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**Re: Inquiry into climate change and biodiversity.**

Dear Committee,

We welcome the opportunity to provide information to the inquiry and comments on the terms of reference below.

**How climate change impacts on biodiversity may flow on to affect human communities and the economy:**

Protecting biodiversity is an essential part of tackling human-induced climate change. Australia's ecosystems can provide permanent carbon stocks that can slow global warming, and protecting biodiversity has been described as the quickest and easiest solution to cutting emissions and stopping climate change in Australia.

The majority of our terrestrial ecological communities and threatened species are found in Australia's native forests. From a global perspective, Australian forests have a high level of biodiversity, particularly in terms of invertebrates, tree and shrub species, and hollow-dependent mammals and birds.

Loss of ecosystem health is part of the symptom of climate change and also part of the solution. Natural vegetation (as opposed to planted tree crops) has the capacity to capture and hold carbon in safe storage for centuries, thereby moderating climate through shading soil and safely storing atmospheric carbon. Natural vegetation cover also reduces soil loss, filters rainwater, creates cloud making nuclei, acts as water

pumps to shift ground water to rain clouds, and provides critical habitat for so much of our native wildlife.

### **Species loss**

Australia has in the last 200 years been responsible for half of the world's mammal extinctions. Under National legislation 1,667 species are listed as threatened. A further 103 are listed as extinct. These figures are very conservative due to a lack of funds to work on surveys and research into native flora and fauna. The situation is likely to be much worse and despite acknowledgments by various authorities that we need to conserve rare species, the situation is worsening and is now critical. This may not be having obvious effects on humans at the moment, but will impact indirectly through a general weakening of the natural ecosystem. A robust and healthy ecosystem is the basis for so much of our dependence on agriculture, soils and water. The obvious spin-offs include natural pollinators and pest control services, good water supplies, healthy soils and rivers to name a few.

Much of our biodiversity which makes up our various ecosystems is seriously threatened. In NSW, between 2001 and 2009, the number of threatened animal species increased by 21% in that time to reach 353 species, the number of threatened plant species grew by 23% to 663 species and the number of endangered ecological communities grew by 115% so that there were 101 threatened communities in 2009. In Victoria 30% of the states native animals are extinct or threatened with extinction (CSIRO). A staggering 44% of plants are extinct or threatened (CSIRO) and over one third of all species that are at risk from climate change are Victorian.

### **Fire in a drying landscape**

Extreme weather events will create more severe droughts, water shortages, and cause increased and more severe fires. Sadly, in states like Victoria, the major response to this threat of bushfires is to intentionally burn vast areas of intact forests and woodlands as part of a fire reduction strategy. This has not been proven to reduce fire severity, although it has been shown that it reduces the number of hollow bearing trees – the loss of which is listed as a threatening process under Victoria's Flora and Fauna Guarantee Act along with unnatural frequencies of burns. Prescribed burning has also been shown to have very little if any impact on slowing fires during severe climatic conditions as we have seen in the last decade. There is however, evidence that where natural forests were logged, or where plantations had been established, the fires were more ferocious. More frequent fires will kill off regenerating eucalypts and other plant species which require many years (10-20) before they can produce viable seed. This will cause 'deserts' of non-descript scrub where once very productive and diverse forests once stood. Logging alters, simplifies and dries out a once more fire resistant landscape.

Bushfires are responsible for much less carbon pollution per ha than clearfell logging. A mixed species fire affected forest will begin regenerating immediately from epicormic shoots and rhizomes. Tree ferns begin to resprout within days, the soil is left intact and the bulk of stored carbon is retained in living trunks and fire

adapted understory. The clearfelling of a forest renders almost the entire forest to stumps and churned earth which is then given an intensely hot management burn to 'sterilise' the site. The two cannot be compared.

Alpine areas will become warmer and become more vulnerable to exotic weed and pest animal invasions as well as lower snowfall averages. Particular species of birds or mammals, often require specific understory species or even certain fungi, to survive. These relationships, so critical to biodiversity, are seldom studied and rarely monitored. The 2003 fires in eastern Victoria were overlapped in some areas by the 2006 fires. Extensive areas of Mountain Ash forest regrowth were destroyed. The best water catchments are often protected, largely old, long-unburnt Mountain Ash forests.

