Submission No 317

INQUIRY INTO MANAGEMENT OF PUBLIC LAND IN NEW SOUTH WALES

Organisation: The Colong Foundation for Wilderness Ltd

Name: Mr Keith Muir

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The Colong Foundation for Wilderness believes that any proposed undertaking of multiple use management for the exploitation of natural resources in national parks and reserves would defeat the nature conservation purpose of the reservation of these areas.

Instead of exploiting its national parks and reserves, society must continue to encourage sustainable multiple use of farms, forests and Crown reserves where nature conservation goes hand in hand with primary production and conservation management practice.

Thursday 30 August, 2012

INQUIRY INTO THE MANAGEMENT OF PUBLIC LAND IN NEW SOUTH WALES

General Purpose Standing Committee No. 5
Parliament House
Macquarie St
Sydney NSW 2000

CONTENTS

ALL TERMS OF REFERENCE

This Upper House Inquiry will favour the critics of national parks and sustainable land management practices

This inquiry seeks to question how society has preserved certain parts of the natural environment, whether in some cases it should be preserved, or whether it should instead be exploited, even while being set aside for conservation. This inquiry appears to be based upon the presumption that nature is but a resource for exploitation; that nature has little intrinsic value; and also too many rights.

The "pre-Copernican" view that the environment revolves around us, even to the extent that climate change and other forms of environmental degradation are denied, is dangerous nonsense.

Sensible citizens who would oppose the application of a "pre-Copernican" view of the natural environment are unlikely to make a submission to this Inquiry. Many find the terms of reference of this inquiry abhorrent. The vast majority of visitors and users of public lands, who are content with existing arrangements, also are unlikely to comment.

In the particular case of parks and reserve management, there are always interests who would like to get access to the parks either for resources or other commercial opportunities, and the tourist industry is no exception. These public land user groups which include park visitor groups, such as horse riders and off-road vehicle users, deny that their particular forms of use or access has or would have any significant adverse impacts on parks and reserves.

Those groups, who would gain from implementation of Government policies for further access and exploitation of public lands, including hunting, fishing, logging, stock grazing, vehicle and horse riding have an incentive to make detailed submissions to this Inquiry.

Another key aspect of this Inquiry appears to be the creation of political momentum that would change public land management practice in ways contrary to the interests of nature conservation.

The Federal Environment Minister, the Hon Tony Burke addressing the Sydney Institute on 20th July 2011 said 'it isn't new to have controversy over whether or not new lands are put into National Parks. That's actually pretty standard. But an area, once protected, usually has the principle apply that there shall be "no backward steps". New areas for National Parks frequently have existing commercial uses that are phased out or scaled back over time. But once those commercial uses end we don't talk about going back on it.'

This Inquiry seeks to do nothing less than to collapse the long-standing political consensus over management of national parks, wilderness areas and nature reserves. This inquiry is about reversing the nature conservation gains on public land.

The terms of reference and the membership of the committee are biased toward findings that will confirm greater resource exploitation of public lands set aside for conservation and identify faults with the reservation processes of particular parks and reserves in NSW. Many

citizen conservationists from all political backgrounds are aware of the pre-conceived intent of this Inquiry and will have nothing to do with the Committee's processes.

The Colong Foundation asks that these views of the silent majority who support the long-standing political consensus on national park management be noted.

INTRODUCTION

In his book *Sustainability* (2006), Alex Colley explains that humanity, like all forms of life, is entirely dependent on natural resources. If our resource use exceeds regeneration, then society will decline. Australian society has generally failed to replenish its natural resources, but we have succeeded to preserve to some extent parts of the natural environment for the future.

In this submission the Colong Foundation for Wilderness argues that any proposed undertaking of multiple use management for the exploitation of natural resources in national parks and reserves would defeat the nature conservation purpose of the reservation of these areas.

Instead of exploiting its national parks and reserves, society must continue to encourage sustainable multiple use of farms, forests and Crown reserves where nature conservation goes hand in hand with primary production and conservation management practice. For example, tree plantations on grazing land should be facilitated to arrest soil salinity and erosion. The 15-20 million trees estimated to be required would also provide ample timber for prosperity and to a small extent help to slow climate change.

While the multiple use paradigm is an appropriate approach to land resource conservation and management for our State Forests and Crown reserves, in national parks, however, it would defeat the purpose of setting lands aside from development for nature.

On state and regional levels, national parks, nature reserves and wilderness areas occupy one end of a land use spectrum that ranges from Central Business Districts and heavy industry such as Wollongong's steel works to vast wilderness areas like the Wollemi.

While it is relatively easy to increase the intensity of development of a natural area within that land use spectrum, by land clearing for example, it is politically and ecologically very difficult to reduce it.

It is impossible to convert an urban area into a wilderness but not to change wilderness into agricultural land. The conversion of parks and reserves into multiple use zones redefines protected areas for the benefit of narrow sectional interests, against the broader public interest of nature conservation.

The claim that national park should not be the default model for the reservation of public land would create reserves under the *National Parks and Wildlife Act, 1974* contrary to the primary heritage conservation purposes of the current Act. The purposes of resources extraction and use are hostile to nature conservation in the majority of cases. Compromises have been limited to underground mining in the case of state conservation area designation

and high use visitation in the case of the regional park designation. The proposals put forward by Mr Max Rheese of the Australian Environment Foundation would be compatible with the current legislation regulating the management of Crown Lands and State Forests where natural resource conservation is undertaken within a paradigm of resource exploitation. Placing such activities as logging and stock grazing in parks, however, would make no sense administratively as park officers are not foresters or graziers, nor should they have such duties. It would be more honest to revoke a national park than to degrade the currency of the reservation.

National Parks are the very last places on earth where nature-centred values prevail over use-centred perspectives. They remain places for nature conservation, where natural beauty and ecological integrity are valued above profit and use. Such a land management practice is the most practical approach to nature conservation for our urban-industrial society. Without wilderness, our urban-industrial culture becomes an inescapable prison without boundaries across NSW.

The continued expansion of the NSW economy will place ever more demands on natural resources, produced from once natural lands that were cleared for farming or other forms of exploitation. It follows that the pressure on remaining natural areas is also ever increasing, which is why national parks, land clearing laws and other natural resource conservation measures are essential bulwarks to hold back these economic pressures.

Unprotected natural areas are being constantly further exploited, endangering or causing the extinction of many species. In this context, national parks, nature reserves and wilderness are protected under law as the last bastions for nature. These areas are our bequest to future generations. Once we begin to exploit these precious areas, society is set upon the downward spiral into decline. It is the environmental equivalent of selling cheap Government Bonds to gain cash flow; it heralds decline.

Wilderness is the word used by the Colong Foundation to describe the larger remnants of the natural environment. It is generally accepted that the minimum area of such remnants is about 5,000 hectares. The reservation of smaller remnants is very desirable, and sometimes essential for the preservation of some threatened species, ecological communities and outstanding scenery, but the smaller areas, though they preserve flora and some fauna, are more vulnerable to the intrusion of both human and feral predators. The margins of wilderness areas are equally vulnerable, as the Nattai at Hilltop is from the Southern Highland Shooting Complex, but most wilderness areas afford good, healthy habitats for native wildlife.

The only secure habitat is a fenced area within which all feral wildlife has been eliminated and the fence is adequately maintained. As the troubles of Earth Sanctuaries prove, this is beyond the capacity of private enterprise, and an outlay not favoured by governments. A more recent example from July this year is the predator fence constructed by volunteers around Queensland's Currawinya National Park. It was damaged by the recent floods allowing feral cats to nearly wipe out the bilbies protected inside.

The protection afforded to native flora and fauna in national parks and wilderness is the best practical alternative to intensive wildlife management methods that rely on uncertain, much greater inputs of capital and human resources.

National parks are the very best idea the United States of America ever had, although the Colong Foundation believes our Royal National Park was the first. Dr Geoff Mosley is preparing a World Heritage nomination proposal for this park that will rest on this argument.

For 44 years the Colong Foundation has successfully campaigned for wilderness. It has been supported by the public and by the NSW Parliament. The Inquiry's terms of reference imply that there is something deficient in the funding and management of wilderness, national parks and reserves. That may be so, but it is the best form of nature conservation management for public land.

Vast areas of Australia are subject to serious environmental degradation. Most of Australia's cropping soils have probably lost about half their original topsoil organic matter. Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) estimates that land degradation has cost Australian's about $1 billion annually. In temperate ecosystems, less than 2% of the original grasslands remain. It is estimated that Australia gains around 20 new pests or diseases each year. Some well-known examples include cane toads, rabbits, willows and, more recently, black striped mussels and red fire ants.

The ecological footprint of NSW residents increased from 6.35 hectares per capita in 1998–99 to 7.02 ha in 2003–04.

At the Kyoto Conference 31 developed nations agreed to limit their emissions by the year 2012 to targets below the levels of 1990. Australia, Ireland and Norway were allowed to increase their emissions. The targets could, however, be increased if additional emissions were offset by the establishment of "carbon sinks", which Australia was to achieve by stopping land clearing.

The NSW Government may be about to rip up these arrangements, established by the Howard Government and confirmed by Opposition Leader Tony Abbott through his support for Kyoto-2. The current debate over the Federal Government's recently deployed tax measures to reduce carbon emissions also occurs as if the Kyoto debate had never happened!

Very little our society does is ecologically sustainable. Society needs, we all need to continue to make greater efforts to restructure its unsustainable systems to address the pressing environmental imperatives that face us.

IMPROVED FUNDING FOR PROTECTED AREAS

Improved management of parks and reserves should be funded by the elimination of public expenditure on environmentally destructive activities, like logging native forests, particularly on public lands, and the imposition of taxes on polluting activities, like the carbon tax. Such mechanisms enable society to restructure towards ecological sustainability, the sustainability upon which our economic (pre-Copernican) lives depend. When such reform is undertaken during times of economic wellbeing, those who are disadvantaged can be more than adequately compensated, just as the compensation that accompanies the carbon tax is being provided for low and middle income earners.

By devoting a realistic amount of the government income created through reducing environmental destruction and pollution to nature conservation, national parks could have an enhanced income stream. It would also build a stronger relationship between the tax-payer and the national park estate.

These two mechanisms (elimination of subsidies for environmental destruction and introduction of pollution taxes) would ensure that the economic surplus gained by depleting or degrading natural resources fairly compensates the natural environment.

TERMS OF REFERENCE 1

RIVER RED GUM PARKS

River Red Gum Parks were created in the Southern Riverina Subregion where there are very few national parks and 80 per cent of the land has been cleared. This community and Region deserves its share of national parks. The remaining forests and woodlands in this landscape support many endangered species. The 63 vertebrate fauna species listed as threatened in this Region rightly deserve protection in national parks where the management priority is nature conservation.

The reservation of River Red Gum Forests in the Southern Riverina secured these forests for nature conservation, as well as for all Australians to enjoy. On May 19, 2010 a new 107,000 hectare river red gum reserve system was created. The former Environment Minister, Frank Sartor, found an additional $17 million on top of an industry assistance package of $80M to secure a 42,000 hectare Millewa National Park. The Millewa National Park directly adjoins the Barmah National Park in Victoria. Together these national parks protect a 70,000 hectare Ramsar listed wetland area. The wetland provides significant breeding habitat for 18 migratory bird species listed under international agreements with China, Japan and Korea, including the Garganey Teal, Latham's Snipe and the Common Sandpiper.

More than $50M of that financial package was allocated to support timber industry restructuring, a far more generous transitional arrangement than any made previously. To open up these forests to grazing and logging would throw away that government investment in nature conservation.

Recent research provides no evidence of environmental benefits from commercial thinning to River Red Gum forests or woodlands (see **Attachment A**). Very dense stands of River Red Gums are very rare on the Murray River floodplain. Regenerating River Red Gum forests self-thin over time, as they have done for millennia.

Thinning of River Red Gum forests is unlikely to reduce their susceptibility to dieback, as increased water availability through flooding is necessary to reduce dieback.

National Parks are not needed for firewood harvesting. The NSW Red Gum IFOA provides for logging of 17,533 tonnes of residue per annum and an additional 20,000 tonnes of early thinnings in 2012-2013. There is also an extensive Red Gum industry on private land also providing firewood.

Large areas of State Forests are available for domestic firewood collection in the Riverina. More than 35,000 hectares are open in Koondrook-Perricoota State Forest, and additional large areas in Gunbower State Forest in Victoria, plus private lands.

Further, any proposal for grazing in the River Red Gum parks should be rejected due to the significant environmental damage that this activity would cause. Cattle target the two most sensitive ecosystems - wetlands and sandhills. In dry times, cattle move into the wetlands for palatable feed. Cattle cause pugging of the soil, soil erosion and reduction in water quality.

During wet times, cattle move onto the sandhills which are very sensitive and culturally significant areas (frequently containing traditional burial sites) where they again cause erosion and further degradation.

The fire hazards from Silver Wattle and Brush Cherry are not reduced by cattle grazing as these plants are not eaten by cattle. The remaining ground layer of vegetation in River Red Gum forests is generally sparse and doesn't represent a fire risk.

Proposals for Multiple Use in Protected River Red Gums are Flawed

The evidence gathered so far at the hearings held in Deniliquin on August 1st and 2nd has incorrectly applied multiple use of natural resources to a small regional national park estate. The multiple use concept should instead be applied to the 9.7 million hectare Riverina Bioregion as a whole.

As previously stated, multiple use is best applied at the regional level, not to the only land category set aside for nature. To permit multiple use in a national park defeats the nature conservation purpose of its reservation.

The Riverina Bioregion is a very high national conservation priority for the following reasons:

- It is very poorly reserved, with only 1.9% of the bioregion in NSW protected in permanent conservation reserves (CAPAD 2006) prior to the Red Gum and Yanga decisions.
- It has been identified as one of the most highly threatened bioregions in the country by the National Land and Water Resources Audit (NHT 2002), with more than 80% of the subregion along the Murray River having been cleared of native vegetation since 1788 (NSW SOE 2006).
- It has been recognised as one of the highest priority bioregions for new conservation reserves in Australia by the National Reserve System Directions report (NHT 2002, NRMMC 2005).
- It has been subject to very high extinction rates, with at least 16 vertebrate fauna now considered extinct in the region and a further 63 vertebrate fauna species threatened with extinction.

There are only about 115,000 hectares of national park estate in the bioregion that contain River Red Gum forests and woodlands. To achieve the JANIS criteria for reservation of River Red Gum forest and woodland would require the reservation of 200,000 hectares (NRC, Dec 2009, pg 106).

The river red gum reserve system is more than 40% under the JANIS reservation target. The proposals for multiple use should be pursued on other land tenure, not in river red gum national parks that are below the minimum reservation target.

The way forward would be to plant more river red gums through the Carbon Farming Initiative (CFI) that would benefit landholders as well as the environment (the Hon Mark Dreyfus, 17 August 2012 media release). Carbon Farming Initiative (CFI) would benefit landholders as well as the red gum environment.

The Carbon Farming Initiative (CFI) allows farmers and land managers to earn carbon credits by storing carbon or reducing greenhouse gas emissions on the land. These credits can then be sold to people and businesses wishing to offset their emissions.

Programs for carbon storage on farms will result in the price of firewood dropping towards parity with other energy resources.

Several submitters have misrepresented the intrinsic purpose of national parks and also misrepresented the Natural Resources Commission recommendations regarding the appropriate application of forest management principles. Resource extraction, such as thinning, grazing or logging, is not appropriate in a national park.

To my knowledge there is no wilderness in the River Red Gum Forests or Woodlands. These forests would, however, benefit by conservation management through rewilding processes, such as environmental flows that replicate natural flow patterns, pest management to remove exotic plants and animals, and use of fire for environmental outcomes. On the last point, it is clear that most forests and woodlands in NSW have not been subject to frequent (less than 10 year) burns in times before settlement (Benson, J.S. and Redpath, P.A., 1997). Nature-focussed management, not human-focussed management, should remain the foundation of national park management.

It is also nature based management that creates the national park cachet that is worth marketing and tourism promotion. Tourists do not want to be depressed by degraded forests subjected to resource exploitation while on holidays.

Further, Government's create national parks for the protection of biodiversity and natural heritage protection. The tourism is a bonus, not the reason for the park and tourists are attracted to and enjoy the difference.

(See also ToR 3 – logging national parks and reserves and ToR 2 – grazing stock in national parks)

NORTHERN HARDWOOD FORESTS
TERMS OF REFERENCE 1 CONT

Dailan Pugh (2011) cogently argues that native forests have use and non-use values. Both these values need to be taken into account when identifying the costs and benefits to the community from the use of public forests of northern NSW. Use values include timber, water supply, carbon storage, recreation and tourism, all of which are usually mutually compatible except logging. Non-use values include aesthetics, wildlife, ecological function value, option value, existence value and bequest value.

The Inquiry needs to acknowledge that logging of public native forests in NSW does not pay a resource rent to the community as Forests NSW (hardwoods division) is operating at a considerable financial loss to the state government. It also needs to be recognised that costs to Government are escalating and timber volumes declining. The Inquiry needs to identify ways to remove public subsidies granted to the timber industry.

The 2011 submission to the Inquiry into the Australian Forestry Industry by the North East Forest Alliance offers insight into the process of conversion of state forests and crown lands into national parks in the hardwood forests of northern NSW (**Attachment B**).

The process of reservation of the hardwood forests of northern NSW was comprehensive and involved consideration of social and economic impacts. Compensation was paid and an economic transition package provided to permit conservation outcomes.

The 1996 NSW Parliamentary Briefing Paper on the forest reform process concluded that 'Whilst the timber industry has been portrayed as one of conflict, with images of unemployed young people blockading logging machinery the staple diet of the media, the shape and image of the industry is changing. The package of forest reform as announced by the Carr Government during 1995 has received support from many sectors of the industry. Mr Col Dorber of the NSW Forest Products Association, a leading industry association, and the Construction, Forestry, Mining and Energy Union have both supported the reforms.'

Since the forest restructuring process, the costs of logging native hardwood forests in northern NSW have escalated while economic returns have declined.

Opening up national parks to logging would accelerate these trends, as costs would increase due to the presumed prescription of a lower intensity of logging in these areas. All that would be achieved is the destruction of world-class park system to prop up a dying industry. **The future for forestry in Australia lies in plantations, not native forests.**

The level of industry and social compensation set up by the NSW Government under the National Forest Policy (1992) was unlike the Wran Government's rainforest decisions of 1982 and 1984 that phased out rainforest logging. The only transition scheme for the rainforests was established by the NSW Forestry Commission. It was an expensive pine plantation for the Munro and Lever's Grevillea timber mill, a mill that subsequently closed down.

This inquiry should note that the strident opposition to rainforest conservation of the 1970s by the local residents on the NSW north coast has vanished. Jim Somerville (2005)

explains: ‘As one enters Kyogle, the timber town which stood to lose most from the end of logging in the proposed Border Ranges National Park, there is now a large sign – *Welcome to Kyogle, Gateway to the Rainforest*. The proliferation of World Heritage Rainforest signs throughout the district is indicative of the now recognised value of rainforest in tourism promotion.’

The rainforests of the north coast are now in world heritage listed national parks and fondly appreciated by everyone. The native hardwood forests of northern NSW also merit world heritage listing, in recognition of their outstanding universal value.

This year, a Northeast NSW Eucalypt Assessment Project was completed by the National Parks Association of NSW that assessed the world heritage values of these forests (Boudicca Cerese, 2012). It found that the north coast forests have 143 species of eucalypt, of which 43 are endemic and 21 threatened. There are 159 eucalypt forest and woodland communities. Eleven endangered plant communities have a eucalypt component. Eucalypt forests on the north coast provide habitat for 695 vertebrate fauna, including 148 threatened species. There are 3412 native plant species in these forests and 231 of those are threatened species.

In the foreword to this report, Peter Hitchock observed that ‘...increasingly many Australians have come to recognise [eucalypts] as a quintessential part of Australia’s natural heritage... This report provides the first comprehensive case for recognition of the subtropical eucalypt forests of Australia as an important and integral part of the story of eucalypts as World Heritage.’ Given time, the conservation values of the reserved hardwood forests will become as recognised as the rainforests.

(See also ToR 3 – logging national parks and reserves)

TERMS OF REFERENCE 2

The presumption of this term of reference, that lands reserved under the *National Parks and Wildlife Act, 1974* and the *Wilderness Act, 1987* are not managed or poorly managed is incorrect. National parks, nature reserves and wilderness areas are well managed by dedicated staff.

The following remarks are provided to address some of the issues and criticisms that may come up under this term of reference.

PEST SPECIES MANAGEMENT

Pest species are animals (including invertebrates) and plants that have negative environmental, economic and social impacts. In parks, pests may have impacts across the range of park values, including impacts on biodiversity, cultural heritage, catchment and scenic values.

There are very serious vertebrate pest problems across the entire continent. It’s not a problem restricted to national parks. A rational response to this environmental threat requires well-planned and coordinated programs with specific goals of environmental impact

reduction, using effective and humane methods, and with monitoring to assess whether goals are being met.

Pests are among the greatest threats to biodiversity. In New South Wales, by 2007 they had been identified as a threat to 657 of 945 (70%) species, populations and communities listed under the *Threatened Species Conservation Act 1995*; more than any other process except the destruction and disturbance of native vegetation. Minimising the impacts of pests on biodiversity is thus the main objective of the National Parks and Wildlife Group pest management.

Pests can also have significant impacts on the economic values of neighbouring lands. The National Parks and Wildlife Group seeks to address these impacts when setting management priorities and significant resources are committed towards landscape-wide pest programs, including wild dogs (e.g. the Blue Mountains Region - Pest Management Strategy, 2007 provides the only wild dog management in the region).

The National Parks and Wildlife Group's targeted weed programs have been successful in removing particular 'iconic' weeds, motivating community involvement and active control. Where individual weed species programs are undertaken, some have expanded to include the control a host of weeds impacting on a particular area, e.g. the Great Grose Gorse Walk has developed into the Great Grose Weed Walk.

The mantra of wilderness opponents, that wilderness is a refuge for weeds and pest animals is generally incorrect. Pests are controlled in wilderness as they are on all public lands, and are less prevalent in well managed wild places.

Wilderness is not pristine but it is the best, least disturbed bush that is left, and society should do all it can to protect these areas, including adequate pest management. Eradicating wilderness by opening it up to horse riding, 4WD vehicles and trail bikes can only make the pest management task harder as these vehicles are vectors for weeds.

The Colong Foundation strongly supports appropriate and effective weed control and humane culling of all exotic pests, when approved by a park plan of management.

Weeds, such as blackberries and willows, can be effectively controlled when volunteers and professional pest controllers work co-operatively.

The National Parks and Wildlife Group employs highly qualified pest control officers that can kill hundreds of vertebrate pests a day. For example, through the use of helicopters they can eradicate hundreds of goats in a few hours. Amateur hunters in a ground-based operation can only cover a few hectares, provided they have the sufficient fitness to safely traverse rugged park terrain.

Supervised hunting activities actually restrict effective control of pest species by diverting limited park staff and resources. Even if feral animals are located during these hunting forays, amateur hunters will find it difficult to get a clear shot in forested parks. Animals will be maimed and suffer horrible deaths as a result.

In 2010-11 the Game Council issued 15,080 hunting licences and reported 14,161 animals killed on public land or 0.9 pests per hunting trip. Some 46% of the animals shot were

rabbits, about 20% were goats and about 16% were pigs. Wild dogs, which are one of the biggest problems for landholders made up just 0.5% of all animals taken (Game Council Ann. Rpt., pgs 13 & 15). The annual budget for the Game Council is $2.5 million, so each pest animal killed on public land cost $176.50.

These figures demonstrate ground-based recreational hunting is an ineffective means of feral animal control. Removing the occasional rabbit, goat or pig using is a waste of public money and time.

The Shooters and Fishers Party allege that the impact by recreational hunters on pest and feral animal populations has been proven as every pest animal killed counts. They also say that shooting ducks is appropriate because there are millions of ducks and the ones hunters shoot would die anyway. Unlike native ducks, whose long-term population levels are in decline, feral animal populations are on the increase and require effective control. To control feral animals, the techniques used must remove over half of a population annually. Hunting just doesn't have any positive impact on vertebrate pest populations.

Recommendations on vertebrate pest management (from the NPA submission to the 2002 Upper House Inquiry into the management of feral animals):

1 There should be integrated pest-species control regimes, based on specific action plans, covering natural geographic areas such as whole catchments or bioregions.

2 More detailed information, more study is needed into the ecology of certain feral animals, e.g. foxes.

3 Much more work needs to be done into the development of biological control agents and the use of sterilisation agents.

4 There should be adequate, enforceable deterrents against the release of animals into the wild.

The cost of removal/destruction of animals released, or escaping from custody, should be clearly the responsibility of and borne by the owner, who should also be subject to prosecution.

5 Shooting is still one of the most effective and humane methods for the eradication/control of large feral animals, including horses, as long as sufficient calibre rifles and qualified shooters are used.

The Committee should recommend against the ban on aerial shooting of horses.

6 No aerial or surface use of poisons (1080) should be permitted.

7 1080 should only be targeted at canids (foxes and dogs) and, if used, should only be placed in special bait stations under more than 10 cm of soil.

No more than one bait per bait station should be used.

The quantity of 1080 per bait should be reduced below 3 mg - the exact quantity - so as to avoid the accidental by-kill of *Dasyuris maculatus* as determined by recent scientific measurement.

8 Animals killed by poison should be collected and taken out of the surface foodchain by being buried at least 50 cm below the ground.

9 All baiting programs (whether to protect stock or wildlife) should only be a component of a larger, long-term, ongoing action plan which includes the use of other, appropriate management techniques.

10 Greater resources should be applied to control of feral animals, and

11 More rational, cross-jurisdictional and uniform sets of legislative procedures should be formulated for the control of pest species.

GRAZING STOCK IN NATIONAL PARKS
TERMS OF REFERENCE 2 CONT

There is over 60 years worth of scientific research and government reports showing that cattle affect water catchments, soil and nature conservation values, and spoil visitors' enjoyment of national parks.

In particular, cattle:

- Trample stream-banks, springs and soaks.
- Damage and destroy fragile alpine mossbeds.
- Pollute water.
- Create tracks.
- Cause soil erosion.
- Reduce what should be spectacular wildflower displays.
- Spread weeds.
- Are known to be a significant threat to a number of rare and threatened plants and
- animals, and plant communities.
- Cover areas in cowpats and spoil the enjoyment of the area for visitors.

Source: Department of Sustainability and Environment Q&A, 2005,
on VNPA website, ref below:

http://vnpa.org.au/page/publications/fact-sheets/faq-sheet-_-cattle-grazing-in-the-alps

The evidence of grazing impacts from Victoria

Two reports to government agencies (Parks Victoria 1998 and DSE 1997) made it clear that cattle grazing should not continue in the Alpine National Park.

There are also numerous peer-reviewed studies demonstrating the different impacts of cattle grazing on the alpine environment. The following quotes are extracts from some of these studies.

"Continued grazing is an undoubted cost to national park values, and, indeed, compromises national park management. Any claims made with respect to the benefits of grazing to alpine ecosystems are not supported by scientific evidence."
Williams, R. J. Papst, W. A. and Wahren, C-H (1997) The Impact of Cattle Grazing on Alpine and Sub-alpine Plant Communities of the Bogong High Plains. Report to the Dept of Natural Resources and Environment, Victoria, p40.

"The alpine and sub-alpine ecosystems and landscapes of south-eastern Australia

are significant to all Australians because of their inherent value for nature conservation, water-yielding capacity, landscape and wilderness values and for recreation, as well as for their cultural history of human usage."
Groves, R. H. (1998) Grazing in the Victorian High Country. Report to Parks Victoria, p3.

"There is no scientific reason why grazing by non-native animals should not have been excluded from the Victorian high country as early as 40 years ago. That grazing under licence has persisted in Victoria to the present is an indictment of Victorian land management authorities, including Parks Victoria and its predecessors, who have failed to take into account the scientific evidence available and give it its due in the politics of making decisions on land management."
Groves, R. H. (1998) Grazing in the Victorian High Country. Report to Parks Victoria, p6.

The following are a few quotes from the 60 years of scientific studies relating to alpine grazing:

"It is concluded, therefore, that present-day grazing in the Australian alps is not consistent with the preservation and improvement of catchment values." (p.12)
Costin, A. B. The Grazing Factor and the Maintenance of Catchment Values in the Australian Alps. January 1958.

"The condition of the vegetation and soil in the Loch-Hotham area (now protected from grazing) has noticeably improved during the last 20 years. Most bogs and snowpatches are also recovering."

"On the more extensive Bogong High Plains (where cattle grazing continues) the same upward trend is not apparent, except in the enclosures... Likewise the bog and snowpatch areas examined show no substantial recovery and, in many places, active deterioration and erosion continue."
Costin, A.B. Report on inspection of Plants of the Bogong High Plains Area. May 2-6, 1977.

"...it can be concluded that protection from grazing and absence of fire results in (a) the development of luxuriant vegetation which provides adequate cover for the soil surface, and (b) promotes an improvement in soil structure and presumably in the hydrological characteristics of the mossbeds and their catchments."'
Carr, S.G.M. (Maisie Fawcett) Report on Inspection of the Bogong High Plains, 1977

"As most of the free-flowing water accessible to cattle is found in mossbeds, cattle by necessity used mossbeds for drinking.' (p. 62) 'Overgrazing of rangeland by herbivores results in a loss of cover of preferred dietary species."'

"In the absence of grazing the composition of the grassland community changes rapidly with several of the preferred species making spectacular increases in cover."
(p. 125) van Rees, H. Behaviour and diet of Free-Ranging Cattle on the Bogong High Plains, Victoria, 1984

"...The contention that grazing is a primary (or even the primary) factor preventing the spread of shrubs on the High Plains is an inappropriate application of the ecological evidence."

"The continuation of grazing as a means of controlling the cover of shrubs cannot be recommended in the face of the evidence presented both in this thesis, and in the various publications of S.G.M. Carr, A.B. Costin and D.J. Wimbush."
Williams, R. J. Aspects of Shrub-Grass Dynamics on the Bogong High Plains (sub-alpine), PhD thesis, 1985

"Overgrazing of rangeland by herbivores results in a loss of cover of preferred dietary species. This enables less preferred plants to increase in cover through reduced competition by the preferred plants ..."

Van Rees, H. and Holmes, J.H.G. The Botanical Composition of the Diet of Free-Ranging Cattle on the Alpine Range in Australia. Journal of Range Management 39 (5), Sept. 1986.

"On the basis of present evidence, continued grazing by cattle as a means of inhibiting shrub expansion on the Bogong High Plains cannot be recommended."'

"...the continued grazing of cattle within the Bogong National Park is not compatible with strict values of nature conservation."
Williams, R.J. and Ashton, D.H. Effects of Disturbance and Grazing by Cattle on the Dynamics of Heathland and Grassland Communities on the Bogong High Plains, Victoria. Australian Journal of Botany 1987, 35, pp. 413-31.

Abstract: "The ungrazed mossbed appears to be better serving its role filtering water that is used for the production of hydro-electricity."'
McDougall, K.L. The Effect of Excluding Cattle from a Mossbed on the Bogong High Plains, Victoria. Sept. 1989.

"There is ample evidence indicating that the grazing of domestic livestock within the Australian high country is incompatible with nature conservation values."

"The continuation of grazing as a means of controlling the cover of shrubs on the Bogong High Plains, therefore, cannot be recommended as a management option, given the weight of the experimental evidence against the practice collected over four decades ..."'
Williams, R.J. 'Cattle Grazing within Sub-alpine Heathland and Grassland Communities on the Bogong High Plains: Disturbances, Regeneration and the Shrub-Grass Balance.' Proceedings of the Ecological Society of Australia, 1990, 16, 2555-265.

"In the Pretty Valley ... improvement will occur in the absence of grazing."'
"In the Rocky Valley ... there was no evidence that grazing has reduced shrub cover, and therefore potential fire risk, in open heathland."

"...grazing by cattle has substantial impacts on the composition and structure of sub-alpine vegetation."

"In grassland... continued grazing ... will not reduce the risk of fire in such communities."
Wahren, C.H.A. Papst, W.A., Williams, R.J. Long-term Vegetation Change in Relation to Cattle Grazing in Sub-alpine Grassland and Heathland on the Bogong High Plains: an analysis of vegetation records from 1945 to 1994.

"...the species composition of arthropods was significantly different between the grazed and ungrazed sites ... most probably related to differences in moisture content in the vegetation and top layer of soil and the species composition of the vegetation, which are influenced by cattle grazing.'"
Kimpson, K. The Effects of Cattle Grazing on the Diversity and Abundance of Terrestrial Arthropods on Poa hiemata Grassland on the Bogong High Plains. May 2001.

"The present study demonstrated that exclusion of cattle has positive benefits for aquatic ecosystems ... removal of grazing from sub-alpine catchments may release short-term benefits to some features of the aquatic ecosystem, with continued improvement up to 40 years... However, (recovery of) large-scale features such as channel morphology may take much longer."
Simpson, L. Assessment of the Effect of Cattle Exclusion on the Condition and Recovery of Sub-alpine Streams, April 2002.

Grazing national parks and fire severity

The following Opinion article was published (slightly edited) in Stock and Land on 12/10/06, in response to a request from Neil Barraclough for information on studies into the relationship between cattle grazing and fire in the Victorian Alps. As the National Party in NSW has been calling for the introduction of grazing into our national parks, it is appropriate to examine some of the science behind this debate. Provided by Phil Ingamells, Park Protection Project, Victorian National Parks Association.

Neil Barraclough asks (Stock & Land, 5/10/06) if there is any real science showing that cattle grazing didn't reduce the intensity of the 2003 fires in the alpine area. The answer is “yes”.

It's a good question though, because it cuts to the core of what might be the most important issue in conservation management in Victoria over the next few decades: the need for greatly increased research and monitoring.

It seems obvious that because cattle eat grass, and grass burns, then if we have less grass we'll have less fire. But it's the job of scientists to test the obvious (otherwise we'd still think we're on a flat earth instead of spinning, improbably, on a free-floating sphere).

So shortly after the 2003 fire, a group of scientists set about testing the "grazing reduces blazing" theory.

The authors of the study are all scientists with solid reputations: Dick Williams (CSIRO Sustainable Ecosystems), Carl-Henrik Wahren (Centre for Applied Alpine Ecology at La Trobe University), Ross Bradstock (University of Wollongong) and Warren Mueller (CSIRO Mathematical and Information Sciences).

Measurements were taken in over 400 locations through 100 square kilometres of the Bogong High Plains, in both grazed and ungrazed areas. They surveyed fire occurrence and severity in alpine heathland (shrubby places) and in open heath (shrubs in grassland), and fire occurrence in grasslands. The severity of the heathland fires was measured by

recording the diameter of burnt twigs on shrubs. It wasn't possible to reliably measure fire intensity in grassland.

The results were interesting.

Heathlands, at 87% burnt, were by far the most flammable, open heaths less at 59%, while only 13% of the grassland areas were burnt. Importantly, there was no significant difference in these results between grazed and ungrazed areas.

So what about severity?

Again, there was no significant difference in grazed versus ungrazed areas of heathland, even in open heathland where cattle had grazed grasses in between and around the shrubs.

Essentially, in alpine areas fire is mainly spread by tall, flammable shrubs, most species of which cattle don't eat.

In some ways, there are no surprises here.

The 2003 fire blazed through almost every alpine grazing licence area in its path. The notable exception was Pretty Valley on the Bogong High Plains - the largest grassy plains area in the Victorian Alps. The only comparable place in Australia is in Kosciuszko National Park, where even larger areas of grassland remained unburnt, even though they had not been grazed for decades.

And in the Caledonia fire of 1998, in the southern section of the Alpine National Park, every bit of grazing licence area within the path of the fire went up in flames. That fire stopped at the ungrazed and unlogged Avon Wilderness - but mainly because it rained.

Fire behaves differently in different forest types, and areas that have been burnt recover differently in different locations, different altitudes and different soil types. That's why we should be doing more measuring and recording, both before and for many years after control burns, and natural burns.

In Justice Stretton's 1946 Royal Commission into forest grazing, he blamed the extent of shrub growth in the Alps on the cattlemen's habit of burning to promote grasses: “With each burning, the growth of scrub was stimulated so that it successfully contended with the grass for possession of the mountain sides.”

It would be very useful to have had reliable and thorough measurements of the effects of the cattlemen's legendary burning, but the idea of carefully recording ecological processes is relatively new. By comparison, our understanding of the way the human body operates, for example, is vast.

With a climate crisis upon us, Victoria's natural areas are going to be placed under unprecedented stress, and our vulnerability to fire will increase. We will need all the knowledge we can muster.

The Victorian National Parks Association is asking for greatly boosted research and monitoring of our natural systems, right across the landscape. That way we, and future generations, might be able to secure safety for those who must live near natural areas.

Importantly, we might also help secure the long-term survival of Victoria's truly remarkable natural heritage.

The Federal Government came to the aid of Victoria's Alpine National Park and stopped the reintroduction of cattle grazing. Federal Environment Minister, Mr Tony Burke said 'it beggars belief that last summer the Victorian Government sought to reintroduce grazing to the Alpine National Park. This reintroduction of grazing ran against the grain in so many ways:

- The mountain cattlemen had previously been paid compensation when cattle grazing was discontinued;
- The environment of the Alpine National Park is already under serious distress from invasive species such as deer;
- The so-called scientific study which was used as an attempted justification by the Victorian Government was commenced without conducting any baseline survey of the sites before the cattle arrived; and
- The crass claim that this was the solution to future bushfires ignored the fact that none of the recommendations in the Royal Commission into the Victorian Bushfires called for such an action.'

FIRE AND WILDERNESS AREAS
TERMS OF REFERENCE 2 CONT

Wildfire frequency in eastern Australian wilderness areas has generally increased since white settlement and is likely to continue to do so due to climate change and continuing population growth. Wilderness and other large bushland areas can be a buffer against ecosystem shifts due to global climate change. The wilderness areas protected by statute (which cover just two per cent of New South Wales) should be places where natural ecological processes can be protected from intensive fire management for the protection of human life and property.

Fire management for wilderness should limit fire frequency in ways that mimic the pre-European and pre-global warming environment. This management should seek to restore and maintain wilderness integrity (natural processes and biodiversity). Excessive burning can cause severe damage to rugged wilderness areas. When burnt, the ground cover that binds the soil is lost, leading to accelerated sheet erosion as the next rains strip away the thin soils and nutrients. Streams then fill with gravel and silt.

Too-frequent fires can also wipe out local wildlife populations, destroy the important and restricted old growth vegetation and lead to the replacement of existing vegetation communities with more fire-tolerant (and fire-prone) communities. Fire sensitive trees, such as *Eucalyptus oreades*, *E. deanei* or *E. dalrympleana*, or shrubby understorey species, such as Banksias and Allocasuarinas, can be lost from broad areas. Often it is these oldest plants that provide most of the nesting and roosting places for birds, such as the Eastern Bristle-bird and a number of threatened microbat species.

The assertion that Australia's forest lands were once all some sort of grassland or open woodland and should be burnt more often to mirror Aboriginal burning practices is incorrect[i]

(see also **Attachment C**). Many types of forests and woodlands, particularly those containing long-lived shrubs, would not have been subject to frequent (less than ten-year) burns[i]:

(i) The evidence is in the biology of key species in this vegetation. For some wilderness areas in NSW fire frequency is already well in excess of acceptable ecological limits (e.g. much of Wollemi). Many iconic wet old growth forests, such as the Coolangubra, greatly exceed the constructed ecological fire regime limits as currently conceived and the concept may not be appropriate for such forests. These forests are much more susceptible to fire than rainforests, and may need active protection from wildfire in a climate-changed world.

In these circumstances, effective fire-fighting in wilderness requires constant aerial and satellite surveillance (or alternatives) in bush fire danger periods to enable rapid detection and response. Such an approach is flexible and also eliminates the need for static fire observation towers in wilderness areas. To effectively tackle fires in remote areas while they are still small, more personnel need to be trained and supported as RAFT teams and as fire strategists. Although there has been much investment in recent years in road-based fire suppression capability, equivalent investment in remote area firefighting has been lacking.

Vigilant fire suppression in a climate-changed world would help to restore the natural variability of native vegetation age classes. It would also help to ensure rare old growth plant communities, including rainforests and tall eucalypt forests, and other fire sensitive species can be protected.

It is recognised, however, that even a well-resourced strategy of rapid aerial suppression backed up by RAFT is very unlikely to stop all intense wildfires. It is the ones that get away that can become very large wildfires and may prompt damaging control responses. Most wildfires have burnt into parks, and not the other way around[ii].

(ii) For this reason broad-area planned burns of wilderness are a poor and ineffective way of controlling such external fires. In this context, additional fuel reduction burns should be undertaken where they are most effective, and that is close to the assets being protected (e.g. towns and rural districts)[iii].

(iii) Further efforts to achieve an appropriate mosaic of patch burns on adjoining private land are necessary. Letting wilderness burn may be a valid fire management strategy, when controlling the fire by burning from containment lines a long distance from the wildfire would be likely on balance to cause more area to be burnt, or when such a response may be ecologically appropriate.

Fire management of wilderness needs to be based on solid science and detailed ecological understanding at the local landscape level. Much more investment in both research and professional fire strategy skills is needed to ensure that fire management is responsive to the ecological needs of specific wilderness areas and ecological communities. There should be more comprehensive and rigorous mapping and analysis of fire areas, fire intensity and

vegetation responses so that knowledge of how particular communities function under different fire regimes is developed over time.

Decisions on the application of damaging suppression practices, such as construction of containment lines in wilderness areas and large-scale backburning, should be addressed in an open transparent manner during risk management planning, not during a fire crisis. In a fire emergency, bulldozers should not be allowed to scar the scenery and initiate erosion by cutting poorly considered fire control lines on steep slopes. Hurriedly installed control lines often fail to contain a wildfire and cause more harm to the environment than either the wildfire or a well-designed and maintained fire trail. Use of constructed containment lines deep within a wilderness area to control wildfire can be dangerous to firefighters, as ground vehicle access is often slower than a hot wildfire and refuge areas and escape routes are limited. Except for fire trails in perimeter areas, trails should be closed and rehabilitated to restore wilderness values, particularly those installed without due consideration during a fire emergency.

Bush fire management encompasses all bush fire policies and operations, including fire mitigation, ecological burning and fire suppression. Fire management in and affecting wilderness and other large bushland areas should protect wilderness values in a climate-changing world through the following principles and strategies.

