similar to that seen in Charleville and Roma today. To give this change in climate perspective Charleville and Roma have a dry subtropical climate.

What's going to happen?

Change will be subtle at first as it has been for the past century; however, the rate of change is increasing.

Have you noticed any changes? In Gunnedah you can expect to experience:

- Higher average maximum temperature.
- Fewer cold nights.
- Higher autumn rainfall.
- Lower winter rainfall.
- Change in local species.

What is the Worst Case Scenario?

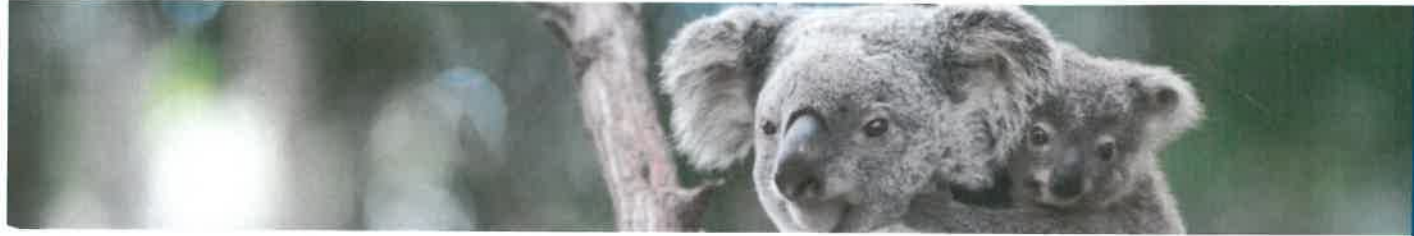
There are three categories (**LOW, MED & HIGH**) that represent the differing future concentrations of greenhouse gas in the atmosphere. As you know, greenhouse gasses increase the oven-like effect in the atmosphere.

TEMPERATURE (°C).

Year	LOW	MED	HIGH
2016	25.3	25.3	25.3
2030	26.8	26.8	28.3
2050	28.3	28.3	28.3

RAINFALL (mm/in")

Year	LOW	MED	HIGH
2016	622/24.5	622/24.5	622/24.5
2030	529/20.8	529/20.8	466/18.4
2050	466/18.4	466/18.4	466/18.4
2090	466/18.4	466/18.4	466/18.4



I love a sunburnt country.

Expectations for the years to come

Tree death due to water stress mainly River Red Gums.

Increase in erosion on river banks will cause loss of structural support by River Red Gums.

Dry waterways will be more common due to lower rainfall as well as stagnant water and lower water quality.

Shift to a drought-tolerant landscape such as the Brigalow Belt, West of the Nandewar Range.

Fewer Koalas Local wildlife you are accustomed to seeing will change in assemblage.

What does this mean for Australia's most iconic animal, the Koala?

Koalas love River Red Gums. The high water content gives them longer between drinks and allows them to stay up high for extended periods of time, away from danger.

Along with the River Red Gum, Blakely's Red Gum, another Koala favourite, will potentially die off as Australia's arid centre pushes east. This will favour the more adapted Dirty Gum and Poplar Box changing the makeup of the local ecosystem dramatically.

This means fewer large, mature trees as well as less Koala food tree types in general. **The possible extinction of a national icon is a very real threat.**

Gunnedah in the future

According to the CSIRO you can expect the nature of your surrounding climate, and ecosystem type, to 'travel' northward into areas with lower rainfall and higher levels of sun exposure, increasing the rate of evaporation. As you probably know, this is a potentially devastating blow to the welfare of all Australians as the Liverpool plains have high environmental and agricultural value.

What does this mean for the people and farmers of the Gunnedah area?

Reduced rainfall will mean farmers will have to adapt to plants losing water at a faster rate (evapotranspiration) due to increased temperatures alongside reduced rainfall. Farmers may then have to move away from more profitable, thirsty crops, such as cotton, to more durable, lower yielding crops.

Planning for posterity

Planting food trees for koalas that would suit the future climate, such as Dirty Gums, would be an apt start to planning for the tree death that may occur.

Although a touchy subject, reduced rainfall can have an indirect social impact in regards to mental health. This then has impacts on doctors and rebates on medicine for such ailments. **The effects of climate change are far reaching.** Through history, Australian's have had to be mentally and physically resilient, but we still have our limits.

Australia is as beautiful as it is harsh. **Climate change, alongside the boom-bust nature of the ecosystem, looks to further increase aridity in areas that are currently productive.**