With climate change, logging and prescribed burns, eucalypt forests that surround rainforests are likely to become drier, leaving them more prone to fire. Professor David Lindenmayer, expert in Forest Wildlife Management and Nature Conservation, co-authored a research paper in 2009 [\*Effects of logging on fire regimes in moist forests\*](#). This paper is a review of research from around the world, and indicates that logging practices elevate bushfire risks in wet forests. Contrary to claims by some commentators (e.g., National Association of Forest Industries), industrial logging is likely to make some kinds of forests more, not less, prone to an increased probability of ignition and increased fire severity and/or fire frequency.

Just one bushfire can effectively destroy a rainforest, Once these remnant forests are lost from wetter gullies and along streams, they may never return. The old growth, dense and damp understory vegetation, multi-aged strata and the rainforest vegetation in gullies and wetter southern slopes are natural fire breaks during bushfires.

### **Pest plants and animals**

A warmer climate will most likely see an increase in pests, fungal and bacterial diseases in crops as well as humans. We are yet to see new viruses and parasites thriving as a result of altered climatic conditions.

Invasive weeds and animals are generally highly adaptable. Many of Australia's flora and fauna have evolved to be site and environment specific. Pest animals like pigs, deer, horses, foxes and cats are the main threat to our wildlife and the second biggest threat to rivers, streams and wetlands. With an altering climate, these threats will escalate and our natural systems will find it more difficult to cope with these added impacts.

### **Forests**

The landscapes occupied by Australian forests experience the strongest climatic gradients in the continent. Climate is the prime determinant of the taxonomic composition, vegetation structure and productivity of forest ecosystems.<sup>1</sup>

Land clearing, prescribed burning, bushfires, feral invasion and logging have taken a significant toll on Australia's biodiversity. Forests in Australia now represent around 5% of our landmass. Half of the original forests have been cleared and much of the remaining forests are extremely degraded. Years of clearfelling for the logging industry has rendered large parts of our most productive, healthy and biodiverse forests as little more than young, depauperate, simplified forests that expedite industrial logging. This management effectively destroys biodiversity.

The soil is an integral component of the forest ecosystem as the soil profile co-evolves *in situ* with the vegetation and micro-organisms, and soils are also severely degraded in forested and previously forested areas. The complexities of the underground ecosystem is as intricate as that above the ground. Unseen by most, it is difficult for them to gain the recognition as also being very biodiverse in their components. Soil fungi has an extremely significant role in capturing the carbon of the 'duff' layer on top of the soil. Bacteria is also important but plays a slightly lesser role in converting leaf litter and general detritus into soil stored carbon.

These plus the microorganisms that help ensure healthy systems operate in the soil to allow it to capture and store carbon, have not evolved to cope with, let alone even survive logging with heavy machinery, soil compaction, intense post-logging incineration and then full exposure to light, heat, and frost. Healthy soils are also a very important part of carbon capture and storage.

Forest degradation and land clearing have contributed markedly to Australia's GHG emissions. Logging and clearing in Australia contributes around 18-20% of Australia's GHG emissions – more than the whole transport sector.<sup>2</sup> The logging and woodchipping industry in Australia alone contributes an estimated 9% to Australia's GHG emissions. Climate damaging emissions are released when logged; an estimated 95-97% of a forest's entire biomass is bulldozed and burnt on site or taken to be woodchipped for short-life products. As well there is carbon loss from soil disturbance, which when added to the carbon emitted during the logging operations, transport and processing makes the native forest logging industry one of Australia's major atmospheric polluters. This is a major player in contributing to pollution and out of proportion to its very small value within the Australian economy.

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[http://www.parliament.nsw.gov.au/Prod/parlment/publications.nsf/0/5ED2A6066A06121ECA257839007C6E6B/\\$File/Environment+Paper.pdf](http://www.parliament.nsw.gov.au/Prod/parlment/publications.nsf/0/5ED2A6066A06121ECA257839007C6E6B/$File/Environment+Paper.pdf)

<sup>2</sup> Avoidable emissions (not net emissions) from clearing and logging native forests in Australia exceed those from transport (91 Mt CO<sub>2</sub>-e in 2006 compared with 79 Mt CO<sub>2</sub>-e for transport).