2006 COLONG FOUNDATION POLICY
BUSHFIRE MANAGEMENT AND WILDERNESS

Principles

i. Bush fire management (which by definition occurs in predominantly natural environments) is treated as one component of ecological management of bushland.

ii. The prime bush fire management objectives in and for wilderness are the minimisation of all biophysical impacts and the maintenance and restoration of wilderness integrity (natural values, natural processes and existing biodiversity).

iii. All fire management in wilderness is based upon principles of ecological sustainability and the best scientific knowledge.

iv. Fire management in wilderness is evidence-based but flexible and adaptive (recognising that knowledge is evolving and an ecological risk management approach may be necessary if knowledge is incomplete).

v. The principle performance criterion for fire management in wilderness is the maintenance of the majority of each vegetation community within its (scientifically determined) desirable limits of fire regime (frequency, intensity, timing and variability).

vi. The integrity of old growth forests, rainforests and other fire sensitive vegetation are protected from an increased risk of wildfire arising from inappropriate fire regimes and climate change.

Strategies

Research

vii. Increased research and analysis of:

- vegetation and fire history;
- fire ecology specific to landscapes and plant and animal communities;
- the effects and efficacy of fire management activities.

viii. Rapid and supported assimilation of knowledge into on-ground fire management policies and practice.

Fire mitigation

ix. Undertaking planned fires in wilderness areas for ecological reasons only, and protecting off-wilderness assets on off-wilderness lands.

x. Allowing wildfires in wilderness to burn in appropriate circumstances, e.g. expected fire area, intensity and timing is within ecologically-determined limits, risk to human life and property is manageable, suppression may cause more impact than the fire, fire origin is natural (lightning).

xi. Increased effort by state and local government to prevent urban expansion within the bushland interface adjoining a wilderness area (as these are often high fire danger areas).

Fire suppression

xii. Greatly increased investment in the development of expert fire strategists and pre-planned low impact fire control strategies (aimed at maintaining natural processes and biodiversity in the long term) for large bushland areas.

xiii. More concerted and consistent efforts to prevent illegal ignitions and to investigate and prosecute offenders, e.g. the permanent establishment of well-resourced bush fire arson investigation teams.

xiv. Increased efforts in early wildfire detection, particularly during bush fire danger periods and in remote areas, to enable rapid detection, assessment and response.

xv. Rapid attack and close containment as the preferred suppression response to wildfires (when suppression is the objective – see clause xviii below), and ensuring that resources, capability and response times (for aerial suppression, Remote Area Fire Teams and other means) are adequate to support the highest possible success rate for such responses in remote bushland areas.

xvi. Ensuring that, if initial attack fails, ongoing ‘campaign’ fire suppression strategies affecting wilderness have as prime objectives the protection of natural values and the minimisation of environmental impacts, and that strategies are evidence-based on a detailed understanding of the ecology, history and behaviour of fire in the local landscape, as well as the successes and failures of past suppression efforts.

xvii. Ensuring that in large fire campaigns, knowledge, skills and resourcing are adequate to support 'surgical' and low-impact strategies (e.g. small tactical burns, use of natural containment lines and handtool lines, precision aerial burning and water-bombing) in preference to strategies that may be higher impact and less precise (e.g large-scale backburns from hard containment lines).

xviii. Ensuring that 'let burn' is an approved and supported option for wildfires in wilderness under appropriate circumstances (see clause x above).

Physical intrusions in wilderness

xix. Using existing constructed containment lines within a wilderness for back burning only when they have been identified for such use in a pre-incident operations plan that has been subjected to public comment and review, and these lines are properly constructed to minimise damage to wilderness values.

xx. Avoiding the installation of containment lines by bulldozer during a section 44 bush fire emergency or other wildfires without prior consideration and approval in an open and transparent process.

xxi. Immediate closure and/or restoration of any new trails constructed or upgraded during fire suppression operations.

xxii. Removal and replacement of fire observation towers located in wilderness areas with other effective detection methods that do not impact upon wilderness values, such as more aerial surveillance.

i Benson and Redpath, 1997, 'Nature of pre-European native vegetation in Australia, in Cunninghamia, Vol. 5(2).

ii Mr J P Henry, Deputy Fire Co-ordinator with the Bush Fire Council of NSW, 14-16 Sept, 1983, reported in the proceedings of the Ninth National Conference of the Australian Fire Protection Association.

iii Park Watch, March 1994, Vol 76

TERMS OF REFERENCE 3

LOGGING OF NATIONAL PARKS AND RESERVES

In 1991 the Commonwealth's Resource Assessment Commission Inquiry into Forestry and Timber summarised the overcutting of forests as follows: 'Australia's native forests have been overcut in most states causing an impending shortage in the supply of hardwood logs. The prolonged overcutting and not the inclusion of cutting areas in national parks and conservation reserves appears to be the main cause of the dwindling supply of hardwood logs. Overcutting coincides with and is caused by, the cutting out of most of the reserved old growth forest well before significant numbers of regrowth sawlogs reach harvestable size. The Inquiry cannot find any instance in recent decades where large areas of forest have been managed on a sustained yield basis.'

Native forests (as opposed to plantations) generally grow at a rate too slow for a sustainable and viable economic return (say 7% on investment), and so are usually logged on an

unsustainable basis for greater economic return. Any logging in national parks and reserves would be subjected to the same economic pressures. The logging of a national park, however, would be of lower intensity, and therefore have a lower economic return than current non-viable native forest logging operations. Otherwise the logging of a national park would be a raid and pillage operation with no intention of ensuring a sustainable yield of wood through time, let alone any concession to nature conservation objectives.

Time and money are better invested elsewhere than in logging national parks. The opportunity costs in terms of amenity, ecological integrity, wildlife and wilderness values degraded, as well as pest species invasion must also be added to the economic costs of logging.

So it cannot be argued that logging national parks at low intensities could be of an economic benefit, and if it is not economic, it is could not be justified on the grounds of social welfare for loggers. To this argument, the Inquiry also should note that the very suggestion that River Red Gums or the North Coast hardwoods should be logged in any national park is repugnant to most Australians.

Logging impacts

The following points summarise logging impact:

1. Biodiversity

Australia's native forests are complex biological systems. They are rich in plant species, ranging from mosses and ferns, many species of herbs and shrubs to mixtures of tree species, including a uniquely diverse assemblage of eucalypts. Similarly, animals range from tiny soil organisms through a myriad of insect and other invertebrate species to amphibians, reptiles, birds and mammals, the whole forming a network of interdependent organisms.

The massive disturbance involved in logging compromises this complex interaction, removing its major elements (trees) and altering the very basis of soils and microclimates on which it depends.

Years after logging, trees may have regrown, but habitat has not.

2. Soil Erosion

The practice of logging produces a soil disturbance. When combined with post-logging fire the soil surface is exposed to a degree that makes large scale sheet and gully erosion inevitable. The removal of the forest canopy allows high intensity rain to bombard the exposed soil and cause run-off loaded with silt.

Snig tracks and roading all contribute to the disturbance. Streamlines in and below logged areas have shown increased turbidity and bed loads and estuarine lakes in catchments with integrated logging are filling with sediment at a rate far exceeding that where the forests have remained relatively undisturbed.

3. Soil fertility

Regrowth forest has consistently shown a decrease in vigour compared to the forest it replaces, implying a loss of fertility.

4. Water

Logging removes vegetative cover and litter. It lowers water infiltration into soil, thereby increasing surface run-off. This is further increased by heavy machinery compacting the soil. Baring the soil surface causes evaporative losses in the upper layer, which forms a dry crust resistant to wetting. Catchment studies have shown that immediately after logging, discharge increases.

5. Aesthetic, wilderness and recreational value

The aesthetic impact of integrated logging immediately following harvesting is devastating and for many years afterwards the monotony of even-aged regrowth and lack of diversity detract from the enjoyment of the forest by recreational users. The effect on wilderness values is self-evident.

UNSUSTAINABLE ACCESS ARGUMENTS
TERMS OF REFERENCE 3 CONT –

The unstated assumption of this term of reference is that the current use of the national park estate is unsustainable due to a lack of access for visitors to parks. This assumption is untrue. All parks can be reached by road or rail and there is no restriction on public access except for exceptional circumstances, such as the outbreak of bushfire and professional pest management. It is implicit that there is a special meaning attached to sustainable use by park user groups, the 4WD vehicle and equestrian lobbies which seek access to previously closed areas of parks.

The application of sustainable use implies more access for high impact recreation, just as support for balanced decision-making in town planning means that the proposed development gets approved.

There is no need for more access, for properly maintaining access for high impact visitor use puts a heavy burden on National Parks and Wildlife's financial and human resources.

Australia is older and flatter than other continents. There are very few places where terrain prevents 4WD vehicle users and horse riders from going off-road. Most areas that are now national park were previously penetrated by riders and drivers with minimum track development, usually associated with some form of use, such as cattle grazing or logging.

This freedom from physical constraints and past use means that most parks already have too many access tracks. The road network encompasses the whole state, and there are very few areas more than five kilometres from a road or track (Mosley, G. 1966 'Wilderness Areas' in Architecture in Australia, March 1966). The call for sustainable use brings into

sharp focus vehicle and horse riding access as key issues in managing the NPWS parks estate.

The benchmark 1979 State Pollution Control Commission inquiry into off-road vehicles found that 'the use of vehicles in areas of high wilderness value jeopardises wilderness qualities. The desire to explore and trail-blaze areas of virgin country can cause immeasurable damage to flora and fauna, cutting deep impressions as vehicles tyre-spin their way to gain traction over rough terrain. Narrow trails are widened, hillsides are rut-scarred, erosion is initiated, reserves become and remain scarred, front-end winches rope-scar and ruin vegetation, archaeological relics are damaged and the possibility of fires is increased from vehicles and the activities of users of vehicles.'

As the National Parks and Wildlife Group is aware, the claimed lack of access to protected natural areas is blamed by the advocates for high impact recreation use for various environmental ills. It is unavoidable that these advocates for multiple use and park development will exploit the Inquiry process to organise, seek to gain further influence and over-ride existing park management and conservation policies.

WHAT HAPPENS WHEN NATIONAL PARKS MUST PAY THEIR WAY
TERMS OF REFERENCE 3 CONT –

Adopting a business-like approach by focusing on marketing, promoting and facilitating tourism and recreation will result in park management being influenced by those wanting to exploit national parks for profit, despite a stated concern for the environment by those groups. For every operator concerned for the environment there are another ten itching for more access to increase profits in the name of balanced use.

To quote Peter Cochrane "I unquestionably and undeniably have a commercial interest, and I have the interests of my employees at heart, I have the interests of my community at heart, and as the Mayor of Cooma I'm concerned for the economy of the entire area, and I certainly won't be dictated to by the National Parks and Wildlife Service or any other government group who thinks that they can in any way inhibit the growth of our society so far as recreation is concerned" (ABC transcript, 29/4/01).

Mr Cochrane is a trenchant opponent of wilderness and it was his highly orchestrated campaign that led to a the dropping of the proposed karst zone being horse riding free in the current draft Kosciuszko plan of management. Karst is highly vulnerable to weed invasion and polluted waters and that is the fate awaiting these areas. Even the identified Tabletop wilderness will be subject to commercial horse riding.

According to Mr Peter Cochran, the outcome of the NSW Government 'independent' horse riding trial will be a track that traverses through 500 kilometres of Kosciuszko National Park's famed wilderness areas. His family runs a private commercial company 'Cochran Horse Treks' from Yaouk near Adaminaby and Khancoban on the west of the Kosciuszko National Park. The Cochran family business would benefit from any trial that throws open alpine wilderness to horse riding.

This so-called wilderness horse riding trial of over 500km would spread Orange Hawkeweed, a very serious weed, throughout NSW's only alpine national park. Prevention is the most cost-effective form of weed control and so it is vital to keep uninfested areas free of hawkweed. Minute barbs on the seeds enable them to stick to hair, fur, riding equipment and be carried long distances.

There are many good tourist operators, but there are also legions of self-interested operators ready to derail good intentions and promote instead many nature-compromising schemes under the false flag of eco-tourism. Cable-cars, coastal resorts, wilderness lodges and a multitude of motorised intrusions are waiting for their chance to access the quiet realm of wilderness. Such development will trammel wilderness and put a barrier between it and the human soul (Brown, B 1993).

We know that the determination of carrying capacity is vital but inexact, with very little data available to decide the level of abuse an ecosystem can tolerate. In addition to uncertainty is the pressure for a so-called balance between wilderness and development. Supply and demand considerations will influence carrying capacity and the determination of recommended wilderness boundaries. So, for balance, read destruction of wilderness, like wilderness in Kosciuszko.

The restriction of visitor use is essential in fragile park areas but setting the right number involves park managers in a conflict of interest if the setting of the level of park use is not just an ecological and moral issue but becomes an economic one as well. When budgets are set for popular parks, managers are tempted to take risks and adverse results will cause irreversible harm.

As commercial tourism becomes a revenue earner for the National Parks and Wildlife Service, park managers and administrators will be tempted to overlook their guardianship role of minimal impact and appropriate use governed, as it should be, by the precautionary principle under the Act. And this focus on revenue becomes an increasing concern when a park administration is confronted with a contracting funding base. Park managers would be tempted to maintain staff levels and income at the expense of the environment through increased commercial revenue streams.

Marketing and development would become a management focus

To part visitors from their money, services have to be provided. Expansion of facilities to meet growing tourist numbers, while at the same time enhancing the conservation management of a reserve, are mutually exclusive policies.

To market parks, saleable and bookable facilities are necessary. The unpriced impacts of tax-payer funded facilities are sewage effluent, roads, carparks and powerlines. So in realising the value of park assets to raise funds for management there are always greater unpriced and unrecoverable ecological impacts.

Expensive wow-factor lookouts and elevated walkways would be developed with the objective of attracting more tourists. These structures are built on the belief that nature on its own is not good enough. To modify the national parks' most scenic points to improve 'marketability' is the wrong message and sets a poor example for society.

A large range of accommodation would be provided in national parks from bush camping to caravan sites, cabins and lodges to cater for all elements of the tourist market. These facilities may be provided by the NPWS as in the case of the Warrumbungles, or by long-term lease as in Kosciuszko and at Pretty Beach.

The NPWS will be required to develop retail product lines in partnership with private enterprise. Park managers will become captive of their commercial clients by developing special relationships and working partnerships based on the need for revenue.

Promoting mass tourism to attract large organised groups that inevitably travel by coach requires large parking areas, toilets and, in remote areas, necessitates overnight accommodation on-park. Any revenue for management gained by on-park accommodation would be at a high environmental cost and also at the expense of the local community who are denied the benefit of expanding their town's facilities.

Developing an on-park accommodation approach ignores the experience of United States park managers who are demolishing such facilities in the Grand Canyon, Sequoia and Yosemite.

User pays is a path toward development and is not for the average park visitor

Echo Point, Katoomba, has the greatest nature-based visitation in NSW by far, at over 2 million a year, but unfortunately returns nothing for management. Blue Mountains City Council subsidises visitor services provided, while bus operators make big profits.

Charging an entry fee is the only way that increasing access can improve park revenues and reduce subsidies but the fees would have to be greatly increased to recover the current tax-payer support. Such an increase would lead to dramatic increases in development, as park visitors would insist on seeing value for the fees paid.

Fees would also drive away those who could not afford to pay, including large family groups.

Park managers become tourist agents

Park managers will be recruited who have business and financial management skills, as these skills will be required to raise park revenues. There will be no additional money available and so the tasks of publicity, marketing and revenue raising will eat into staff resources allocated to conservation management.

In the context of revenue raising, NSW will have to compete with Queensland and Victoria for tourists. The NPWS will target the "organised holiday maker" with heavy marketing, including international visitors on package tours, escalating a NPWS demand-driven ideology. Sustainable use will become damaging overuse, wearing out park facilities leading to another cycle of infrastructure development and environmental degradation.

Field staff will become glorified ticket sellers, traffic wardens and road maintenance crews. Little or no time will be spent on conservation, like the north Queensland national parks that have no money for pest control but there are plenty of government funds for tourist publicity.

Broadening appeal to high impact groups degrades conservation management

The NPWS already has been improving its communication skills by promoting tour opportunities, like trail bike riding in the pristine Tanatwangalo Creek catchment of the South East Forests National Park. Such publicity does not ensure appropriate use, it just increases high impact use at the sites advertised.

The NPWS will seek to broaden its appeal by catering to a broader range of recreation pursuits. By becoming less risk averse, the NPWS would introduce plans of management that greatly expand the number of off-road vehicle tracks and horse trails. New tourist destinations will be developed to assist the private sector and other self-interest groups in partnerships through memoranda of understanding that circumvent and dictate park management processes.

In the case of the draft South East Forests Plan of Management over 400 kilometres of exclusive 4WD roads are planned. Even more 4WD roads are planned for the Southern Escarpment Parks in the adjoining region. In 1998 there were 2,136 kilometres of public access roads in the National Parks of NSW. There are now more public roads in the parks of the Southern third of NSW alone than there were across the whole state just seven years ago. These newly opened roads include over a thousand kilometres of 4WD roads in national parks and hundreds of kilometres of 4WD roads opened in NPWS identified wilderness.

To maintain newly opened fire roads for their original purpose, large sums of money must be spent in road maintenance. Each cycle of road maintenance results in more soil erosion, stream sedimentation, a wider road and more 4WD vehicle use, creating another vicious cycle of on-park degradation.

Zoning parks focuses on recreation opportunities

The NPWS will classify parklands into classes or zones. These zones determine where, how much and what type of development, access and recreation use is allowed in each part of every park.

The development zone will allow for substantial modifications to dominate the immediate landscape. Such modifications in no way enhance the conservation status of the area, satisfy the IUCN definition of a national park or provide for opportunities to restore disturbed lands. The provision of roofed accommodation in this class would involve, as it must, the need for electricity and garbage and sewage disposal.

Under economic imperatives the zoning inexorably ratchets park areas up the categories toward increasing development (just like zoning of private land responds to economic pressures). Park management strategies may state that habitat fragmentation is a main cause of species extinction but on-ground management will facilitate more fragmentation and development in parks. Commercial 4WD tours in identified wilderness and perhaps even that oxymoron the wilderness lodge will be permitted.

Endless Economic Growth

In Koscisuzko National Park commercialisation is continually being expanded to the detriment of the environment. Not satisfied with the concessions gained, the resort developers have succeeded in the removal of seven resort areas from the park to facilitate development under the guise of building safety. The 1980s NPWS policy of no new accommodation structures within protected areas was swept aside along with DEC as the economic and political power of resort growth snowballed.

And it is not just Kosciuszko. This policy would apply to situations where existing planning processes have flagged a need for accommodation.

Adventure tourism and wilderness

Another form of tourism anxious to get into wilderness is adventure tourism. In the Blue Mountains this activity has developed abseiling, canyoning and climbing sites. To reach these sites, many bush tracks have been created, removing vegetation and numerous illegal bolts and rings installed in the sandstone rock. The establishment of these sites is followed by overuse, erosion and damage to cliff faces, which in some cases can be seen over a distance of many kilometres. In the case of canyoning, stream banks are trampled and peaty rainforest soils eroded.

A Plan to Stop Commercialisation of National Parks

The vicious cycle of upgrading park facilities to meet demand must be avoided so that wilderness is not subjected to eco-tourism activities such as joy flights, horse riding and 4WD tours.

NSW parks receive over 23 million visits a year, compared with the very heavily promoted parks in the Northern Territory that receive only a little over a million visitors a year. The obvious conclusion is that park visitation can thrive without heavy promotion or diversion of scarce funding.

OTHER "SUSTAINABLE USE" CONCEPTS INAPPROPRIATE TO APPLY TO NATIONAL PARKS AND RESERVES
TERMS OF REFERENCE 3 CONT.

Bee Keeping

The impacts of European honey bees in the Australian environment include:

- Competition with native species for floral resources (There have been numerous studies from around the world showing that when honey bees are present, native bee visitation rates are reduced); and
- Changes in reproduction by native plants (Honey bees have distinctive behaviours that mean they may cause patterns of plant pollination that differ from the native pollinators. Studies of different plant species have shown different kinds of effects,

with honey bees diminishing pollination of some species and enhancing pollination of others (Gross & Mackay 1998)).

Excluding bee keeping would reduce unnatural ecological changes brought about by exotic bees.

Bee keeping is not an appropriate use of national parks or nature reserves. There is adequate scope for bee farming in the rest of the state outside national parks and nature reserves. Bee keeping permits should be phased out within the NPWS estate as European honey bees displace native bees. These insects do not pollinate all species of native wild flowers but displace the bees that do. The flora that is not pollinated will decline, causing a cascade of ecological change in protected natural areas.

Hereditary access as a right

Exclusive access to a bridle trail, historic huts or other non-indigenous historic sites is inappropriate, especially within wilderness areas. Every part of Australia has historical significance to various community groups. A presumption of hereditary (horse riding or vehicle) access to places of interest or importance could result in such arrangements to almost every part of the NPWS estate. A broad policy of hereditary access is strongly opposed by the Colong Foundation as it would cancel out wilderness management and compromise park management arrangements in many other environmentally sensitive areas, such as nature reserves. Arrangements for the family access and indigenous access are made by the National Parks and Wildlife Group but these should not be generalised to a broad policy.

Acceptance of 'traditional' access by the NPWS would lead to demands for exploitation of parks from past traditional uses with which access to the area was formerly associated. For example, Reynella Riders were formerly licensed to undertake cattle drives through Kosciuszko National Park by the NPWS. This is the same company which this year was awarded an environmental prize for eco-toursim by Environment Minister, Robyn Parker and granted free park access. The pressures for grazing in national parks will, if acceded to by the NSW Government, occupy huge amounts of time and effort by the Service. The Service, like the general community, is aware of the consequences of stock grazing.

If approved, park managers would be advocating the imposition of restrictions on traditional access to protect the environment, after the damage is done.

Cattle grazing in the high country and 'traditional' horse riding are uses that usually take place with dogs and support vehicles, multiplying the damaging effects of the grazing activity.

Inappropriate application of 'equity of access' principle to commercial interests

Recreation clubs provide the community with significant park access and services for free.

Commercial users are financially motivated to exclude competitors and rivals. The tourist industry demand for equitable access includes seeking the application of equivalent standards to voluntary recreation clubs that provide similar services to the commercial operators (e.g. leadership standards). Professional accountability and accreditation standards for commercial operations should not be transferred to voluntary, non-profit clubs and conservation organisations.

Those community groups that offer park access services to society for free (e.g. bushwalking clubs, 4WD clubs, etc) should not be expected to achieve the same leadership standards as those providing services for payment. Such a move could significantly reduce access to the parks, including regular park visitors who may not be able afford commercial tour group prices.

Visitor-focused access management and site hardening for commercial tourism

Commercial use of lookouts and other areas of high attraction, such as board walks through rainforests, should be limited by the setting (as determined by potential impact on the quiet enjoyment of the park by other users, land capability and recreational setting assessments) and not by the aspirations of tour operators. This is sometimes termed 'nature-focused park management'.

Site-hardening to accommodate commercial use is not appropriate within parks (e.g. by providing more car parking spaces, upgraded facilities or a proliferation of facilities). The pattern of economically driven expanded use quickly becomes ecologically unsustainable. The amenity of the place becomes ruined by infrastructure, such as experienced on the tourist-overloaded South Rim of the Grand Canyon in the United States. This is sometimes termed 'visitor-focused park management'.

Park management must not be compromised so that wilderness is trimmed especially to accommodate commercial tourist operations that damage the natural environment or visitor amenity. Unfortunately commercial tourist routes are rapidly being label 'sacrosanct', not be altered or varied (e.g. the Bicentennial National Trail), even to protect endangered species.

Commercial tourism accommodation

Of course commercial tourism activities are popular in parks, where land is cheap. The state is exceptionally well endowed with a complete range of commercial visitor facilities outside the park system, ranging from 5 star hotels to camping grounds.

The proposed hut development in the heart of Warrumbungle National Park was rejected. This proposal was rejected by public opinion, the NPWS and the NPWS Advisory Council, and finally by the Minister for the Environment. The cabins would have simply realised the park's natural assets and provided park land, access and other services at a subsidised price on public land. Park development gives unreasonable price and location advantages over resorts in the town and countryside. The proposal would have set a precedent that encouraged more inappropriate development of this type.

The place for commercial activities is outside parks. Commercial visitation inside parks should be restricted to public roads approved for commercial use in a plan of management. Parks should provide opportunities for quiet recreation in a natural environment unencumbered by commercial activities.

The Emirates - a case study

The Emirates 'eco-resort' in the remote Wolgan Valley is a good example of why national parks are unsuitable for resort development.

In 2005 the company developed an eco-resort proposal for a 1,000 hectare private property which had been affected by cattle grazing in the past. There were plenty of resort development opportunities on that private property, but ultimately none of these were selected. Part of the Wollemi National Park in the World Heritage Area was proposed for the resort instead. The resort was developed on the park and that part is still planned to be one-day revoked from the national park in a yet-to-be-implemented land swap arrangement.

Managing Director, Christopher Brown, stated that the resort proposal was developed in close consultation with 'the tourism industry, park managers and conservation groups'. The implied justification for this private enterprise partnership is the argument that the industry can lend a helping hand to the public sector to advance nature conservation? No problem with that when degraded grazing land is to be restored. Where the resort development occurs in the national park, however, the objectives on advancing nature conservation and those of resort development come into direct conflict.

It was perhaps a convenient argument, but the Wollemi National Park still does not benefit in any significant way from the resort lease. Only adequate taxpayer funding of park management and effective protection of the park from exploitation can do that.

Conservative journalist Andrew Bolt ridiculed conservation group efforts to protect national parks from development. A close media associate of Gina Rinehart, he attacked concern over the Emirates' Resort stating this 'is the one at Wolgan Valley that green groups fought and green tape nearly strangled. A hotel in a national park? Sacrilege!' (*Adelaide Now*, 13 June, 2012).

The Emirates' Wolgan Valley Resort was the very first 'concept plan' proposal under the notorious Part 3A amendment to the *Environmental Planning and Assessment Act, 1979*. Part 3A is law that gave too much power to the Planning Minister and which slashed green tape but didn't help the Emirates' project.

The initial Part 3A 'concept plan' in fact placed the resort on freehold land and went on public exhibition just before Christmas 2005. Then, just before Christmas 2006, a variation of the 'concept plan' went on exhibition that relocated the proposed resort onto the World Heritage listed Wollemi National Park.

The amended 'plan' did not indicate the boundary of the national park let alone explain why the 1,000 hectares of freehold land available for the proposed resort were so unsuitable that it had to go onto adjoining national park land. The NSW Director-General of Planning required that the modified plan to specify any 'Incorporation of National Parks and Wildlife

Service's land to accommodate the relocation of the resort facilities and buildings'. This direction was ignored, but being a Part 3A variation of approval, it too was approved, with no possibility of a legal challenge to that decision.

Any decent environmental assessment would have located the original resort design well away from the 1820s homestead that Mr Ian Kiernan of Clean Up Australia was commissioned by Emirates to renovate. It would also have avoided the World Heritage Area as the designers would have known where park boundaries lay. Well of course the relocation of this large resort onto the World Heritage Area triggered Federal Environmental laws and the blundered environmental assessment was redone for a third time.

Green tape free 'concept plans', that the Tourism and Transport Forum so desires, caused the muddle, the time wasting, the expense and the precedent of a large resort in the Greater Blue Mountains World Heritage Area.

No rational person would suggest, looking back on two years of bungled decision-making, that this resort should have been located in the national park. So many opportunities existed on the 1,000 hectares of private property for the resort, yet none were taken up. The slashing of green tape inverted common sense, preserving degraded farmland at the expense of a World Heritage National Park!

WILDERNESS MISCONCEPTIONS
TERMS OF REFERENCE 3 CONT.

by Dr Geoff Mosley

Supported as it is by the vast majority of Australians, wilderness nevertheless has some influential enemies. This is not surprising when one considers that wilderness protection is so diametrically opposite to mainstream obsessions with economic growth.

Some influential people see wilderness as a barrier to their ambitions and it suits them to try to muddy the waters. In this climate honest misunderstandings over meanings also arise.

The following is a preliminary list in alphabetical order of some of the most common myths, and distortions. The list is by no means conclusive and there is considerable overlap between the entries. My comments are in italics.

ANTHROPOCENTRIC. Wilderness is anthropocentric, being concerned first and foremost with human needs. *Although we still see nature as something separate from ourselves, a decision to deny ourselves access to all the available resources in large natural areas and to regard those places as places were natural forces will be dominant is a move in the opposite direction and could be more accurately better described as 'ecocentric'.*

BIODIVERSITY. Being selected for their value for wilderness-type recreation, wilderness areas do not make much contribution to the protection of biodiversity, and in any case, without interventionist management, any biodiversity values present will be reduced. *Wilderness areas are the last large natural areas and are chosen because of their potential for the protection of viable natural conditions. They have both biodiversity and recreational*

values. Their size provides the optimum geographic circumstances for the protection of biodiversity, geodiversity and natural processes. Additional reserves are necessary for the protection of the full range of environmental variety.

CONCEPT. Wilderness is a concept not a place. *Wilderness is no more a concept and no less a place than any other term used by humans to describe spatial differentiation. As with words like 'mountain', 'forest', national park', 'rural', 'town', the answer lies in community agreement on definition.*

ELITIST. Wilderness is elitist because it is accessible only to those fit enough to walk through the natural areas and cope with their natural hazards. *Wilderness areas are available to all those who are willing to tackle them on their own terms. They add to the range of experiences possible and hence to human freedom. They teach self-reliance and improved understanding of the environment. Walking is the oldest mode of human travel and is that which is available to the greatest number of citizens. In its inclusiveness wilderness is the opposite to elitist.*

HUMAN EXCLUSION ZONE. Wilderness is an area from which humans are excluded. *Humans are prevented from exploiting resources in wilderness and from the use of modern technology for travel (e.g. off road vehicles) but one of the main reasons for having wilderness areas is for people to be able to enjoy the special experiences they offer. Therefore they are people zones. Wilderness areas are closed to permanent settlement.*

LOCKED UP. Wilderness areas are 'locked up' and are therefore against the public interest. *This claim is similar to that of 'human exclusion zone'. Wilderness areas are locked up against materials extraction, and mechanised and other forms of damaging access but not to their highest public uses – nature conservation, scientific observation and enjoyment of the wilderness experience. Hence the phrase is inappropriate.*

NOT AUSTRALIAN. The idea of wilderness conservation is an American import. *The idea was developed in NSW by Myles Dunphy between 1914 and 1932 in response to what was seen as a local need. The National Parks and Primitive Areas Council (NPPAC – formed 1932/33) was the first voluntary group in the world to have wilderness conservation as a major objective. Dunphy and the NPPAC were inspired and encouraged by parallel developments in the USA.*

TERRA NULLIUS. Setting aside areas for protection as wilderness is insensitive to the culture, rights, interests and needs of Aborigines and is an extension of terra nullius, implying that the lands were uninhabited. *Terra nullius involved the notion that since Aborigines did not own land and occupy it in the European way it could be appropriated by colonists. Recent recognition of the existence of native title on tenures other than freehold has created a potential competition for land between Aborigines and protected areas. The wilderness movement knows that it has several things in common with the traditional Aboriginal relationship with the land including: a belief in sharing; ownership of land by the community; a sense of kinship with the environment; love of quiet contemplation of one's surroundings and an awareness of the spiritual quality of place. The conflict arises where Aborigines want to use the land for modern technological processes, have motor vehicle access or manage the land in a way which interferes with natural processes.*

NOT PRISTINE. Wilderness areas are not pristine because they have been affected by many thousands of years of occupation by Aborigines and, in some cases by Europeans for grazing, timber extraction, mining, etc. *Wilderness conservation has never claimed that the environment in wilderness areas is unaffected by such occupations – although they believe that the impact varied from area to area. What is said is that the areas selected are those that have the capacity over time and under the influence of natural forces to return to a natural condition.*

Note: Wilderness conservation challenges the conceit of humans which drives their superior exploitative attitude to the environment. The reversal of the older meaning of the word from something second rate – wasteland – to something of intrinsic worth – a good-land – is a significant development in human affairs. It lays down a challenge to the prevailing economic rationalist outlook and could become a standard bearer for a reorientation of our basic environmental value system.

PRINCIPLES OF NATURE-FOCUSED PARK MANAGEMENT
TERMS OF REFERENCE 3 CONT.

A visitor management strategy that provides adequate opportunities for quiet enjoyment and ensures the preservation of aesthetic and natural values would have five main principles:

- All activities should be governed by the plan of management;
- No visitor accommodation on-park;
- The majority of each park should be subject to wilderness-style management with suitable areas on the edges set aside for motor vehicles;
- Vehicle access should be on formed 2WD roads approved for use by the plan of management;
- Low key facilities such as picnic tables and basic camping grounds should be located near park boundaries.

Limited high quality road access on the edges of parks and good quality low-key facilities are the key to appropriate visitor management. Almost all heavily used park areas are within an hours walking distance of a vehicle access point. There are some exceptions to the above rule, such as the very attractive Main Range in Kosciuszko National Park and most scenic parts of the Budawang National Park, but they are few.

These five principles can be elaborated on to construct ecologically sustainable park management policy:

1. Equity for future generations and wildlife

Since the primary purpose of national parks and reserves is the preservation of the natural environment, equity considerations should be for nature itself and not the access demands of high-impact recreationists, including recreational hunters. In the small part of the State set aside for conservation, high-impact recreation users' case for equity of access should be

subordinate to the interests of those without a voice — future generations, wildlife and the wild places themselves.

The above policy setting is prescribed by the management principles of the *National Parks and Wildlife Act, 1974*, which are themselves enshrined into the objects of that Act (see section 2A(1)(d)). Section 30E of that Act states that 'A national park is to be managed in accordance with the following principles: … (e) provision for sustainable visitor use and enjoyment that is *compatible with* the conservation of the national park's natural and cultural values.'

2. Manage core areas to be free from vehicles

Core areas of NSW parks should be kept free of public access for vehicles and other high-impact users. Management and fire trails should be closed and kept closed to the public.

This provision is in keeping with the precautionary principle, one of the three principles of ecologically sustainable development through which the objects of the *National Parks and Wildlife Act, 1974* are to be achieved.

Motorised transport is an anathema to wilderness; as Myles Dunphy said, "The only way to conserve valuable wilderness is to place an embargo on roads in relation to it" (1934). In 1935, Myles Dunphy told the NSW Minister for Mines and Forests, Roy Vincent, that the road is the greatest avenue of damage to forests and the destruction of wildlife and habitat, fire, illicit hunting, dust of traffic, noise, acts of irresponsible persons, picnic refuse and travellers, filth, water pollution, plant theft, broken glass, rubbish-dumping and dilapidation caused by sheer numbers.

In 1938 Marie Byles, a notable bushwalking conservationist of the time, warned of the mistakes made by America. The initial mistake was to regard it sufficient to dedicate lands as parks. She argued that there must also be wilderness that will stay wilderness for all time. Even in the 1930s, expansion of tourist roads and mass marketing had caused motor tourists to flock to parks, damaging wilderness and environmental values.

Today, the potential for environmental damage from vehicles is exponentially greater. Off-road vehicles, first produced during the war, are now nearing plague numbers. A network of fire trails and tracks for past logging, grazing and mining activities traverse nearly all wilderness areas, leading vehicle-based lobby groups to demand access for all. They ignore the soil erosion and stream bank degradation caused by their activities.

Fire trails used for vehicle recreation divert precious public funds into restoring and upgrading tracks in remote areas. This takes funds away from pressing pest control and nature conservation objectives.

Vehicle access tracks interfere with the movement of small mammals that do not cross bare areas. A road, which divides the critical habitat of a population of small mammals, may create two or more doomed populations that may exist for a time before dying out. Loss of adequate living space can also cause genetic effects in wildlife populations, such as inbreeding and a reduced ability to adapt to ecological changes. Roads assist invasion and

foraging by foxes and dogs, enabling them to expand their hunting range to prey on formerly isolated populations of threatened species, such as the smaller wallabies.

Rare species existing at low densities or needing large areas of habitat are the first to suffer from this kind of habitat fragmentation. These animals rely on wilderness for their long-term survival.

Road verges also encourage distribution of weeds brought in by motor vehicles. An example is the noxious weed scotch broom, which spread out from fire trails used by recreational vehicles at Barrington Tops.

3. No horse riding in national parks

The use of national parks for horse riding is opposed by the conservation movement due to the damage caused to natural values (see detailed submission, **Attachment D**).

The reversal of the precautionary principle in relation to horse riding by the Office of Environment and Heritage is inappropriate.

The domestic horse is an excellent vector through which to disperse parasites and weeds into remote wilderness. Allowing horse riding in wilderness must draw into question *P. cinnamomi* management or any pathogen quarantine.

Park visitors would be disinclined to comply with a visitors code, including any quarantine measures, while the National Parks and Wildlife Group argues that its scientific management finds piles of horse manure an acceptable impact for wilderness areas. A 1997 NPWS report found that horse riding caused severe impacts in nine parks and reserves. Since that time the level of use related damage has increased.

4. Regional studies before regional plans

Collecting data on the relative environmental impacts of user groups is a prerequisite for regional access management. Regional tourism planning should identify 4WD and horse riding opportunities outside national parks and reserves.

National parks and reserves offer opportunities for nature-focused recreation. These appropriate visitor use opportunities are located at the low-impact end of what is called the 'recreation opportunity spectrum' (Clark and Stakely, 1979). These forms of recreation are *compatible with* the preservation of the heritage and natural values of national parks and reserves (see policy 1 above).

High-impact recreation opportunities for 4WD vehicles and horse riding should be provided off-park on public and private lands where they are more compatible with natural resource extraction and sustainable use. The vast area outside parks and reserves, over 90 per cent of NSW, is available to all.

Visitor use of parks is based around key sites or features, generally with some provision of visitor facilities (Macris, 2008a). These nodes (or honey-pot sites) are often subject to visitor-based management. Allocating park visitor management resources to these sites and access to them, rather than facilitating further dispersion of visitor impact across parks and

reserves, ensures the most economically efficient allocation of management money and human resources.

All parks and reserves are environmentally sensitive areas. Regional environmental studies for vehicle and horse riding opportunities in national parks and reserves should be restricted to approved and maintained, two-wheel drive suitable public roads linked to visitor nodes.

In addition to being efficient use of investment in visitor facility dollars, it ensures improved amenity at the honey-pot sites, reduced damage from dispersed vehicle-based visitor activity and enhanced protection of wilderness values.

The Plan of Management (POM) provides, as it should, that only certain roads identified in the POM are available for public vehicular use; there is no legal possibility of providing other such roads in the zone without amending the POM.

There is a considerable danger in recreational zoning of large areas for higher-impact activities and/or development. For example, if an area which includes a public or park road is designated a 4WD vehicle zone, this may mean to some that the whole area could later be made available for an expansion of motorised recreation. At the least, expectations could be created that are not what the zoning intended (Catford, 2003).

Similarly, a large tourism zone would create the expectation that resorts could be constructed anywhere is such a zone. For this reason the current practice of park management plans identifying the location of particular facilities and roads on a map should be continued. Afterall, if the public is to use these facilities, then there should be a map of where these facilities are located, or intended to be located, so that the public may access them.

5. Public access should be subject to park and reserve plans of management

All public access in national parks and reserves should be subject to due process. Consideration of proposals for access of existing roads and tracks should not be delegated outside of the plan of management process. Only roads specified on a map by a plan of management should be available for public use. This official map will provide certainty and guidance not only to park visitors and the tourist industry but also to publishers and advertisers.

Proposed new roads and major track work should be subjected to a development application, public exhibition and review process, as well as plan of management review processes. This is no less a prescription than that applied to private land where only development applications that are compatible with the local environmental plan can be determined by decision-makers.

Concessions for exclusive private visitor use and new vehicle access routes should not be provided in parks. Wilderness proposals were subjected to four rounds of public consultation, the Bicentennial National Trail was never subjected to environmental impact assessment, public consultation or a development application. As a result many wilderness areas were cut in two by the Trail, which now takes a presumptive management priority over these wilderness areas.

6. Regional tourism planning should protect core park areas and encourage off-park nature based tourism

The most appropriate strategy to limit the spoiling effects of overcrowding is to protect core park areas from vehicles and incursion by other high-impact users, while at the same time encouraging use of the newly established regional parks where adequate picnic grounds should be provided, subject to environmental impact assessment, public comment and review. Outside the NPWS estate, use of other public (Crown) lands where high-impact recreation can be more appropriately accommodated should be facilitated, as recommended by the 1979 SPCC off-road vehicle inquiry.

7. Develop visitor facilities in adjoining towns

The provision of appropriately located accommodation in adjoining rural settlements should be enthusiastically embraced by the National Parks and Wildlife Group and networked with existing park facilities at visitor nodes. 'The Gateway Concept' has seen successfully regulated visitor use in the United States (except where it has become a 'bridge-head' for ingress of commercial interests into the parks).

The provision of facilities off-park benefits rural communities and boosts the economic vitality of struggling villages and towns. The facilities can tap into existing utilities, instead of constructing these in park areas. Sewage treatment and waste disposal are then efficiently addressed and do not encourage pest species within protected areas.

8. Only basic visitor facilities should be provided in parks

Facilities within parks should be restricted to an essential minimum needed to protect natural values, and car parks, toilets and basic camping facilities appropriately located toward the edges of the park. An appropriately located visitors centre could be located on the edge of one park in each region of NSW but caravan parks, commercial or private huts and resorts should not be established as these drain resources away from conservation management.

9. Commercial access should be limited to approved public roads

The place for commercial activities that require major visitor facilities or that are not nature-focused is outside parks. Commercial visitation should be restricted to nature-focused activities and commercial vehicles should be restricted to public roads approved for commercial use by a plan of management. Commercial activities should not be granted exclusive access to any road or part of a park.

10. Parks should not be subject to site-hardening to provide for commercial use

Commercial access must not be determined by the aspirations of tour operators. Commercial use of vantage points and other places of interest accessed by roads should be limited by the setting (as determined by the potential impact on the quiet enjoyment of other park users, land capability and recreational setting assessments). Site-hardened areas should not be expanded to accommodate commercial or increased public use within parks (e.g. no enlarged car parks).

11. Information and Education

Park information should focus on natural and cultural heritage values, not the promotion of parks as playgrounds for visitor groups. This provision stems from the objects of the *National Parks and Wildlife Act, 1974.*

12. Formed walking tracks inappropriate in core park areas

High quality walking track access should be based on existing facilities, and must by necessity and economic constraints be short and near places of interest (e.g. to viewing platforms and board walks). This will ensure that the public gets the most use of park facilities.

These routes should be located on the edges of parks and should cater for inexperienced park visitors.

13. Access for Special Groups

There is adequate scope for all sections of the community to enjoy parks by reason of the provision of thousands of kilometres of public roads and the formed walking tracks radiating from them within the parks (commercial tourism operations and the disabled can and do use and enjoy these roads and tracks).