"Emissions totalling at least 100 Mt CO<sub>2</sub>-e per annum (18% of Australia's net 2006 emissions) could be avoided immediately if native forests were protected from clearing and logging. Protected forests would continue to contribute additionally by sequestering carbon as they regrow to maturity." <sup>3</sup>

A diversity of species increases the ability of ecosystems to properly function, like hold soils together, maintain soil fertility, deliver clean water to streams and rivers, cycle nutrients, pollinate plants (including crops), buffer against pests and diseases and resist invasive species – these are sometimes called 'ecosystem functions' or 'ecosystem services'. A loss of species could reduce this ability, particularly if environmental conditions are changing rapidly at the same time. It is therefore possible that as the climate changes and as species are eliminated from an area we will see a change in some ecosystem functions; this could mean more land degradation, changes in agricultural productivity and a reduction in the quality of water delivered to human populations. <sup>5</sup>

### **An assessment of whether current governance arrangements are well placed to deal with the challenges of conserving biodiversity in a changing climate:**

Australian governance arrangements have not dealt with the challenges of conserving biodiversity to date and will be inadequate to address increased pressures brought on by a changing climate.

On the 10th anniversary of the Convention on Biological Diversity, in 2002, Australia and other parties adopted the 2010 Biodiversity Target: to reduce significantly the rate of biodiversity loss at global, regional and national levels. Australia failed to achieve its 2010 Biodiversity Target. Australia's Terrestrial Biodiversity Assessment 2008 found that existing threats to biodiversity are rapidly escalating and that climate change will compound these pressures further. It is now well documented that Australia could face a biological catastrophe.

### **The EPBC Act and the Failure of RFA's to protect biodiversity –**

Regional Forest Agreements (RFAs) were introduced by Commonwealth and State governments to create a new regulatory framework for the logging of Australia's native forests. RFAs are 20 year agreements between the Commonwealth and the State governments, which effectively hand over the Commonwealth's indirect power

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[http://www.greeninstitute.com.au/images/uploads/Biocarbon\\_biodiversity\\_and\\_climate\\_WP3\\_v.1.pdf](http://www.greeninstitute.com.au/images/uploads/Biocarbon_biodiversity_and_climate_WP3_v.1.pdf)

<sup>4</sup> <http://www.science.org.au/nova/091/091key.htm>

<sup>5</sup> <http://www.science.org.au/nova/091/091key.htm>

to control forests to the States. These have been extremely controversial ever since the first of these were signed off in 1997, and have been shown to have not honoured their commitments to conservation. The agreements have instead increased the rate of forest destruction and conversion with negligible accountability. RFAs were engineered/tailored to suit the demands of the logging and export woodchip industries, not for protecting conservation values.

However, Commonwealth and State Governments committed themselves to establishing a 'world class forest reserve system' which will 'safeguard biodiversity, old growth, wilderness and other natural and cultural values of forests, and ensure that forests outside the reserve system would be managed to ensure 'long term sustainability and contribute to the conservation of these natural and cultural values'.<sup>6</sup>

In practice such values have been marginalised in favour of granting resource security to a politically influential logging (and particularly woodchipping) industry which exploits our forests for commercial gain.

In 2000 there was a major overhaul and consolidation of Commonwealth environmental legislation. As a result, the main Commonwealth Act regulating the environment is the Environment Protection and Biodiversity Conservation Act 1999 and export controls no longer apply to the native forest logging industry. However, it is the Regional Forest Agreements which have the most impact on Australia's forests.

Many concerns have been raised about the flawed scientific basis of the reserve system. Increased destruction, not protection, of forest ecosystems appears to be an alarming result of the RFAs. In many instances reserves are either too small, or too spatially fragmented, to provide an effective habitat for many species.

The impact on animals such as possums, gliders and owls has been immense. These species rely on hollows, which only form in mature trees of at least 120-200 years old, for their survival. Where a forest is regularly logged these species are unable to maintain their population and go into decline. There is clear evidence of declining populations of these animals, and even localised extinctions.<sup>7</sup> Water quality and quantity is also reduced by the logging of catchments as the massive disturbance leads to greater erosion and entry of sediment into streams.

The 'Kuzera curve' is a well accepted illustration of what happens when a forested catchment is logged. The fast growing eucalypts suck up vast amounts of water, depriving the creeks, rivers and reservoirs downstream of natural rainfall flows. This has been demonstrated to be 50% of a catchment's normal flow, and as trees mature and their growth spurt slows, they slowly allow rainfall runoff back into waterways. However this can take 120-150 years. When forests become part of a

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<sup>6</sup> (<http://www.affa.gov.au/agfor/forests/policy/rfa.html>).

<sup>7</sup> <http://www.wilderness.org/projects/forests/extinctions>

logging cycle every 30-50-70 years, it is effectively sentencing precious water catchments to suffer permanent and severe drought. Again, this is a loss out of all proportion to the benefit. We have a massive loss of the most basic of life's essentials for people and nature, for the sole benefit of an extremely small industry.

Most forestry operations on land that is covered by an RFA are not subject to the environmental impact assessment provisions in the Environment Protection and Biodiversity Conservation Act 1999 . This means that even if RFA forestry operations will have a significant impact on listed threatened species or ecological communities, in most cases no environmental impact assessment under Commonwealth legislation will be required. This appears to be a deliberate concoction of legislation which was to benefit the logging industry. It is even more unjustified now and extremely obsolete. This must be altered as a matter of urgency if the government is serious about protecting our biodiversity.

AFCA asks the government to amend the Regional Forest Agreements and the EPBC Act to enable the protection of valuable public native forests from logging. AFCA also supports the allocation of funds to enable protection and ongoing management of forests as one of the cheapest and most effective federal government investments in climate mitigation.

**Strategies to enhance climate change adaptation, including promoting resilience in ecosystems and human communities & Mechanisms to enhance community engagement:**

The most obvious way to help climate-proof native species is to enlarge, protect and connect their existing habitat as well as restoration of degraded habitat where necessary to ensure not just their survival but ability to breed and flourish. Habitat restoration and protection has two very direct outcomes for both biodiversity and climate moderation. Specifically the Australian Government must act in regards to:

**1. Implementing a system of accurate carbon accounting in natural ecosystems.**

This must recognise the role that forests play in climate moderation as carbon capture and storage systems as well as providing ground shade and as a pump in the planet's water cycle loop.

Current climate change policy does not adequately recognise the important role of natural ecosystems in climate change mitigation.

Current Australian greenhouse gas accounts should be upgraded and recalibrated to reflect the true carbon values of native forests. New scientifically measured carbon storage assessments are needed and research to support that recalibration should be funded and incorporated into the National Carbon Accounting System.

To be credible locally and internationally, the Australian Government must acknowledge the critical importance of safeguarding biodiversity as part of Australia's climate change response. Australia must commit to correspondingly urgent action to address the systemic drivers of biodiversity loss. In so doing, due recognition should be given both to the threat that global warming poses to biodiversity and ecosystems and to the vital role these have in mitigating dangerous climate change including by permanently storing carbon.

In its climate policies the Commonwealth should clarify the distinction between native forests and plantations, because their respective optimal uses differ. Native forests are complex ecosystems, resilient to extreme weather events and pests and diseases, they store more carbon than plantations and they are safer and more secure and substantial natural carbon stores. Plantations are essentially agricultural crops that are planted for the purpose of being harvested to produce wood and paper products. They store less carbon than natural forests and are less resilient. They are best suited for short term cropping rotations to provide wood and paper needs. Forests are best suited for carbon storage, water providers, soil stabilisers and as biodiversity storehouses.

## **2. The legislative protection of Australia's biodiverse native forests;**

AFCA believes that only a total exit from all native forest logging and tightening current planning will bring about the kinds of outcomes that are now required to protect biodiversity.

The pivotal role of national parks in saving Australian wildlife has been highlighted in a ground-breaking new study by WWF and researchers from The University of Queensland. Of the alternate conservation activities examined in the study - including less secure forms of protected areas, number of natural resource management activities and even the number of threatened species recovery actions applied - none were significantly linked to stable or increasing populations of threatened species.

The study suggests land-clearing laws are also important. The three states with the highest levels of land clearing - Queensland, NSW and Tasmania - also have the most threatened species in decline. Co-author Dr Taylor said "If you want a sure bet to save endangered species, secure their habitat and put it in a national park, or stop habitat destruction through legislation. Anything else is risky,"<sup>8</sup>

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<sup>8</sup> The study What works for threatened species recovery? An empirical evaluation for Australia is published in the international science journal Biodiversity and Conservation.....