14. Phase Out Alien Use Access Agreements

The NPWS should continue to vigorously resist proposals by government agencies and corporations for the construction of towers, powerlines, roads and other alien infrastructure in parks. Alien use agreements should aim to phase out these uses. The term alien use is appropriate for all activities that are not nature-focused.

15. Maintenance of natural quiet

Low flying aircraft must be excluded from parks, including helicopters. Tourist joy flights ruin the enjoyment of those on the ground (e.g. the joy flights at Uluru National Park). All wilderness areas should be subject to a 10,000 feet minimum flying height agreement between the NPWS and Air Services Australia. No aircraft should be allowed to land in parks, except for emergency, rescue and essential park management purposes.

16. No hunting in parks

Use of firearms in parks should be rejected. Weapons cause serious conflicts with other users' perceptions of parks as wildlife sanctuaries, put at risk park visitors and managers, and interfere with effective pest management.

17. No privileged off-road equestrian and vehicle access

The NPWS policy of access for all by well-formed 2WD public roads approved by a park plan of management should be retained.

Access for vehicles (including horses) using management trails should be rejected by this Inquiry. This practice is not consistent with minimising the environmental impacts of visitor usage.

18. Apply traffic calming to park roads in park areas

The objective of park access management should be to get people out of vehicles to appreciate park environments. To reduce the conflict between park users, the principles of traffic calming should be applied to public park roads and vehicle speeds limited to 60 km/h or even 40 km/h to protect wildlife and recreational park visitors (e.g. Lane Cove National Park visitor areas).

19. No 'traditional' access by horse or vehicle

Acceptance of a 'traditional' access philosophy for horse or motor vehicle will lend support to demands for other traditional uses of parks, such as bee keeping, hunting, logging, grazing, mining, fishing and brumby running.

Such forms of exclusive use remain incompatible with current tenures as national parks or nature reserves. Farmers don't graze sheep in Pitt Street simply because it was once a traditional use of the area.

The claim of traditional use is a flimsy argument. It seeks to elevate the priority traditional access above its detrimental environmental impacts on park heritage values and other park visitors on the grounds that it used to happen when the land was managed for primary production.

20. Phase out inholder access

The NPWS should develop a program of establishing either formal access agreements with landowners similar to those that have been proposed for some alien uses or develop an amended form of Controlled Access System agreement with affected landowners. These agreements should be phased out as inholdings are voluntarily acquired.

21. Bicycling should be confined to public roads

The Colong Foundation for Wilderness supports the use of bikes on roads, including fire trails, that are approved for such purpose through a reserve plan of management. Cyclists should not ride on walking tracks due to impacts on track quality and safety considerations (c.f. footpaths). Bicycling in wilderness areas is inappropriate.

Tracks built exclusively for mountain bike sport are no more appropriate than ovals and golf courses in national parks. These facilities are for a sport (mountain biking), not the appreciation of heritage values. The construction of new exclusive mountain bike tracks would be an inappropriate diversion of limited resources to a new inappropriate sport that damages park values. Mountain bike use will always be a minority park use compared to the walking public. Bike riders have vast amounts of legal access in the form of thousands of kilometres of roads in parks, including management roads. For these reasons, the diversion of funds from nature conservation is unjustified.

Bike events that require major track works and visitor facilities to cater for very large numbers would be beyond the scope of any activities conceivably compatible with the nature conservation purpose of national parks.

22. No bee keeping

No bee keeping should be allowed in parks as these exotic species are ecological pests that accelerate 'unnatural' ecological change (see previous section for the environmental impacts of keeping honey bees in parks and reserves).

23. Wild rivers should be managed by NPWS:

A memorandum of understanding between the Office of Water and the NPWS and legislation should transfer responsibility for waterways in parks to the NPWS. Wild rivers outside existing parks also should be protected by legislation.

24. NPWS should regulate fisheries in parks:

Legislation should be enacted to transfer the responsibility for fisheries management in parks to the NPWS. Fish are wildlife or pest species, and on-park management should be by the National Parks and Wildlife Group charged with the responsibility of protecting wildlife, not by the authority responsible for managing the sustained yield of fisheries.

IRREPLACEABLE BENEFITS OF WILDERNESS

Australia's remaining wilderness areas are shrinking, biological 'islands' in an expanding sea of exploited land. The number of species that can survive on these 'islands' decreases as the 'islands' become more fragmentated.

But there is hope, if only we can get governments, citizens and opinion leaders to understand the undeniable and irreplaceable benefits of wilderness.

Wilderness holds a genetic store of unimaginable wealth. Only in wilderness could the Wollemi Pine (*Wollemia nobilis*) survive unknown for 200 years of European occupation. In the relative stability of the deepest canyons of our largest forest wilderness, these 30-metre trees survived 100 million years of climate change. Their discovery has brought home to the world that Australia's wilderness contains biological treasures of great importance to science and society. Opportunities yet to be grasped in our wild places include examination of the medicinal properties of native plants known to Aborigines, such as certain grevilleas, and opportunities for improving pasture contained in the genetic resources of our rapidly diminishing native grasslands.

The significant variation in altitude, soil and terrain in the wilderness areas on Australia's eastern seaboard may provide the essential opportunities for wildlife to relocate in response to global warming.

The rare and isolated plant populations and ecosystems of today are the survivors of previous warmer and wetter climatic conditions. They may be essential to the ecosystems of tomorrow.

Wilderness provides opportunities to study responses to climate change in environments where other types of disturbance is minimal. Such studies may enable scientists to recommend appropriate measures for wildlife survival in fragmented habitats where extinctions are likely, and how to adapt fire management and farming practices to a warmer world.

Our ability to retain wilderness is a key indicator of whether the Australian environment as we know it is environmentally sustainable. For example, to cease building wilderness-flooding dams Australians need to stop wasting fresh water. It is more important than ever to stop clearing native vegetation, reverse soil erosion, tree dieback, river salination and salt scalding of agricultural lands, to cease pesticide contamination of food crops and contain urban pollution and sprawl.

Wilderness, the ultimate self-sustaining natural system, provides the necessary inspiration for an ecologically sustainable society. Its undisturbed catchments also supply a higher, more constant water yield and quality than disturbed catchments. It also reinforces the viability of fresh water native fish populations and other aquatic life.

Wilderness has provided inspiration to philosophers such as Henry Thoreau and Aldo Leopold, and the Australian poet Judith Wright. The best opportunities for solitude and peace are found in wilderness . The wilderness has an enviable track record as a source of spiritual renewal and in providing an insight into humanity's place in nature.

Wilderness offers protection to the 40,000-plus years of Aboriginal history by helping to keep cultural heritage sites isolated and secret. Wilderness has enriched all our lives with art.

Who can deny the artistic impact of Peter Dombrovskis' image of Rock Island Bend — initially a campaigning tool to help stop the Franklin Dam and more recently seen as marking a turning point in Australia's environmental and political history.

Whether we see wilderness conservation as pragmatic resource management, whether we treat wilderness as a scientific store-house of natural diversity or an object of beauty — and therefore a source of human creativity and spiritual peace — the future of the Australian wilderness is inextricably bound up with the quality of human life on this planet.

Thank you for the opportunity to make this submission.

Yours faithfully,

Keith Muir
Director
The Colong Foundation for Wilderness

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Attachment A

Forests Assessment

Natural Resources Commission

GPO Box 4206

Sydney NSW 2001

23rd October, 2009

To whom it may concern

We are encouraged by the Natural Resource Commission's investigation of how best to conserve, protect, use and manage the river red gum forests of the Riverina in New South Wales. These forests are not sustainable under current management practices. Increases to environmental flows, and removal of logging, firewood collection and grazing from many areas will help ensure the sustainability of this important, unique ecosystem. We have a long history of research within river red gum forests and woodlands. Below we provide a summary of relevant research that will inform the management of these forests.

Yours sincerely

Dr. Shaun Cunningham

Professor Ralph Mac Nally (ACB Director)

Australian Centre for Biodiversity
School of Biological Sciences
Monash University 3800

Forest Condition

We recently mapped the condition of river red gum stand along the Victorian Murray River Floodplain (Cunningham *et al.* 2007a). This involved development of a quantitative method for assessing stand condition (Cunningham *et al.* 2007b) , which has since been adopted by the Murray-Darling Basin Authority to assess the condition of forest in the Living Murray Icon Sites (Souter *et al.*, 2009). We surveyed stand condition 140 sites on the floodplains of the Victorian Murray River, used this survey data to build a model that predicted stand condition from remotely-sensed environmental variables and tested the predictions of the model with a follow-up survey. This approach is cited in the Preliminary Assessment Report (p.51) by the statement "Based on the results of 140 sites surveyed", which suggests it was simply a field survey and not a landscape map based on remote sensing and rigorous modelling. Predictions of the model were robust and the model was used to produce a map of stand condition across the whole Victorian Murray River floodplain (103 000 ha of forest). The map indicated:

- only 30% of river red gum stands across the Victorian Murray River Floodplain are in 'good' condition.
- a downstream decline in the stand condition of river red gum forests and woodlands along the Victorian Murray River Floodplain.
- the Victorian Riverina is the only region where the majority of river gum stands are in good condition.

We have been contracted by Murray-Darling Basin Authority to use a similar approach to build a tool that will predict stand condition of river red gum and box woodlands in the Living Murray Icon Sites annually, using current ground assessments and remotely-sensed data. The current results of this work will soon be released in a report to the MDBA. This year we conducted a survey of stand condition across the whole Murray River floodplain, including Millewa, Perricoota and Koondrook forests, and the River Murray channel in New South Wales. These assessments were successfully predicted from Landsat imagery using an artificial neural network. This is the first of three years (2009-2011) of modelling required to build the above tool. The 2009 Stand Condition Model was then used to map stand condition across the Murray River floodplain in 2003 and 2009.

Environmental water

Our stand condition map of the Victorian Murray River Floodplain suggests that current watering regimes (rainfall and flooding) below the Yarrawonga Weir are insufficient to maintain the majority of river red gum stands (76% of the area) in good condition. The change in stand condition predicted by the 2009 Stand Condition Model between 2003 and 2009 showed improvements in areas that have received environmental watering over this period. A field experiment in the Mallee has shown that survival of river red gum saplings (1 m high) is significantly higher in flooded creeks (83% survival after 25 weeks) than unflooded creeks (27% survival after 25 weeks) after flooding (Horner et al., unpublished) We have also found that the abundance of the yellow-footed antechinus (a small marsupial carnivore) dramatically increased (222%) in the first breeding season following an environmental water allocation and continued to increase (391%) after flooding the following year (Lada *et al.*, 2007). Regular flooding is critical to the survival of both animal and plant species within these forests and woodlands.

Thinning

Our research provides insight into the effectiveness of environmental thinning in these forests. First, we conducted an extensive survey of the condition and structure (size distribution, basal area, density, etc) of stands across the whole Victorian Murray River floodplain (176 stands across 100 000 ha of forest. Stand condition was found to have little relationship to stand structure, with a slight positive influence of basal area on condition (Cunningham *et al.*, in press). This is simply a result of higher basal area stands occurring on more productive sites (e.g. naturally higher flooding frequency). In contrast, longitude had a strong positive influence on stand condition, with stand condition being higher in the east of the Murray River floodplain where flooding frequencies are higher. This suggests that dieback of these floodplain forests can not be mitigated by altering stand structure and instead requires increased water availability through flooding.

Second, we have analysed a 42-year growth trial from Barmah Forest to investigate the effect of planting density on the structure and dynamics of red gum forests (Horner *et al.*, 2009).

Highest density stands (8000 trees ha^{-1}) are now dominated by many slender trees, mostly < 10 cm in diameter, whereas the lowest density stands (600 trees ha^{-1}) produced size distributions with a wider range of stem diameters and higher mean and maximum stem diameter. After 1996, mortality increased dramatically in high-density stands (> 1000 trees ha^{-1}), yet remained unchanged in low-density treatments (600 and 1000 trees ha^{-1}). This elevated mortality coincided with increased temperatures and a sharp decline in water availability due to a lowering of the water-table, reduced flooding and a substantial rainfall deficit.

Third, we used a 42-year thinning trial from Barmah Forest to investigate the effects of pre-commercial thinning on long-term patterns in habitat quality, forest structure and rates of carbon storage (Horner *et al.*, in press). Early thinning (270, 560 and 750 trees ha^{-1}) of naturally regenerating stands improved habitat value by producing 20 (± 8) hollow-bearing trees ha^{-1} after 42 years, while the unthinned treatment (~4000 trees ha^{-1}) produced none. Moderately thinned stands (560 trees ha^{-1}) had the highest aboveground carbon storage rate (4 t C yr^{-1}) and the highest aboveground carbon stocks (200 ± 10 t C ha^{-1}) after 42 years, while the unthinned treatment had the lowest carbon storage rate (2 t C yr^{-1}) and an intermediate level of aboveground standing carbon (165 ± 31 t C ha^{-1}).

The long-term trials suggest that early thinning of high-density (> 1000 trees ha^{-1}) stands may improve their chance of surviving the continuing dry conditions, ensure they produce large trees (and therefore hollows) and increase aboveground carbon storage. However, our extensive study in Victoria only found stands < 800 trees ha^{-1}, suggesting that these high-density stands are rare along the Victorian Murray River. This is probably due to past logging practices and the rarity of flooding events. Furthermore, dieback of river red gum still occurs in low-density stands under the current climate and flooding regimes. Therefore, based on this research thinning of river red gum forests is ultimately unlikely to reduce their susceptibility to dieback. Instead increased water availability through flooding is required to mitigate the dieback of river red gum along the Murray River.

Harvesting of forest products

We have conducted a large-scale experiment that manipulated the amounts of coarse woody debris (fallen timber) in river red gum forests on Gunbower Island. Birds and the only understorey small mammal species, the yellow-footed antechinus were surveyed before and three years after experimental changes in the wood loads. Increasing the wood load increased the species richness of birds and the abundance of several bird species (Mac Nally, 2006; Mac Nally & Horrocks, 2007a) and the abundance and breeding success of antechinus (Mac Nally & Horrocks, 2007b). Therefore, exclusion of firewood collection from these forests will lead to an increase in animal diversity and population viability.

Domestic stock grazing

We have a project investigating the influence of flooding and grazing on the regeneration capacity of river red gum. Part of the project is a field trial in the Mallee to assess the effects of grazing and flooding on recruitment of seedlings and saplings in anabranch creeks. Grazing (feral and native) significantly reduced the survival of seedlings (from 27.5% to 1.3%) and saplings (from 69.6% to 40.8%) after 25 weeks (Horner et al., unpublished).

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Attachment B
North East Forest Alliance submission to Inquiry into the Australian forestry industry

Dailan Pugh, North East Forest Alliance, March 2011

This submission addresses aspects of the following terms of reference of your committee:

This submission relates specifically to north-east NSW and comments herein, unless otherwise stated, are specific to the North East Regional Forest Agreement region.

This submission relies upon recent audits undertaken by the North East Forest Alliance, notably:

Pugh, D. (2009) Preliminary Audit of Yabbra State Forest Compartments 162 and 163. North East Forest Alliance, December 2009.
http://nefa.org.au/wp-content/uploads/2011/02/Audit_Yabbra_Dec2009.pdf

Pugh, D. (2010a) Preliminary Audit of Yabbra State Forest, Compartments 162 and 163', Supplementary Report. North East Forest Alliance, 1February 2010.
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http://nefa.org.au/audit/Doubleduke/Prelim_Audit_Doubleduke_SF_1.pdf

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http://nefa.org.au/wp-content/uploads/2011/02/Audit_UNE_Forests_Feb2011.pdf

Sparkes, M (2010) Five Years of Proven Forestry Breaches. North East Forest Alliance, September 2010 .
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RECOMMENDATIONS

1) **The Inquiry needs to reassert that the establishment of comprehensive, adequate and representative reserve systems that satisfy the national criteria (JANIS 1997) is the primary requirement for Ecologically Sustainable Forest Management. The inquiry needs to recognise that the forest reserve system in north east NSW does not satisfy the national criteria. To improve compliance with the national reserve criteria and the North East Regional Forest Agreement it is requested that the Inquiry:**
    i) **Report on the current shortfalls in attainment of the JANIS reserve criteria in north-east NSW and identify means of redressing gross deficiencies;**
    ii) **Investigate the failure of the Commonwealth to ensure accurate and timely reporting on sustainability criteria and indicators; and**
    iii) **Review compliance with all clauses of the RFA and identify actions to remedy failures.**

2) **The Inquiry needs to reassert that that the management of native forests on a sustainable yield basis, and within ecological constraints, is a fundamental requirement for Ecologically Sustainable Forest Management. The inquiry needs to recognise that public native forests in north east NSW are not being managed on a sustainable yield basis. In order to satisfy the RFA's requirement to review sustainable yields in 2006, reduce commitments in line with timber reviews and cease unsustainable logging of native forests as soon as possible, it is requested that the Inquiry:**
    i) **Investigate the failure of the Commonwealth to document, consider and account for identified criticisms of FRAMES wood assessments;**

ii) **Investigate and remedy the failure by NSW to annually report on actual versus predicted yields as required by the RFA;**
iii) **Investigate the expenditure of Commonwealth funds provided for the enhancement of FRAMES and long-term timber supplies;**
iv) **Investigate the decision to entrench and extend unsustainable logging for a further 5 years in contravention of the RFA, and for 3 years beyond the expiry of the RFA;**
v) **Investigate the failure of Forests NSW to satisfy current Wood Supply Agreements;**
vi) **Require an immediate independent review of the new FRAMES wood assessments that accounts for previous criticisms and specifically identifies the sustainable yield from native forests; and,**
vii) **Identify means of reducing the logging of native forests to a sustainable level as soon as possible.**

3) **It is suggest that the Inquiry consider the issue of public forest management arrangements and consider recommending separating policy and regulation from operations. Any such system would be enhanced by allowing members of the public third party appeal rights.**

4) **The inquiry needs to recognise that forestry operations can and do have significant impacts on inadequately reserved, rare and endangered ecosystems. In order to appropriately protect inadequately reserved, rare and endangered ecosystems, it is requested that the Inquiry:**
   i) **Require the identification of the reservation status of all forest ecosystems in accordance with the RFA;**
   ii) **Review the management arrangements for values protected in informal reserves and by prescription;**
   iii) **Review the poor management of forest ecosystems intended to be excluded from logging; and,**
   iv) **Identify appropriate management arrangements for each inadequately reserved, rare and/or endangered ecosystem.**

5) **The inquiry needs to recognise that forestry operations can and do have significant impacts on a range of native plants and animals and that many current prescriptions are inadequate and inadequately applied. In order to appropriately protect nationally rare and endangered plant and animal species, it is requested that the Inquiry:**
   i) **Identify the reservation status of all nationally threatened species;**
   ii) **Engage appropriate experts to review the adequacy of prescriptions applied to safeguard threatened species in logging operations; and,**
   iii) **Review the application of prescriptions in logging operations and identify means to improve their implementation.**

6) **The Inquiry needs to recognise that forestry operations do cause soil erosion and do have a significant impact on streams, and that Forests NSW go out of their way to avoid external regulation and the application of Best Management Practices to protect stream quality. To ensure the application of best management practices to minimise the impacts of forestry operations on soil erosion and streams it is requested that the Inquiry;**
   i) **Engage appropriate experts to identify performance standards and review the adequacy of prescriptions applied to safeguard streams and water quality in logging operations;**
   ii) **Ensure independent regulation by requiring application of Environmental Protection Licences to all logging operations;**
   iii) **Ensure that Forests NSW comply with the requirement to assign FMZ8 areas to the appropriate protection zone; and,**

iv) **Identify measures needed to improve compliance with requirements.**

7) **The Inquiry needs to recognise that logging has significant impacts on water yields from native forests, such that:**
   i) **Reduction of mature and oldgrowth forest to younger growth stages will cause a significant reduction in water yields;**
   ii) **Water yields will increase with increasing forest maturity; and,**
   iii) **Logging should be excluded from significant water catchments.**

8) **The Inquiry needs to recognise that Bell Miner Associated Dieback is a significant threat to native forests and that appropriate management involves:**
   i) **Identifying and mapping all affected and susceptible areas;**
   ii) **Placing all affected and susceptible areas under a logging moratorium until such time as appropriate management responses that maintain ecosystem functioning are identified; and,**
   iii) **Undertaking rehabilitation works (i.e. weed control) in affected stands.**

9) **The Inquiry needs to recognise that logging has significant impacts on carbon storage in native forests, such that:**
   i) **Reduction of mature and oldgrowth forest to younger growth stages will cause a significant reduction in carbon storage in forest;**
   ii) **Carbon storage will increase with increasing forest maturity;**
   iii) **Large trees are particularly important for carbon storage; and,**
   iv) **Forests should be managed so that they are carbon sinks.**

10) **The Inquiry needs to recognise that NSW's Wood Supply Agreements distort the hardwood sawlog market and are for excessively long periods. The Inquiry needs to recommend that every opportunity should be taken to reduce the volumes committed and reduce the length of the agreements.**

11) **It is requested that the Inquiry recognise the market distortions and lack of transparency caused by NSW's amalgamation of plantations and native forests for resource allocation and reporting and recommend separate reporting of native forests.**

12) **The Inquiry should recognise that the accreditation of timber being obtained from north-east NSW's forests as coming from ecologically sustainably managed forests and legal sources risks Australia's international reputation and credibility of its accreditation programs.**

13) **The Inquiry needs to recognise that forests have both use and non-use values that need to be taken into account when identifying the costs and benefits to the community from use of public forests. Use values include timber, water supply, carbon storage, recreation and tourism, all of which are usually compatible except logging. Non-use values include aesthetics, wildlife, ecological function value, option value, existence value and bequest value.**

14) **The Inquiry needs to acknowledge that logging of public native forests in NSW does not pay a resource rent to the community and is operating at a considerable financial loss. It also needs to be recognised that costs are rapidly escalating and timber volumes declining. The Inquiry needs to identify means of removing public subsidies to the timber industry and returning a resource rent to the community from the commercial use of public resources.**

1. Opportunities for and constraints upon production

NEFA considers that management of native forests has to be in accordance with the principles of Ecologically Sustainable Forest Management and the agreed national framework for forest management. Full and proper compliance with these requirements has to be the primary constraint upon production. This entails:

1. Establishment of a comprehensive, adequate and representative reserve system in accordance with JANIS targets as a minimum;
2. Implementation of adequate off-reserve management to adequately protect fauna, flora, soils and streams, including by application of Best Management Practices as a minimum;
3. Limitation of logging from native forests to a sustainable yield within the proceeding constraints.

Points 1 and 3 are dealt with in the following sections 1.1 and 1.2 respectively. Off-reserve management is dealt with in Section 2 of this submission.

1.1. Regional Forest Agreements

The concept of 'ecologically sustainable development' has been adopted by the world community as the solution to our rapidly deteriorating global environment. The generally accepted definition of 'sustainable development' is that provided by the World Commission on Environment and Development: development that *"meets the needs of the present without compromising the ability of future generations to meet their own needs"* (RAC 1992).

The National Strategy for Ecologically Sustainable Development (1992) includes

> *Objective 3.2*
> ***to maintain ecological processes within the forests, maintain biodiversity, and optimise benefits to the community from all uses, within ecological constraints***
> ***Governments will:***
> - *determine agreed criteria for a comprehensive and representative reservation system*
> - *protect old growth forest in a representative reserve system as the primary means of protection, supported by complementary management outside reserves*
> - *protect all forest wilderness areas in reserves*
> - *develop a dedicated and secure nature conservation reserve system, containing comprehensive, replicated, adequate and representative areas of all major native forest ecosystems and other listed values*
> - *address biological threats to forests; ...*

The National Forest Policy Statement (CoA 1992) was signed by the then Prime Minister and Premiers of all the mainland states in 1992. In signing the National Forest Policy Statement (NFPS) the States committed themselves to establishing a comprehensive, adequate and representative (CAR) reservation system by the end of 1995 for public lands (with the inclusion of necessary forest from private land by 1998) and developing codes of practice for logging based on consistent nationwide baseline environmental standards (CoA 1992).

It took NSW until 1998 to establish a reserve system for public lands in north east NSW that falls well short on the CAR criteria. The baseline environmental standards were abandoned by the forestry agencies before they were finished being developed. While NSW still does not have quantifiable performance standards it does have a suite of logging protocols for public lands.

The National Forest Policy Statement (CoA 1992) states:

> *The nature conservation objectives are being pursued in three ways. First, parts of the public native forest estate will continue to be set aside in dedicated nature conservation reserve systems to protect native forest communities, based on the principles of comprehensiveness, adequacy and representativeness. The reserve system will safeguard endangered and vulnerable species and communities. Other areas of forest will also be protected to safeguard special areas and to provide links where possible between reserves or other protected areas. Nature conservation reserves will be managed so as to protect their values. Second, there will be complementary management outside reserves, in public native forests that are available for wood production and other commercial uses and in forests on unallocated or leased Crown land. Third, the management of private forests in sympathy with nature conservation goals will be promoted.*
>
> *…*
>
> *Ecologically sustainable forest management will be given effect through the continued development of integrated planning processes, through codes of practice and environmental prescriptions, and through management plans that, among other things, incorporate sustainable-yield harvesting practices.*

Forests NSW (2005) ESFM Plan notes:

> *The National Forest Policy Statement (NFPS) identifies protection of the full range of forest ecosystems and other environmental values as being fundamental to ecological sustainability. This entails the maintenance of ecological processes, biodiversity and the protection of water quality.*

The principal biodiversity conservation outcome of the NFPS was the establishment of the principles of 'comprehensiveness', 'adequacy' and 'representativeness' as the basis for developing reserve criteria from which to review and establish reserve systems to protect the conservation values of forests. These three key words are defined in the NFPS as:

- *comprehensiveness - includes the full range of forest communities recognised by an agreed national scientific classification at appropriate hierarchical levels;*
- *adequacy - the maintenance of ecological viability and integrity of populations, species and communities;*
- *representativeness - those sampled areas of the forest that are selected for inclusion in reserves should reasonably reflect the biotic diversity of the communities* (CoA 1992).

The NFPS also precipitated the development of nationally agreed criteria for the establishment of conservation reserves. It was not until 1997 that agreement was achieved on national reserve criteria called the *Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia* (JANIS 1997).

Comprehensive Regional Assessments (CRAs) were to be undertaken to identify Comprehensive, Adequate and Representative (CAR) reserve systems as a basis for developing Regional Forest Agreements (RFAs). The purposes of the RFAs are claimed to be:

> *(a) identify areas in the region or regions that the parties believe are required for the purposes of a Comprehensive, Adequate and Representative Reserve System, and provide for the conservation of those areas*
>
> *(b) provide for the ecologically sustainable management and use of forested areas in the regions*
>
> *(c) provide for the long-term stability of forests and forest industries, and*
>
> *(d) have regard to studies and projects carried out in relation to all of the following matters that are relevant to the regions:*
>
> > *(i) environmental values, including old-growth, wilderness, endangered species, National Estate values and World Heritage values;*

(ii) indigenous heritage values
(iii) economic values of forested areas and forest industries
(iv) social values (including community needs), and
(v) Principles of Ecologically Sustainable Forest Management.

In NSW the CRA process commenced in 1996 under the auspices of Resource and Conservation Assessment Council (RACAC). A Joint Steering Committee was formed by the State and Commonwealth to oversee the process. Two of the 5 regions assessed were the Upper North East (UNE) and Lower North East. (LNE)

When negotiations commenced for north-east NSW (UNE and LNE), the Commonwealth withdrew from the process. In their negotiations for north east NSW, the NSW State agencies identified an option, which maximised the achievement of the reserve targets, subject to an artificial 'political' cut-off point of no more than 70% of the State Forest estate, even though this meant that many reservation targets were not met. With this constraint applied, the outcome identified over 1 million hectares of public land in north-east NSW as required for addition to the reserve system to best satisfy the national reserve criteria. Conservationists then applied the data without the political constraint, and identified 1.2 million hectares as required to reasonably establish a CAR reserve system for public lands in the region (Flint, Pugh and Beaver 2004).

The NSW Government Agencies were then instructed by the Government to limit the reserve system to allow the supply of 270,000 cubic metres of sawlogs per annum for 20 years, with reductions in supply volume allowable thereafter. The outcome of the State agency negotiation in early November 1998 was the finalisation of a 'State Agency position' on reserves that identified approximately 554,000 hectares of land for reservation. This included 390,447 hectares for immediate reservation as National Parks, Nature Reserves or Flora Reserves, 20,161 hectares for reservation in a new form of Crown reserve, a further 76,106 hectares of State Forests for later reservation following resolution of mineral and leasehold interests, and 67,000 hectares of vacant Crown land for later reservation following resolution of other interests and impediments. This outcome met the specified political constraint of maintaining current timber commitments for the next 20 years. (Flint, Pugh and Beaver 2004).

The NSW Government finally decided to broadly implement the negotiated 'State Agency position', although it was reduced by 76,106ha to exclude the State Forest areas that were previously earmarked for later reservation, and a further 15 logging compartments chosen specifically by the timber industry were also removed from the position. The 67,000 hectares of vacant Crown land remained earmarked for potential later reservation, though with somewhat less emphasis than in the original position. (Flint, Pugh and Beaver 2004).

On the 12 November 1998, NSW Premier Bob Carr announced the creation of 386,627 hectares of new NPWS reserves, 3,820 hectares of new SFNSW Flora Reserves and 20,100 hectares of new Crown reserves in north-east NSW. The decision also resulted in the protection of a subset of oldgrowth forests designated as 'high conservation value', all mapped rainforest, and steep and non-commercial areas in 370,000 hectares of protected Forest Management Zones in late 1999. The outcome also included a revised set of licence conditions for Threatened species, erosion control and stream protection for off-reserve management of State Forests. The revised conditions were negotiated between State Government agencies without proper independent scientific review or any assessment of their effectiveness.

At the same time, the Government signed wood supply agreements with the timber industry committing to supply 269,000 cubic metres of large quota sawlogs for 20 years. This represented 50% of 1995 levels, and the annual volumes were phased down to this level by the year 2000. The new 20-year contracts removed existing clauses for value adding,

though included a clause that required a review of the available timber resource and sustainable yield to be undertaken by December 2006.

The decision also included major freeing of forestry operations from legislative controls by enactment of the Forestry and National Park Estate Act 1998. Existing legislation was amended so that Forests NSW's forestry operations were exempted from the *Environmental Planning and Assessment Act 1979*, thereby removing the requirement for Environmental Impact Statements and Species Impact Statements. The Act introduced ministerial discretion into the implementation of the *Threatened Species Conservation Act 1995* and the *Protection of the Environment Operations Act 1997*, prevented the application of stop work orders to forestry operations, removed third party appeal rights on forestry activities and exempted forestry from most other relevant environmental legislation including the *Wilderness Act 1987*. These changes represented a fundamental erosion of the most important legislative controls on forestry in NSW. They were implemented without any community consultation, were opposed by the conservation movement, and directly contradicted the ALPs own 1995 election policy.

NSW Forest Agreements were made between the NSW Ministers for the Upper North East (UNE) and Lower North East (LNE) in March 1999 for a period of 20 years until March 2019. They are enacted through the Integrated Forestry Operations Approvals granted under the Forestry and National Park Estate Act 1998. Regional Forest Agreements between the Commonwealth and State governments were signed for UNE and LNE in March 2000.

1.1.1. Satisfaction of Criteria

Our analyses (based on figures given in NE Regional Forest Agreement 2000) show that the 1998 decision increased the number of ecosystems achieving targets to 52 (32%), though with the inclusion of Informal Reserves and values Protected by Prescription this increased to 73 (45%). Of the total areal target, 51% was achieved in Dedicated Reserves leaving a shortfall of 372,258ha. With the inclusion of Informal Reserves and values Protected by Prescription 61% of areal targets are achieved, leaving a shortfall of 299,222 ha.

It is astounding that with 300,000 (39%) of the forest ecosystem areal targets required to be satisfied to establish a CAR reserve system in UNE remaining unmet (along with numerous other targets), both the NSW and Commonwealth Governments (Premier Bob Carr and Prime Minister John Howard) signed that reserve requirements had been met. The North East Regional Forest Agreement (RFA 66) states:

> *Parties agree that the CAR Reserve System as identified on Map 1(A) and Map 1(B) and presented in Attachment 1(A), Attachment 1(B) and Attachment 2, satisfies the JANIS Reserve Criteria.*

While it may have satisfied their respective political agendas, it clearly did not satisfy the criteria.

UNE FOREST ECOSYSTEM TARGET ACHIEVEMENT

		Ecosystem Target Achievement (no)					Areal target Achieved (%)	Areal extent of Unmet Targets (ha)
		<25%	25-49%	50-74%	75-99%	>100%		
1998	**Dedicated Reserves**	52	23	17	18	52	51%	372258
	Dedicated and Informal Reserves and Prescriptions	34	24	11	20	73	61%	299222
2004	**Dedicated Reserves**	38	22	16	19	67	58%	322675

Based on GIS reporting we updated the achievement of targets in Dedicated Reserves to take into account reserve additions up to 2004, the number of ecosystems achieving targets has only increased to 67 (41%), leaving 95 (59%) below target. 60 ecosystems (37%) have

less than half their targeted areas reserved, with 21 ecosystems (13%) achieving less than 10% of their targeted areas. 70 of the 95 forest ecosystems under target have been identified as high priorities for inclusion in the reserve system (1 and 2) in the expert workshops. 35 have been classed as rare and endangered, and 20 as vulnerable, in accordance with the JANIS criteria. This represents 90% of all rare, endangered and vulnerable ecosystems in the UNE. There are still 322,675 hectares of 95 forest ecosystems requiring reservation in formal reserves to satisfy the national reserve targets.

Due to the complexities we were not able to assess Informal Reserve and Values Protected by Prescription as at 2004, though as many of the additional reservations came from these categories the overall target achievement will not be proportionally improved.

Some 130,500 hectares of the ecosystems requiring reservation occur on public lands that remain available for the NSW government to include in Dedicated Reserves or to fully protect off reserve. It is indeed both possible and practicable for the NSW Government to increase the inclusion of required forest ecosystems in the CAR reserve system but at present there appears no will to achieve this.

The NSW and Commonwealth Governments appear intent on obscuring the extremely poor reservation outcomes in north-east NSW by failing to reveal the relevant figures. The NE Regional Forest Agreement fails to consider forest ecosystems in relation to JANIS reserve targets, referring instead to original extent.

For plant and animal species, the national reserve criteria (JANIS 1997) establishes that:

The reserve system should seek to maximise the area of high quality habitat for all known elements of biodiversity wherever practicable, but with particular reference to:

- *the special needs of rare, vulnerable or endangered species;*
- *special groups of organisms, for example species with complex habitat requirements, or migratory or mobile species;*
- *areas of high species diversity, natural refugia for flora and fauna, and centres of endemism; and*
- *those species whose distributions and habitat requirements are not well correlated with any particular forest ecosystem.*

Reserves should be large enough to sustain the viability, quality and integrity of populations.

Flint, Pugh and Beaver (2004) analysed the adequacy of the reserve system for fauna in 2004, finding;

> *A binary target assessment of all 710 fauna populations under consideration (excluding targets for bat roosts) reveals that only 217 (31% of all populations) have met conservation targets. Seventy-two of the 139 species (or 52% of species) with targets set have failed to meet target for any of their populations. Only 17 species have met target for all their populations, while the remaining 50 species have met target for at least one but not all populations.*
>
> *A proportional target analysis indicates that only 45% of fauna populations have sufficient habitat reserved to achieve 50% or more target fulfilment, and 20% of fauna populations are yet to achieve even 10% of the habitat required to meet targets. The mean target achievement for all populations across all tenures is 49%, and the target area index is 33%. The mean target achievement for public lands is 76% and the target area index is 70%.*
>
> *...*
>
> *Of the 38 fauna species ranked by the expert panel as having the highest vulnerability to threatening processes (vulnerability 1), 30 do not attain targets for any populations, and none attain targets for all populations. Only 8 species attain targets for one or more populations. Therefore, species with the highest vulnerability to threatening processes remain very poorly reserved.*

Examples of the achievement of reservation targets for particular species (Flint, Pugh and Beaver 2004) in north-east NSW (UNE and LNE) were:

- **Hastings River Mouse**, a nationally Endangered species; target was 33,969 breeding females distributed across 8 populations (of up to 4,251 females each). The outcome was the reservation of a total of 2,863 breeding females, with 8% of the mean target achieved (1-29%).
- **Spotted-tailed Quoll**, a nationally Vulnerable species; target was 4536 breeding females distributed across 4 populations (of up to 1,800 females each). The outcome was the reservation of a total of 1,201 breeding females, with 25% of the mean target achieved (10-55%)
- **Barking Owl**, a State Vulnerable species; target was 1,610 breeding females distributed across 2 populations (of up to 805 females each). The outcome was the reservation of a total of 466 breeding females, with 61% of the mean target achieved (44-79%)
- **Powerful Owl**, a State Vulnerable species; target was 756 breeding females distributed across 2 populations (of 378 females each). The outcome was the reservation of a total of 234 breeding females, with 14% of the mean target achieved (11-18%)
- **Yellow-bellied Glider**, a State Vulnerable species; target was 9,240 breeding females distributed across 8 populations (of 1,155 females each). The outcome was the reservation of a total of 1,636 breeding females, with 18% of the mean target achieved (6-33%)

These outcomes highlight the failure of the RFA to satisfy national reserve criteria and deliver on the promise of an adequate reserve system sufficient to maintain the ecological viability and integrity of fauna populations. The extremely poor reservation status of many threatened fauna species in north-east NSW emphasises the need for substantial additions to the reserve system to improve fauna conservation, as well as the strict application of strengthened logging protocols that take into account the poor reservation outcomes. Evidence from NEFA's audits is that off-reserve management prescriptions for fauna are frequently not being applied, are inadequately implemented or are negated by other forestry practices.

1.1.2. The Process is a Sham

The Regional Forest Agreement process has become a sham with numerous commitments and timelines simply ignored. The 1999 NSW Forest Agreements and 2000 North East Regional Forest Agreement identify numerous milestones that have not yet been achieved.

There are numerous examples of failures of the NSW Government and Forests NSW to deliver on commitments in a timely manner (i.e. Spencer 2009), for example the Commonwealth put great emphasis on the need for Forests NSW to complete and publish a Regional ESFM Plan for the UNE by June 2000, with failure to do so considered as grounds for annulling the agreement, yet the UNE plan was not completed until 2005

The annual implementation reports are often many years late and the 5-year reviews are 5 years late, and they often do not report on the required parameters. This is best illustrated by the flurry of activity in 2009 when the annual NSW Forest Agreements (IFOA) Implementation Reports for 2004/05, 2005/06, and 2006/07 were prepared in one go (the 2007/08, 2008/09, 2009/10 reports are still missing), the 5 year NSW Forest Agreement review was prepared five years late and subsequently expanded to also constitute the 10 year review without most information being updated, and the 5 year Regional Forest Agreement (RFA) review was undertaken four years late. These rushed generic reviews are generally superficial and simplistic tick-the-box exercises. Which play no meaningful role in ongoing implementation

In relation to the 5 year RFA review Spencer (2009) notes:

> *However, fundamentally, the first reviews should have been completed in the 2004-2006 period, i.e. five years from their initialisation. That fact these reviews have been delayed 3-4 years is of considerable concern, has reduced public confidence in the outcomes and seriously distorts the process for the future.*
>
> *...*
>
> *It also is the case that many of the specific milestones required by the RFAs simply were not delivered in the timeframe required by the RFAs. While most are now either completed or underway, unless there is a real improvement in delivery, public confidence in the RFAs is at risk.*

Forest Ecosystem Reporting

The UNE Forest Agreement 2.11.2 identifies the need to report annually on the reserve status of forest ecosystems as a *Criteria and Indicators for ESFM*. Appendix 9 states (forest type is as defined in the RFA data):

> ***Indicator 1.1.a Extent of area by forest type and tenure***
>
> ***Rationale***
>
> *To monitor the change in **forest type*** cover for the entire forest estate within the region against targets set for retention of forest types. This indicator aims to identify which forest types are increasing or decreasing in area, as a basis for adaptive management.*
>
> ***…***
>
> ***Reporting***
>
> *Area (ha) for each forest type by tenure (where available). Add narrative to describe how much of the total forest area the data refers, and to identify tenures that are not mapped or poorly known.*

The "annual" Forest Agreement Implementation Reports generally have a vague discussion regarding additions of forest ecosystems to reserves, no details of improvements in reserve targets, no mention of reserve status in State Forests and no information on private lands. As undertaken, reporting on this criterion is meaningless.

We have found that Forests NSW's planning system and Harvesting Plans ignore the CRA forest ecosystem classification and, aside from providing protection to specified "Rare Non-commercial Forest Types" give no regard to the reservation status of commercial forest types or ecosystems.

Oldgrowth Reporting

One of the CRA indicators used for reporting is "1.1.b: Area of forest type by growth stage distribution by tenure" This is meant to be reported on annually and in the 5 and 10 year reviews as a key indicator of Ecologically Sustainable Forest Management. The NE Forest Agreement (2.11.2) requires annual reporting of this attribute. Appendix 9 elaborates:

> **Rationale**
>
> *Ecological processes and the species associated with those processes, within any forest ecosystem or forest type, are associated with vegetative structures and developmental stages.*
>
> **…**
>
> ***Data requirements and Monitoring methodology***
>
> *Baseline data will be used from the RFA forest type data sets.*
>
> *Ongoing data from SFNSW tenure will be provided through operational updates to a forest management database. Ongoing data from NPWS will be provided by mapping disturbance (e.g., fire).*
>
> *Regional Vegetation Management Plans and applications for clearing licences may provide relevant information for private and leasehold land.*

Re-inventory using remotely sensed imagery may be possible across all tenures if appropriate resourcing is available.

Reporting

Report on the percent of forest estate with a mix of early, mid and late age classes. Record by the same forest types as used in Indicator 1.1.a. Report forest stands as:

- *Regeneration stands - defined as stands where the most abundant crown form is regeneration and or the year of origin indicates that the majority of trees within the stand are less than 20 years of age.*
- *Regrowth stands - defined as stands where the most abundant crown form is regrowth and or the year of origin indicates that the majority of trees within the stand are between 20 and 80 years of age.*
- *Mature stands - defined as stands where the most abundant crown form is regular and or the year of origin indicates that the majority of trees within the stand are greater than 80 years of age.*
- *Overmature stands - defined as stands where the most abundant crown form is irregular and this has been determined to be due to age.*

Changes in area over time related to forest management objectives.

In the CRA process the condition of forests was mapped from aerial photographs and assigned to the categories; Rainforest, Candidate Old Growth Forest, Disturbed Old Growth Forest, Mature Forest, Disturbed Mature Forest, Regrowth and Recently Logged. In the agency negotiations it was agreed to classify a subset of the Candidate Old Growth Forest as High Conservation Value Old Growth (HCVOG) based on limited criteria and a timber supply constraint.

The reporting on this indicator now assumes that the growth stages as applied in the CRA remain static. Since the RFA, according to Forests NSW's interpretation it is now possible to clearfell an oldgrowth forest without affecting its growth stage. The 2002/3 Forest Agreement implementation report states:

> *Growth stages within the NPWS estate and State forests have remained relatively stable. As with the previous indicator, changes have been the result of land additions and revocations.*
>
> *...*
>
> *The extent of growth stages within State forests has not changed significantly since 1999/2000.*

The Commonwealth realised this was an absurdity and included a reference to the fact that logging affects growth stages, though they did not fix the problem. As an example the NSW&CoA (2009) 5 year RFA review comments:

> *The spread of age classes across forest communities is a measure of ecosystem diversity, since the structure and species composition of forest change as the forest grows older. Sustainable forest management requires the maintenance of a full range of age classes across the Forests NSW forest estate. Old-growth forest is a priority.*
>
> *Forests are not rapidly changing systems, so monitoring of forest growth stages will not show large variations from year to year. The value of this indicator will be determined over time as the volume of data increases and trends can be identified. At this stage, any changes recorded from year to year will be primarily due to changes in land tenure and timber harvesting activities.*
>
> *There are two broad criteria that determine growth stage classes within forests – ecological maturity (i.e. dominant age class of trees and characteristics of understorey) and level of disturbance (i.e. logging and clearing) (NPWS 1999c).*

Areas of forest categorised as old-growth are areas of ecologically mature forest where the effects of disturbances are now negligible (JANIS 1997).
...
Approximately 50% of state forest tenure is excluded from timber harvesting. The remaining 50% is available for harvest and the growth stages will change to mature forest that has been recently disturbed, mature forest and young forest as operations proceed. ...

The extent of growth stages in state forests and DECC reserves remained relatively stable between 1999–2000 and 2001–02. Following the completion of the FMZ assessment in the UNE and LNE regions in late 2002, some larger changes in forest type extent and growth stage have subsequently been recorded in 2002–03 and 2003–04. The largest increases in growth stage extent were recorded on DECC reserves following the gazettal of a number of land transfers resulting from the National Park Estate (Reservations) Act 2002 and the National Park Estate (Reservations) Act 2003....

Growth stage distribution in the Forests NSW forest estate. Source NSW&CoA (2009). Mature forest includes mature, disturbed mature and candidate old growth; regrowth forest includes young forest; young regeneration includes recently disturbed forest; 'unassigned' represents no growth stage assigned.

Table 5.3: Growth stage distribution – Upper North East region

	2001–02	2002–03	2003–04	2004–05	2005–06
Forests NSW forest estate	Hectares	Hectares	Hectares	Hectares	Hectares
Rainforest	31,685	31,631	28,475	28,259	28,253
High-conservation-value old-growth	68,029	67,971	55,328	55,225	55,231
Mature forest	231,420	231,406	211,324	212,027	211,975
Regrowth forest	38,837	38,893	37,268	37,307	37,289
Young regeneration	53,670	53,667	51,742	51,758	51,798
Un-assigned	7338	7149	6302	412	6351
Totals	430,979	430,717	390,439	390,988	390,897

During the period covered by the above table, in the UNE 65,799ha was transferred to National Parks on 1/01/2003 as part of the resolution of FMZs and Wilderness and 14,573ha was transferred to National Parks on 1/07/2003 as part of the Forest Icon areas. These changes are presumably responsible for the changes belatedly identified by NSW&CoA (2009) for 2003/4, though they only appear to have been partially considered. Apart from the surprising increase in mature forest in 2004/5, and the mysterious disappearance of 6,000 ha of un-assigned forest for two years, logging appears to have had no significant impact on growth stages. There appears to be no correspondence between the data provided by DECCW and Forests NSW.

There should be discernable declines in mature forest and corresponding increases in young regeneration if logging is taken into account. It is apparent that reporting on changes in the extent of growth stages has become a meaningless exercise that demonstrates a total lack of commitment to achieving agreed outcomes and providing transparent, unambiguous accounting of the process.

Changes in extent of growth stages on State Forests and NPWS reserves. Adapted from NSW&CoA (2009) for State Forests and relevant FA implementation reports for National Parks and reserves. Note that Forests NSW do not report on candidate oldgrowth.

	2001/2 to 2002/3 (ha)		2002/3 to 2003/4 (ha)		2003/4 to 2004/5 (ha)		2004/5 to 2005/6 (ha)	
	SF	**NP**	**SF**	**NP**	**SF**	**NP**	**SF**	**NP**
Rainforest	-54ha	?	-3156		-216	+347	-6	
High-conservation value old-growth	-58ha	?	-12,643	+1701	-103		+6	0
Candidate oldgrowth		?		+2 093		+7.970		+839
Mature forest	-14ha	?	-20,082	?	+703	+1,641	-52	+989
Regrowth forest	+56	?	-1,625	?	+9	+213	-18	+341
Young Regeneration	-3	?	-1,925	?	+16	+16	+40	0
Un-assigned	-189	?	-847	?	-5,890?	+1,704	+5,939?	+231
Totals	**-262**	**?**	**-40278**	**?**	**+549**	**+11,891**	**+91**	**+2,464**

The reporting of changes in growth stages is a meaningful measure of the status of forest structure but only if it takes into account the affects of fires and logging on those growth stages, is consistently and reliably reported and identifies oldgrowth forests. Reporting on this criterion for each forest type would significantly increase its usefulness, and this appears to be the intent. Unfortunately there is no reporting of growth stages for each forest type, which should at least be presented and discussed, with any significant changes highlighted.

Carbon Storage Reporting

Reporting on carbon storage in forests by forest type, age class, and successional stages is a key requirement of the Regional Forest Agreements (NE RFA s. 2.11.2(5.1a, 5.1c)) and essential for Australia to satisfy its international obligations. Despite this explicit requirement the State and Commonwealth Governments refuse to consider carbon storage and sequestration in native forests and instead only consider carbon sequestration in plantations. This is a deliberate failing, as the Governments do not want to admit that logging reduces the carbon stored in native forests and account for this loss.

One of the requirements of the UNE Forest Agreement (2.11.2) is annual reporting on carbon storage in forests:

> *5.1a: Total forest ecosystem biomass and carbon pool, and if appropriate, by forest type, age class, and successional stages*
>
> *…*
>
> *5.1c Contribution of forest products to the global carbon budget.*

In Appendix 9 to the Agreement 5.1a is elaborated upon:

> ***Rationale***
>
> *Forests can undergo significant changes of carbon storage associated with natural mortality, thinning, fire, harvesting and regrowth. This indicator is compatible with the National Carbon Accounting System which will meet Australia's obligations to track changes in national Carbon stocks under the Kyoto Protocol.*
>
> ***Indicative target***
>
> *Maintenance of the total carbon stored in the forest.*
>
> ***Data requirements and Monitoring methodology***
>
> *Data on wood loss by natural mortality, thinning, fire and harvesting can be balanced against regrowth data to indicate positive or negative changes to carbon across the region.*

Partial reporting of this indicator can be derived from wood volume and age class data in Indicators 1.1.a and 1.1.b, provided that appropriate biometric relationships have been established. SFNSW will develop these biometric relationships based on FRAMES and will provide these to other agencies.

Reporting

Changes in Carbon held in above-ground wood volumes will be reported once biometric relationships are established. This must be interpreted as a surrogate for total forest contribution to global carbon.

The NSW&CoA (2009) five year RFA review states:

This criterion addresses the contribution to the global carbon pool of carbon from forest and forest products and contributes to Australia's obligations under the Kyoto Protocol.

...

The Kyoto Protocol requires Australia to track changes in national carbon stocks from deforestation, reforestation and afforestation activities initiated since 1990. This indicator monitors any increases or decreases in the amount of carbon stored within forest areas, forest age class and successional stage. It provides information on the changing structure of forests, eg regeneration, maturity.

...

Carbon sequestered in Forests NSW hardwood and softwood plantations is calculated for the net stocked area only. All environmental exclusions and retained native vegetation are excluded from the calculations, providing a more accurate estimation of the amount of sequestered carbon.

The amount of carbon sequestered is dependant on the area of plantation. This area changes each year because of harvesting and new plantings.

The RFA reviews only consider sequestration of carbon in plantations, they make no attempt to identify or measure changes in the native forest carbon pool due to emissions from logging and burning.

<u>World Heritage Identification</u>

Contrary to the 'Scoping Agreement', identification of World Heritage values were not specifically considered in the NE CRA process and their consideration was limited to future actions in the NE RFA. The NSW Forest Agreement identified that extensions to the World Heritage CERRA property based on the existing rainforest theme would be completed by April 2001, and the documentation of the themes of eucalypts, passive marginal swells, and Aboriginal sites by April 2002. However work on the renomination did not start until 2003 and appears to have made little progress to even expand on the rainforest theme to date.

The World Heritage listed Gondwana Rainforests of Australia (formerly Central Eastern Rainforest Reserves (Australia)CERRA) is located on the central east coast of Australia, generally occurring in disjunct reserves scattered along the Great Escarpment from near Newcastle in the state of New South Wales to near Brisbane in the state of Queensland. They have primarily been recognised for their unique array of rainforests, exceptional biodiversity, and ancient species.

The Scoping Agreement for New South Wales Regional Forest Agreements between the Commonwealth of Australia, and the State of New South Wales states:

1. The Governments recognise each other's statutory, international and policy responsibilities in regard to forests. For the purposes of each Regional Forest Agreement (RFA), both Governments agree to undertake jointly the following regional assessments:

...

(f) World Heritage values

This assessment will allow the Commonwealth to meet its obligations arising both from it being a State Party to the World Heritage Convention and from its own statutory requirements as set out in the World Heritage Properties Conservation Act 1983. The output from this assessment will be an assessment of World Heritage values of the forested areas of New South Wales.

In 1998 Australia established a 'World Heritage Expert Panel' to identify places of possible outstanding universal values in forested areas as part of its Regional Forest Agreement process. The panel identified that *Eucalyptus* dominated vegetation in Australia is an outstanding example on a continental scale of forest and woodland vegetation dominated by a single genus. This vegetation has evolved under stress, including conditions of high climatic variability, nutrient deficiency, and high fire frequency.

The panel identified that:

- There are two major peaks of eucalypt species richness in the eucalypt forests of the Australian continent – one in the Blue Mountains and the other in north east NSW extending into south-east Queensland.
- All major ecological types of eucalypt forest, except monsoon forest, are well represented in these two areas.
- Two of the eucalypt subgenera, Monocalyptus and Symphyomyrtus, and the genus *Angophora* are most diverse within these two areas.
- The emphasis should be on inclusion of large natural areas of eucalypt forests.
- CERRA was designed for rainforest representation and does not cover the variety of eucalypt species and forest types in the region.
- To adequately encompass the eucalypt theme, CERRA needs to be expanded to include adjoining areas of National Parks, State Forests and private property.
- Supporting values include representation of passive marginal swells and Aboriginal ceremonial sites.

In 1999 the NSW Government removed large areas of rainforests and eucalypt forests on public lands from potential timber production and added them to the reserve system as part of the Regional Forest Agreement process. This includes many areas adjoining, surrounding and linking the existing World Heritage areas. The UNE Forest Agreement (2.7) signed by the NSW Ministers on 5 March 1999 states:

The rainforest values contained in existing reserves, which have been recognised internationally by being listed as World Heritage Areas, must be protected. These areas are collectively known as Central Eastern Rainforest Reserves, Australia (CERRA).

As a result of the UNE agreement, substantial new rainforest areas have been added to existing reserves. The Ministers agree to undertake studies in the new dedicated reserve* areas, and if they meet World Heritage criteria, to nominate additional areas for World Heritage Listing as extensions to CERRA, by 1 April 2001.*

The Ministers also recognise that the forests of the UNE Region may potentially contain other outstanding universal World Heritage values apart from rainforests. These other potential values may include Eucalypt dominated vegetation and religious beliefs embodied in the landscape (Aboriginal dreaming sites and bora grounds). The Ministers* agree to further studies being undertaken in the forests of the dedicated reserve* areas of the UNE Region by 1 April 2002, to investigate and document other potential World Heritage values. If areas are demonstrated to be of outstanding universal significance on the basis of these values, the Ministers* agree to put them to the Government for consideration of their protection and nomination for World Heritage Listing.*

In March 2000 the NSW and Commonwealth governments signed Regional Forest Agreements for north-east NSW which committed them to (clause 27):

Parties agree to actively investigate, and jointly participate in the further World Heritage assessment of the relevant Australia-wide themes specified in Section 3.4.2 (Table 17) of the World Heritage Expert Panel report, including any potential contribution from the Upper North East and Lower North East regions.

Immediately after signing the RFA the Governments apparently abandoned any intent to assess the eucalypt values of north-east NSW, or the supporting value of "passive marginal swells", and instead decided to only consider the existing value of "rainforest" and the supporting value of "Aboriginal ceremonial sites". The November 2000 "Strategic Overview for Management" states:

Recent additions have been made to the reserve system in NSW and Queensland, including some significant additions to existing reserves included in CERRA. These include many suitable areas identified by the IUCN in 1993 and improve the integrity and decrease the fragmentation for the property. There are also some other significant areas of rainforest that have been reserved. Other reserves may also warrant consideration, following the recommendations of the Comprehensive Regional Assessment (CRA) World Heritage Expert Panel. Potential additions also exist in the increasing number of protected areas on private lands (subject to conservation agreements) and reserves managed by local government authorities.

The CRA World Heritage Expert Panel also identified the potential for the forests of north-east NSW and south-east Queensland, including CERRA, to contain outstanding universal cultural values, in relation to its use by and significance to local Aboriginal peoples. The indigenous cultural values of CERRA are poorly known.

Rather than completing the renomination by 2001 DECCW (2010) note that they didn't start until 2003–04 and limited consideration to *"its current rainforest theme*". NEFA understands that even then the assessment was limited to minor additions so as not to have to undertake a renomination.

DECCW (2010) note:

In the UNE and LNE regions, a consultant's report commissioned by the then Commonwealth Department of Environment and Heritage (DEH) and completed in mid-2005, identified potential sites of national significance in the broader CERRA region based on the following themes: Aboriginal earthen ceremonial initiation sites ('bora rings'), stone arrangements, Dreaming/creation places, working together and resistance.

The combined 5 and 10 year review of the NSW Forest Agreements and IFOA (DECCW 2010) identify that objective criteria to identify and score protected areas for inclusion were developed by the CERRA Technical and Scientific Advisory Committee (TSAC), though were again apparently limited to the rainforest theme:

In 2005, TSAC provided a ranked list of potential sites to the CERRA Ministerial Council as the recommended starting point to expand CERRA on its current rainforest theme. These sites will more than double the existing area and include those that form part of existing parks in CERRA, those that have been previously recommended by the International Union of Conservation of Nature (IUCN) and those that scored highly when assessed against criteria linked to CERRA's World Heritage values. DECCW provided assistance in refining and applying these criteria to potential reserves.

The Commonwealth Minister has declined to coordinate a process to develop a nomination to extend CERRA, until he receives a formal approach from both relevant NSW and Queensland State Ministers. As at the end of the five-year review period, DECCW was reviewing the TSAC list (to ensure that regional issues and management implications were considered) and working with the NSW Department of

Premier and Cabinet in determining statewide priorities consistent with Government priorities.

…

Other themes, such as eucalypt dominant vegetation or cultural-related issues, may be considered after the current nominations are finalised over the next few years. Any future sites or new criteria for existing sites proposed for World Heritage listing would require considerable research and data collection, including the development of a comprehensive nomination document describing how the sites meet World Heritage criteria.

Note that while the 5 year review was expanded to also become the 10 year review, this entry (along with many others) was apparently not updated.

In 2007 the name was changed to Gondwana Rainforests of Australia.

Contrary to the 'Scoping Agreement', identification of World Heritage values were not specifically considered in the CRA process and their consideration was limited to future actions in the RFA. The NSW Forest Agreement identified that that extensions to the CERRA property based on the existing rainforest theme would be completed by April 2001, and the documentation of the themes of eucalypts, passive marginal swells, and Aboriginal sites by April 2002. Though work on the renomination did not even start until 2003 and appears to have made little progress to even expand on the rainforest theme since.

The Inquiry needs to reassert that the establishment of comprehensive, adequate and representative reserve systems that satisfy the national criteria (JANIS 1997) is the primary requirement for Ecologically Sustainable Forest Management. The inquiry needs to recognise that the forest reserve system in north east NSW does not satisfy the national criteria. To improve compliance with the national reserve criteria and the North East Regional Forest Agreement it is requested that the Inquiry:

a. **Report on the current shortfalls in attainment of the JANIS reserve criteria in north-east NSW and identify means of redressing gross deficiencies;**
b. **Investigate the failure of the Commonwealth to ensure accurate and timely reporting on sustainability criteria and indicators; and**
c. **Review compliance with all clauses of the RFA and identify actions to remedy failures.**

1.2. Sustainable Yield

The National Forest Policy Statement (CoA 1992) states:

Ecologically sustainable forest management and codes of practice

Ecologically sustainable forest management will be given effect through the continued development of integrated planning processes, through codes of practice and environmental prescriptions, and through management plans that, among other things, incorporate sustainable-yield harvesting practices.

...

4.2 Wood production and industry development

Sustainable economic use of native forests and plantations is one of the principal objectives of this Statement.

...

The Commonwealth-State regional agreement resulting from the assessment will also cover guidelines for all aspects of ecologically sustainable management of the forests ... In this respect, the guidelines will cover, for example, management for sustainable yield, the application and reporting of codes of practice, and the protection of rare and endangered species and national estate values.

The NE Forest Agreement (2.11.2) requires annual reporting of:

2.1.d Annual removal of wood products compared to sustainable volume.

The Regional Forest Agreements (Commonwealth of Australia and the State of New South Wales 2000) state:

***"Sustainable Yield"** means the long term estimated wood yield from forests that can be maintained from a given region in perpetuity under a given management strategy and suite of sustainable use objectives*

This section only considers sustainable yield in the context of timber supply from public forests and focuses on of quota sawlog volumes. Quota sawlogs are generally taken to be large high quality sawlogs with minimal defect and a centre diameter of 40 cm, and until relatively recently were annual commitments. Since the NSW Government first introduced Wood Supply Agreements in 1988 these annual commitments have slowly been converted to term agreements for periods of from 10 to 20 years. While these long-term tradeable rights are worth a lot, they are given at no cost to the loggers.

After the creation of the new (1998) national parks, and with the protection of the Government's HCV oldgrowth forest, rainforest, streams and allowance for threatened species protocols, Forests NSW's 1998 Forest Resource and Management System (FRAMES) identified the 100 year sustainable yields of *High Quality Large Sawlogs* as 80,319 m^3 gross of high quality large sawlogs per annum for the Upper North East CRA region (UNE) and 136,902 m^3 per annum in the Lower North East (LNE).

The NSW Government subsequently decided to increase 20 year volumes and guarantee them in Wood Supply Agreements, at the expense of long-term yields, thereby committing NSW to unsustainable logging. In clear recognition of the failure to apply sustainable yield in north-east NSW, the Regional Forest Agreements (Commonwealth of Australia and the State of New South Wales 2000) now claim to be implementing a strategy:

***"Sustainable Wood Supply Strategy"** means the intent to manage yields of High Quality Large Sawlogs and Large Veneer Logs from the forest at a specific and constant level for twenty years under a given management strategy and suite of sustainable use objectives. It recognises that a transition to long term Sustainable Yield will be phased in to accommodate social and economic considerations;*

The strategy was to go on logging at unsustainable rates, and to supplement this by purchasing private properties with existing resources and for establishment of new plantations to attempt to increase future timber availability. However the strategy has not fulfilled its aims and the resource assessments it is based on have been found to be inflated and fundamentally flawed.

The Commonwealth of Australia and the State of New South Wales' (2000) Regional Forest Agreement for North East New South Wales (Upper North East and Lower North East Regions). States:

Under the Sustainable Wood Supply Strategy, NSW agrees to supply 129,000m^3 per annum for 20 years in the Upper North East Region and 140,000 m^3 per annum in the Lower North East Region of High Quality Large Sawlogs and Large Veneer Logs. Annually, approximately 20,000 $m^3$of High Quality Large Sawlogs and Large Veneer Logs allocated in the Upper North East Region will be sourced from the Lower North East Region over the period of the Agreement.

...

... It is estimated that the 100 year supply levels after 2018 will average approximately 70,000 m^3 per annum in the Upper North East Region and 113,500 m^3 per annum in the Lower North East Region of High Quality Large Sawlogs and Large Veneer Logs from existing native forests and Plantations on State forests and other land owned by SFNSW, assuming harvesting under existing terms and conditions.

...

Both Governments aim to provide additional sawlog and other wood products that will become available through purchase by SFNSW of private native forest property and through Plantations established on purchased land or as joint ventures. These measures are currently predicted to bring the average annual available High Quality Large Sawlog and Large Veneer Log yield from State forests beyond the 20 years of this Agreement to within approximately 15 per cent of the 20 year contracted levels for Upper North East Region and Lower North East Region.

In 2009 the NSW Auditor-General, Peter Achterstraat, prepared the report "Sustaining Native Forest Operations: Forests NSW". He reached the obvious conclusion that *"current yield from native forests in the north coast is not sustainable in the long term"* stating:

To meet wood supply commitments, the native forest managed by Forests NSW on the north coast is being cut faster than it is growing back. This is especially the case for the blackbutt species. This does not mean that the forest will not regrow but there will be a reduction in yield in the future.

The UNE Forest Agreement (3.5) requires that monitoring be used to improve FRAMES, noting:

Monitoring of FRAMES performance will also comprise comparison of actual and predicted volume each 12 month period at the RFA Region level, and assessment of the progressive 20 year supply at the RFA Region level.

The results of resource inventory and annual monitoring must be used to review the performance in achieving the implementation of sustainable yield of timber products.

Milestone 16.4 for the UNE RFA is:

Monitoring FRAMES through comparison of actual versus predicted volumes

Initially Forests NSW complied with this requirement. This was until Forests NSW's 2002 North Coast Timber Supply Monitoring Estimate *showed that actual yield was 87 per cent of predicted.* In contravention of the Regional Forest Agreement, Forests NSW's response was to stop collecting data on actual versus predicted yields.

In 2002 Vanclay's "Review of Projected Timber Yields for the NSW North Coast" applied this to identify that "*it is evident that the harvest able to be sustained during the next 20 years is 220,000 m3/year at most ... In the longer term (21-100 years), production from native forests is expected to range between 175 and 110,000 m3/year".* This reduction in predicted short-tern unsustainable log volumes by 18% and long-term sustainable volumes by 5–40% is significant.

In July 2004 Forests NSW prepared a report "State of the Resource, A Review of Wood Resources on the North Coast of NSW. This document is not available on the web and has not apparently been referenced in the various RFA reports or yield reviews, though a subsequent report by Partington and Stevenson (Forests NSW 2004b) consider that it *"clearly described*" the deficiencies with the *"process of estimating merchantable volume"*; stating that:

... for some time there has been concern about actual volumes being less than those predicted by the FRAMES process. And recently a report by State Forests highlighted deficiencies in just about every aspect of the process of estimating merchantable volume ...

…

The deficiencies described include the following: merchantable classification of species that are never harvested; inaccurate estimates from some of the tree volume, taper, and height equations; problems of consistency, reliability and ease of use in relation to tree proportionment, issues in relation to defect modifiers and the division of losses due to inherent defect and those due to sub-optimal log making practices; the limitations of the GIS system in adequately handling the complexity of net harvest area analysis and the difficulty of verifying the results of such analysis; technical problems with the net harvest area modifiers, their lack of currency and the small sample sizes on which the defect modifiers are based; a single strike rate is used but studies suggest different strike rates apply in different areas; growth models and the records on which they are based need to be overhauled; and most importantly the inventory data was no longer considered a reliable description of the resource due to the effect of harvesting and a lack of replacements for the harvested inventory plots.

In 2004 Forests NSW released the simplistic report "A Review of Wood Resources on the North Coast of New South Wales", which it is assumed would have been available to the Government when they issued the WSAs. Unfortunately only bits of data are poorly presented in a confusing and contradictory manner that appears designed to make it hard to interpret.

Interestingly, compared to the 2002 NCTS this new study was based on a reduction in gross area of 100,600 ha (11%) but, due to different assumptions, an increase in net harvest area of 700ha.

The outcome of the revised modelling for large quota sawlogs applying a set *"high level of cut in the next 20 years"* was "*220,000m^3 per annum of HQL for the first five years, decreasing to 200,000m^3 per annum for years six to twenty"*. The graph indicates that this drops to a "sustainable" yield of something like 63,500m^3 per annum after year twenty, though no details of this dramatic reduction in long-term sustainable yield are provided or discussed.

Though the new assessment cautions that:

Interpretation of these results and their translation into management actions requires some care. In particular, the modelled outcome is generally 10-15% above the likely outcome due to factors that cannot be incorporated for practical reasons or cannot be adequately represented mathematically.

This caveat was subsequently ignored by both the NSW and Commonwealth Governments. If allowance is made for a 15% over-estimation, as a precautionary approach demands, then the 5 year cut is reduced to 187,000m^3 per annum and the 6-20 year cut is reduced to 170,000 m^3 per annum. There is an identified major reduction in large high quality (LHQ) sawlogs from Native Forests after year 20, though the corresponding information from plantations is not provided, which intentionally prevents any identification of the 100 year sustainable yield of LHQ sawlogs.

Given that these revised estimates are based on a similar nett harvest area to the NCTS, they represent yet another significant reduction in estimates of yields per hectare. Basically, when compared to Vanclay's (2002) assessment that 220,000 m^3/yr could be sustained for 20 years and 175,000-110,000 m^3/yr for the next 80 years, the new modelling shows significantly reduced timber volumes, and brings a higher proportion of that available forward for logging within 20 years at the cost of increased reductions in yields thereafter. This effectively increases the rate of unsustainable logging.

Partington and Stevenson (Forests NSW 2004b) undertook a review for the NSW Auditor General - 'Forests NSW: Review of North Coast Standing Volumes for the 2004 Valuation' which reached significantly different conclusions than Vanclay, stating *"it has been clear for some considerable time that the timber volumes predicted by the FRAMES process are*

proving difficult to achieve. This naturally creates a question-mark over valuations derived from the FRAMES data."

Partington and Stevenson (Forests NSW 2004b) found that the FRAMES data was in disarray for many reasons, including that 500 of the 2000 inventory plots had been logged, noting:

> *Unfortunately, following the FRAMES process the intensity of effort that went into inventory management diminished. The responsibility for inventory management was allocated to the regions until this was changed in 2003. During this time, about 500 of the original 2000 or so north coast inventory plots were lost to harvesting. Many of these plots were not replaced. We are not critical of this; it may have been an entirely appropriate choice by regional management to invest their resources in other areas that they saw as more important. However, the consequences in Forests NSW own words, was that, "The inventory data can no longer be considered a reliable description of the resource due to the level of harvesting over the last five years and the lack of a replacement programme for harvested plots."*[1]
>
> *There were also a number of other issues requiring attention including the need for a new system of management for the area records, the limited data on which estimates of the net harvest area modifier were based, variation in strike rates across the region, a need for new growth and product proportionment models, and various other issues that needed to be addressed. In short a complete overhaul of the native forest and hardwood plantation inventory was required.*
>
> *… There will be a need for assessment and review and recalibration of some of the modelling. It is also apparent that the rebuilding of the inventory system is a work-in-progress. We think directions that are being taken are generally appropriate and the effort is admirable, but there is still some way to go.*
>
> *It is also apparent that a number of interim measures have been employed in bridging the gap between the old system and the full implementation of the new system. This has been necessary in order to derive a set of numbers for the current valuation. For, example a single height diameter model was applied, irrespective of species, in order to estimate the height of trees from their diameter. Neither, with the functionality of the current system, was it possible to grow the forest forward from the date of original measurement of inventory plots. …*
>
> *There are also some technical sampling issues. …*

It is interesting that the North East RFA "Attachment 12, Long-term Timber Supply Strategy and Sustainable Yield Systems and Processes, Part E FRAMES, Sustainable Yield Systems and Processes", requires that Forests NSW:

> *Undertake additional inventory plot measurement consistent with FRAMES principles to improve the accuracy of volume estimates at the Regional Level, funded at $500,000 per year for the first five years of this Agreement.*

The draft NSW CoA (2009) 5 year RFA review identifies that from 1997 to 2003 there were 127 new plots established. It is hard to fathom how this marries with Forests NSW's logging of over 25% of their existing plots over this period. And it is surprising that this is not mentioned in the RFA reviews.

Partington and Stevenson (Forests NSW 2004) identified that Forests NSW were in the process of rebuilding the inventory system *"but there is still some way to go",* noting:

> *There was limited time to conduct a detailed statistical analysis of the inventory data and in our judgement little need to do so since it was clear that the prior basis of*

valuation had to be changed and that the new basis was still a work-in-progress the reliability of which could not be cost effectively determined. Consequently, we concluded that the 2004 valuation could differ substantially from the true value, and, in our judgement, none of the possible statistical analyses were going to change that conclusion.

Partington and Stevenson (Forests NSW 2004) did identify a variety of problems with the work to date, such as errors in the data, inadequate data on some species, inadequate height models, poor estimates of loggable areas, flawed growth models, poorly specified models for estimating Total Standing Volume, etc., noting:

For example, in the inventory plot data that we received there are 304 trees which are reported as each having a total standing volume (TSV) in excess of 100 cubic metres, and there is one remarkable tree with a TSV of 597 cubic metres! [1.6 cubic metres is considered the average per tree]

...

In past valuations height was modelled according to species group as a function of site and Dbhob. In the current valuation the height is estimated by a single model for all species as a function of Dbhob. ... This use of a single model across all species is a weakness in the valuation modelling and is only acceptable as an interim measure. We anticipate that when a wider range of models are implemented next year that volumes may change significantly as a result.

...

Another complicating issue is that areas previously considered unmerchantable are now being reclassified as merchantable as the constraints on available timber become more severe.

Partington and Stevenson (Forests NSW 2004) conclude:

In our opinion the comprehensive improvement of the hardwood inventory is highly desirable, and we believe that good work is being done. However, it is clear that the process is incomplete with many of the new models untested, and some models are still under development. Consequently, while it is feasible to conclude that this year's estimate of value represents the best estimate currently available, it must also be concluded that there is the potential for the value estimated to differ substantially from the true value.

Faced with damning yield reviews in 2004 the NSW Government decided to ignore them, expand Wood Supply Agreements by 260% to include small and low quality sawlogs, remove review clauses, and extend them for a further 5 years. Based on Vanclay's assessment, in 2004 the NSW Government issued new Wood Supply Agreements to north coast sawmillers for quota, small and low quality sawlogs and extended them for 5 years (until 2003) past the expiry of the NSW Forest Agreements. Most significantly the NSW Government removed the clause that allowed for a non-compensable reduction in commitment following a review of available timber resources.

Even though the seriously flawed yield assessments identified that commitments of large quota sawlogs should be limited to 187,000m^3 per annum for 5 years and then reduced to 170,000 m^3 per annum for years 6-20 the NSW Government issued new tradeable and compensational WSAs for 215,422m^3 per annum for 20 years until 2023. This results in firm commitments for a total supply of 4,365,852m^3, and tentative commitments for a further 95,687m^3. At the time the new WSA were made there were remaining commitments of 269,000m^3 of quota sawlogs for 15 years, which is a total of 4,035,000m^3. These new WSAs thus resulted in an increase in committed volumes of large quota sawlogs of 330,062-426,549m^3 - not a bad windfall.

The Government was even more generous, giving millers commitments of up to 1,777,180m3 of high quality small sawlogs and 4,097,940 m3 of low quality sawlogs,

increasing the total volume of sawlogs committed in WSAs by up to 260%. While such commitments of tradeable timber rights are worth a fortune to the millers, they were given freely.

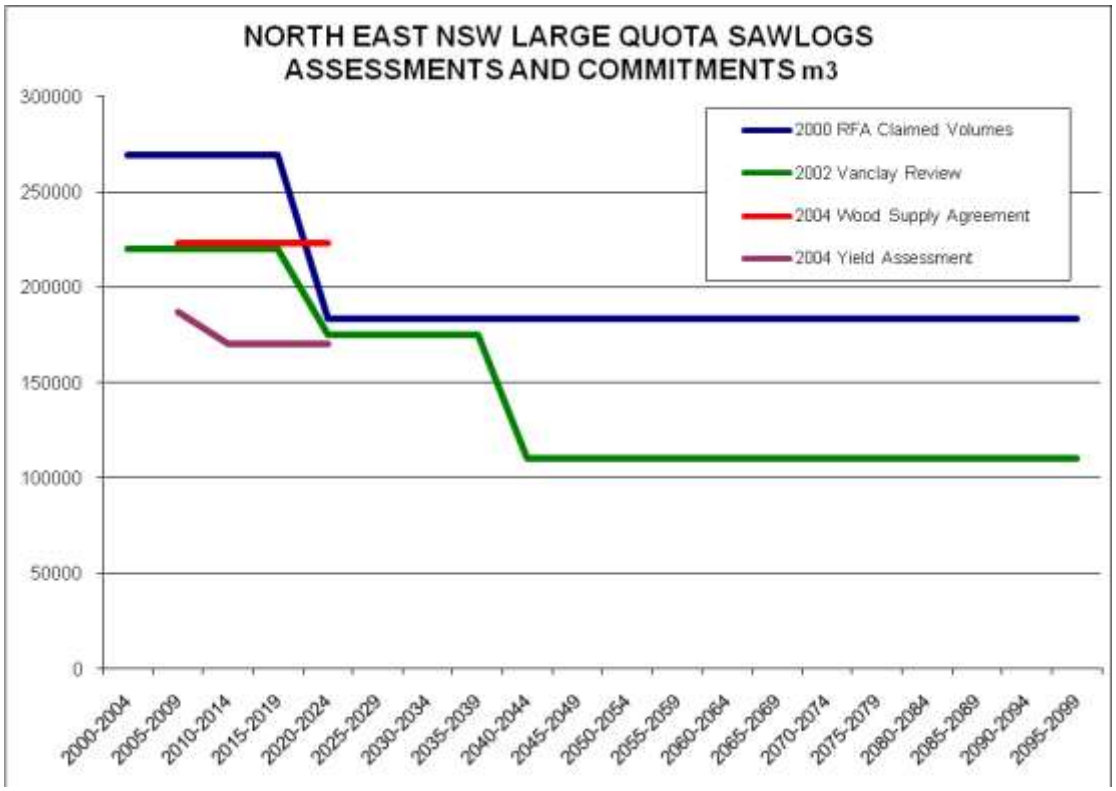
Forests NSW's (2005) ESFM Plan provides the details of Wood Supply Agreements for north east NSW.

Table 9. 2004 Wood Supply Agreement Strategy. From Forests NSW ESFM Plan (2005)

Product	WSA Volume	WSA Type
High-quality large Products	215,422	A
	7,655	B
High-quality small Products	57,759	A
	31,100	B
Low Quality Sawlogs	14,897	A&B
	190,000	C
Total Volume	516,833	

The Auditor General (2009) comments:

> *In this new agreement, the Government waived its rights to reduce commitments without compensating industry for any loss. This removed Forests NSW's ability to better manage supply risks by adjusting commitments. In addition, timber volumes were more or less maintained despite the loss of forest estate to national park and reserves.*



Thus the NSW Government further entrenched unsustainable logging in contravention of the Regional Forest Agreement. Though Forests NSW can not satisfy the commitments and has already had to buy back quota and compensate mills for their failure to supply. The situation is rapidly deteriorating.

1.2.1 Coming to Grips with Sustainability

The Auditor General (2009, p23) relies upon the 2004 Forests NSW's "A Review of Wood Resources on the North Coast of New South Wales", though fails to consider the need

identified in that assessment to reduce modelled estimates by 10-15%, and fails to acknowledge or consider the damning Partington and Stevenson (2004) report specifically prepared for the NSW Auditor General and the July 2004 report. It is perplexing why the 2004 report prepared for the Auditor General is not cited and, judging by comments, apparently not considered, particularly as the resource assessment the auditor now relies upon was found to have numerous significant flaws and "*concluded that there is the potential for the value estimated to differ substantially from the true value".*

In their 2003/04, 2004/5, 2005,06, and 2006/07 Forest Agreement Implementation reports, the New South Wales Government (2007) fails to identify the revised Wood Supply Agreements or acknowledge any of the 2004 yield reviews assessments, instead (i.e. New South Wales Government 2009c) extolling the virtues of Vanclay's (2002) outdated *"extensive independent review of FRAMES"*.

Similarly the combined 5 and 10 year reviews of Forest Agreements DECCW (2010) and the draft NSW & CoA (2009) 5 year review of the Regional Forest Agreement extol Vanclay's *"independent review"*, pay cursory attention to the 2004 review (with no mention of the reduced yields it identified and the need for a 15% discount), and fail to acknowledge the existence of the Partington and Stevenson review or the July 2004 review. This is particularly strange as the link (www.dpi.nsw.gov.au/forests/management/reporting/rfa-review-report) to Vanclay's report includes the Partington and Stevenson review.

Similarly for his 5-year review of the RFA Spencer (2009) seems ignorant of the 2004 reviews and fails to consider the reduced yields and numerous problems they identify, instead only referring to Vanclay's review:

> *However there has been independent review of the system and to this extent there would appear to be compliance with RFA requirements. Nevertheless the last independent consideration of the system was at least 7 years ago. There have been a number of enhancements since that date and new data are presumably available.*

While Spencer appeared unaware, the 2004 data were available. For his review Spencer (2009) sought additional information from Forests NSW who once again only referred to Vanclay's (2002) redundant study.

This total failure of recent agency reviews to consider and address the numerous specific issues and problems identified in Forests NSW July 2004 review and by Partington and Stevenson (2004) is professional negligence and requires investigation. Of most concern is that there can be no assurance that the identified failings of the modified FRAMES have been satisfactorily dealt with, and no subsequent reports on remodelling of volumes based on the significantly changed attributes have been made public (Forests NSW did recently present graphs of new yield estimates for native forests, though with no supporting report their veracity can not be ascertained, though the results seem uncreditable).

Despite the clear requirements to annually monitor actual versus predicted yields established by the RFA, and the repeated requests that they should do so (ie Auditor General 2009, Spencer 2009), Forests NSW, with the support of the NSW Government, continues to avoid this requirement at any resolution. It is absolutely astounding that the NSW Government has managed to get away without comparing predicted and actual volumes since the unfavourable comparisons in 2002. Forests NSW can fiddle with their models all they like, but if there is no reality check they can not be considered as anything other than fantasy.

The draft NSW & CoA (2009) 5 year RFA review accepts NSW's claims, going so far as to pretend that *"The RFA requirement to monitor timber off-take and compare it against FRAMES predictions was addressed in the Vanclay review"*. For the 5-year RFA review Spencer (2009) could not understand why Forests NSW insisted that there could be no comparison between actual and predicted yields at any scale, stating:

> *However it is a specific RFA requirement to monitor modelled and actual performance on a continuous basis. The reasons for such a requirement seem quite obvious and*

to not do so suggests that models should be accepted without reference to whether they reflect reality.

The Auditor General (2009) recommended that *by June 2010* Forests NSW *"compare harvest results against its yield estimates over five year periods as a means of testing the accuracy of estimates".* In response to questions on notice from the General Purpose Standing Committee No.1 Budget Estimates 2009-10, Steve Whan claimed that the annual and five year (till June 2010) *"results will be published on Forests NSW website by December 2010".* They were not. On the 24 December 2010 Forests NSW finally responded to the Auditor General, presenting some unreferenced graphs of revised timber volumes which were published on Forests NSW website and effectively continuing their refusal to release results of comparisons between actual and predicted yields.

Similarly the Commonwealth has allowed Forests NSW to get away with not undertaking the RFA's required 2006 yield review. The RFA "Attachment 12, Long-term Timber Supply Strategy and Sustainable Yield Systems and Processes, Part B, FRAMES and Wood Supply Reviews",states:

15 NSW, through SFNSW, agrees to complete the following by 1 December 2006:

- *Update the FRAMES information base and enhance the FRAMES Models consistent with Part E of this Attachment;*
- *Commission and publish an independent review of the enhanced systems and process, models, information base, and assumptions which contribute to the FRAMES system;*
- *Using the results of the above FRAMES enhancement and review, NSW will review the timber resource and the annual volume which may be harvested from 2007 – 2018 consistent with the overall Sustainable Wood Supply Strategy to achieve a long-term Sustainable Yield and to optimise sustainable use objectives consistent with this Agreement.*

There were also a variety of requirements to improve FRAMES such as establishment of additional inventory plots and to *"Monitor FRAMES performance through comparison of actual versus predicted volumes each 12 months for 20 years".*

This reflects the UNE Forest Agreement (3.5) requirement for enhancement of FRAMES:

The second level of refinement must be an aggregation of these progressive enhancements into a review of supply levels across the RFA Region at Year 8 of the 20 Year Term Agreements. The review must determine a supply level for Years 9-20 of the Term Agreements.

The supply review at year 8 is specified in the Term Agreements. The review will be based on the 1999 forest agreement land base, the EPA conditions and Conservation Protocols applying to the 1999 IFOA (without amendment), and the enhanced FRAMES estimates of supply levels. The review must determine a supply level for Years 9-20 in accordance with the Term Agreements. In addition, value-adding criteria will have been applied at year 5.

Despite attempts to pass off Vanclay's 2002 review as satisfying the need for a 2006 yield review, Forests NSW's (2005) UNE ESFM Plan states:

Forests NSW will:

- *Undertake a Forest Resources and Management Evaluation System (FRAMES) inventory program to improve volume estimates at Forests NSW administrative region level by 2006;*
- *Improve the biometric models in FRAMES and refine harvesting area definition to improve the precision of standing timber volume estimates by 2006;*

As well as requiring a yield review by 2006, the Regional Forest Agreement (RFA) required a review of sustainable yield:

> *48 (g) Implement the review and monitoring processes and develop the strategic and operational requirements of sustainable yield systems and processes using enhanced Forest Resource and Management Evaluation System (FRAMES) as described in Attachment 12 (Part E) to enable the review of sustainable yield by 1 December 2006 as described in Attachment 12 (Part B);*

Milestone 16.5 for the UNE RFA is:

> *Strategic and operational requirements of sustainable yield systems and processes, review sustainable yield every five years using enhanced FRAMES and publish methods*

It is particularly concerning that the NSW & CoA (2009) 5 year RFA review relies upon the 20 year estimates from the 2004 Review of Wood Resources as a surrogate for the long-term sustainable yield as required to be identified in the RFA (48g). Sustainable yield has to be maintained in perpetuity, not just for 20 years.