Dr Martin Taylor, WWF's protected areas scientist, co-authored the report along with Paul Sattler, former chief planner for Queensland Parks Service and University of Queensland researchers Professor Hugh Possingham, Dr Richard Fuller, Dr James Watson and Ms Megan Evans.

National Parks and secure legislated reserve systems will only protect biodiversity in an age of climate insecurity if these areas are enlarged. This is the best and most robust insurance policy for our flora and fauna. It is especially necessary for those top of the food chain hunters such as quolls and owls. These can require 3-5,000 ha a pair. The accepted number to insure healthy genetic variation and ability to withstand diseases and natural disasters is at least 1000 individuals.

Parks must also be linked with very generous connectivity corridors to allow species to move both in altitude and latitude as the climate changes. If parks are islands in a sea of altered landscapes, they will simply become 'death traps'. The management of adjoining native vegetation must also be managed to compliment the Park's main purpose – that of nature conservation.

The loss of a small component of our biodiversity is like the loss of a small component in a sophisticated piece of electronic equipment. On its own it may seem insignificant, yet we still have no thorough understanding of, for example - a particular insect, which is essential for pollination of a co-evolved plant, which flowers and nectar are essential for the seasonal food supply of a co-evolved bird or bat, which in turn is necessary to spread the seed of certain native plant. These many small chains connect into huge labyrinthine interdependent systems within systems. Most of the workings of our natural ecosystems are based on the unseen. It is these components that we must accommodate as well as the more obvious mega species.

The environment portfolio needs a Green Carbon Fund and a carbon management authority to administer it, using a percentage of the revenues from carbon pricing. This Fund would provide the means to protect and rehabilitate degraded forest ecosystems.

Schemes to assess the damage to native vegetation from mining and other developments will be crucial in helping to bring about the kinds of outcomes that are urgently required to protect biodiversity.

### **3. A significant funding package for a transition of the wood and paper products industry away from native forests in Australia;**

Both the native forest sector and the hardwood plantation sector are in crisis financially. This crisis can best be resolved by completing the transition out of native forests into plantations for virtually all of Australia's domestic and export needs. The transition can be made quickly and cheaply within the context of developing climate policies.

,Dr Judith Ajani, economist at the Fenner School of the Environment and Society at the Australian National University, calls for an end to government subsidies

for the plantation timber industry and allow market forces to determine demand and supply thereby allowing better use of the land and to end the “forest wars.”

The forestry industry is now well placed to move entirely out of native forest logging and use plantations for virtually all Australia’s domestic and export needs. This would be of enormous benefit to the environment, but it requires Governments to make policy and institutional changes.

#### SUMMARY POINTS

Australia is mega diverse yet has the greatest loss of species and for a developed nation, still a great capacity to lose even more.

- The impacts of climate change and with it, increasing periods of drought severe weather events and increased forest fires will create a positive feedback loop on climate degradation. Warming or altered climate will see more diseases and pest plants and animals creating more stresses on our biodiversity and agriculture.
- Forests are arks for biodiversity. Natural native forests store vast amounts of carbon. They are cost free, effective and immediate carbon stores.
- Forest degradation and deforestation is responsible for almost 20% of Australia’s GHG emissions.
- Native forests are being systematically converted to simplified, commercial and fire-prone wood crops. Prescribed burns are unproven as a fire mitigation practice but make forests more fire prone and destroy carbon stores and processes. Losses of carbon and biodiversity from logging is out of proportion to the very small benefits to this one small industry
- Australia’s governance arrangements have not dealt with ongoing biodiversity loss. RFAs and EPBC Act have worked against environmental protection. The Commonwealth Government must overhaul the EPBC Act as recommended in recent review.
- AFCA calls upon the government to implement a transition logging out of native forests – using forests as carbon stores and plantations as wood providers.
- New reserves are the best way to protect biodiversity and mitigate climate extremes. These must be enlarged, well connected and well funded.
- A system of accurate carbon accounting is needed that includes the natural environment and forests.
- Adequate funding is needed to help bring about decent forest protection and transition to plantations.

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