The NSW Auditor General (2009) states that in 2006 and 2007 Forests NSW bought back wood supply allocations from two customers totalling 13,403m^3. It is assumed that these must have been for large sawlogs from north east NSW because WSA are now claimed to be 13,577 m^3 less. It is not revealed how much was paid to the millers.

As well as possibly getting into the plantations and small sawlogs too early, the Auditor General notes that Forests NSW have not been meeting their target of 30,000m^3 per annum from private property for the north coast, instead averaging only 7,000m^3 per annum over 5 years. This increases the strain on public forests and plantations and further jeopardises future yields.

The Regional Forest Agreement 2000, Attachment 12, Part C, Hardwood Sawlog Supply Supplementation Strategy, states:

> *19 The Parties agree that the following long-term hardwood sawlog supply supplementation strategy will be implemented to allow the supply of more timber and raise the long term Sustainable Yield of hardwood sawlogs from public forests in northern New South Wales;*
>
> - *Subject to availability of suitable land, New South Wales will spend the allocated $18 million between 1999 and 2004 to purchase Private Land and/or timber rights to provide approximately 180,000 m^3 of High Quality Large Sawlogs and Large Veneer Logs for the Upper North East and Lower North East regions within the term of this Agreement.*
> - *Subject to the availability of suitable land, New South Wales will spend the allocated $30 million by 2004 to establish at least 10,000 ha of hardwood Plantations across both the Upper and Lower North East Regions to supplement supplies of High Quality Large Sawlogs and Large Veneer Logs from public forests. This initiative is expected to produce approximately 125,000m^3 per annum for 10 years commencing*

DECCW (2010) note:

> *Forests NSW has purchased 11 properties across the UNE and LNE regions (three in the UNE region and eight in the LNE region) under the Private Property Timber Supplementation Program. These cover an area of more than 13,000 ha of native forest with an estimated standing volume of 141,439 m^3 of high quality large quota sawlogs.*
>
> *As of June 2005, three timber sale agreements for purchase of private property timber rights have been implemented across the LNE region with a further 10,962 m3 of high quality large sawlogs estimated to be produced.*

In sourcing 152,401 m3 of supplementary high quality large sawlog, Forests NSW has made substantial progress in achieving the targeted outcome of 180,000 m3.
....
Forests NSW successfully established 7,543 ha of hardwood plantation in the UNE and LNE regions between 1999 and 2004.

Subsequent strong real estate prices and competition for land have made it difficult for Forests NSW to secure appropriate land to establish additional hardwood plantations.

These are significant shortfalls in the volumes (15%), areas (25%) and 2004 timelines established by the RFAs, it is thus surprising that they are not remarked on in FA Implementation Reports. It would be interesting to know if the $48 million provided by the Commonwealth has been spent.

One of the Auditor General's (2009) recommendations was for Forests NSW to investigate the reasons for not meeting its private property targets for hardwood timber. In their 24 December 2010 response Forests NSW make the extraordinary claim:

Important background note to this recommendation is that the 'private property targets' were set in the ESFM Plans framed in 2005, not in the Regional Forest Agreements signed around 2000.

There are significant shortfalls in the targeted volumes of timber required to be obtained from private property and the areas of new plantations required to be established to enhance yields from 2018 until 2100. These are RFA commitments and have been funded by the Commonwealth, though Forests NSW seem unaware of this. When combined with declining yields and early logging of sawlogs from native forests and plantations the prospects of reasonable long-term yields are declining.

The NSW Auditor General (2009, Exhibit 20) indicates that the new Wood Supply Agreements are for 209,500 m^3 per annum of large high quality sawlogs. It is astounding that none of the NSW Forest Agreement implementation reports or reviews bother to identify the WSA commitments and the changes made to them. The draft NSW&CoA (2009) 5 year RFA review is the only document located that identifies the new Wood Supply Agreements, though it fails to identify their type.

While the Auditor General highlights one change there have obviously been significant changes to high quality small sawlogs (-25,087) and low-quality sawlogs (+125,657). Such changes to allocations of public resources should be made public and not kept secret.

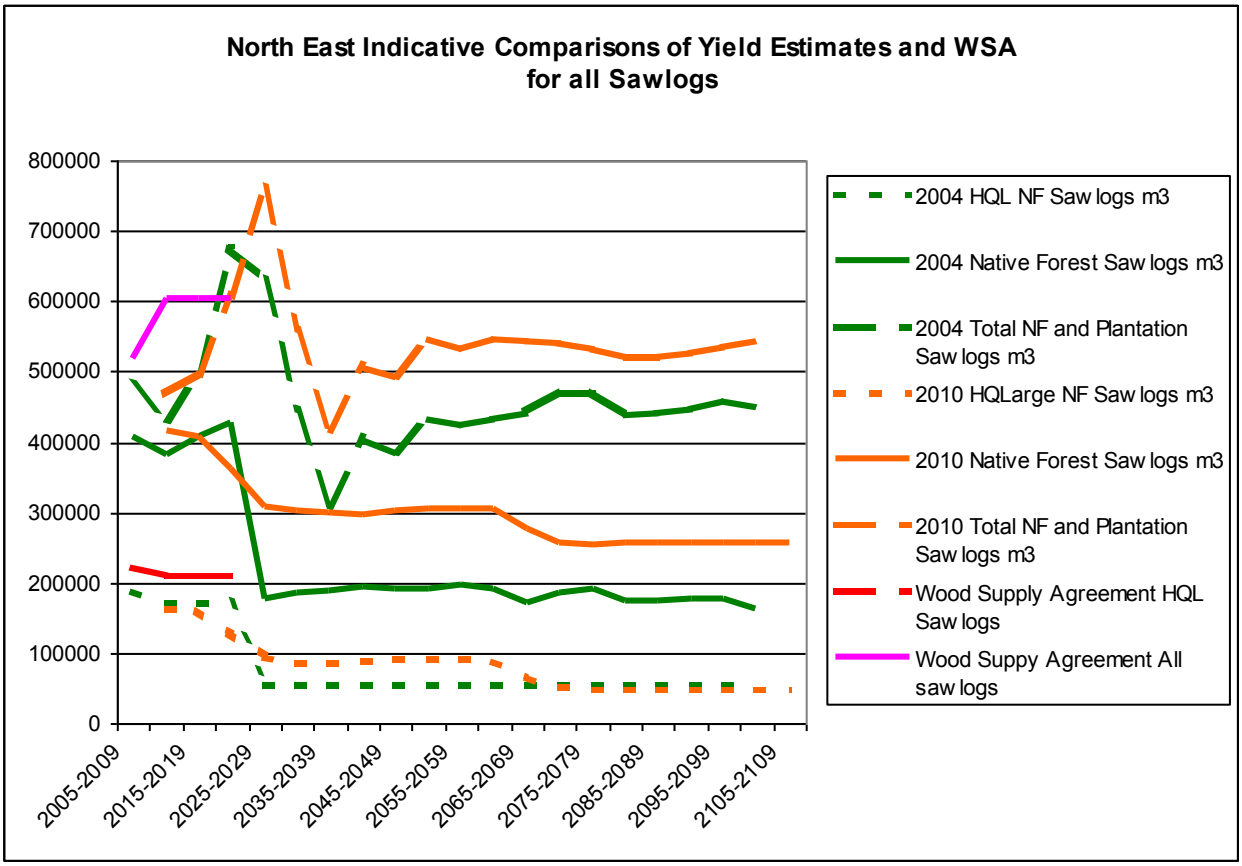
WOOD SUPPLY AGREEMENTS FOR NORTH EAST PUBLIC FORESTS UNTIL 2023.
From NSW & CoA 2009 4.21 Volume Review, Table 4.7.

Log type	UNE (cubic metres)	LNE (cubic metres)	TOTALS
High-quality large sawlogs including veneer logs and girders	83,686	125,814	209,500
High-quality small sawlogs	27,184	36,588	63,772
Low-quality sawlogs	153,677	176,867	330,554
Pulp grade and chipwood (domestic and export grade)	45,000	120,000	165,000

This is well overdue and the revised FRAMES needs to be refined to reflect reality. Spencer (2009) concludes:

... the Auditor General, in his April 2009 Performance Review of Forests NSW effectively comes to the same conclusion of this Independent Assessment that there is a definite need to, at the very least, revisit estimates of wood availability as a matter of priority.

The Auditor General (2009) recommended that Forests NSW *"by June 2010, publicly report the results of yield estimates for high quality large sawlogs, high quality small sawlogs, low quality logs and pulpwood for each region"*. The graph below represents Forests NSW's latest yield offering made on their website in response to the Auditor General's recommendation, it is dated November 2010, though was not released until 24 December 2010. There is no explanatory report other than the statement that *"The charts included in this report show estimated annual yields by broad product category in cubic metres (m3) over the next 100 years"*. Forests NSW's latest yield estimates are presented without any methodology, explanation or review (independent or otherwise) and thus are of unknown veracity. As yet no data on plantation resources has been provided. Comparison with other yield estimates are made harder by the fact that the Central Region has now been separated from the North East Region and the data underlying the graphs has not been presented.



Notes on table: This table is presented for illustrative purposes. The 2004 data have been reduced by 15% in accordance with the caveat in the 2004 yield review. There are no revised plantation yields yet for 2010 so the 2004 plantation figures have been used. It is not known when the WSA commitments were increased for low quality purposes, though for plotting purposes 2009 was taken as the date (also for the reduction in HQL sawlog commitments). For comparison purposes the 2004 figures are aligned with 2005.

The only conclusion that can be reached from the data provided is that Forests NSW's new FRAMES is once again predicting significantly increased resources. The overall quota sawlog yields are on a par with the 2004 estimates before the identified 15% reduction is accounted for, and there has been a significant increase in estimates of total sawlogs from native forests.

NEFA remain incredulous that Forests NSW are allowed to get away with failing to document their yield estimates, accounting for the 2004 criticisms, comparing predictions with reality and ensuring their estimates are peer reviewed. There are many complicit agencies and Ministers who should also be held accountable for their lack of oversight of Forests NSW. Forests NSW need to urgently document their methodology and the NSW Government has

to ensure that brand new FRAMES is peer reviewed and the estimates reality-checked against actual yields.

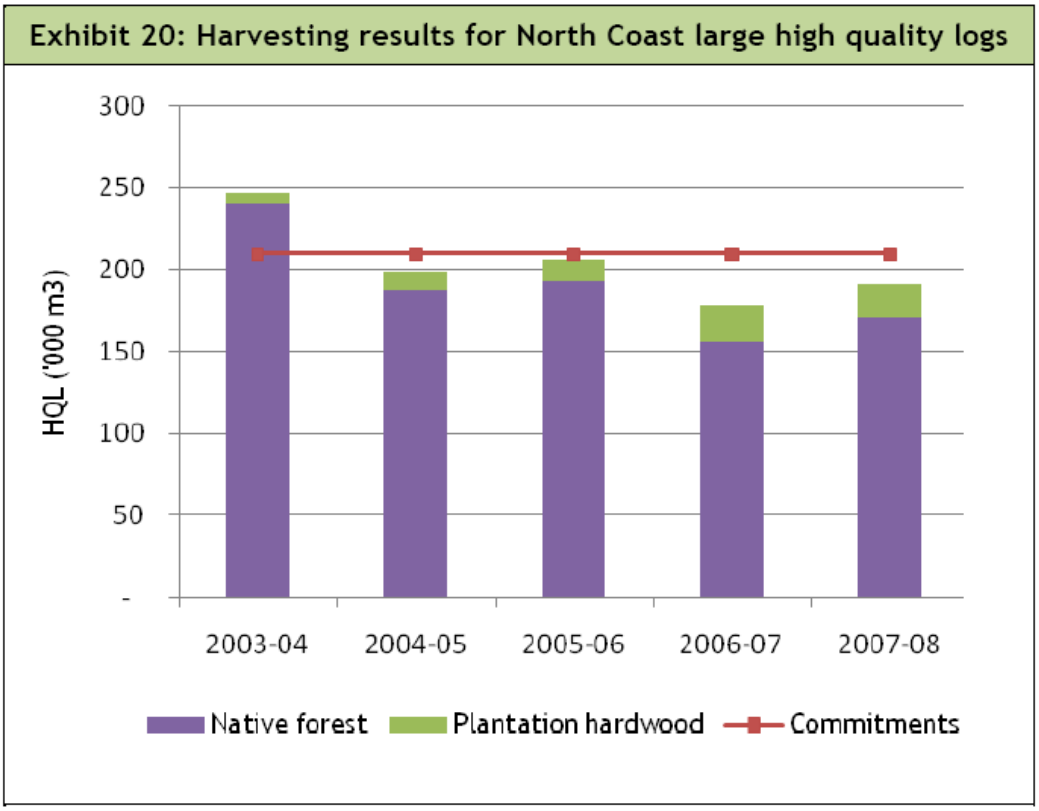
1.2.2. Yield Shortfalls

Ever since the new 2004 WSAs were signed Forests NSW have not been able to meet commitments, particularly in the Upper North East. Over the 5 years 2004-09 there was a shortfall between commitments given in WSA and actual yields of large high quality sawlogs of at least 144,000m3 (13%). This has forced Forests NSW to increase logging of small high quality sawlogs (the large sawlogs of the future) and get into the plantations too early, further compromising future yields. Forests NSW have already had to buy back timber committed in WSAs and compensate mills that they couldn't meet supply commitments to.

The Auditor General (2009) identifies that at 2008 there were wood supply agreements for some 209,500 m^3 per annum of large high quality sawlogs from north coast forests and that commitments are not being met (see below), and neither are commitments for low quality sawlogs. Immediately after giving the new Wood Supply Agreements to the millers, the Auditor General identifies that Forests NSW had to compensate mills for not supplying commitments and start buying back wood supply allocations, for example paying one mill $550,000 for 34,000$m^3$ of high quality large sawlog they were unable to supply during 2004-2006.

The Auditor General accepted that Forests NSW *"has not provided data on the total volume and value of allocations bought back and compensation payments made since the wood supply agreements were signed".* NEFA considers that such information should be publicly available and included in the annual Implementation Reports.

North coast high quality large commitments not being met (NSW Auditor General 2009)



Note that the Auditor General fails to account for increased WSA commitments pre 2006.

In 2008/9 the yield of high quality large sawlogs (including from plantations) was 101,504m^3 from LNE and 55,730m^3 from UNE (DECCW 2010), which is a continuation of the downward trend.

Since the new Wood Supply Agreements (WSAs) were introduced it is evident that WSA commitments are being significantly undercut for large sawlogs in the UNE, small sawlogs in the LNE, low-quality sawlogs in both UNE and LNE, and pulpwood in the UNE and LNE. In the UNE the cut of small sawlogs is significantly higher than commitments, presumably to help compensate for the significant undercut in large sawlogs. This just helps entrench un-sustainable logging further as the future large sawlogs are cut early.

NORTH EAST COMPARISON OF ACTUAL YIELDS TO COMMITMENTS From NSW&CoA (2009).(based on WSA commitments therein rather than Forests NSW (2005) ESFM Plan, note that WSA figures for UNE and LNE have been significantly changed over these three years though as the timing of the changes and their distribution across the regions is not publicly available, the current figures have had to be used)

		Wood Supply Agreement m^3 per annum	2004/5 yields m^3 (% WSA)	2005/6 yields m^3 (% WSA)	2006/7 yields m^3 (% WSA)	3 year deficit m^3 (% WSA)
High-quality large sawlogs (incl. veneer and girders	UNE	83,686	70,389 (84%)	70,333 (84%)	68,814 (82%)	-41,522 (-17%)
	LNE	125,814	127,539 (101%)	135,744 (108%)	111,537 (89%)	-2,622 (-0.7%)
Small high quality sawlogs	UNE	27,184	29,500 (109%)	32,763 (121%)	29,959 (110%)	+10,670 (+113%)
	LNE	36,588	24,780 (68%)	29,316 (80%)	31,127 (85%)	-24,541 (-22%)
Low-quality sawlogs	UNE	153,677	86,258 (56%)	88,219 (57%)	69,148 (45%)	-217,406 (-47%)
	LNE	176,867	147,401 (83%)	138,769 (78%)	148,788 (84%)	-95,643 (-18%)
Pulp-grade and chipwood (domestic and export grades) (tonnes)	UNE	45,000	11,648 (26%)	19,220 (43%)	12,269 (27%)	-91,863 (-68%)
	LNE	120,000	108,647 (91%)	97,170 (81%)	121,162 (101%)	-33,021 (-9%)

Annual shortfalls of at least 17% in large quota sawlogs and 47% in low-quality sawlogs in the UNE are significant. The failure to meet large sawlog commitments indicates an inability to meet supply commitments given in the Wood Supply Agreements. Given that this is one of the performance indicators the causes should have been documented by now. Across north east NSW over the 5 years 2004-09 there was a shortfall between commitments given in WSA and actual yields of large high quality sawlogs of at least 143,978m3 (13%).

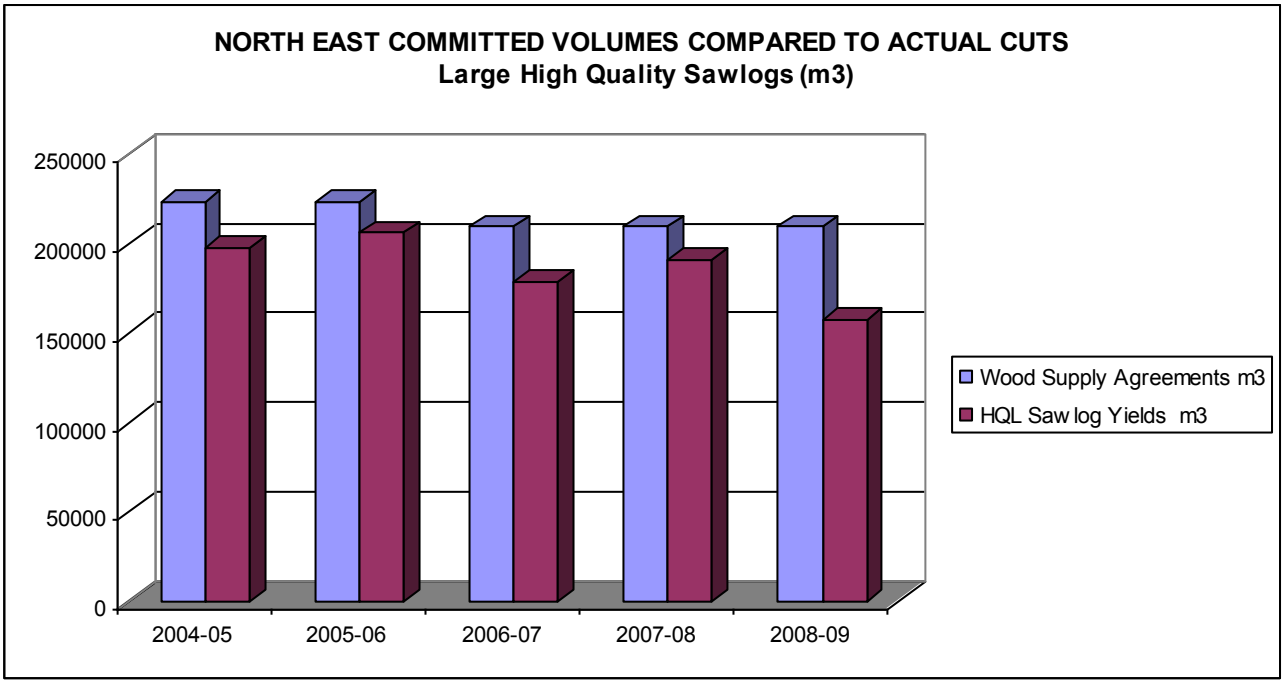
NORTH EAST COMPARISON OF ACTUAL YIELDS TO COMMITMENTS. Source DECCW 2010, Auditor General 2009.

	Wood Supply Agreements m3	**HQ Large Yields m3**	**% Actual of WSA**
2004-05	223077	197928	89
2005-06	223077	206077	92
2006-07	209500	178351	85
2007-08	209500	191086	91
2008-09	209500	157234	75
TOTAL	**1074654**	**930676**	**87**

The Auditor General (2009) notes:

> *... Resource reviews were a key risk management tool for Forests NSW which is no longer available under wood supply agreements for large logs.*
>
> *...the North Coast region has been unable to meet its species commitment since 2004 for blackbutt, although this is based on 'best endeavours'. This commitment accounts for about 36 per cent of all high quality sawlog allocations on the north coast.*
>
> *Regional staff report that the Blackbutt commitment forces them to harvest coastal timber when they would prefer to balance commitments between the less accessible tableland timber and other species. This is in order to sustain the resource on the coast and buffer the impact of cost increases as it accesses more tablelands timber. This issue could have been addressed if the review clause remained in the north coast wood supply agreements.*

NORTH EAST COMPARISON OF ACTUAL YIELDS TO COMMITMENTS.



The Auditor General identifies that Forests NSW is currently taking 56% more sawlogs from plantations than proposed, noting that if it is taking more than planned to meet commitments *"this could affect future production"* as plantations "*will form an increasing proportion of future supply*", *"because current yield from native forests in the north coast is not sustainable in the long term; that is, beyond the term of the current contracts*".

Based on a comparison between commitments given in Wood Supply Agreements and actual yields in north east NSW it is evident that Forests NSW are unable to supply committed volumes of large high quality sawlogs, with the situation being particularly bad in the UNE. Over a 5 year period Forests NSW accumulated a deficit of 144,000 m^3, and the situation is deteriorating. Forests NSW have already had to buy back timber committed in WSAs and compensate mills that they couldn't meet supply commitments to. They appear to be overcutting small sawlogs in the UNE and sawlogs in plantations to help compensate for their shortfalls.

This problem is widely recognised, for example URS (2008) state:

> *... There is concern that Forests NSW will not be able to meet commitments in Wood Supply Agreements (WSAs) with the current forest areas allocated for commercial*

forest production. This is evidenced through the fact that Forests NSW is purchasing private native forest resources to meet current commitments.

The Inquiry needs to reassert that that the management of native forests on a sustainable yield basis, and within ecological constraints, is a fundamental requirement for Ecologically Sustainable Forest Management. The inquiry needs to recognise that public native forests in north east NSW are not being managed on a sustainable yield basis. In order to satisfy the RFA's requirement to review sustainable yields in 2006, reduce commitments in line with timber reviews and cease unsustainable logging of native forests as soon as possible, it is requested that the Inquiry:

a. **Investigate the failure of the Commonwealth to document, consider and account for identified criticisms of FRAMES wood assessments;**
b. **Investigate and remedy the failure by NSW to annually report on actual versus predicted yields as required by the RFA;**
c. **Investigate the expenditure of Commonwealth funds provided for the enhancement of FRAMES and long-term timber supplies;**
d. **Investigate the decision to entrench and extend unsustainable logging for a further 5 years in contravention of the RFA, and for 3 years beyond the expiry of the RFA;**
e. **Investigate the failure of Forests NSW to satisfy current Wood Supply Agreements;**
f. **Require an immediate independent review of the new FRAMES wood assessments that accounts for previous criticisms and specifically identifies the sustainable yield from native forests; and,**
g. **Identify means of reducing the logging of native forests to a sustainable level as soon as possible.**

2. Environmental impacts of forestry

Forestry operations have a large variety of impacts on our natural environment, including:

1. Interference with ecosystem processes and functioning;
2. Causing dysfunction and dieback;
3. Degrading habitat for a large variety of mammals, birds, reptiles and frogs;
4. Causing erosion and stream pollution;
5. Reducing stream flows;
6. Reducing carbon storage; and,
7. Reducing aesthetic values.

Aside from having a grossly inadequate reserve system, forestry operations on public lands are governed by the Integrated Forestry Operations Approval (IFOA) for Upper North East Region and the licence it contains. These are referred to as Environmental Protection Licence (EPL), Threatened Species Licence (TSL) and Fisheries Licence (FL). Together with various clauses of the IFOA these constitute the regulatory regime applied to forestry operations on public lands in north-east NSW

Notwithstanding this requirement, Forests NSW no longer obtain EPLs for most forestry operations. For example in 2006/7 there were 221 forestry operations in the UNE region, the EPL applied to 23 of these, leaving 198 operations where logging occurred without EPL coverage. This enables Forests NSW to avoid some requirements and the scrutiny of an outside agency for most operations.

As Fisheries NSW and Forests NSW are both in the Department of Industry and Investments there is a strong reluctance by Fisheries to regulate or penalise their colleagues, as evidenced by just one FL audit/complaint being dealt with in the UNE over the 10 years 1999/2009, and no enforcement action being taken. Our recent audits prove that the FL is being regularly breached, the problem is that there is no enforcement.

Another problem is that Forests NSW interprets the Fisheries Licence to mean that they do not have to take specified actions to protect threatened fish species unless the data is first provided by Fisheries NSW. When NEFA recently complained about the failure of Forests NSW at Doubleduke to consider information presented in the 2005 Recovery Plan for the nationally endangered Oxleyan Pygmy Perch, (Pugh 2010c) we were told (J. Murray pers. com., November 2010) that they didn't need to consider the species because Fisheries NSW had not provided them with the required information. It is revealing that Fisheries NSW were going to give them the data 5 years ago, but hadn't got around to it, as stated in the 2004/5 RFA report:

> *Preparation of distribution data for the Oxleyan pygmy perch (Nannoperca oxleyana), a species occurring in coastal areas of northern New South Wales, and Macquarie perch (Macquaria australasica) occurring in streams of the southern highlands and slopes, is complete. Both species could be affected by forestry operations and the distribution data is expected to be provided to Forests NSW shortly*

It is also revealing that Fisheries NSW approved the Doubleduke assessment without themselves identifying the missing endangered species. What you don't know won't hurt you – just the fish.

DECCW are principally responsible for ensuring Forests NSWs compliance with the Environmental Protection Licence (EPL) and Threatened Species Licence (TSL). In the 5 years 2004/9 DECCW undertook an average of some 3 audits a year, and while they located a large number of breaches of the EPL in 2006/7 and 2007/8, they otherwise appear to find relatively few breaches.

Over the past year and a half NEFA have undertaken preliminary audits of three areas of public forests. We have written a number of audit reports and submitted them to the

appropriate authorities (Pugh 2009, 2010a, 2010b, 2010c and 2010d). To date only the breaches we identified in Yabbra have been reported on. We understand that DECCW are currently considering legal action over the breaches we identified in Doubleduke and we are waiting for responses for Girard.

Even when breaches are proved the agencies downplay them and only implement token fines. Pursuant to our complaints for Yabbra SF (Pugh 2009, Pugh 2010a) the following action against Forests NSW eventuated:

1 DECCW issued a Penalty Infringement Notice (PIN) and a $300 fine for "harvesting timber within IFOA mapped rainforest", this was for illegally logging dozens of trees within 3ha of rainforest and causing massive damage by pushing over and piling up over 100 rainforest trees.
2 DECCW issued a Penalty Infringement Notice (PIN) and a $300 fine for "the failure to mark Yellow-bellied Glider sap feed trees and feed trees", we detailed 11 extant sap feed trees and estimate there were more than 50 such trees, many of which would have been logged. In addition to retaining sap-feed trees Forests NSW were required to identify, mark and retain 15 "feed trees" within various distances of sap-feed trees and 34 mapped Yellow-bellied Glider records, which equates to hundreds of trees, none of which were marked, and many of which are likely to have been logged.
3 DECCW issued a Penalty Infringement Notice (PIN) and a $300 fine for "timber felling within a wetland and wetland exclusion zone", Fisheries NSW issued a warning letter for these same offences, this was for logging over a dozen trees within what were meant to be 10m exclusion zones around two small wetlands. They also failed to mark their boundaries, conduct searches for the frog Philoria within them, exclude post logging burning from them, and excluded cattle from them.
4 DECCW issued a Penalty Infringement Notice (PIN) and a $300 fine for "machinery entry within a wetland and wetland exclusion zone", this was for the two wetlands above, where machinery drove through the wetlands at a number of locations, causing extensive damage.
5 DECCW also issued a formal warning to Forests NSW for not identifying habitat and surveying for Richmond's Frog, and inadequate mark-up of exclusion zones and retained habitat trees.
6 Fisheries NSW issued a Penalty Infringement Notice and $500 fine, for failing to mark exclusion boundaries on unmapped drainage lines, we identified 5 unmapped grainage lines which had not been identified in the field or on harvest plans in contravention of the ESFM Plan, EPL and FL and expected there to be dozens more.
7 Fisheries NSW issued a Penalty Infringement Notice and $500 fine for logging, bulldozing and burning within 10m of these unmapped streams. We documented 22 trees to have been illegally removed from these stream banks and suspect that there were over a hundred such trees logged, as well there were a variety of snig tracks constructed within these buffers and across the streams which were not rehabilitated.

As a result of our complaints Forests NSW also repaired drainage on four stream crossings and one track because they were not up to pollution control requirements.

So, for illegally logging 3ha of rainforest, 2 wetlands, numerous stream banks, and potentially hundreds of feed trees of the Yellow-bellied Glider, Forests NSW were fined a total of $2,200. In addition to this Forests NSW were given token reprimands for a variety of other offences, excused many other breaches on the basis that they did not have an Environmental Protection Licence (DECCW could not take action against the contractors), and excused others on the basis that their controlled burn got out of control. This is an insult as Forests NSW and the contractors made far more money from the timber illegally logged than what they were fined. It cost us more than the fine to undertake our audit.

As well as being concerned about the paltry penalties, we are concerned that DECCW and Fisheries NSW failed to explicitly identify the breaches that occurred, treated multiple breaches as single breaches, failed to apply required auditing methods, and (despite the

evidence of systemic breaches) failed to assess additional areas in the vicinity of our complaints (we also believe that they did not assess all our complaints). Forests NSW also assessed our complaints but refused to provide us with a copy of their report.

We are also concerned that at Yabbra, despite the presence of Bell Miner Associated Dieback, rampant lantana, an endangered ecological community, the Endangered Black-striped Wallaby and a variety of other threatened species, there was no assessment of the habitat degradation associated with the breaches and no specific rehabilitation works required (aside from the erosion mitigation works) in the rehabilitation plan prepared by Forests NSW and approved by DECCW.

Forests NSW also have their own internal audit process, for example 253 incidents of non-compliance were recorded in 2003/4 in the UNE region (NSW Government 2007), across NSW *"In 2003/2004 the main area of noncompliance soil erosion and water quality (59%), followed by flora and fauna issues (33%). The remaining 8% of incidents were related to other issues such as safety".* Details of these are not provided in RFA reports.

We only checked Forests NSW's own breach reports for Girard SF (Pugh 2010d). Before NEFA informed Forests NSW that we were going to undertake an audit, they had identified 9 breaches; 6 related to trees being dropped and pushed into streams, one related to a tree being dropped into a rainforest exclusion, one related to four breaches of a frog exclusion area, and one related to bulldozing a road across two drainage lines. The records indicate that no action has yet been taken for a single breach, other than the contractors being talked to occasionally, and it is apparent that no rehabilitation works have been undertaken for the road across the drainage line.

Of the 4 breaches identified after we informed Forests NSW of our audit, 3 related to hollow-bearing and recruitment trees and, significantly, one related to a major intrusion into a wildlife corridor and FMZ 2 area. It is revealing that before we specifically told Forests NSW's CEO that we expected to find breaches of hollow-bearing and recruitment tree requirements because they are common, Forests NSW had not reported any such breaches.

In our brief audit (Pugh 2010d) of the same area they had been auditing for months, and intensively for the two weeks after we informed them of our proposed audit, we independently found 3 of their reported breaches and documented numerous additional breaches of 2 conditions of Forests NSW's Integrated Forestry Operations Approval, 24 conditions of their Threatened Species Licence, 9 conditions of their Fisheries Licence and 10 conditions of their Environment Protection Licence. On a site inspection we showed some of these breaches to Forests NSW and they did not assuage our concerns.

Most resources available for auditing are used internally by Forests NSW for their own auditing program. It would be far preferable and more effective to strengthen external regulation by allocating the resources to DECCW and Fisheries NSW.

URS (2008) consider:

> *Public sector reforms across Australia over the past two decades have recognised that separating policy and regulation from operations provides greater clarity in objectives for each function of government and improved performance. ...*
>
> *Governments manage native forests for multiple objectives. They manage them to protect a range of environmental and biodiversity values as well as for commercial wood production. Separation of the environmental from the commercial objectives is fundamental to sustainable multiple-use management. So to is separation of regulatory and audit functions from the bodies being regulated and audited.*

URS (2008) state:

> *A lack of separation between environmental, governance and commercial management can result in a lack of transparency and accountability. For example, it may be in the short to medium term interests of a commercial forest manager to increase harvest volumes above long-term sustainable yields to maximise profit. To offset this incentive, checks and balances should be in place to ensure that harvest volumes are indeed sustainable and do not compromise environmental objectives (outside the domain of the forest entity).*
>
> *In Victoria, for example, DSE determines the sustainable yield while VicForests is responsible for the harvest and commercial sale of timber. The environmental aspects of commercial operations of these agencies are externally regulated though the EPA, which undertakes annual audits of compliance with relevant legislation. The situation is similar in Queensland where operational and governance/auditing activities are undertaken by separate government agencies. However in other states, there is less separation of commercial operations from the regulation and governance function. This is most notable in NSW, where Forests NSW sets sustainable harvest levels and also carries out commercial operations on public land, and is not subject to external audit against relevant legislation and regulation.*

It is suggest that the Inquiry consider the issue of public forest management arrangements and consider recommending separating policy and regulation from operations. Any such system would be enhanced by allowing members of the public third party appeal rights.

2.1. Ecosystems

We have found that the subsequent reservation of lands in UNE has not redressed the extremely poor reserve outcome achieved for north east NSW in 1998 and the Government's refusal to report on forest ecosystem target achievement has masked this situation. Even when off-reserve management is accounted for there is a shortfall of some 250,000-300,000 ha (33-39%) in areal targets for forest ecosystems, with more than 50% of ecosystems below national reserve targets. The vast majority of nationally rare, endangered and vulnerable ecosystems have not met reserve targets. "Annual" reporting has failed to update relevant information and Forests NSW ignores the reserve status of poorly reserved ecosystems when logging them.

For example (as identified in 5.2.3) the audit of Yabbra (Pugh 2009) encompassed a large expanse of forests suffering from Bell Miner Associated Dieback (BMAD), with a dense lantana understorey in places. The forest ecosystems most affected are Grey Box-Red Gum-Grey Ironbark, and Wet Bloodwood-Tallowwood, which have achieved 41% and 82% respectively of their national reservation targets (including in Informal Reserves and Protection by Prescription). In the affected areas there were numerous sick and dead trees with extensive lantana understoreys. Forests NSW failed to identify or consider the reserve status of the ecosystems or their poor health, instead logging them on a maximum utilisation basis and, despite the proliferation of weeds following logging and the poor prognosis for the survival of the ecosystems, failed to identify any rehabilitation works.

In our recent audits we identified 4 areas of one Endangered Ecological Community (EEC) that had been logged and roaded. After we identified the first area Forests NSW failed to admit to the other three breaches in an effort to cover them up. At another site fire had escaped into an EEC and despite breaches of legal requirements and significant degradation no rehabilitation was undertaken by Forests NSW or required by DECCW. At approximately the same time logging of another EEC was separately reported

Endangered Ecological Communities are excluded from Forests NSW's licence, making picking or harming an endangered ecological community a direct offence under sections 118A and 118D of the National Parks and Wildlife Act 1974. At Doubleduke SF (Pugh 2010b, Pugh 2010c) we have identified 4 incursions into an Endangered Ecological Community, in part because the planning process failed to accurately identify the community and in part because the forester undertaking the marking up apparently did not have the expertise to identify and delineate what is, at its core (i.e. away from edges), an easily identifiable community. We have counted 1,453 trees and shrubs picked or harmed within this EEC, each offence being liable to a $11,000 fine. DECCW are now going through the process of initiating legal action.

Around the same time as Forests NSW committed this offence they logged the EEC Lowland Sub-tropical Rainforest in Grange State Forests. This offence was revealed by the Clarence Environment Centre. DECCW are now going through the process of initiating legal action over this too.

The problem is that the DECCW auditors do not have the expertise or will to identify such breaches and thus it is left up to the community to identify intrusions into EECs. Given the small number of logging operations assessed by suitably qualified volunteers it is apparent that such breaches are far more widespread.

In Yabbra SF (Pugh 2010a) Forests NSW illegally logged mapped rainforest without recognising it as such. The existence of this mapped rainforest went unnoticed in Forests NSW's implementation of plantation accreditation process (despite being pointed out to them), it was not noticed in the planning process for logging in this compartment, was not identified according to Forests NSW's "rainforest protocol" when marking up, and was logged. .

There was maximum damage deliberately done to the rainforest understorey in the logging operation, with hundreds of rainforest trees bulldozed over with the apparent aim of maximising disturbance to promote eucalypt growth. Some large rainforest trees were cut down (along with eucalypts previously planted along old snig tracks and in log dumps for rehabilitation) and there are already some significant weed problems. Much of the debris is piled up and hindering regeneration. Pursuant to our complaint, DECCW issued Forests NSW with a Penalty Infringement Notice and a fine of $300 for logging in this rainforest.

Further work undertaken since our audit (Pugh 2010a) has established that 1.9ha of mapped rainforest was logged, and re-mapping by Forests NSW's botanist Doug Binns has identified an additional hectare that he considers qualifies as rainforest according to application of the standard protocol "Forest Practices Circular No. 2005/02, dated 24 June 2005". This brings the total area of rainforest unlawfully logged to some 3ha, and raises the question as to why Forests NSW's planning processes and forest foremen failed to identify it for protection.

In Forests NSW's (2010) subsequent "Rehabilitation and Monitoring Plan, Compartments 162 and 163 Yabbra State Forest No 394" this area is considered, though the early intervention required to get regeneration on track was not admitted and monitoring is all that is proposed for illegally logged rainforest. DECCW have approved this plan.

Many oldgrowth forest ecosystem targets were not met in the CAR reserve system. To some unspecified extent target achievement has been facilitated by off-reserve protection, mostly as High Conservation Value Old Growth Forests (HCVOG). Forests NSW now refuse to recognise the existence of mapped oldgrowth forest that is not HCVOG. While its existence is denied, we found that oldgrowth forest is still being logged, including in a Special Prescription Zone (FMZ 3B) apparently created specifically to protect the oldgrowth forest present which was also a contribution towards the CAR reserve system. In addition, Forests NSW's reporting on growth stages fails to recognise oldgrowth forest exists outside HCVOG.

Forests NSW pretend that they can clearfell an oldgrowth stand and not affect its growth stage!

The inquiry needs to recognise that forestry operations can and do have significant impacts on inadequately reserved, rare and endangered ecosystems. In order to appropriately protect inadequately reserved, rare and endangered ecosystems, it is requested that the Inquiry:

a. **Require the identification of the reservation status of all forest ecosystems in accordance with the RFA;**
b. **Review the management arrangements for values protected in informal reserves and by prescription;**
c. **Review the poor management of forest ecosystems intended to be excluded from logging; and,**
d. **Identify appropriate management arrangements for each inadequately reserved, rare and/or endangered ecosystem.**

2.2. Threatened Species

During expert workshops conducted as part of the CRA process for North East NSW information describing the disturbances that affect the priority species was collected (Environment Australia 1999). This involved experts listing all the disturbances affecting a species and then ranking them in terms of their impact on the regional population. Those disturbances that had the most detrimental affect were ranked one and so on.

Of those species identified as being of particular conservation concern, a total of 7 mammals (excluding bats), 27 bats, 31 birds, 16 frogs, 5 turtles, 15 lizards and 8 snakes were identified as being specifically vulnerable to logging, with many of these species, and a number of others, also vulnerable to the associated fire regimes, stream pollution and weed invasions (Appendix 1). For 41 of these 109 species logging is identified as a primary (number 1) threat.

In the whole of north east NSW only 31% of the CRA reserve targets for viable populations of fauna species have been achieved to date. This outcome shows that our reserve system does not contain sufficient habitat for most vulnerable forest dependent species to survive in the long term and emphasises the need for expanded reserves. But most importantly, it highlights the need for adequate off-reserve management.

Forests NSW undertake logging operations under a Threatened Species Licence (TSL) and Fisheries Licence (FL) which attempt to regulate activities so as to protect State and national threatened species of terrestrial animals, plants and fish. We have found that the FL has rarely been applied or enforced. The TSL is only subject to occasional audits and, in our experience, significant breaches are missed even when pointed out to DECCW. Even when breaches are reported to the regulators they are not explicitly or comprehensively audited, the fines and penalties are grossly inadequate, and no rehabilitation or provision of compensatory habitat is required to compensate for illegally logged threatened species habitat.

2.2.1. Compartment Mark Up

Both the Threatened Species Licence and Fisheries Licence require a variety of habitat assessments and the identification of specific Threatened fauna habitat attributes and Threatened flora localities to be undertaken by appropriately trained people. We found that attributes required to be identified at the mark-up stage are rarely identified, that stream and Threatened species exclusion areas are often not marked, and that habitat trees required for

retention rarely marked. We do not consider that adequately trained people are undertaking thorough searches for the "*threatened and protected species features"* required by the TSL at the mark-up stage with the result that feed trees, habitat trees and areas required to be retained for threatened species are often logged. Neither do we consider that other features requiring identification and protection are being adequately located and marked in the field, resulting in further losses of key fauna habitats.

One of the basic requirements of the Threatened Species Licence is the Compartment Mark-up Surveys (TSL 5.2.). Under the TSL (5.2.1d) Harvesting Operations are prohibited in areas which have not been subject to compartment mark up surveys.

At this time *"an adequately trained person must conduct a thorough search for, record and appropriately mark … threatened and protected species features".* These features include nests, roosts and dens of a variety of hollow-dependent species, Koala high use areas, latrine and den sites of the Spotted-tailed Quoll, Glossy-black Cockatoo feed trees, Yellow-bellied Glider and Squirrel Glider sap feed trees, bat tree roosts, Swift Parrot and Regent Honeyeater feed or nest trees, wombat burrows, soaks and seepages in Philoria spp. habitat, and threatened flora. This is a key step in providing the intended protection to a range of threatened species. It is only by undertaking the required on-ground assessment that the features can be found that that trigger a variety of prescriptions.

These features are not necessarily easy to locate and the diverse range of tasks requires a high level of expertise in a range of fields, which is a lot to ask of any person. The requirement to thoroughly search for the features requires that the necessary techniques and methods are applied. There is also a necessity to reasonably assess the entire compartment, and particularly the nett harvest area.

PHOTOS: What had been potential soaks for Richmond Frog that were meant to be protected with 10m buffers. Forests NSW were fined $300 and not required to do any rehabilitation.

In our audits we found a poor outcome from the mark-up surveys with regards to identifying and protecting the targeted features:

- the targeted nests, roosts and dens of a variety of species have not been identified at any sites, despite some obviously being present;
- Koala's were present at all sites, though no intermediate or high use areas were identified (Pugh 2010b);
- Yellow-bellied Glider sap feed trees were present at all sites (we identified 11 such trees at Yabbra, Pugh 2009)) and were not identified;
- Sparkes (2010) found that wombat burrows and exclusion areas were not being identified;

- Sparkes (2010) found that bat tree roosts have not been identified anywhere in the UNE;
- Sparkes (2010) found that Tiger Quoll latrine sites were identified in one area, though misplaced, none were found in our audit areas though the species would have been present;
- soaks and seepages in Philoria habitat at Yabbra (Pugh 2009) were not identified; and,
- threatened flora at Doubleduke were not identified (Pugh 2010b).

Forests NSW's Threatened Species Licence (5.2.1b) requires them to identify and appropriately protect locations around an array of threatened plant species. There have been no locations identified within the nett logging areas in the Harvesting Plans we have assessed. In a single inspection of Doubleduke SF a botanist employed by the North Coast Environment Council (see Benwell 2010, Pugh 2010b) found *"The endangered species Lindsaea incisa (a small ground fern) was identified at a site that appeared to be within the harvestable area of cpt 145"* and in compartment 144 he found the threatened grass *Paspalidium grandispiculatum "amongst earth on an upturned stump at the edge of the recently constructed or upgraded access track, so would appear to have been directly damaged during track construction".*

NEFA subsequently found large numbers of *Lindsaea incisa* (within a wetland and its buffer that had been illegally logged) in Doubleduke SF from within which trees had been logged and machinery driven through it, despite the requirement being for a 50m exclusion zone to be established.

In Doubleduke, Benwell (2010) considered "*No pre-logging flora surveys or flora assessments that could have detected this species appear to have been carried out by FNSW".* After roading and logging resumed in compartment 144 NEFA was informed that a foreman had been trained (by showing him a picture) to identify the cryptic *Paspalidium grandispiculatum.*

The Fisheries Licence (Section 9) requires that "Pre-Logging and Pre-Roading Aquatic Habitat Assessments" be prepared under certain circumstances by "*suitably experienced and trained persons".* In Doubleduke SF (Pugh 2010c), compartment 144, the assessment was undertaken by a Forester who apparently did not have the required expertise as he failed to undertake a proper assessment and omitted to consider the nationally endangered Oxleyan Pygmy Perch.

The Compartment mark-up is the time when many other features are marked for protection, notably a range of exclusion zones, a variety of feed trees, habitat trees, and recruitment trees. Importantly this is the time when stream and wetland exclusions are marked.

We have found numerous instances of failures to mark exclusion boundaries and required trees:

- At Yabbra (Pugh 2009) exclusion boundaries and habitat trees were rarely marked in the field away from roads, unmapped streams and wetlands had not been identified and marked, feed trees were not marked, and rainforest was not identified;
- At Doubleduke (Pugh 2010b) we found active logging in an area they had not fully marked-up. In some areas at Doubleduke marking-up seemed to be limited to defining the boundary of the nett logging area with little other tree marking away from roads. The boundary of an Endangered Ecological Community was not delineated. At one site the required number of habitat trees had not been marked for retention, though sufficient trees had been retained. At other sites tree retention appeared deficient.
- At Girard (Pugh 2010d) one area had been marked up, though the boundaries had been erroneously marked-up at two locations, a mapped stream was not

identified and cleared, some unmapped streams were not marked and cleared and drainage depressions were not marked and severely impacted. Habitat and recruitment trees had been marked, though there were insufficient trees marked. In another area at Girard there had been a failure to mark stream buffers, threatened frog exclusion area, feed trees and enough habitat trees - marking up was limited to token hollow-bearing trees near the main track.

What ever the excuse we do not consider that adequately trained people are undertaking thorough searches for the *threatened and protected species features* required by the TSL at the mark-up stage. We also found that other required features are not being adequately located and marked in the field.

Part of the problem is that often the contractors in their machines are driving around choosing what to log. They have effectively replaced the forest foreman in many operations. They have limited chance of finding many of the required fauna features, such as Koala scats, and little chance of finding cryptic threatened plants. They place reliance upon their Geographic Position Systems (GPS) and often measure exclusion areas from mapped features rather than the required natural features (i.e. top of stream banks). GPSs are also of limited accuracy in the forest.

Forests NSW appear to be moving in the direction of increasing mechanization and away from mark-up surveys. The principal problem with this is that it precludes the implementation of a raft of requirements of the TSL aimed at minimizing impacts on threatened flora and fauna.

2.2.2. Protecting Hollow-bearing trees

A plethora of forest animals depend upon the trunk and branch hollows provided by big old trees for their survival. Approximately 20% of the Australian bird fauna, 75% of arboreal marsupial fauna and an undetermined proportion of the bat, reptile and invertebrate fauna are dependent on the hollows provided by old trees for roosts, nests and shelter.

Generally speaking, small hollows begin to develop once a eucalypt is over 100 years old, and the large hollows required by many species after a tree is over 200 years old. Depending on the species and site conditions trees may live for 300 to over a thousand years old, providing their lives are not cut short. In order to provide for hollows through time it is necessary to protect those trees with existing large hollows, as well as sufficient trees in the next age class to replace them when they die, and trees in the next age class to replace the replacements.

The NSW Scientific Committee has identified *Loss of Hollow-bearing Trees* as a Key Threatening Process. The highest priority action for this KTP is "*Adopt appropriate policies for recruitment tree ratios with a stipulated minimum retention density in areas of forestry operations"*.

Under the Threatened Species Licence (TSL 5.6 a) a minimum of 10 hollow-bearing trees per 2 hectares, selected from the largest trees in the stand, are required to be retained within the nett harvest area. Where there are insufficient hollow-bearing trees then the largest trees need to be retained. In the coastal "regrowth" zone only extant hollow-bearing trees need to be retained (TSL 5.6 c), that is that if only one hollow-bearing tree is left then that is all that needs to be retained.

Under the TSL (5.6 b, d) a "mature to late mature" recruitment tree is required to be retained for each hollow-bearing tree required to be retained, so that when the old tree dies the recruitment tree will be old enough and healthy enough to provide the required homes for hollow-dependent species.

Retained hollow-bearing trees must be selected from the trees with the largest dbhob and must be live trees and should have good crown development and minimal butt damage (TSL 5.6 a, c). Recruitment trees are required to be mature to late mature growth stages, to have good crown development and minimal butt damage, and also to not be "suppressed" (TSL 5.6 b, d). Suppression occurs when trees are out competed by adjoining trees and become consequently stunted and deformed, which can persist after the competing trees are removed.

Retained trees must be scattered throughout the logging area. The TSL (5.6 g) requires damage to retained trees to be minimised and that *"logging debris must not, to the greatest extent practicable, be allowed to accumulate within five metres of a retained hollow bearing tree"* or recruitment tree.

The (TSL 5.6 (f) (iii)) requires that retained trees *"must be marked for retention".* This is required to be undertaken at least 100m in advance of logging.

In Yabbra (Pugh 2009) it appeared that, with few exceptions, hollow-bearing and recruitment trees were not marked in the field, except near the principal roads and one side track. At that time we did not attempt to quantify the retention deficit as we thought DECCW would (we were wrong). At a number of sites large stumps made it apparent that hollow-bearing trees had been felled despite there apparently being insufficient hollow-bearing trees retained in the vicinity. Many of the marked recruitment trees were small and/or suppressed trees which have limited prospects of developing into the habitat trees of the future – they were not mature to late mature trees.

PHOTO: Yabbra: note the butt damage to the marked hollow-bearing tree and the small size of the marked suppressed recruitment tree. The large old tree is vulnerable to burning and is unlikely to survive long, while even if the recruit was healthy it has no chance of providing replacement hollows in time – though as it is suppressed it will be lucky to outlive the hollow-bearing tree. This is pure and deliberate tokenism.

In our first audit of Doubleduke (Pugh 2010b) we found logging underway in Compartment 146 without hollow-bearing and recruitment trees being marked. We complained at the time.

When we returned after logging had finished we found that the hollow-bearing trees that had survived had subsequently been marked. Though it appeared to us that retention requirements had not been met.

At another area in Doubleduke (Pugh 2010b) where tree retention appeared deficient, a large senescent hollow-bearing tree had been felled while nearby damaged late-mature trees without significant hollows had been marked as hollow-bearing trees for retention.

In a third area in Doubleduke (Pugh 2010c) it was found that an average of 1.9 hollow-bearing trees, and 1.3 recruitment trees, per hectare had been marked for retention. A measurement of all trees and stumps in a subset of this area found that sufficient trees had been retained to meet retention requirements, though 3 of the 7 largest trees had been logged. In this area it appeared that someone had walked along a track and the boundary of the nett harvesting area marking habitat trees in an ad-hoc manner as they went, without venturing far into the logging area.

In one area at Girard (Pugh 2010d) trees and stumps were measured to quantify tree retention standards. In that area the density of Greater Gliders exceeded 1 per hectare so the TSL owl prescription (6.9d) required the retention of 8 hollow-bearing trees per hectare and the general recruitment tree prescription required the retention of 10 mature/late mature recruitment trees per 2 hectares. It was found that while there were originally 7.8 large old (late mature/senescent) trees per hectare they only retained 4.8 per hectare, and of the next size class (mature/late mature) there were originally 19 per hectare but only 3.9 per hectare were retained. Insufficient trees were retained to satisfy TSL licence requirements. It is important to recognise that the area measured was oldgrowth forest within a special prescription zone, with tree retention generally appearing significantly lower elsewhere in the compartment.

PHOTOS: Girard: note the debris stacked around the habitat tree ready for burning, and the extensive damage to the retained hollow-bearing tree on the right.

In another area at Girard (Pugh 2010d) only three hollow-bearing trees and two recruitment trees were marked for retention in a 3.7 ha area, giving a retention rate of one hollow-bearing tree per 1.2ha and one recruitment tree per 1.4ha. In this case there were additional trees available for marking though these were not quantified. It appeared that, even with the inclusion of the unmarked trees, that retention was still deficient. It appeared that someone had walked along the track only marking easily accessible hollow-bearing and recruitment trees in the vicinity of the track. Near the end of the track a “clump” of trees had been marked in an attempt to improve counts.

Contrary to licence requirements retained hollow-bearing trees often have butt damage. Trees retained as recruitment trees are commonly too young and too suppressed to satisfy licence requirements. At both Yabbra and Doubleduke (Pugh 2009, Pugh 2010b) it was found that marked recruitment trees were often suppressed regrowth trees with poor crown development . At one site at Girard (Pugh 2010d) 2 hollow-bearing trees and 7 recruitment trees were classed as suppressed, and one recruitment tree had 60% of its butt severely damaged. At the other site 1 hollow-bearing tree and 1 recruitment tree had significant butt damage.

At both Yabbra and Doubleduke (Pugh 2009, Pugh 2010b) it was found that retained trees often had large amounts of debris felled and pushed around their bases. At one site at Girard (Pugh 2010d) 8 of 13 hollow-bearing trees and 7 of 10 recruitment trees had significant amounts of debris dropped or pushed around their bases. At the other site all five marked trees had significant amounts of debris left around their bases.

There is a war of attrition against hollow-bearing trees being waged. Their numbers are being depleted by continued logging, the required replacements are not being retained and funeral pyres are regularly being constructed around them in apparent attempts to burn them to the ground. The Australian Forestry Standards (4.4.5) require that the forest manager shall ensure damage to forest growing stock during forest operations stays within tolerable levels, in order to maintain wood quality and promote forest health. We consider that the damage being caused to hollow-bearing and recruitment trees is beyond tolerable levels and is causing forest degradation.

2.2.3. Implementing Prescriptions for Threatened Fauna

In NSW the protection of Threatened Species in logging operations on public lands is governed by the Threatened Species Licence. As well as general prescriptions there are species-specific prescriptions. The results from our audits, and those of Sparkes (2010), provide an indication of the scale of the problem. It is emphasised that only a small sample of the logging areas have been audited and that problems are evidently far more widespread.

From his review of 384 harvest plans for north east NSW, Sparkes (2010) considered that conditions of the Threatened Species Licence (TSL) that are under represented in these plans were:

- *Microchiropteran bat roost tree exclusions (TSL 5.14.1b);*
- *Koala high use area exclusion (TSL 6.14c);*
- *Yellow-bellied Glider Den exclusion (TSL 6.17a);*
- *Bird Nest and Roost site protection (TSL 5.13); and*
- *Threatened Flora conditions of the TSL (TSL 6.22, 6.23, 6.24.,6.25,6.26,6.27,6.28)*

In relation to our recent audits of the prescriptions specified in the licences we identified numerous failures (i.e. Pugh 2011), including failures to:

- recognise the existence of, and appropriately plan for, the Endangered fish Oxleayan Pygmy Perch;
- recognise the habitat of the Endangered Richmond Frog, undertake required surveys, exclude logging, roading and burning, assess and rehabilitate habitat;
- mark exclusion zones around the habitat of the Endangered Stuttering Frog and fully exclude it from logging;
- recognise the habitat of the Endangered Hastings River Mouse, and undertake required surveys;
- assess and rehabilitate the habitat of the Endangered Black-striped Wallaby after it was intensively logged and then accidentally burnt. Despite grazing being an identified threat Forests NSW continued to allow illegal grazing of its habitat after they said they would stop. They also failed to prepare the required grazing management plan by 2000;

- adequately assess habitat of the Vulnerable Koala, and conduct pre-logging scat searches;
- identify den and sap-feed trees of the Vulnerable Yellow-bellied Glider and systemic failures to apply the prescription for the retention of feed trees;
- appropriately locate and protect exclusion areas required to be implemented for the Vulnerable Spotted-tailed Quoll;
- apply prescriptions to exclude logging from the vicinity of burrows of the regionally significant Wombat; and,
- identify roost and nest trees for the Vulnerable Powerful Owl, exclude logging from retained habitat and retain the required habitat trees in good habitat.

Forests NSW often measuring exclusion zones along creeks (often with GPS) from the mapped centreline rather from the top banks (which can make them considerably wider). For this reason alone they frequently and repeatedly under-protect riparian areas.

In relation to biodiversity Forests NSW (2005) ESFM Plan notes:

> *Forests NSW will use adaptive management principles and actions within State forests to complement the management of the CAR reserve system.*
>
> *…*
>
> *During operations, site specific conditions are continually assessed, results recorded, the appropriateness of operational conditions reviewed and plans amended where necessary.*
>
> *Operational auditing monitors compliance with plan conditions and, where non-compliance occurs, assesses environmental harm, details repair works where necessary, the cause of non-compliance, whether sanctions are necessary and how the non-compliance can be avoided in future operations.*

We have come across no evidence of this, quite to the contrary we are concerned that Forests NSW does not learn from their mistakes. We are most concerned that neither DECCW nor Forests NSW bother to assess the effectiveness of prescriptions and improve them accordingly. Rather than applying adaptive management as a routine practice we find that Forests NSW use it as an occasional excuse to log somewhere they shouldn't.
One has only to look at the supposed rehabilitation plan for Compartments 162 and 163 of Yabbra SF (Forests NSW 2010) where, despite the intense scrutiny, Forests NSW failed to consider why numerous prescriptions were inadequately applied, failed to assess the impacts that eventuated and failed to identify any rehabilitation measures (aside from repairing drainage). Despite being found guilty, they apparently learnt nothing.

Example 1: Hastings River Mouse.

Pseudomys oralis is listed at both state and national levels as an Endangered species. For the Hastings River Mouse only 8% of the mean of the habitat targeted for reservation is included in the reserve system in north-east NSW, all 8 populations have achieved less than 29% of reservation targets, with 6 below 10%. For Hastings River Mouse, the CRA expert panel (Environment Australia 1997) identified predation by foxes and cats as the biggest threat to this species, followed by burning.

On their threatened species site DECC identify as threats:

- *Loss of habitat through clearing.*
- *Reduced groundwater and stream flow as a result of clearing or canopy reduction.*
- *Cattle grazing and trampling of preferred habitat, especially close to water.*
- *Too frequent fires, which may destroy or severely reduce species diversity ground cover.*
- *Predation by foxes and feral cats.*

The Threatened Species Licence (TSL 6.13) requires that exclusion zones of 200-800 metres must be established around records of Hastings River Mouse. TSL 8.8.9 establishes that habitat surveys and trapping surveys need to be undertaken in modelled habitat before it can be logged.

In three separate forests Sparkes (2010) identified a total of 83 hectares of modelled habitat of the Hastings River Mouse where the required surveys had not been undertaken. Because the required surveys were not done it is not known whether the mouse was present and the exclusion zones should have been applied. DECCW issued warning letters for two of these breaches.

Example 2: Richmond Frog.

NSW has identified *Philoria richmondensis* as an Endangered Species, it is also listed as endangered on ICUN's Red List. For the Richmond Frog only 56% of the habitat targeted for reservation is included in the reserve system in north-east NSW, and this target is only a fraction of the habitat needed for a viable population. For Philoria species, the CRA expert panel (Environment Australia 1997) identified changes in soil moisture resultant from logging and roading as the most significant threats to these species.

DECCW's website identifies a variety of threats including:

- *Degradation of habitat due to changes in hydrological regimes and water quality, and also from trampling by domestic stock*
- *Reduction of moisture levels caused by intensive forest management, including timber harvesting, road construction and burning.*

On their threatened species site DECC state:

What needs to be done to recover this species?

- *Prevent conversion of large areas of old-growth forest to young, even-aged stands.*
- *Protect known and potential habitat from forest management practices that reduce dry season stream flows and ground moisture levels.*
- *Protect areas of known habitat from roading, logging and other disturbance.*
- *Reconnect isolated rainforest patches with corridors of wet forest, particularly along drainage lines in stream headwaters.*
- *Adopt the DEC frog hygiene protocol to prevent the spread of chytrid fungus in amphibian habitat.*

Section 5.2.1 of the Threatened Species Licence requires that an adequately trained person must conduct a thorough search for, record and appropriately mark permanent soaks and seepages in *Philoria* spp. potential habitat during or before the marking-up of a compartment. In Compartment 163 of Yabbra State Forest (Pugh 2009) we found 2 soaks/wetlands that had not been identified in the planning process and had not been surveyed for *Philoria* spp. as required. Forests NSW had mistakenly identified that surveys for *Philoria loveridgei* rather than *P. richmondensis* were required, though neither was apparently searched for. One of these soaks was identified in our audit as likely to have been potential habitat for *P. richmondensis,* though the intensity of the disturbance has now rendered it unsuitable habitat.

As wetlands, both these soaks were required by the Fisheries Licence and Threatened Species Licence to be marked on the harvesting plan, have 10m buffers established and have forestry operations excluded. Both the soaks were intensively disturbed by roading, logging and burning (Pugh 2009). As a consequence of our audit DECCW issued Forests NSW a Penalty Infringement Notice for "timber felling within a wetland and wetland exclusion zone", Fisheries NSW issued a warning letter for these same offences, and DECCW issued a formal warning to Forests NSW for not identifying habitat and surveying for Richmond's Frog.

In Forests NSW's (2010) subsequent "Rehabilitation and Monitoring Plan, Compartments 162 and 163 Yabbra State Forest No 394" there is no mention, or assessment of the condition, of these wetlands and no proposal to undertake any remedial actions to restore the wetlands. And this has been agreed to by DECCW.

Example 3: Oxleayan Pygmy Perch.

Nannoperca oxleyana is identified as 'endangered' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the NSW *Fisheries Management Act 1994*.

The "*Terms of Licence under section 220ZW of the Fisheries Management Act, 1994 to harm threatened fish species during undertaking of forestry related activities. Upper North East Region"* (the Fisheries Licence) requires in Section 9 for Forests NSW to prepare "Pre-Logging and Pre-Roading Aquatic Habitat Assessments": While the licence implies these should be prepared for all operations, in practice they are only prepared when in-stream works are proposed. In response to our request for the assessment for compartment 144 of Doubleduke SF (Pugh 2010c) NEFA was provided with the document *"Assessment of Proposal for In-stream Works in Aquatic Habitats"* (1/7/2009).

The assessment undertaken failed to recognise the existence of Oxleyan Pygmy Perch despite the 2005 Recovery Plan identifying that this compartment occurs within the identified *"likely natural distribution"* of the Oxleyan Pygmy Perch, with a pre 1980 record of this species apparently near Compartment 145. The assessment guidelines included in the licence also identify this as one of the 3 primary target species in UNE.

The Fisheries Licence requires that those undertaking assessments have some expertise and to consider existing records. Forests NSW apparently get untrained foresters to do their aquatic habitat assessments despite their not having the appropriate expertise (Pugh 2010c). Though according to a Forests NSW planner under the licence they only need to consider a species if records and data are first provided by Fisheries, which was meant to happen five years ago, as stated in the 2004/5 RFA report:

> *Preparation of distribution data for the Oxleyan pygmy perch (Nannoperca oxleyana), a species occurring in coastal areas of northern New South Wales, and Macquarie perch (Macquaria australasica) occurring in streams of the southern highlands and slopes, is complete. Both species could be affected by forestry operations and the distribution data is expected to be provided to Forests NSW shortly*

Intentional ignorance, supposedly by a fish expert, should not be an excuse for inaction to protect an endangered species.

As of November 2010 Fisheries NSW had still not provided the documentation to Forests NSW. This oversight means that since Oxleyan Pygmy Perch was listed as endangered Forests NSW has used their intentional ignorance to justify not taking any specific action to protect it. Given that the *"Assessment of Proposal for In-stream Works in Aquatic Habitats"* for compartment 144 was approved by Fisheries NSW, and it did not even recognize the existence of Oxleyan Pygmy Perch, it is apparent that there is something very wrong with Fisheries approval process. You would think that over the years someone would have noticed that Oxleyan Pygmy Perch wasn't being duly considered.

The inquiry needs to recognise that forestry operations can and do have significant impacts on a range of native plants and animals and that many current prescriptions are inadequate and inadequately applied. In order to appropriately protect rare and endangered plant and animal species, it is requested that the Inquiry:

a. **Identify the reservation status of all nationally threatened species;**
b. **Engage appropriate experts to review the adequacy of prescriptions applied to safeguard threatened species in logging operations; and,**
c. **Review the application of prescriptions in logging operations and identify means to improve their implementation.**

2.3. Water Quality

As noted by Cornish (1980) *"the quality of water emanating from virgin forested catchments is generally of the highest order. A reduction of quality may occur as a consequence of operations associated with logging, and this is frequently due to an increase in stream sediment concentrations and associated turbidity levels."*

Raindrop impact and overland flow are the principal means of detaching and transporting sediments and nutrients in forests.

In a logging operation the removal of vegetation allows an increase in rainfall volumes and the force of raindrops reaching the ground, and thus a greater mobilisation of soil particles can occur. Movement of machinery and dragging of logs causes an increase in compacted areas of soil surface and removal of topsoil, thereby reducing the permeability of the soil and increasing runoff, as well as causing channelling and creating loose soil for easy movement. In the short term the removal of the canopy also decreases transpiration, allowing water tables to rise and the soil to become saturated sooner and begin generating overland flow, particularly nearer streams.

The increased runoff also acts to increase the erosive force as doubling the depth of overland flow increases the velocity four times, resulting in the movement of particles 4096 times larger than before and an increase of 1024 times in the total mass able to be carried.

Loss of understorey vegetation and leaf litter, which slows overland flows and traps sediment, will also facilitate transport of soil for longer distances. The impacts of logging are greatly amplified by burning which removes the understorey and ground litter and/or weakens soil structure or increases soil hydrophobic properties.

As the soil becomes more disturbed or wetter it becomes more resistant to infiltration and thus overland flow is increased and mobilised soil can pass directly into streams and thus increase stream turbidity. The potential effects of logging on streams are therefore more pronounced in wetter weather and as operations get closer to streams.

As the velocity of the water begins to slow the larger soil particles begin to be deposited, causing sedimentation of stream beds and ultimately dams.

Logging has been found to result in a variety of impacts on stream quality:

(i) significant increases in peak sediment loads (Campbell and Doeg 1989, Lake and Marchant 1991, Bonell, Gilmour and Cassells 1991, Sadek *et. al*. 1998) leading to increased sediment deposition in streams with consequent short-term and long-term impacts on invertebrates and fish (Campbell and Doeg 1989, Lake and Marchant 1991, Davies and Nelson 1994);

(ii) increased nutrient levels which can stimulate algal production in summer (Campbell and Doeg 1989, Lake and Marchant 1991, Davies and Nelson 1994), affecting both the instream community in the vicinity of logging and downstream water users and reservoirs; and,

(iii) reductions in levels of dissolved oxygen in streams as a result of oxygen demands of decomposing logging debris in streams, which becomes most apparent in periods of low flows (Campbell and Doeg 1989).

The impacts of logging on stream quality is largely related to the impacts of machinery on soils and the consequences this has for runoff and thus changes in stream turbidity, nutrients and chemistry.

2.3.1. Increased runoff

Logging operations have been found to have a very significant impact on soil structure and stability. The most significant of these in relation to runoff is the compaction of soil reducing its permeability and thus increasing runoff. As noted by Croke *et. al.* (1997), *"once surface runoff commences, flows transmit relatively quickly downslope in the absence of areas of higher infiltration which can absorb large volumes of surface flow."*

During logging operations from 16% (Van Loon 1966) to 23% (Wronski 1984) of the logging area can be subject to significant disturbance by machinery, increasing to over 70% in wetter forest types where machinery disturbance is maximised to encourage regrowth (Forestry Commission 1982, Rab 1994, 1996). Rab (1996) found that *"snig tracks, log landings and disturbed general logging area occupied about 19%, 3% and 66% of the coupe area, respectively."*

Compaction of forest soils during logging operations is caused by the weight of machinery, loads and falling trees. The single passage of machinery has been shown to cause major compaction (e.g. Incerti, Clinnick and Willatt 1987) while repeated loadings and logging cycles have been shown to increase compaction effects (e.g. Seymour 1981). Wronski (1984) found that after two or more passes of logging vehicles the full depth of the soil's A horizon was compacted immediately beneath the wheel tracks and to a lesser extent up to 0.75 m from the edges of the tracks.

Compaction effects have been shown to dramatically increase with soil moisture (Greacen and Sands 1980, Seymour 1981, Jakobsen and Moore 1981, Wronski 1984, Lamb 1986), Greacen and Sands report that one passage of a tractor over wet soil made it almost impermeable to water and the effect was equivalent to four passages over dry soils. Shear stress and wheel slip can increase the compaction effect of static loads by up to 2 and 5 times respectively (Greacen and Sands 1980). To some extent, gravel and organic matter in the soil reduce compaction effects (e.g. Wronski 1984, Lamb 1986).

For krasnozem soils compaction is generally greatest in the top 25-30 cm of the soil profile though there is some effect down to 50 cm (Jakobsen and Moore 1981, Jakobsen 1983). In sandy soils movement down to 120 cm depth has been recorded (Greacen and Sands 1980).

As noted by Jakobsen (1983) *"Compacted forest soils, in the absence of ameliorative treatment, recover slowly under the influences of climatic processes and the activity of roots and soil fauna. However, it may take 10-20 or more years for soil to recover after shallow compaction ... while compaction of deeper layers may persist for 50 to 100 years ... When biological activity in the soil is severely reduced by compaction, recovery may be further retarded."*

In relation to water movement, soil compaction resultant from logging machinery and vehicles, has been shown to significantly:

- *increase soil density (Greacen and Sands 1980, Seymour 1981, Jakobsen and Moore 1981, Jakobsen 1983, Wronski 1984, Incerti et al 1987, Rab 1994, Croke* et. al. *1997), with various estimates of 20-65% increases on major snig tracks and log landings;*
- reduce infiltration capacity (Langford and O'Shaughnessy 1977, Greacen and Sands 1980, Jakobsen and Moore 1981, Wronski 1984, Lamb 1986, Campbell and Doeg 1989, Rab 1994, Croke *et. al.* 1997), thereby increasing surface runoff, loss of water from the site and erosion; and,
- reduce hydraulic conductivity (Jakobsen and Moore 1981, Jakobsen 1983, Wronski 1984, Incerti et al 1987, Rab 1994);

Croke *et. al.* (1997) found that *"the bulk density of snig track soils was approximately 1.25 times higher than those on the general harvesting area. This is due partly to compaction but*

also to the loss of more porous surface soil during cross bank construction." Croke *et. al.* found that as a consequence of this *"For the 1:2 and 1:10 year storms, snig tracks generate approximately seven times more surface runoff per unit contributing area than the general harvesting areas on recently logged sites"*.

Rab (1994) concluded that *"The results indicated that logging significantly increased bulk density and decreased organic carbon and organic matter content, total porosity and macroporosity on over 72% of the coupe area. However, on 35% of the coupe area, the snig tracks, log landings and subsoil disturbed areas of the general logging area, bulk densities and macroporosities reached critical levels where tree growth could be affected. On these areas, organic carbon decreased between 27 and 66%, bulk density increased between 39 and 65% and macroporosity decreased between 58 and 88%."*

Rab (1994) found that *"Saturated hydraulic conductivities decreased to critical levels for runoff to occur on over 72% of the coupe area (topsoil and subsoil disturbed areas of the general logging area, snig tracks and log landings). On this area, the reduction in saturated hydraulic conductivity varied between 60 and 95%."*

Other water related problems with the impact of logging machinery on soils include dramatic increases in erosion resulting from: removal of the more stable surface organic layer and channelling of overland flow and increasing its erosive force (Bonell, Gilmour and Cassells 1991).

On its own, fire has been found to cause very significant increases in surface runoff following rainfall (Floyd 1964, Langford and O'Shaughnessy, 1977, Good 1973, Leitch, Flinn and van de Graaff 1983, Atkinson 1984), this is attributed to a reduction of the soils infiltration rate caused by high temperatures, and loss of litter and vegetation cover. In one instance streamflows for a 14,600 ha area in Western Australia increased by 72% following wildfire (Langford and O'Shaughnessy 1977). Various recovery periods of one to six years have been reported (eg. Langford and O,Shaughnessy 1977).

Fire can also degrade soil structure and functioning (Floyd 1964, Langford and O'Shaughnessy 1977, Leitch, Flinn and van de Graaff 1983, Sims 1991), including the formation of hydrophobic (water-repellent) surface layers. Repeated (control) burning has been found to compound the impacts of a single fire on soil structure (Floyd 1964).

2.3.2. Increased erosion

Roads and tracks are the most significant sources of erosion in logging operations (Langford and O'Shaughnessy 1977, Lamb 1986, Grayson *et. al.* 1993, Davies and Nelson 1993, State Forests 1996b, Croke *et. al.* 1997, Lacey 1998), contributing up to 95% of sediments in streams at one NSW site (Lamb 1986). Roads and tracks also alter hydrological patterns by creating new drainage lines and affecting the pattern of surface and subsurface waterflows (Bren and Leitch 1985, Lamb 1986, Bonell, Gilmour and Cassells 1991).

Sediment production rates from unsealed roads have been found to vary from 0.2 to 2,000 tonnes per hectare per annum (t ha^{-1} $year^{-1}$) (Grayson *et. al.* 1993). Grayson *et. al.* (1993) found that sediment production from unsealed roads in the Melbourne Water catchment (annual rainfall around 1600mm) was in the order of 50-90 t ha^{-1} of road surface per year, with 15-25 t ha^{-1} of this being coarse sediment and 35-65 t ha^{-1} being suspended sediment. They note that the sediment loading being composed of two-thirds suspended sediment *"is important for management, as it is more difficult to prevent suspended sediment entering streams."*

Grayson *et. al.* found that *"with low usage* [2 return passes per week] *the level of road maintenance is not a factor in sediment production; however, with high usage* [15 return passes per week]*, the level of road maintenance becomes important"*. They considered it noteworthy that *"on several occasions after grading, very large sediment loads were*

deposited in fumes. On one occasion, approximately 6 t of coarse sediment was removed from the fumes in one week."

The concentrated nature of runoff from roads, particularly when situated on side slopes, makes it difficult to control sediments and ensure their deposition prior to reaching streams.

Bren and Leitch (1985) found that spreading outflow from a road evenly over a 5m wide and 5m long area of undisturbed ground *"did not have any effect. Scrutiny of the individual storm records indicated that a possible effect was discernible only for very small storms"*, an outcome which they in part attributed to the area quickly becoming *"covered with a layer of fine sediment which blocked points of infiltration entry into the soil"* and the tendency of the water *"to flow along preferential paths, thereby reducing the opportunity for infiltration".*

The next most significant source of sediment production in a logging operation are the snig-tracks used to transport logs from where they are felled to log dumps for loading onto trucks. Cross-banks are the principal means used to control runoff and thus erosion from snig-tracks. They are used to slow runoff and thereby precipitate and trap coarser sediments on the track surface and to redirect runoff into less disturbed areas in order to trap additional sediment.

Croke *et. al.* (1997) assessed erosion from logged areas using simulated rainfall events and experimental plots and found that "*Snig tracks on these recently logged sites generate, on average, 20 times more sediment than the general harvesting areas for the 1:100 year* [110 mm/h] *storm intensities",* with *"for the most recently logged sites, sediment yield is in the order of 2 to 11 t/ha for the 1:2 year and 1:100 year storms"* over a 30 minute period.

Croke *et. al.* (1997) found that with various 30 minute rainfall simulations 65-100% of the mobilised sediment was deposited at cross banks at relatively low rainfall intensities of 45mm/h, while 33-88% was deposited at higher rainfall intensities of 110 mm/h, noting that *"The particle size distribution of the eroded sediment from the snig track and the cross bank outlet indicates the propensity for the coarser sediment to be deposited in this area, leaving a predominance of fine materials to be transported into the general harvesting area."*

While there was no real attempt by Croke et. al. (1997) to analyse the reduction in sediment after leaving the cross bank, it would appear that with a rainfall intensity of 110mm/hr lasting for half an hour, some 3-51% of the remaining sediment was transported across 5-7m of the forest floor, with volumes depending upon soil types and particle sizes. Croke *et. al*. note *"Relative differences in sediment yield from the cross bank outlet to the trench … suggest that approximately 50% of the sediment eroded on the metasediment sites reached the hillslope trench."*

Lacey (1998) assessed sediment production on snig-tracks in Orara West and Doyles River State Forests under natural conditions and presumably best practices, finding that *"the total average amount produced on snig tracks in the first year was 29 t ha^{-1} at Doyles River and 31 t ha^{-1} at Orara West. Second year results displayed a greater difference with 9 t ha^{-1} at Doyles River and 4.5 t ha^{-1} at Orara West."*. It needs to be noted that his sediment traps did overflow and thus unquantified volumes of silt were transported further on.

Lacey also assessed sediment accumulation at traps located 5 m below cross bank outlets on other tracks and found it *"to be of a similar magnitude to that of the on-track traps"* at all of the Orara West sites and one of the four Doyles River sites. In other words, in the majority of cases re-direction of silt laden water over infiltration slopes had no effect. Lacey attributed this to a fire 2 months before logging at Orara West removing ground litter and vegetation and *"some ground disturbance by logging machinery"* at the Doyles River site.

Croke *et. al.* (1997) found that *"The relationship between surface runoff and total cover varies with rainfall intensity as reflected in coefficients of variance of 36%, 34% and 5% for*

the 1:2, 1:10 and 1:100 year storms. This suggests that the effect of total cover in reducing runoff volumes is greater for low to medium events, but once rainfall intensity exceeds some threshold value, the influence of cover on surface runoff weakens as a greater percentage of the general harvesting area produces runoff and vegetated areas become saturated."

Fire alone has been found to result in significant and sometimes extreme erosion (Floyd 1964, Good 1973, Leitch, Flinn and van de Graaff 1983, Atkinson 1984). Atkinson (1984) estimated soil losses of 30 to 48 t/ha, over a 10 week period, following a wildfire in Royal National Park, he suggested that for that terrain and climate 20 t/ha may be a more realistic estimate of soil loss following wildfire in an average year. Losses of similar magnitude have been recorded in other instances (e.g. Leitch, Flinn and van de Graaff 1983). Thus a fuel reduction or accidental burn occurring around the same time as a logging operation greatly reduces the effectiveness of erosion mitigation measures while also compounding the impacts of logging on erosion.

2.3.3. Impacts on streams

As noted by Croke *et. al.* (1997) *"Erosion undoubtedly occurs in forestry environments and, in particular, on disturbed areas such as snig tracks. The transportation and delivery of this material to the drainage lines depends upon a number of factors. These include the prevailing slope, topography, soil texture, and trapping efficiency of drainage structures and protection features, such as buffer strips, within the catchment."*

Cornish's (1980) brief assessment of the relative turbidities of Rocky Creek and Little Rocky Creek (Gibbergunyah Creek) concluded that *"Turbidity levels in both Rocky Creek and Little Rocky Creek were at or below recommended levels for treated water on 78% of the sampled weeks"* (implying that it was above recommended levels 22% of the time).

For a low erosive catchment such as Girard State Forest, State Forests' (1996b) identified that *"turbidity was projected to increase by 50% at the compartment scale following integrated harvesting, and to return to pre-logging levels within four years"* and there was estimated to be a *"long-term increase due to existing roads"* of 10% at a catchment scale. The combined impacts from these for the Girard catchment was simplistically modelled as an average 12-16% increase in annual turbidity.

In adjacent catchments in Tasmania, Wilson and Lynch (1998) found that following logging around a small intermittent stream the mean turbidity of the stream was 4.7, with a maximum of 40, compared to a nearby unlogged catchment around 10 times the size generating a mean turbidity of 1.12 with a maximum of 20. They concluded that in their study area *"logging does appear to increase turbidity in small tributary streams draining logging coups, even when these streams are protected by buffer strips."*

Even with a highly constrained and regulated logging operation Grayson *et. al.* (1993) still found that the important changes detected were a 30% increase in the median value for turbidity, 20% increase in the median value of iron and a 100% increase in the median value of suspended solids. Though they did not consider these to be a major impact.

The impact of logging on turbidity is highest in storm events. Sadek et. al. (1998) found that *"the disturbed forest basin produced approximately 10 to 100 times the load per unit area during storm events compared to the undisturbed basin".* Cornish (1980) found that even where comparing two logged catchments *"Turbidity levels in Rocky Creek relative to those in Little Rocky Creek rose when logging activities in Rocky Creek coincided with periods of high rainfall"*.

The increased turbidity following logging and burning have been found to result in massive depositions of sediment in stream channels (Good 1973, Leitch, Flinn and van de Graaff 1983, Lamb1986, Davies and Nelson 1993). While some of the impacts may only persist for a few years after logging, others may persist for long periods, for example Davies and

Nelson (1993) found that *"road crossings were associated with large increases in infiltration in adjacent riffle pairs, 30-50 years after construction."*

Effects on macroinvertebrates have been recorded in catchments where logging has been carried out with extremely restrictive prescriptions for the protection of aquatic habitats (Robinson [1977] in Forestry Commission of Tasmania 1991) and some changes have been found to be longterm (up to 40 years after logging) (Silsbee and Larson [1983] in Forestry Commission of Tasmania 1991).

Davies and Nelson (1994) found that *"Logging significantly increased riffle sediment, length of open stream, periphytic algal cover, water temperature and snag volume. Logging also significantly decreased riffle macroinvertebrate abundance, particularly of stoneflies and leptophlebiid mayflies, and brown trout abundance. All effects of logging were dependent on buffer strip width and were not significantly affected by coupe slope, soil erodibility or time (over one to five years) since logging. All impacts of logging were significant only at buffer widths of <30 m."*

At buffer widths of 10-30 m Davies and Nelson (1994) found that the most significant impacts were increases in superficial silt and decreases in populations of macroinvertebrates and Brown Trout, with declines in abundance of 80% and 54% respectively at buffer widths <30 m.

Davies and Nelson caution that their assessment was undertaken during low flow conditions and that *"it is possible that larger buffer widths may be needed in some or many situations to protect streams from enhanced sediment and/or nutrient loads associated with substantial storm events."* They cite research by Gowns and Davis which found that even with 100m buffers the macroinvertebrate composition in buffered streams was intermediate between unlogged and clearfelled streams, suggesting *"that even logging with 100-m buffers may still cause community responses at the species level."*

Increased water flows have been found to scour gullies and undermine streambanks (Good 1973, Leitch, Flinn and van de Graaff 1983).

2.3.4. Mitigating impacts

Direction of runoff onto undisturbed vegetation and the maintenance of undisturbed filter strips along streams are the principal means of reducing the impacts of logging on water quality. The theory being that the undisturbed soil allows increased infiltration of water and thus sediment deposition and the roughness of the ground litter and vegetation act as sediment traps. Though if the forest is disturbed by machinery which causes compaction or channelling, or subject to burning removing ground litter and vegetation then the effectiveness of such zones is greatly reduced. Filter strips along streams encompass the most saturated soils of a catchment, so their effectiveness as sediment traps is also greatly diminished when higher groundwater levels reduce infiltration of runoff.

There are two licences aimed at mitigating impacts of Forests NSW's operations on streams and water quality; the Environmental Protection Licence (EPL) and Fisheries Licence (FL). In addition to this the Forest Management Zone 8 (FMZ 8) incorporates modelled streams that are supposed to be subject to ground-truthing when preparing Harvest Plans and allocated to the appropriate FMZ.

Unfortunately we found that the EPLs are rarely applied, the FL is usually ignored and the requirement to resolve the FMZ8 zones is not undertaken.

The EPL states:

> *The objects of this licence are to require practical measures to be taken to protect the aquatic environment from water pollution caused by forestry activities and to ensure*

monitoring of the effectiveness of the licence conditions in achieving the relevant environmental goals.

It is a shame that Forests NSW get away with refusing to apply this licence. This is apparently part of an agenda to open up "unmapped" drainage lines for logging and to not protect drainage depressions, which they frequently log and road anyway.

Even with the implementation of 'best practice' measures logging has been found to still result in increased erosion and thus stream turgidities (Davies and Nelson 1993, Davies and Nelson 1994, Grayson *et. al.* 1993, Lacey 1998).

Lamb (1986) considers *"Much damage can be minimised, if not prevented, by providing ample water-dispersing drainage, locating roads on ridges rather than on steep slopes, minimising river crossings and hastening revegetation of earthworks."*

Cornish (1975) recommended that *"Roads, tracks and [log] dumps should be drained immediately they are no longer required to prevent large increases in the depth and velocity of runoff water, and to direct this runoff on to adjacent undisturbed vegetation. … Log dumps often become compacted during use, making revegetation difficult. Ripping to a depth of 10-30 cm when the area is drained would increase the rate of revegetation, and hence reduce total sediment production".*

Bren and Leitch (1985) found that "*The passage of runoff across a short length of natural forest slope appeared to make little difference to the flow, and it is concluded that if infiltration of the outflow of road culverts is to be obtained then special measures to distribute water adequately over the slope and to maintain infiltration pathways may be necessary."*

Cornish (1975) also considers that *"air transport systems, where the log is lifted from the ground at point of cutting and transported to the landing without further contact, will cause least damage; whereas large, heavy, poorly manoeuverable crawler tractors, dragging logs dully on the ground are likely to create maximum damage, particularly in steep areas."*

In their paired catchment experiment Grayson *et. al.* (1993) applied a strict logging regime in which *"buffer strips with a minimum width of 20 m were maintained around the saturated source areas, all roads, snig tracks and log landings were drained into areas with a high infiltration capacity, no logging was allowed during wet periods, the logged surface was expeditiously replanted, and compacted areas such as log landings were deep ripped. The supervising officer was present at all times and exercised total authority over the operation. … The maximum extent of the saturated area (defined by a break in slope) was surveyed by Melbourne Water staff, and it was ensured that this area was well within the limit of the buffer zone."* In addition to this there were no stream crossings within the area.

While Grayson et. al. (1993) considered that strict adherence to their methodology resulted in acceptable outcomes in terms of drinking water quality it went far beyond measures applied in practice. Application of prescriptions in the real world is also a very different matter.

In terms of erosion, Cornish (1975) notes that strips of vegetation (filter strips) should be retained along watercourses to reduce the velocity of overland flow, slow water to allow deposition of sediment, and stabilise banks. Cornish states that *"the effective width of a filter strip is of direct relevance to the absorption of sediment from upslope",* and that rather than *"permanence of flow" "the high peak flow situation (with the coincident likelihood of higher surface runoff) is more in need of strip protection",* and recommends that *"A filter strip of natural vegetation should be retained to extend 20 m on either side of a stream and be provided downstream from the point on that stream where its catchment area exceeds (at most)100 ha."*

Davies and Nelson (1994) found that stream buffer widths need to be greater than 30 metres to avoid significant increases in superficial silt and significant decreases in populations of

macroinvertebrates and Brown Trout, while also acknowledging that buffer widths less than 100 m "*may still cause community responses at the species level."*

Davies and Nelson (1993) note that *"the role of first-order streams in sediment transport from hillslopes experiencing accelerated erosion has long been recognised".* In their assessment of logging impacts on streams in steep country in northern Tasmania, Davies and Nelson (1993) found that *"fine sediment infiltration in ephemeral, first-order streams … is significantly enhanced by logging on steep slopes, by factors of two to three times the median values for unlogged streams. Infiltration by very fine organic sediment … is greatest during the 2 years immediately after logging, decreasing with time to a level similar to that for unlogged streams after 6 years.",* concluding that *"enhanced fine sediment movement in streams as a result of logging is most likely to occur owing to disturbance of headwater stream channels,"*.

In current practice buffer strips along streams increase in size with stream size rather than catchment area. Bren (1999) notes that the problem with this is that *"compared to more rigorous methods this under-protects the stream head, but overprotects divergent areas downstream. A method based on a constant ratio of upslope contributing area to buffer area gave the widest buffers at the stream head and buffers of diminishing width as one moved downstream."* Bren notes that having relatively wider buffers for the smaller headwater streams *"makes sense hydrologically but is probably politically unacceptable."*

It is apparent that enhanced measures could be adopted to reduce increases in sediment mobilisation, stream turbidity and sedimentation due to logging in the catchment, though this would require significant enhancements of current practices, such as:

- Adequate buffers should be applied to all streams, stream channels and areas most likely to become saturated in wet periods;
- Logging should be discontinued when soil moisture is higher than an acceptable level;
- Heavily compacted sites (ie log dumps, snig tracks) should be deep ripped after use and revegetated to an acceptable cover within 6 months;
- Roads and tracks need to be well drained, with temporary tracks (i.e. snig tracks) having adequate cross drains constructed at the end of operations and when rain is threatening;
- Logging operations must be constantly and rigorously supervised;
- All runoff needs to be directed into areas with a good vegetation and leaf litter cover, in an area unlikely to become saturated in prolonged wet weather, and not subject to machinery disturbance or burning;
- Roads crossing streams should be avoided where possible, where a stream crossing is unavoidable the road should be properly drained well away from the stream and the road surface adequately armoured (rocks, concrete, bitumen) in the vicinity of streams to resist erosion; and,
- Roads left open for regular traffic need to be regularly maintained, with special precautions taken after grading.

If impacts on streams are to be minimised it is essential that the buffers applied be of an adequate width. Munks (1996) reviewed the available literature to identify buffer widths for various functions:

Function of the Riparian Vegetation	**Recommended Buffer Width (from edge of bank)**
Water Quality, Sediment, Pollutants etc.	20-50m (streams) 40-100m (rivers)
Bank Stabilisation	10 m + (rivers and streams)
Provision of habitat for terrestrial animals	50-60 m (rivers)
Provision of food, habitat and protection of stream fauna	30-100 m (streams)

Munks (1996) recommended the following minimum buffer widths for streams:

Type of River or Stream	Minimum width from stream bank*
Main Rivers	40 m
Creeks and streams from the point where their catchment exceeds 100 ha	30 m
Small streams with a catchment of 50 to 100 ha	30-50 m
Small streams, tributaries, gully and drainage lines which only carry surface water during periods of heavy rainfall	30 m

* If the slope of adjacent land running down to the stream is greater than 10%, the recommended width is increased to 50m.

Munks (1996) also considers that *"adequate widths of riparian vegetation for fauna protection needs to be species-specific."*

It also needs to be recognised that areas subject to increased rainfall intensities and/or an increased number of high intensity rainfalls as a result of global warming will be subject to an increase in the rate of soil erosion, particularly when possible ecosystem instability and changes reduce soil protection (Tegart, Sheldon and Griffiths 1990). It is thus important to consider the likely impacts of climate change when deciding appropriate mitigation measures.

2.3.5. Poor Practice

Forests NSW undertake logging operations under an Environmental Protection Licence (EPL) and Fisheries Licence (FL) which attempt to regulate activities so as to protect water quality. These represent minimal best practice. Forests NSW have opted not to obtain EPLs for over 90% of their operations and, until our recent audits, the FL has rarely been applied or enforced. Even when breaches are reported to the regulators they are not explicitly or comprehensively audited, the fines and penalties are grossly inadequate, and no rehabilitation is required for illegally logged wetlands and stream banks.

In our recent audits we found that Forests NSW routinely breach prescriptions intended to protect water quality and fish habitat, most notably failing to adequately protect unmapped drainage lines, wetlands and drainage depressions, dropping trees into stream buffers, poorly constructing and failing to rehabilitate stream crossings, failing to establish adequate drainage on tracks and roads, and otherwise being careless. We found that Forests NSW are ignoring the requirement to remap and appropriately rezone streams delineated as FMZ 8 areas when preparing harvesting plans and are often logging them. It is of particular concern that Forests NSW refuse to "turn on" Environmental Protection Licences (EPLs) in over 90% of logged compartments in order to avoid external regulation. Their agenda is to be allowed to log unmapped drainage lines.

Our audits did not focus on compliance with Environmental Protection Licence (EPL) and Fisheries Licence (FL) conditions, though incidental observations were made.

At Yabbra (Pugh 2009) we documented a variety of contraventions of the EPL (Schedule 4; 17, 20C D6, D15, D19B, D20, D20J, D20R, D20S, D20T, D21, D22, D23, H70, Schedule 5; I 37) and FL (7, 7.2, 7.4, 7.5), such as;

- 3 sites where snig tracks had caused extensive soil disturbance to areas adjacent to and across unmapped drainage lines;
- failure to identify, delineate or protect unmapped streams from logging roading and burning;
- failure to delineate or protect drainage depressions from significant machinery disturbance;
- failure to identify, delineate and protect wetlands from logging roading and burning;

- inadequate drainage of a snig track; and,
- drainage off roads and tracks being diverted directly into streams.

At Yabbra Forests NSW subsequently repaired drainage on four stream crossings and one track because they were not up to pollution control requirements

PHOTOS: Left; one of the 22 trees documented as being felled next to one of the 5 drainage lines that were logged at Yabbra – these only represent the tip of the ice-berg though the regulators could not be bothered revealing their full extent. Right: Doubleduke crossing; Note the sediment in stream bed which extended a long-way downstream - the Minister failed to report this to Fisheries.

At Doubleduke (Pugh 2010b) we found two poorly constructed creek crossings without implementation of soil stabilisation measures that resulted in significant mobilisation of sediments into both streams (Breaches EPL J45, J46, J52, FL 8.4.1.(a), 8.4.2.(b), 8.4.3.(b)). Forests NSW subsequently implemented erosion mitigation works at both crossings, though Fisheries NSW were not informed of our complaint.

At Girard (Pugh 2010d) we documented a variety of contraventions of the EPL (6, 15, 22, 30, 46, 50, 51, 53, 54, 56) and FL (7, 7.1, 7.4, 7.5, 7.8, 7.9, 8.4), such as;

- one mapped drainage line had been logged and intensively disturbed;
- some unmapped drainage lines were not identified and protected;
- drainage depressions were not delineated and protected;
- debris from a log dump were pushed into a drainage line;
- stable structures were not used to cross streams;
- stream crossings were not rehabilitated; and
- large amounts of spoil were deposited in some streams.

Forests NSW identified one of these Girard breaches in April 2010, stating "*Bulldozer driver opening old road for snig track, pushed through 2 unmapped drainage lines".* Despite large amounts of fill being pushed into the drainage lines and both crossings being situated upstream (50-80m) from a Stuttering Frog exclusion zone, Forests NSW concluded that there was no environmental harm and simply explained the licence to the operator without undertaking any remedial action. When we audited the operations in August we independently identified these breaches and observed that erosion had commenced. While logging had finished no attempt had been made to remove the spoil from the streams and undertake rehabilitation.

PHOTOS: Girard; note the extensive disturbance to stream crossing on left and the lack of rehabilitation. The large tree on right of second photo is marked as an exclusion boundary, with another marked tree bulldozed into the debris on the left.

At Girard, Forests NSW also identified 6 breaches where trees had been dropped into stream exclusions.

Sparkes (2010) identified 27 breaches of NSW environmental regulations by FNSW in the UNE, noting:

> *Ten of these involved failures to implement adequate erosion controls after logging, in the worse case 27 cross-banks had been so poorly constructed that they failed and caused significant pollution of Washpool Creek. In one case a bridge had collapsed into a 4th order stream and in another Forests NSW had failed to properly assess, and thus under-estimated, soil erodibility. DECCW directed that remediation should be undertaken for 8 of these breaches and sent warning letters in respect to 3 others. No action was taken in respect to the failure to properly assess soil erodibility.*
>
> *Five of the breaches involved logging of stream exclusions imposed to protect habitat for an array of threatened species (TSL 5.7a) and water quality, with up to 2,150m^2 being logged in the worst case. DECCW issued a Penalty Infringement Notice for one of these incursions and issued warning letters for three others.*

Despite most compartments not being subject to the EPL, at its peak there were 146 “non-compliance Incidents” with the EPL identified by regulators in the UNE in 2006/07 and 122 in 2007/08. We consider that the decline since then is due to a lack of auditing, rather than an improvement in practices.

It is apparent that Forests NSW are regularly and frequently breaching requirements of the Environmental Protection Licence.

2.3.6. Forest Management Zone 8

Significant areas within the compartments audited are identified as Forest Management Zone 8. FMZ 8 is meant to be an interim zoning of areas where field investigation is required to determine final Forest Management Zone classification as part of pre harvest planning processes. In the assessed cases the FMZ 8 areas represent modelled streams that are intended to be further assessed at the Harvesting Plan stage.

In the 1999 Forests NSW document “Managing our forests Sustainably: Forest Management Zoning in NSW State Forests” FMZ 8 is described as:

An interim zoning of areas where field investigation is required to determine final Forest Management Zone classification. Field investigation will be undertaken as part of pre harvest planning.

These areas require field validation before allocation to a specific Forest Management Zone and are:

...

ii Areas of modelled GIS data where field verification is required to accurately map the features.

The correct information will be mapped onto the harvesting plan ...

Management will be for protection under the same requirements as FMZ 3A until field investigation allows determination of final FMZ classification.

Forest NSW's 2005 ESFM Plan for UNE reiterates: *FMZ 8 areas require field assessment to identify into which of the seven FMZ they should be placed. This is normally done at the time of assessment for harvest planning.*

Forests NSW Sustainability Reporting Supplement 2009-10 states:

***FMZ 8:** Land for further assessment - An interim zoning of areas where field investigation is required to determine final Forest Management Zone classification. Field investigation will be undertaken as part of pre-harvest planning. Management will be for protection under the same requirements as zone 3a until field investigation has taken place.*

FMZ 8 is meant to be an interim zoning of areas where field investigation is required to determine final Forest Management Zone classification as part of pre harvest planning processes. These are a surrogate for unmapped (i.e. not shown on 1:25,000 topographic maps) drainage lines that are meant to be refined, appropriately zoned and then protected in accordance with Environmental Protection Licence (condition D6) and Fisheries Licence (condition 7).

In these compartments, the obvious intent was for Forests NSW to assess the FMZ8 areas and unmapped streams, include the results in refined stream maps in the harvesting plans, and appropriately rezone the refined streams (presumably to FMZ3A). These are also required to be marked in the field as riparian exclusion areas.

At Yabbra (Pugh 2009) we documented 22 trees that had been unlawfully logged within riparian areas along five unmapped streams that were meant to be rezoned prior to logging and that were also required to be protected as unmapped drainage lines, and estimate that there were likely to be over 100 such trees unlawfully logged based on our small sample. No heed was taken of FMZ 8.

There was an attempt to identify unmapped streams at Girard (Pugh 2010d), though significant streams (drainage lines) were missing from the remapping in the working plan and were logged, and no attempt had been made to rezone any FMZ8. The head of a mapped stream was also logged and cleared at Girard.

In compartment 144 of Doubleduke we recently scouted a logging area and found numerous unmapped drainage lines and wetlands that had not been mapped and identified for the required management. A large stream was also incorrectly located. The harvesting Plan failed to identify and appropriately zone any unmapped streams.

In none of our audit areas has Forests NSW attempted to map and identify unmapped drainage lines or wetlands and assign them to the appropriate FMZ. At Yabbra all unmapped drainage lines and FMZ 8 areas had simply been ignored and logged. While at Girard all

FMZ 8 areas had been ignored, some of the unmapped drainage lines had been mapped and protected on the ground, though Forests NSW was unsure what to do with the mapping.

This planning failure to remap FMZ 8 areas is systemic and deliberate and has the effect of counting trees in what should be exclusion areas towards satisfying retention requirements in the nett logging area. It also increases the likelihood that they will not be identified and appropriately protected during logging.

The Inquiry needs to recognise that forestry operations do cause soil erosion and do have a significant impact on streams, and that Forests NSW go out of their way to avoid external regulation and the application of Best Management Practices to protect stream quality. To ensure the application of best management practices to minimise the impacts of forestry operations on soil erosion and streams it is requested that the Inquiry;

a. **Engage appropriate experts to identify performance standards and review the adequacy of prescriptions applied to safeguard streams and water quality in logging operations;**
b. **Ensure independent regulation by requiring application of Environmental Protection Licences to all logging operations;**
c. **Ensure that Forests NSW comply with the requirement to assign FMZ8 areas to the appropriate protection zone; and,**
d. **Identify measures needed to improve compliance with requirements.**

2.4. Water Availability

Forests are responsible for capturing water from the atmosphere by increasing rainfall and condensing fog. This effect is enhanced by the taller trees and rougher canopy of an oldgrowth forest. Forests are also responsible for returning significant amounts of water to the atmosphere through transpiration, thereby contributing to rainfalls elsewhere.

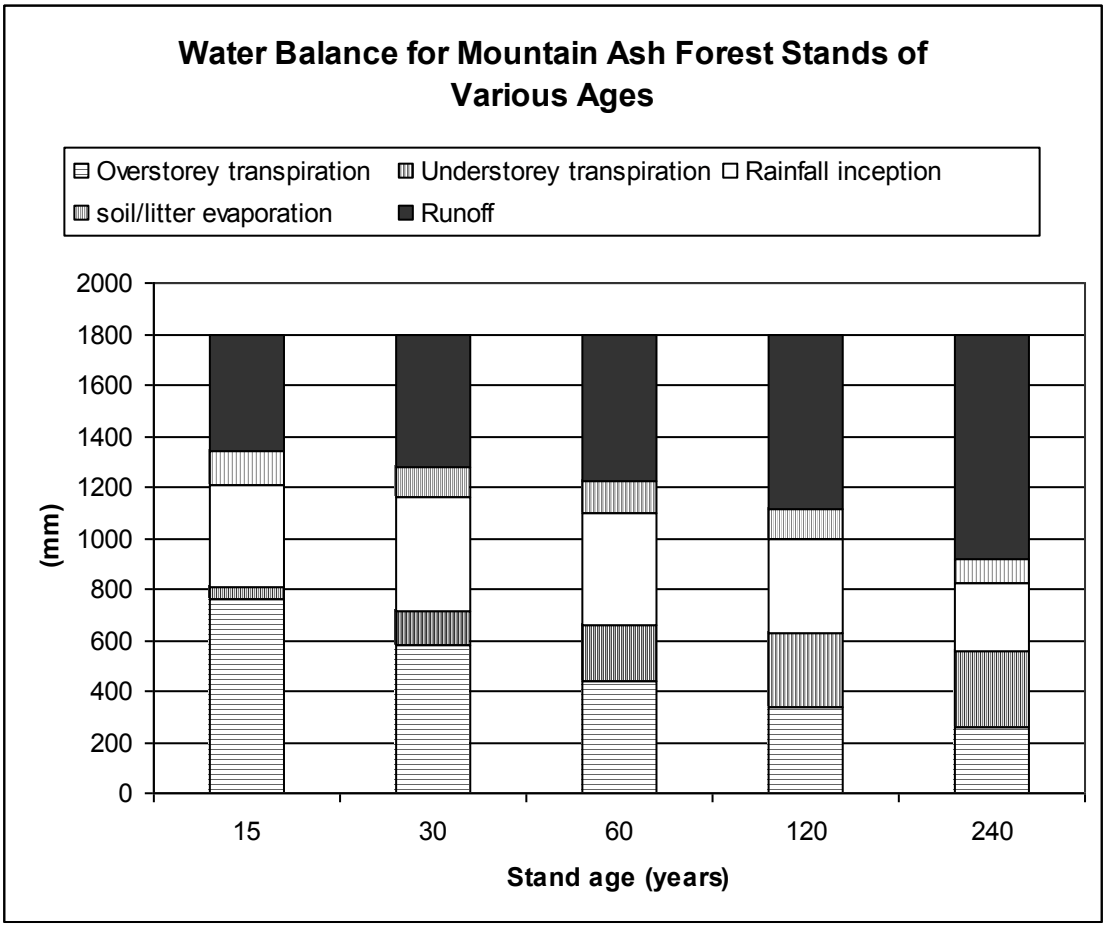
Of the rain which falls upon a forested catchment some is evaporated directly from leaf and ground surfaces and part may be redirected by surface flows directly into streams. Except in intense rainfall events, the majority can be expected to infiltrate the soil where it is used for transpiration by plants, with the excess contributing to groundwater seepage into streams or possibly seeping deep down to aquifers. In a natural forest situation most of the streamflow response to rainfall is provided by the groundwater system.

In their review of 'Logging and Water' Dargavel et. al. (1995) concluded *"The hydrological evidence reviewed in this report indicates that current logging regimes in the native forests of eastern Australia result in a decline in water yields. … In catchments used to supply urban centres, this means that there is less water flowing into dams that provide water to cities and towns for drinking, washing, cleaning, watering gardens and industrial uses."*

The basic relationship between water yields and eucalypt forest age was established by studies of regrowth Mountain Ash forests following wildfires in Victoria. Kuczera (1985, cited in Vertessy *et. al*. 1998) developed an idealised curve describing the relationship between mean annual streamflow and forest age for mountain ash forest. This shows that after

burning and regeneration the mean annual runoff reduces rapidly by more than 50% after which runoff slowly increases along with forest age, taking some 150 years to fully recover.

More recent work by Vertessy *et. al.* (1998) has attempted to quantify the different components of rainfall lost by evapo-transpiration, identifying them as: interception by the forest canopy and then evaporated back into the atmosphere; evaporation from leaf litter and soil surfaces; transpiration by overstorey vegetation; and transpiration by understorey vegetation. All of these have been measured as declining with increasing forest maturity, with the exception of understorey transpiration which becomes more important as transpiration from the emergent eucalypts declines.



Water balance for Mountain Ash forest stands of various ages, assuming annual rainfall of 1800 mm (after Vertessy et. al. 1998)

While not apparent at the large catchment scale used to generate the Kuczera curve, smaller catchments have been found to often generate increased flows of water following clearfelling where a significant area of the catchment is cleared. This “initial yield increase” is largely due to removal of vegetation and soil disturbance causing increased overland flows during rainfall events.

The generalised pattern following heavy and extensive logging of an oldgrowth forest is for there to be an initial increase in runoff peaking after 1 or 2 years and persisting for a few years. Water yields then begin to decline below that of the oldgrowth as the regrowth uses more water. Water yields are likely to reach a minimum after 2 or 3 decades before slowly increasing towards pre-logging levels in line with forest maturity.

Following clearfelling of a forest there may or may not be an initial increase in water yields for a relatively limited period. Thereafter water yields usually decline relatively rapidly in relation

to growth indices of the regrowth, after some decades maximum transpiration of the regrowth is reached and water yields begin to recover with increasing forest maturity.

For Mountain Ash forest in Victoria, a mean annual rainfall of 1,800 mm/yr has been found to generate a mean annual runoff from oldgrowth Mountain Ash forest of about 1,200 mm/yr (Kuzcera 1987, Vertessy et. al. 1998). After burning and regeneration the mean annual runoff reduces rapidly by more than 50% to 580 mm/yr by age 27 years, after which runoff slowly increases along with forest age, taking some 150 years to fully recover (Kuzcera 1987).

In the Barrington Tops area Cornish (1993) found that *"water yield decline exceeded 250 mm in the sixth year after logging in the catchment with the highest stocking of regeneration and the highest regrowth basal area".* This represents a major reduction given that the mean runoff pre-logging was only 362 mm (38-678 mm). With only 61% of its catchment logged and over 20 years left before yields could be expected to bottom out, it is apparent that yield declines in north-east NSW could be expected to be of a similar magnitude to those found in Victoria.

Vertessy (1999) cites an unpublished assessment by himself and Cornish of the Karuah catchments up to 14 years after logging, stating *"streamflows declined below pre-treatment levels seven years after logging in three of the six treated catchments, and declined in a regular manner over the next seven years"*, with yields from the other 3 catchments apparently affected by insect attack causing defoliation and associated reductions in transpiration and thus enhanced streamflows at times. Vertessy notes that *"the maximum decrease in annual streamflow is over 60 mm per 10% of forest area treated, which is similar to the maximum reductions noted for Victorian mountain ash forests"*.

To make it more confusing, this relatively simple pattern is complicated by varying vegetation types and conditions within a catchment, a multitude of environmental variables, and the compounding effects of events over time. Even then we are still dealing with averages and it is in the drought events when water stored in dams and soils is of highest value, that impacts are greatly accentuated and have the most effect.

The effects of yield reductions are most pronounced in dry periods as the vegetation utilises proportionately more of the rainfall. Vertessy (1999) notes that South African studies demonstrated *"that absolute reductions in streamflow were greatest during the wet months, but that the reductions were* proportionally *greatest during the low flow periods"*.

Forest areas that have been recently logged or where regrowth is the dominant vegetation have a very rapid response time in relation to delivery of water into the storage system. Conversely, older less disturbed forests allow more water to permeate into the soil. Soil moisture then percolates more slowly through the catchment increasing the persistence of higher flows.

Water yield has been found not to return to pre-logging levels for some 150-200 years (Kuzcera 1987, O'Shanghnessy and Jayasuriya 1987).

The Inquiry needs to recognise that logging has significant impacts on water yields from native forests, such that:

a. **Reduction of mature and oldgrowth forest to younger growth stages will cause a significant reduction in water yields;**
b. **Water yields will increase with increasing forest maturity; and,**
c. **Logging should be excluded from significant water catchments.**

2.5. Dieback

Bell Miner Associated Dieback (BMAD) is recognised as a significant problem and growing threat to thousands of hectares of forests in UNE, it has been listed as a "Key Threatening Process" (KTP) and identified as affecting timber and water yields, as well as many plants and animals. It is associated with the invasion of forest understoreys by the weed Lantana (another KTP) following logging. It occurs in one of our audited areas. Despite the presence of an Endangered Ecological Community and an endangered wallaby in the same area we found that Forests NSW made no attempt to delineate the area affected by dieback, logged most of the healthiest trees remaining, and has no intention to rehabilitate the severely degraded "forest" left behind. Both Forests NSW and DECCW appear disinterested in the problems caused by BMAD and Lantana invasion, and the need for active rehabilitation of affected stands.

There are many forms of dieback affecting native forests and remnant trees in partially cleared land in NSW. The most obvious example of forest ecosystem collapse in NSW is the dieback associated with logged forests, psyllid infestations and colonies of the Bell Miner. "Bell Miner Associated Dieback" (BMAD) has affected tens of thousands of hectares of forests in north-east NSW, in severe cases leading to death of trees and replacement by lantana.

The Bell Miner Associated Dieback Working Group (BMADWG 2004) summarise the problem:

> *Bell miners are a natural part of eucalypt ecosystems and normally have minor and positive impacts on forests. However, increases in Bell miner populations and their distribution, in addition to other factors such as tree stress, psyllid infestation, dense forest understories as well as weed invasion, drought, logging, road construction, pasture improvement, bio-diversity loss both floral and faunal, soil nutrient changes, and changing fire and grazing regimes have all been implicated in the spread of dieback. The outward expression of BMAD is generally characterised by:*
>
> - *trees stressed and dying;*
> - *high populations of psyllids and other sap-sucking insects contributing to tree stress;*
> - *high Bell miner numbers, with their aggressive territorial behaviour, driving away insectivorous birds that would otherwise help to control insect numbers;*
> - *alteration of the forest structure: canopy and midstories depleted with grassy and wet and dry sclerophyll understoreys replaced by dense shrubby vegetation, often associated with lantana invasion*

The Bell Miner Associated Dieback Working Group (BMADWG 2004) summarise the consequences:

> *The potential impacts of BMAD on forest productivity and biodiversity cannot be overstated.*
>
> *Potential impacts for conservation include:*
>
> - *Extreme degradation of forest ecosystems in World Heritage listed National Parks such as Border Ranges NP, Murray Scrub and Dome Mountain in Toonumbar NP, Bungdoozle and Cambridge Plateau in Richmond Range NP, Mt Nothofagus NP, Kooreelah NP, and Mt Clunie NP.*
> - *Major disruption in ecosystem function, and reduction in diversity and abundance of threatened flora and fauna species including Dunn's White Gum (Eucalyptus dunni) and Rufous Bettong (Aepyprymnus rufescens) across all land tenures,*
> - *Increased weed invasion and associated displacement of native forest species.*

Impacts on forest productivity can be severe. Dieback defoliates the crown, ultimately leading to the death of standing trees. Not only do the standing trees die, but the lack of foliage and flowering and subsequent fruiting, reduce and eventually eliminate the seed production necessary for forest regeneration. Dense understorey development (primarily Lantana weed invasion in northern NSW and Cissus in the south) continues with little overstorey and reduced alternative species competition. Reduced eucalypt flowering directly impacts on honey production and on bird species and populations that compete with Bell miners.

Impacts of BMAD on private lands are significant, as these areas are critical to the livelihoods and well being of local communities. Forest woodlots and timber supplies, honey production, shelter belts and forest-related lifestyles are under threat from BMAD.

Local economies may also be impacted through declining forest tourism as dieback reduces the value, significance and aesthetic appeal of the forests.

In 2004 Forests NSW identified almost 20,000 hectares of the approximately 100,000 hectares of apparently susceptible forest types in an area of north-eastern NSW bounded by the Border Ranges, Richmond Ranges and Captains Creek as being affected by dieback attributed to BMAD (Wardell-Johnson et. al. 2006). The NSW Scientific Committee's (2008) final determination for listing 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners' as a Key Threatening Process notes that:

Of the affected area, approximately one third (6511 ha) has been assessed as 'severe', with 'many dead trees, severe thinning of crowns, low stocking rate of susceptible species and greatly increased mesophyllic ground story vegetation including weeds such as lantana' (State Forests of NSW, 2004).

Wardell-Johnson *et. al.* (2006) state

Bell Miner Associated Dieback (BMAD) is a significant threat to the sustainability of the moist eucalypt forests of north-eastern NSW and south-eastern Qld, and to biodiversity conservation at a national scale.

...

BMAD is a nationally significant conservation problem that has the potential to reduce the chances of achieving sustainable forest management in north-eastern NSW. There is a strong likelihood for significant biodiversity loss in the medium future in the general region, including south-eastern Qld, as well as reduced available timber volumes. Blaming Bell miners for the problem will not lead to its resolution.

...

The severity of the BMAD problem is such that tens of thousands of hectares in north-eastern NSW is currently affected with over 2.5 million hectares considered potentially vulnerable (Ron Billyard pers comm., Nov. 2004). A substantial (although uncertain) area of south-eastern Queensland is similarly affected, although less attention has been directed there. BMAD occurs on both public and private land and the area affected is expanding rapidly. The severe impact of this form of forest canopy dieback has profound implications for the conservation of the internationally significant biodiversity of the region.

There are numerous requirements for Forests NSW to redress dieback and restore degraded areas to a healthy and productive condition.

The IFOA (2.7.1) requires that in carrying our forestry operations "SFNSW must give effect to the principles of ecologically sustainable forest management as set out in Chapter 3 of the document entitled, "ESFM Group Technical Framework".

Principle 1 is: *Maintain or increase the full suite of forest values for present and future generations across the NSW native forest estate.* Relevant specific criteria are:

3.2.1.2 The productive capacity and sustainability of forest ecosystems
maintain ecological processes within forests (such as the formation of soil, energy flows and the carbon, nutrient and water cycles, fauna and flora communities and their interactions);
maintain or increase the ability of forest ecosystems to produce biomass whether utilised by society or as part of nutrient and energy cycles;
ensure the rate of removal of any forest products is consistent with ecologically sustainable levels;
ensure the effects of activities/disturbances which threaten forests, forest health or forest values are without impact, or limited.

3.2.1.3 Forest ecosystem health and vitality
…
ensure the effects of activities/disturbances within forests, their scale and intensity, including their cumulative effects are controlled and are benign;
restore and maintain the suite of attributes (ecological condition, species composition and structure of native forests) where forest health and vitality have been degraded.

The IFO (4.26) also requires:

SFNSW must ensure that the scale and intensity at which it carries out, or authorises the carrying out of, forest products operations in any part of the Upper North East Region, does not hinder the sustained ecological viability of the relevant species of tree, shrub or other vegetation within the part.

Forests NSW's (2005) ESFM Plan identifies as policy:

Forests NSW will maintain or enhance the health and productivity of forests to support nature conservation, timber production and other ecologically sustainable uses in Upper North East (UNE) Region.

In relation to BMAD Forests NSW (2005) go on to state:

Chronic decline occurs when long term environmental changes, as a result of human management, impair tree health. It is increasing throughout dry and moist eucalypt forests, particularly in coastal areas. Approximately 20,000 ha of forest within UNE Region, including about 6,000 ha on State forest is showing signs of decline while a larger area of forest throughout the region is thought to be susceptible.

In UNE Region; Forests NSW is collaborating with other agencies, universities, landholders and conservation groups through the Bell Miner Associated Dieback Working Group in the coordination of efforts to better manage chronic decline. The group has identified key actions that need to be undertaken to develop effective management measures including surveying and assessing the extent of decline, supporting independent literature review, lantana removal trials, guidelines for restoration of affected areas and promotion of the issue.
…
Declining forests are susceptible to invasion by exotic weeds such as lantana because unhealthy trees are weak competitors, and the weeds are better adapted to changed soil conditions that make the trees unhealthy.

One of the requirements of the UNE Forest Agreement (2.11.2, Appendix 9) is annual reporting on factors affecting forest health:

Indicator 3.1.a Area and percent of forest affected by processes or agents that may change ecosystem health and vitality (narrative as interim).

Rationale
A number of agents can affect ecological processes in forests and may produce significant changes to the condition of the forest. This indicator measures the areas affected by those processes, and the level of impact within those areas.

Indicative target
Minimisation of the area and percent of forest affected by processes or agents that reduce ecosystem health and vitality. Note that on the level of individual agents, specific targets may be generated with further research.

Data requirements and Monitoring methodology
Processes and agents that may change ecosystem functioning need to be identified on a regional basis. These include interactions between natural events and management actions in the following areas; fire, climatic events, river regulation, salinisation, grazing, introduction of exotic biota, logging, clearing, roading, bell-miner dieback, insects and diseases.

RFAFTI data should be considered as baseline data, e.g., disturbance codes.

Data from agency fire monitoring, pest control programs and pest survey and research. Data may be generated out of local observation.

Reporting
Narrative, and where possible quantitative, reporting of the area and percent of forest affected by given processes or agents considered important at a regional level.

Narrative, and where possible quantitative, reporting of the area and percent of forest where given processes or agents are controlled or their effects are countered by rehabilitation.

Reporting processes should distinguish between natural and human induced effects.

The RFA reviews recognize the significance of BMAD, The seriousness of BMAD is stated in the NSW & CoA (2009) 5 year review of the RFA:

The resultant cycle of tree stress commonly causes the eventual death of forest stands, and serious ecosystem decline. In NSW the potential impact of BMAD-induced native vegetation dieback represents a serious threat to sclerophyll forest communities, particularly wet sclerophyll forests, from Queensland to the Victorian border. The forests most susceptible to dieback are those dominated by Dunn's white gum (Eucalyptus dunnii), Sydney blue gum (E. saligna), flooded gum (E. grandis) and grey ironbark (E. siderophloia). There is also evidence that some normally nonsusceptible dry sclerophyll types may be affected when dieback is extreme. Current estimates place the potential at-risk areas at a minimum of approximately two and a half million hectares across both public and private land tenures in NSW.

BMAD is emerging as a pressing forest management issue in both the UNE and LNE regions. The potential impacts include:
degradation of sclerophyll forest ecosystems across the UNE and LNE
reduction in diversity and abundance of threatened flora and fauna species including Dunn's white gum and rufous bettong
increased weed invasion and associated displacement of native forest species.

Dieback-affected areas are located in the catchments of the major rivers of the North Coast of NSW including the Tweed, Richmond, Clarence, Macleay and Hastings. Maintenance of water quality in these river systems is critically dependent on maintenance of healthy forest cover over the catchment uplands. Bell miner associated dieback has the potential to degrade these forests, and consequently impact negatively on rivers and catchment communities through increased sediment and nutrient loads, and increased frequency and intensity of flooding.

The 2003/4 FA implementation report (NSW Government 2007) and DECCW (2010) echo these concerns and identify BMAD as *"a serious threat to sclerophyll forest communities, particularly wet sclerophyll forests".* The NSW&CoA (2009) 5 year RFA review identifies that BMAD *"is of prime concern in the northern forest regions of the state".*

Continued logging of BMAD areas can-not be considered to be maintaining ecological processes, conducive to biomass production, to be ecologically sustainable, without (limited) impact, benign, restorative of forest health, or not to hinder the ecological viability of the natural vegetation. This is degrading the forest ecosystems and forest productivity. Logging of affected areas is clearly not in accord with any of the principles of ecologically sustainable forest management.

2.5.1. The causes of Bell Miner Associated Dieback

NEFA considers that in the UNE Bell Miner Associated Dieback is typically associated with heavily logged forests where much of the overstorey has been removed and the understorey invaded by lantana. While we recognise that there are a variety of confounding factors we consider heavy logging to be the primary factor responsible for its current extent. Our concern is that the range of secondary factors are being used to confuse the issue and frustrate required responses.

NSW Scientific Committee's (2008) final determination for listing 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners' as a Key Threatening Process notes that:

> *Broad-scale canopy dieback associated with psyllids and Bell Miners usually occurs in disturbed landscapes, and involves interactions between habitat fragmentation, logging, nutrient enrichment, altered fire regimes and weed-invasion (Wardell-Johnson et al. 2006). At present, no single cause explains this form of dieback, and it appears that 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners' cannot be arrested by controlling a single factor. Over-abundant psyllid populations and Bell Miner colonies tend to be initiated in sites with high soil moisture and suitable tree species where tree canopy cover has been reduced by 35 – 65 % and which contain a dense understorey, often of Lantana camara (C Stone in litt.).*
>
> *…Increased light intensity associated with canopy reduction promotes the growth of the expanding foliage preferred by psyllids as well as understorey growth which is also influenced by altered fire regimes. Increased understorey growth, particularly of the invasive weed Lantana camara, suppresses eucalypt regeneration and provides enhanced shelter and safer nest sites for Bell Miners.*

Stone *et. al.* (1995) found that the affected areas range in size from 1 ha to nearly 100 hectares, with the Sydney Blue Gum league of forest types (FT no's 46, 49, 53 and 54) most affected and the grey ironbark/grey gum league (FT 60) second most affected. They note that *"The vast majority of plots (97%) had been exposed to some degree of logging and were on their second or third rotations"*, postulating *"that bell miners prefer a dense understorey and a discontinuous sclerophyll overstorey."* Stone et. al. (1995) concluded that:

> *"A possible long-term explanation of why the dieback problem may be increasing, is that the proportion of moist sclerophyll forest being exposed to selective logging is increasing throughout the State. In support of this argument is the observation that the non-logged old growth Sydney blue gum stands in Pt. Giro State Forest (Walcha District) are in good health(based on aerial observations) and bell miner colonies appear to be absent in this forest (R. Kirwood, Forester, Walcha District, pers. Comm.)."*

Wardell-Johnson *et. al*. (2006) state

> *A range of multi-tropic attributes (e.g. local climate/host tree condition and structure/natural enemies) have been identified as contributing to elevated psyllid*

populations. Fragmentation, changed disturbance regimes (particularly fire and logging), and pathogens are implicated. Changes in nutrients and other soil constituents, climatic regimes and hydrological factors have also been implicated.

...

Logging and associated disturbances can have direct and indirect effects on overstorey, midstorey and understorey structure and floristics. However, studies directly associating logging, forest structure, floristics and BMAD have not been carried out. While the proliferation of dominant understorey weeds, such as Lantana (Lantana camara), in the north-eastern region of NSW has largely been attributed to the disturbance caused by logging and associated activities, no direct link between BMAD and Lantana has been established.

…

Bower (1998) argued that it is probable that broad-scale habitat modification through intensive logging operations and subsequent Lantana domination has promoted conditions that favour the establishment of psyllids and Bell miner colonies.

...

Kavanagh and Stanton (2003) argued that their findings supported the hypothesis that the disturbance associated with logging can be a contributing factor in creating the habitat conditions required by Bell miners.

...

…Stone (1999) suggested that selective logging without effective overstorey regeneration encouraged dense understorey development. She suggested that this provided conditions favouring the colonisation of Bell miners. Stone (1999) argued that Bell miners then trigger forest decline because they interfere with predators that would otherwise regulate folivorous insects.

…

Hence, logging operations may be both implicated in the development of BMAD, and affected by changes in yield induced by BMAD. Nevertheless, the literature remains very limited concerning the impacts of logging and associated disturbance on the initiation or development of BMAD.

...we have not been able to locate information concerning the impacts of logging on BMAD. We find it surprising that more information is not available concerning the direct and indirect impacts of logging, in the preferred Bell miner habitat of north-eastern NSW. The increase in the area of BMAD has potential not only for significant biodiversity loss, but also for significant reduction in timber yields from these eucalypt stands.

In the UNE BMAD is most commonly associated with the invasive weed lantana. Even where not associated with dieback, lantana is the most significant understorey weed in UNE. In deciding to list the Invasion, establishment and spread of Lantana (*Lantana camara* L. *sens. lat*) as a key threatening process, the NSW Scientific Committee note:

9. L. camara readily invades disturbed sites and communities. Various types of sclerophyll woodlands, sclerophyll forests, rainforests and dry rainforests are all susceptible to Lantana establishment ... There is a strong correlation between Lantana establishment and disturbance (Stock and Wild 2002; Stock 2004), with critical factors being disturbance-mediated increases in light and available soil nutrients (Gentle and Duggin 1998) and, in rainforest, the competitive advantage of seedlings relative to many native species (Stock 2004). ...

...

16. The generally suppressive effect of Lantana on a wide range of native species is attested by several studies (Gentle and Duggin 1998, Day et al. 2003) and a multitude of field observations. Swarbrick et al. (1995), citing observations by Driscoll and Quinlan (1985) that "eucalypt seedlings generally fail to establish under lantana", infer inhibition of germination through lack of light. ....

...

22. L. camara is "regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts" (CRC Weed Management 2003). It is one of the initial 20 Weeds of National Significance declared under the National Weeds Strategy, and a national Lantana Strategic Plan has been adopted (ARMCANZ ANZECC&FM 2001). ...

In relation to lantana, the Bell Miner Associated Dieback Working Group (BMADWG 2004) state:

Lantana is a highly invasive weed affecting a range of land-use types within a wide range of climates and topographies of Australia. The complexity of this weed is amplified by its 29 different varieties, difficulty in integrating control measures and finding suitable biocontrol agents. The extensive infestation across more than 4 million hectares poses a threat to economically effective control. Lantana is a social problem for landholders and community. The National Lantana Strategy highlights the need for increased responsible action and incentive to landholders, local government, regions and State government to take action. The Strategy establishes the National Lantana Management Group; provides for extension and education; encourages best practice in lantana control and management; and includes a community biocontrol element encouraging adoption of biological control measures.

Wardell-Johnson et. al. (2006) state

While Lantana may not be a primary causal factor initiating BMAD, the literature suggests that its presence reflects increased canopy opening, which in itself may be a primary cause for increases in psyllids. These outbreaks in turn may attract the presence of Bell miners, which have the benefit of increased food resources and suitable structure for nesting. There has been some advocacy for management strategies which reduce weed encroachment and plant community degradation to identify and maintain ecological barriers to Lantana invasion. Because large areas in the region affected by BMAD are dominated by Lantana, there has also been advocacy towards the use of fire as a means of Lantana control.

...

For the environments in which BMAD occurs, arguments have been presented suggesting a need both for more frequent fire, and for less frequent fire in particular ecosystems. ...

...

... Lantana in particular has become a dominant understorey plant in open areas of eucalypt forest in the region (Bower 1998: Wardell-Johnson et al., 2005). There have been many recent changes in agriculture and forest management in north-eastern NSW that have been associated with the spread and intensification of Lantana in particular, but also a wide range of other weedy species (see Kanowski et al., 2003; Wardell-Johnson et al., 2005).

...

Bower (1998) argued that the proliferation of Lantana in his study areas was largely associated with the disturbance associated with logging activities which improves the conditions for Lantana germination and recruitment. Bower (1998) further argued that while high intensity burns can be effective at controlling Lantana, many post-logging burns are of low to medium intensity and have often been found to be ineffective at controlling Lantana, which resprouts from basal stems. Bower (1998) argued that the inability of Lantana dominated areas to regenerate significantly impacts on the succession of a structurally complex forest ecosystem.

...

Gentle and Duggin (1997)...found that shading played a greater role as a limiting factor than any other and concluded that successful invasions of Lantana are likely to occur whenever canopy disturbances create patches of increased light availability. ...

...

... While it is no surprise that Lantana proliferates as the eucalypt canopy opens or dies or that Lantana is associated with events which disturb the soil and open the ground to sunlight, this does not mean that Lantana is a cause of BMAD.

While there have been a number of logging trials established, the principal problem is that Forests NSW continue to log in and adjacent to BMAD areas without considering the impacts of their operations on the proliferation of the Key Threatening Processes of BMAD and Lantana invasion. In affected areas logging is focussing on the removal of most of the healthiest trees surviving, is promoting lantana due to extensive understorey removal, and this degradation then favours BMAD. And they can not be bothered monitoring the effects or undertaking post-logging rehabilitation. These impacts will be compounded by increasing severity of droughts due to climate change (which is likely to already be a factor in the spread of this problem).

2.5.2. What is being done about Bell Miner Associated Dieback

The North East Forest Alliance has been pursuing the issue of Bell Miner Associated Dieback for over twenty years. We tried to get it addressed in the Environmental Impact Statements prepared in the early 1990s. This was a major issue we pursued when we were on the North East Harvesting Advisory Board in 1996/8. We unsuccessfully attempted to have this issue dealt with in the CRA process. We have been involved with the BMAD Working Group since early 2002.

While we recognise that we have made some progress over that time the condition of the forests has continued to decline, and Forests NSW are continuing to ignore and compound the problem in their logging operations.

State Forests recognised dieback associated with psyllids as a significant problem in the Gosford-Wyong area of north-east NSW in 1950 (Moore 1959). Stands of Sydney Blue Gum were reported as dying during the period 1949 to 1958, *"the increasing numbers of deaths reaching economic significance toward the end of that period"* (Moore 1959). The two areas assessed by Moore showed 55% and 59% of trees as dead or expected to die. Moore (1959) hypothesised that *"the abnormal rainfall adversely affected the physiology of* Eucalyptus *and other species generally, making them susceptible to heavy attack by psyllids*." Bird et. al. (1975) report Moore (1962) as finding that *"there were more than 150 separate occurrences of variable extent up to 1,500 ha."*

Wyong District Forester, Charlie Mackowski (pers. comm.), noted that field work in the early 1990's had delineated 5,000 hectares of "Bellbird Dieback" on State Forests in the then Wyong District.

Forests NSW (Stone et. al. 1995) have identified significant areas of dieback in the Morisset, Bulahdelah, Gloucester, Taree, Wauchope, Kempsey, Walcha and Urbenville districts. Stone et. al. (1995) notes *"More recently, District staff have reported that affected areas are increasing in size and that previously unaffected areas are developing symptoms."*

In 2003 the NSW Nature Conservation Council Annual Conference unanimously passed the resolution:

'that there should be no further logging in BMAD affected forests or those at high risk of developing BMAD until the causes of the problem are better understood and an acceptable, sustainable management plan is developed to restore the health of these forests'.

The Bell Miner Associated Dieback Working Group (BMADWG 2004) has identified key actions that they consider need to be undertaken in order to develop effective management measures for BMAD. They do not address logging directly, though include "Developing

guidelines for restoration of dieback affected sites which may be implemented by landholders and government agencies".

The NSW Scientific Committee's (2008) final determination for listing 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners' notes that

> *8. Due to the complex interaction between factors that have been altered as a consequence of landscape-level disturbance, there is at present no obvious means of arresting the threat presented by 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners'. Moreover, expert opinion varies considerably as to which factors are causes of dieback and which factors are effects. Broad-scale research and adaptive management are required to understand how to best manage this threatening process, to prevent its expansion throughout forests of eastern New South Wales.*

NEFA understand (J. Morrison pers. com.) that DECCW are presently preparing a 'Statement of Intent' to address the BMAD Key Threatening Process determination. NEFA note that this is a considerably weaker response than the preparation of a 'Threat Abatement Plan' and is only required on the NPWS estate. NEFA consider that attempts to address the BMAD issue warrants strong legislative requirements across all tenures in relation to disturbance to at risk forests and mandatory requirements to undertake post disturbance rehabilitation where disturbance cannot be avoided.

The Bell Miner Associated Dieback Working Group (BMADWG 2004) identifies Forests NSW's claimed approach:

> *Consistent with the EFSM requirements FNSW are preparing Regional Forest Health Management Plans as part of the Native Forest Health Management Strategy. The current management intent is to integrate native forest harvesting with trials to reduce the spread of dieback into open forests by use of frequent low intensity fire and to trial rehabilitation methods for dieback affected areas.*

While some trials have been instigated, the heavy logging of BMAD affected areas continues unabated.

Wardell-Johnson et. al. (2006) conclude:

> *...It may be appropriate for management to prevent the creation of habitat that is preferred by the Bell miner, as such habitat will also facilitate the primary cause of eucalypt dieback. However, to attempt such management intervention in isolation from an understanding of both the processes and the behaviour of Bell miners under different levels of disturbance may compound the problem.*

Forests with existing colonies of bell miners and susceptible tree species are at very high risk of developing BMAD following disturbance and subsequent weed invasion. NEFA considers that considerable resources need to be directed towards rehabilitation of extensive weed infested tracts of susceptible forest types, and the minimizing of disturbance to less than thirty percent canopy removal relative to a fully stocked healthy forest stand.

When NEFA were on the North East Harvesting Advisory Board in the late 90s we attempted to get Forests NSW to map dieback areas in compartments on harvest plans. According to Jim Morrison (pers. comm. 2010) the BMAD Working Group's attempts to get Forests NSW to take appropriate action has been similarly frustrated:

> *The BMADWG has for a number of years requested that FNSW record simple data about the presence of Bell Miners and or associated dieback on its harvest plans as they are prepared. Systematic, simple BMAD identification procedures urgently need to be made a mandatory part of the harvest planning process. This could be done when ecological surveys are undertaken, and also by the harvesting forester and be required to be reported just like any other threat identified in logging compartments. In fact the continued refusal of Forest NSW to undertake this simple task requested by*

the BMADWG only heighten suspicion that Forest NSW don't want to reveal the full extent of the problem across its estate.

There is an urgent need for a moratorium on logging in and adjacent to Bell Miner Associated Dieback areas until such time as a responsible response to this growing problem is identified.

2.5.3. A Case Study in Management

The audit of Yabbra (Pugh 2009) encompassed a large expanse of forests in Compartment 163 suffering from Bell Miner Associated Dieback (BMAD), with a dense lantana understorey in places. The forest ecosystems most affected are Grey Box-Red Gum-Grey Ironbark, and Wet Bloodwood-Tallowwood, which have achieved 41% and 82% respectively of their national reservation targets (including in Informal Reserves and Protection by Prescription). Also affected is the Endangered Ecological Community *White Gum Moist Forest.* In the affected areas there were numerous sick and dead trees with extensive lantana understoreys.

The degraded nature of these stands can be largely attributed to past logging opening up the overstorey and burning regimes promoting lantana. The creation of a low dense understorey and opening up of the canopy are factors which favour dominance by Bell Miners. The Bell Miners in turn facilitate lerp predation on retained trees and regrowth, causing widespread dieback.

These forests had been suffering from Bell Miner Associated Dieback for over thirty years (pers. obs.) and thus those trees still hanging on were survivors. It is likely that the presence of Yellow-bellied Gliders assisted their survival by predating on lerps. Though the ability of the few trees now remaining to persist has been jeopardised by Forests NSWs felling of the sap and feed trees required to be retained to maintain Yellow-bellied Gliders in the area.

The Harvesting Plan for compartments 162 and 163 of Yabbra SF (4.2) states:

> *Lantana & shrubby understorey is providing conditions suitable for occurrence of Bell Minor* (sic) *Associated Dieback (BMAD). A significant section of the harvest area has been adversely affected. There are many dead stems and the crowns of some of the remaining trees are thin and appear unhealthy. BMAD affected areas will have unhealthy merchantable trees removed during this operation*.

This is it. There was no mapping of dieback areas, no assessment of severity, no consideration of amelioration measures to apply in dieback areas, nothing.

The applied logging prescription "*BMAD affected areas will have unhealthy merchantable trees removed during this operation"* resulted in a logging intensity well in excess of the 35% Basal Area removal claimed in the harvesting plan and the maximum 40% allowed to be removed by the IFOA (1.5.10) silvicultural practices. What is effectively a "maximum economic utilisation" silvicultural regime is not allowed for by the UNE IFOA.

.

Given that most eucalypt trees in the worst affected areas were either dead or unhealthy, this prescription resulted in the removal of most of the biggest and healthiest trees from the dieback areas. Some retained trees were killed in the post logging burn and others by the added stress.

PHOTOS: Bell Miner Associated Dieback areas in Yabbra subject to maximum economic utilisation logging. No rehabilitation is proposed and regeneration is currently being smothered by weeds.

From our audit (Pugh 2009), we reported that:

> *Most remaining healthy trees were removed from forests affected by Bell Miner Associated Dieback (resultant from previous logging operations), having significant degrading impacts on forest health, ecosystem functioning and viability and forest productivity. Many retained affected trees had then succumbed to the hot post-harvest burn. This logging and "management" is clearly not in accord with any of the principles of ecologically sustainable forest management as defined in the IFOA (breaches IFOA conditions 2.7.1 and 4.26).*
>
> *Bell Miner colony establishment was noted to be widespread throughout Compartments 162 and 163 and appeared to have been favoured by the logging and burning operations. It can be expected that the threatening process associated with colonies of this species (BMAD) will cause further deaths of trees, severely retard forest recovery and result in the loss of substantial areas of threatened species' habitat in the mid to long-term.*

It was obvious to those visiting the site that there had been excessive canopy removal, though neither Forests NSW nor DECCW would accede to our request to measure tree retention by establishing transects as required in their own auditing manual. Initially both Forests NSW and DECCW told NEFA that it was impossible to audit tree retention, though in accordance with an IFOA requirement in 2003 Forests NSW developed a "Forests Practices Circular" (2003/01) "Monitoring and Measuring Compliance of Operations" which includes a "Compliance check sheet – Tree retention". It basically requires the recording of trees on 250m transects. That neither DECCW nor the forester in charge of auditing Yabbra realised that such a methodology existed specifically to audit retention of habitat trees, recruit trees, Yellow-bellied Glider feed trees, winter flowering trees, and Koala feed trees is a worry.

The outcomes from this logging and burning of the dieback areas were significant reductions in canopy cover, further degradation of the understorey, and prolific weed growth, particularly of lantana. While there has been eucalypt regeneration amongst the weeds, the problem for Forests NSW is that this means that the weeds can not be burnt until the eucalypts are large enough to survive the burn. Many will not be able to out-compete the weeds. The forestry operations have greatly compounded the existing BMAD problems and left the dieback areas in a parlous state (see photos Pugh 2009).

In DECCW's response (Simon Smith, 19/5/2010) they dismiss our concerns regarding BMAD on the spurious grounds that the logging, burning and subsequent weed proliferation that occurred in and adjacent to an existing BMAD area could not be proved to have affected it:

DECCW notes your concerns regarding Bell Miner Associated Dieback (BMAD) and the principles of ecologically sustainable forest management. It is noted however that the NSW Scientific Committee's determination in relation to broad-scale canopy dieback associated with psyllids and Bell Miners "involves interactions between habitat fragmentation, logging, nutrient enrichment, altered fire regimes and weed-invasion". The Scientific Committee's determination also notes that "at present, no single cause explains this form of dieback. And it appears that 'Forest eucalypt associated with over-abundant psyllids and Bell Miners' cannot be arrested by controlling a single factor". An Inter-agency BMAD working group is working to improve knowledge on the interrelation of land management activities and the prevalence of BMAD.,

...

As noted above, the NSW Scientific Committee's determination notes that there is inadequate information available to determine if Bell Miner populations and Bell Miner associated Dieback has been favoured by these logging and burning operations.

This is an abomination of the "Precautionary Principle" in that lack of certainty about the interaction of known causative agents of BMAD is used to justify undertaking activities known to contribute to dieback. What is most reprehensible is that DECCW did not consider that the undertaking of activities that were likely to aggravate the BMAD, a Key Threatening Process, even warranted documenting and monitoring.

It is evident that logging is a contributing factor to Bell Miner Associated Dieback, and that the reduction in canopy and the growth in weeds (enhanced by the hot fire) are contributing factors to this key threatening process and will thus exasperate existing problems. As can been seen from the photographs (Pugh 2009) the forest is a mess.

The fact that the BMAD in compartment 163 is affecting inadequately reserved forest ecosystems, the endangered ecological community *White Gum Moist Forest*, and known locations of the Endangered Black-striped Wallaby, vulnerable Yellow-bellied Glider and vulnerable Brush-tailed Phascogale, appears to be irrelevant to DECCW.

By no stretch of anyone's imagination can logging of these dieback areas be considered "ecologically sustainable". As is particularly obvious in compartment 163, logging is being undertaken in dieback areas in contravention of silvicultural requirements to apply single tree selection, retain 60% of basal area of trees above 20cm dbh, and concentrate growth on the more vigorous trees while promoting low level site disturbance for regeneration. Rather logging is based on a maximum economic utilization basis.

Despite BMAD and lantana being emphasized in our audit, and on a site inspection with Forests NSW's CEO Nick Roberts, in Forests NSW's (2010) subsequent "Rehabilitation and Monitoring Plan, Compartments 162 and 163 Yabbra State Forest No 394" there is no mention what-so-ever of the dieback issue, no delineation of problem areas, and no identification of rehabilitation measures relevant to the problem. There is no identification of problem and noxious weeds, not even a mention of Lantana. This plan has been endorsed by DECCW.

There are generic prescriptions for enrichment plantings with eucalypts and Hoop Pine should sites requiring rehabilitation be identified, though no such sites have been identified. There is also an intention to "*Introduce and maintain low intensity fire regime into the grassy forest areas on 3-5 year cycle",* though this is inappropriate in eucalypt regrowth and in areas that naturally have a rainforest understorey. Given that most of the understorey in the dieback areas is now thick weeds with a scattering of eucalypt seedling which have little chance of out-competing the lantana, the forest is in a parlous state. If they burn it again they will just kill the eucalypt seedlings. The only commitment is to some unspecified monitoring – they can watch the seedlings die.

There is no commitment for any immediate action to control rampant weeds and assist recovery of dieback areas despite the need for immediate action being obvious. It is a do nothing, wait and see, response to an urgent problem. Unless NEFA can force action we suspect we will be waiting a long time.

It is apparent that the logging of the Bell Miner Associated Dieback area in Compartment 163 is in contravention of the silvicultural prescriptions of the Harvesting Plan (2.1 and 4.3), the limits to silvicultural prescriptions specified in the IFOA (1.5.3), the ESFM principles (i.e. 3.2.1.2, 3.2.1.3) required by the IFOA (2.7.1, also 4.26), and the Australian Forestry Standards aimed at maintaining forest productivity and health (4.1.4., 4.4.1., 4.4.2, 4.4.3, 4.4.4., 4.4.5., 4.5.1., 4.5.2., and 4.5.4). What is most significant is that neither Forests NSW nor DECCW apparently care.

BMAD needs to be dealt with as a serious issue. It is contrary to the most basic principles of ESFM that Forests NSW can go on logging areas affected by BMAD, particularly as there is sufficient evidence that this is likely to aggravate the problem. For Forests NSW to be allowed to practice maximum economic usage in the worst affected stands, without specific management prescriptions, a specific rehabilitation plan, and at least a pretence of scientific monitoring, is grossly irresponsible.

The reality is that in the most heavily logged areas the survival of the stands of inadequately reserved ecosystems is doubtful and that the productive capacity of these ecosystems has been dramatically diminished to the point of being unlikely to provide any timber resources for a considerable time. BMAD is now likely to worsen and expand into the healthier stands (including Dunn's White Gum), native species have been diminished and weeds promoted. Anyone buying timber sourced from such dieback areas are aiding and abetting this environmental vandalism.

The Inquiry needs to recognise that Bell Miner Associated Dieback is a significant threat to native forests and that appropriate management involves:

a. **Identifying and mapping all affected and susceptible areas;**
b. **Placing all affected and susceptible areas under a logging moratorium until such time as appropriate management responses that maintain ecosystem functioning are identified; and,**
c. **Undertaking rehabilitation works (i.e. weed control) in affected stands.**

2.6. Atmospheric Carbon

Solving the climate change problem facing Australia and the world requires that emissions of greenhouse gases be reduced and that the storage of carbon in vegetation be increased, so as to enable atmospheric concentrations of greenhouse gasses to be stabilized at a level that avoids the most dangerous climate changes.

The need for reducing emissions from deforestation and forest degradation is now recognized by the international community as an essential part of solution to addressing carbon emissions. Since the 2007 United Nations Climate Change Conference in Bali international negotiations have focused on the role of natural forests in storing carbon.

Native forests play a significant role in the storage of carbon and the sequestration of carbon dioxide from the atmosphere. Old growth forests are the most significant carbon storehouses, with most carbon stored in the oldest and biggest trees (Roxburgh *et.al.* 2006, Mackey *et. al.* 2008). Old-growth forests also remove carbon dioxide from the atmosphere and sequester it in live woody tissues and slowly decomposing organic matter in litter and soil. (Zhou *et. al.* 2006, Luyssaert *et. al.* 2008)

Mackey et. al. (2008) found;

> *Our analyses showed that the stock of carbon for intact natural forests in south-eastern Australia was about 640 t C ha-1 of total carbon (biomass plus soil, with a standard deviation of 383), with 360 t C ha-1 of biomass carbon (living plus dead biomass, with a standard deviation of 277). The average net primary productivity (NPP) of these natural forests was 12 t C ha-1 yr-1 (with a standard deviation of 1.8).*

Average Carbon Carrying Capacity of the Eucalypt Forests of South-eastern Australia. (from Mackey *et. al.* 2008)

Carbon component	**Soil**	**Living biomass**	**Total biomass**	**Total carbon**
Carbon stock ha^{-1} (t C ha^{-1})	**280 (161)**	**289 (226)**	**360 (277)**	**640 (383)**

Carbon stock per hectare is represented as a mean and standard deviation (in parentheses), which represents the variation in modelled estimates across the region

Logging significantly reduces the volume of carbon stored in forests. In regards to logging Mackey et. al. (2008) note:

> *The carbon stock of forests subject to commercial logging, and of monoculture plantations in particular, will always be significantly less on average (~40 to 60 per cent depending on the intensity of land use and forest type) than the carbon stock of natural, undisturbed forests.*
>
> *...*
>
> *The majority of biomass carbon in natural forests resides in the woody biomass of large old trees. Commercial logging changes the age structure of forests so that the average age of trees is much younger. The result is a significant (more than 40 per cent) reduction in the long-term average standing stock of biomass carbon compared with an unlogged forest. ..*

It is important to recognise the outstanding contribution of big old trees to storage of carbon in forests. For example Roxburgh *et.al.* (2006) found:

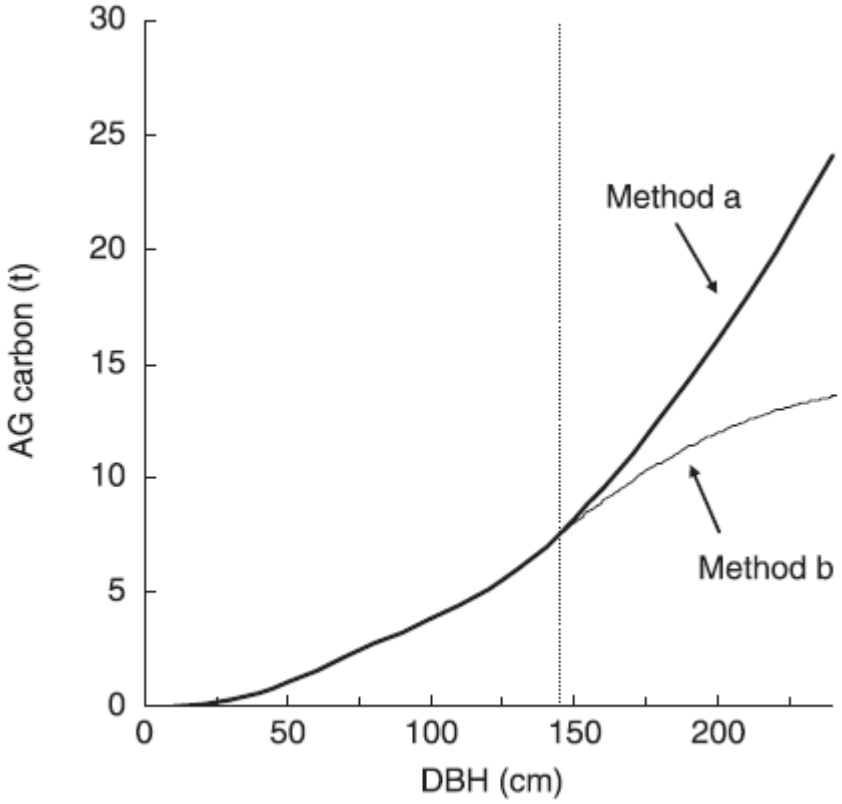
> *In mature forests, large diameter trees greater than 100 cm d.b.h. comprised 18% of all trees greater than 20 cm d.b.h. and contained 54% of the total above-ground carbon in living vegetation. ... The influence of large trees on carbon stock therefore increases with their increasing size and abundance.*

In Australian forests Roxburgh *et.al.* (2006) found that following logging:

> *Model simulations predicted the recovery of an average site to take 53 years to reach 75% carrying capacity, and 152 years to reach 90% carrying capacity.*

This is compatible with the findings of Harmon et. al. (1990) in America, who found that during simulated harvesting carbon storage is reduced by 49-62% and does not approach old growth storage capacity for at least 200 years (even when storage in wooden buildings is accounted for).

Above-ground biomass/carbon relationship to tree diameter at breast height. From Roxburgh *et.al.* (2006). Method A assumes minimal internal tree decomposition. Method B allows for internal decay.



Mackey et. al. (2008) state:

> *Conventional approaches to estimating biomass carbon stocks are based on stand-level commercial forestry inventory techniques. These data are not, however, suitable for calculating the carbon carrying capacity of natural forests.*

Roxburgh *et.al.* (2006) and Mackey *et. al.* (2008) advocate an approach to assessing the carbon stocks of native forests based on the Carbon Carrying Capacity of oldgrowth forest. Mackey et. al. (2008) consider that for reliable carbon accounts two kinds of baseline are needed;

> *1) the current stock of carbon stored in forests; and 2) the natural carbon carrying capacity of a forest (the amount of carbon that can be stored in a forest in the absence of human land-use activity). The difference between the two is called the carbon sequestration potential—the maximum amount of carbon that can be stored if a forest is allowed to grow given prevailing climatic conditions and natural disturbance regimes*

With the urgent need to sequester carbon from the atmosphere we should be managing our forests as carbon sinks. As Mackey *et. al.* (2008) conclude;

> *The remaining intact natural forests constitute a significant standing stock of carbon that should be protected from carbon-emitting land-use activities. There is substantial potential for carbon sequestration in forest areas that have been logged commercially, if allowed to regrow undisturbed by further intensive human landuse activities*

It is outrageous that the reporting on *MIG Indicator 5.1.a* only considers the sequestration of carbon in plantations and ignores the carbon budget of native forests. Even though this is the requirement, the need is simply ignored. It has been shown that it can be done, the State and Commonwealth Governments just refuse to account for native forests because they do not want to.

Reporting on carbon storage in forests by forest type, age class, and successional stages is a key requirement of the Regional Forest Agreements and essential for Australia to satisfy its international obligations. Despite this the State and Commonwealth Governments refuse to consider carbon storage and sequestration in native forests and instead only consider carbon sequestration in plantations.

This is a deliberate failing as the Governments do not want to admit that logging reduces the carbon stored in native forests and account for this loss. Forests recovering from logging will sequester carbon though it is likely that logging rates would need to be significantly reduced to achieve a nett balance between release and uptake of CO2. There is no excuse for failing to identify the break even point.

The Inquiry needs to recognise that logging has significant impacts on carbon storage in native forests, such that:

a. **Reduction of mature and oldgrowth forest to younger growth stages will cause a significant reduction in carbon storage in forest;**
b. **Carbon storage will increase with increasing forest maturity;**
c. **Large trees are particularly important for carbon storage; and,**
d. **Forests should be managed so that they are carbon sinks.**

3. Creating a better business environment for forest industries

The timber market in NSW is totally distorted by massive Government subsides, inefficient resource allocations, cross-subsisation of public native forests by plantations, lack of competitive pricing, public subsidies distorting and depressing timber values from private forests and plantations, and excessive long-term timber allocations.

As noted by URS (2008):

> *Native forests are managed for multiple objectives – commercial and environmental. As a result public ownership is appropriate. However, achieving economic efficiency and good public administration requires clear objectives, separated institutional and governance arrangements, adequate reporting, and competitive pricing and allocation mechanisms. However in several jurisdictions there is a lack of transparency in public management of forest resources and a lack of commercial drivers within publicly owned forest managers. A key example is where the financial performance of plantations and native forest operations are not reported separately. Non-commercial public forest management also acts to encourage downstream industry dependence on government support.*

The administrative pricing system, as compared to competitive pricing, introduces distortions into prices and generally leads to lower returns to the forest owner than what would be realised in a free and competitive market. For example URS (2008) recognise that :

> *Administered pricing is the predominant pricing mechanism used in Australian states, excluding Victorian native forest sawlogs. This leads to poor price discovery in the marketplace. Based on the experience of the introduction of logs auctions in Victoria, and limited competitive sales in other states, administered prices appear to be lower than competitive prices. Low prices depress return on investment and can distort the allocation of resources from highest to lower value uses. Low or non-transparent prices could also fuel public scepticism of the ongoing requirement to pursue commercial utilisation of an asset which also provides environmental services. Competitive pricing can be used by public forest managers to realise true market value and capture resource rent on behalf of the community – the owners of the resource. However its use is limited outside Victoria.*
>
> *…*
>
> *The LVPS residual pricing methodology seeks to obtain a measure of willingness to pay, however this methodology is only used to adjust price relativities not to determine base prices and there is a high risk that the system does not result in efficient pricing outcomes that accurately reflect capacity or willingness to pay.*
>
> *The most accurate and efficient way of determining true market prices is to use the market itself. Market based approaches to log pricing and allocation promote the most efficient allocation of forest resources (allocative efficiency). This is on the basis that buyers who can put the logs to most productive use will be able to outbid those with less productive possible uses. ...*

While NSW has constrained its ability to implement a competitive pricing system due to its Wood Supply Agreement, every opportunity should be made to do so.

NSW has compounded its problems by issuing Wood Supply Agreements for excessively long periods beyond the time required to obtain a return on investments. This leads to further market distortions and favours inefficient processors. URS (2008) recognise:

> *The length of supply contracts offered by public forest agencies are generally excessive, often being much longer than pay-back period for user industries investments (e.g. saw mills). These contract lengths inhibit innovation and investment*

in user industries by creating barriers to entry and inflexibility in the face of changing market conditions. ...

…

Long term contracts create inflexibility for both forest managers and the industry. This is particularly important when supplies are being reduced as a result of continual revision of sustainable yields. The public forest managers may remain committed to their contractual obligations. In practice, such long term contracts also tend to commit the agencies to supply even in the face of changes in supply, e.g. as a result of bushfires. Such sharing of risks can lead to further deterioration in the already low profitability of native forest operations if the agency has to purchase logs from elsewhere to meet long term obligations.

Long term supply contracts also impair the ability of the industry to effectively respond to market changes and derive the greatest value from the resource. Such changes could include changes in local and global demand for wood-based products, new technologies for processing, entrance of new processors and new investment in processing facilities and changes to transport costs.

Long term supply contracts act as a barrier to entry into the wood products industry when the supply is being reduced overall. While new entrants to the processing sector can purchase existing processors or their long-term contracts, such buyouts generally require compensation for the vendor which has to downsize or cease operations. In contrast, under short-term agreements processors are required to compete more frequently with other existing processors and new entrants.

Long term contracts have been justified as providing certainty of access for the processing sector. While such an argument may have some merit regarding the establishment of new timber processing facilities it is weak in a mature industry that has continuity of supply and adequate processing facilities in place. Indeed in practice there is likely to be a trade-off between 'certainty' of supply and industry competitiveness. The argument certainly does not justify contract lengths well in excess of the pay-back period for processing investment which is typically around 6 to 10 years.

Every opportunity should be taken to reduce the terms of Wood Supply Agreements. As state by URS (2008):

Whilst there is likely to always be a place in the Australian industry for long term contracts, there is scope to reduce the length of long term contracts to a duration more aligned with the payback period for new investment and to increase the proportion of volume sold under short term contracts. These actions would act to increase competition and improve the environment for investment by new entrants.

The Inquiry needs to recognise that NSW's Wood Supply Agreements distort the hardwood sawlog market and are for excessively long periods. The Inquiry needs to recommend that every opportunity should be taken to reduce the volumes committed and reduce the length of the agreements.

3.1. Separating plantations from native forestry

There is a deliberate confusing of plantations with native forests in NSW. Yield estimates from hardwood plantations are included with yields from native forests to disguise the true magnitude of the grossly unsustainable logging being undertaken. Similarly the financial returns from plantations are used to disguise the major losses from native forest logging. This also results in the use of plantations to subsidise native forest logging.

URS (2008) note:

> *If a State Government chooses to be involved in commercial plantations, profit maximisation is an appropriate objective to deliver a dividend for taxpayers in contrast to the multiple objectives of native forest management. However an agency's performance in achieving its multiple objectives for native forest plantation management should be reported separately. The New South Wales, Western Australian and Tasmanian models do not perform well on these criteria as they do not produce separate financial reports for native forest and plantation operations. ...*
>
> *... In the absence of separate reporting, it is possible that softwood plantations could be used to support less profitable native forest activities. However there is no stated government policy by any Australian state supporting the provision of such subsidies.*
>
> *Lack of financial reports for native forest management can exacerbate community anxiety about achievement of environmental objectives and the extent of state support for logging in native forests. Such lack of disclosure could enable agencies to deviate from profit goals through cross subsidisation and also to pursue other unstated objectives such as regional or industry development.*
>
> *Cross-subsidisation of native forest operations by plantations is in effect a direct subsidy using taxpayer funds as the profits from plantation forestry would otherwise become direct government revenue. The risk of implicit support to native forestry operations is that it effectively builds up adjustment pressure, adding to the social and economic costs of adjustment when such operations are required to meet commercial pressures. This has implications for the certainty and risk to private businesses in the native forest supply chain, similar to the risk of a future lack of access to resources, discussed below.*

URS (2008) identify as the pre-eminent key sectoral reform:

> ***Recommendation 1 - Transparency in reporting:*** *National reporting of public forest agency performance should be improved with separation of native forest and plantation finances. Such improvements to reporting could be driven by COAG federation reform processes and be modelled on the annual Report on Government Services undertaken for COAG*

It is requested that the Inquiry recognise the market distortions and lack of transparency caused by NSW's amalgamation of plantations and native forests for resource allocation and reporting and recommend separate reporting of native forests.

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3.2. Accreditation

Within Australia and overseas consumers are increasingly demanding that the timber they buy comes from ecologically sustainably managed forests. Many regions, such as Europe, North America, Canada and Asia will not import timber unless it can be traced back to a forest certified as being managed in a sustainable manner.

To satisfy this demand the Australian Forestry Standard was drafted in 2000 under the direction of Australian Forestry Standard Steering Committee comprised of the Commonwealth and State and Territory Governments, National Association of Forest Industries, Plantation Timber Association of Australia, Australian Forest Growers and the Australian Council of Trade Unions. It needs to be recognised that the AFS is effectively the industry's own standard and that the standards were not developed in consultation with environmental NGOs and are not condoned by them.

In June 2006 Forests NSW gained certification for its environmental management system under ISO 14001:2004 for native and planted forests. In December 2006, Forests NSW gained forest certification under the Australian Standard for Sustainable Forest Management (Australian Forestry Standard - AFS) AS 4708 (Int) – 2003. Forests NSW were accredited (certificate 13761) for 2,555,681 hectares of native forests and plantations under AS4708:2007 by the certification body NCS International. NCS International were in turn accredited by JAS-ANZ.

NEFA has established that timber is being obtained from illegitimate sources in the UNE, that many legal requirements are not being complied with and that the industry's own Australian Forestry Standards are not being complied with. This has been documented and submitted to JAZ-ANZ as a complaint. NEFA considers that under the criteria the UNE should be recognised as a "high" risk region and treated accordingly.

It is self evident that timber volumes being removed from public native forests in north-east NSW are not sustainable. The Sustainable Wood Supply Strategy (CoA&NSW 2000), as modified in 2004, is to log at an acknowledged unsustainable rate until 2023 and then to dramatically reduce the volumes being removed. Yield downgrades and increased commitments have increased and entrenched unsustainable logging. Claims that timber from plantations will make up the shortfall are dubious and do not negate the fact that public native forests are being intentionally logged unsustainably.

Our recent audits have also found that timber is regularly being obtained from illegal sources on public lands in the UNE (such as Endangered Ecological Communities, rainforest, stream exclusion areas, owl exclusion areas, Hastings River Mouse habitat etc.), and that trees required to be retained for threatened species (hollow-bearing trees, recruitment trees, Yellow-bellied Glider feed trees etc) are being illegally removed for timber. We have also found that oldgrowth forest continues to be logged.

We have even found that timber claimed to be sourced from a plantation was actually obtained from illegal rainforest logging.

Our recent audits have established that many legal requirements and many of the AFS criteria are not being complied with. We are perplexed as to how Forests NSW's operations in north-east NSW ever gained accreditation given that they are based on intentional and openly acknowledged unsustainable logging. We are also concerned that those charged with independently auditing Forests NSW's operations, DECCW, Fisheries NSW and NCS International, fail to identify the extremely poor performance found in our audits.

> The Inquiry should recognise that the accreditation of timber being obtained from north-east NSW's forests as coming from ecologically sustainably managed forests and legal sources risks Australia's international reputation and the credibility of its accreditation programs.

4. Social and economic benefits of forestry production

All too often assessment of the economics of the timber industry are based solely on their economic benefits, with the costs ignored. The Department of Planning (1994) in its report on the Kempsey/Wauchope EIS notes:

> *"The NSW Guidelines for Economic Appraisal (NSW Treasury 1990) proposes two techniques for economic appraisal, cost benefit analysis (CBA) and cost effectiveness analysis (CEA). Both techniques have the underlying objective of identifying alternatives which maximise community welfare and thus improve economic efficiency and require as many as possible of the benefits and costs to be quantified. The Guidelines also clearly identify that while regional impact analysis may prove a useful adjunct to CBA (consideration of costs and benefits) it is not an alternative to CBA (NSW Treasury 1990)."*
>
> *"An integral part of the evaluation of alternatives and justification of the proposal is based on aspects of regional impact analysis. While such an approach is of use in identifying the structure of a regional economy, the employment, income and output impacts in a region and the distribution of these impacts among industries, it is not an evaluation methodology. Having regard to the legislative framework, Treasury Guidelines on economic appraisal, the literature on regional impact analysis and the purpose of economics it is considered that such an analysis should be considered as an adjunct to the consideration of the economic costs and benefits of the proposal and alternatives and not as an alternative to it."*

A proper cost-benefit analysis should account for the standing value of the trees, management, extraction and transport costs, and quantifiable reductions in water yields, carbon storage, and soil nutrients. Then there are the numerous “non-use” values that need to be accounted for, for example URS (2008) note:

> *Native forests and plantations provide many unpriced goods and services to the economy and values to society, none of which are reflected in the marketplace. Trees assist with water and land management by reducing run-off and controlling erosion. They sequester carbon and reduce greenhouse gas emissions. Forest ecosystems are a major protector of biodiversity and provide habitats for native species. In such circumstances, market forces alone will not provide economically efficient outcomes, as individual decisions will not reflect social benefits and costs. ...*
>
> *...*
>
> *Some of the environmental benefits of forests and plantations are public goods. The aesthetic values of forested landscapes are available for all to enjoy, for example. Similarly, the benefits to water quality accrue to all water users. On the other hand, bushfires are a public ‘bad’ that impose significant economic costs on the community at large and on individuals.*
>
> *It is therefore important to determine the impacts of economic settings of forest policies on such public goods.*

4.1. Balancing all costs and benefits

The issue is one of managing public land in the best interest of the community; regionally, nationally and internationally. An assessment of socio-economic values to identify the costs and benefits to society as a whole arising from allocation of forests is required to inform decision making processes. Assessments of economic impacts are usually simplistic and biased towards the identification of worse-case scenarios for affected extractive industries. A

holistic socio-economic assessment requires consideration of all values, including forest protection values and community values.

Bennett (1998) identifies that forest protection benefits can be classified broadly into use and non-use values:

> *"Use values involve beneficiaries experiencing first hand the forest ecosystem. Non-use values are enjoyed even without that direct contact. Use values are mostly associated with tourism and recreation activities such as sight seeing, camping or bush walking."*

For the UNE and LNE CRAs the approach taken to integrate both "use" and "non-use" values within a socio-economic framework was a "Benefit Transfer Threshold Values Analysis" (Bennett 1998). This is based upon identifying the "threshold values" of the "opportunity costs" resulting from the protection of an area which need to be exceeded by the "forest protection values" *"for it to be in the best interests of the community overall for the forests to be reserved from timber production"* (Bennett 1998).

Some of the primary values of forests to communities are:

Protection of biodiversity,
Provision of water,
Use for recreation,
Provision of timber, and
Storage of carbon.

It is generally acknowledged that logging causes decreases in water yields, water quality, aesthetic values and the populations of some plant and animal species. While not universally accepted, logging also reduces the carbon storage capacity of forests. Thus conflicts in use exist between logging and all of the other primary values.

It terms of overall community preferences revealed in community attitude surveys, it is apparent that cessation of logging within an area identified as having extremely high conservation and social value would be in the best interests of the majority of the community. Associated with this is the next question of whether it would also be in the community's best economic interests?

Pugh (2000) undertook an assessment of the values of the then Whian Whian State Forest and found that timber was worth only a fraction of the other values identified:

VALUE	ANNUAL VALUATION ($1,000)
Timber	2.5 - 11
Water	4,500
Recreation	2,500 - 5,000
Conservation	2,250 - 15,000

Pugh (2000) notes:

> *The most recent valuation suggests that based upon optimistic yields, timber production from Whian Whian State Forest has a current value of somewhere between $2,484 to $10,953. This is the threshold that the forest protection benefits need to exceed in the current year for cessation of logging to be in the best economic interests of the community.*

Given that the forest represented the catchment for the Rocky Creek Dam (a regional water supply for 4 local government areas) and had a visitation of 125,000 visitors per annum, and that both water yields and visitation would increase in the absence of logging, there could be no doubt that both these values far outweighed timber production values.

Given that the forest also supported eleven species of plants and animals listed as in danger of extinction, 61 species listed as vulnerable to extinction, and a further 22 species of plants considered nationally rare, along with significant rainforest stands, and extremely high national estate values, there could be no doubt that its protection as National Park was in the community's economic interests.

Please note that in this section no attempt has been made to update values given, many of which maybe a decade or more old. Values are thus significantly understated in relation to present values.

4.1.1. Non-use values

There has historically been minimal attempts to assess the forest's preservation values (i.e. by assessing and accounting for public opinion and identifying priceless attributes), the replacement cost of public resources removed (e.g. soils, nutrients, water, habitat) or the real and potential economic worth of non-timber values (e.g. recreation, tourism, water supply). A valid economic assessment must identify socially optimal outcomes of proposals, thus in relation to forests it should include assessments of direct use value, ecological function value, option value, existence value and bequest value. The need to incorporate these into economic assessments is well established in the literature.

The presence of existence value is a powerful social reason for conservation and is a value felt by all Australians. All Australians own an equal share in the public forests and they are all entitled to an equal say in their future. Theoretically each Australian who feels a personal consumption loss if the proposal goes ahead should be compensated. Any survey of the value of the forest must survey nationally, as well as locally, if it is to capture this effect. There are a range of techniques available to evaluate public opinion (e.g. contingent valuation, switching value), at least two of which should be utilised for greater credibility.

A major requirement of any social assessment and a key component of determining the social values of public lands is the determination of public preferences. Statistically valid methodologies need to be utilised to assess the values the community places upon otherwise economically unquantifiable natural attributes (such as oldgrowth forests and endangered species), determining existence values and for assisting in determining recreational use. The broad category of conservation values includes the non-use values such as option value, existence value and bequest value. While harder to quantify, conservation values are real values that should be taken into account along with other values.

Non-use values include are expressed in a variety of forms; *"passive use values"* include such things as *"reading books or watching films that are based on the environment …benefit from scientific advances that have been made through research undertaken in a protected forest … high quality water supplies that have originated in protected forest catchments", "existence values" "are held by people who simply enjoy the knowledge that some forest areas have been set aside in reserves even though they have no wishes to visit them"* and *"bequest values"* represent the desire to protect areas for *"members of future generations"* (Bennett 1998).

The Community Attitude surveys undertaken for the Comprehensive Regional Assessments (CRAs) (McGregor *et. al.* 1997 a,b) show that the regional communities place far more emphasis upon "forest protection values" than "opportunity costs" and establish that "non-use" values are extremely important to the broad regional community.

Community attitude surveys undertaken in the region show that for public forests the vast majority of the community attach the highest priority upon protecting threatened species, maintaining sites of natural beauty and maintaining water quality (McGregor *et. al.* 1997, Duthy 1998). This compares to a small minority supporting logging.

The Community Attitude survey for the Upper North East (UNE) CRA (McGregor *et. al.* 1997a) established that the priorities respondents gave to *"various activities with relation to public forests"* were;

- protecting native plants and animals (100%),
- maintaining sites of natural beauty (99%),
- educational/scientific (97%),
- maintaining water quality (96%),
- aboriginal sites (89%),
- bushwalking/picnics (87%),
- protecting wilderness (87%),
- camping (79%), and
- eco-tourism (75%).

Exploitative uses of public lands received a lot less support (timber production 24%, woodchipping 7% and mining 13%), with the highest opposition being to mining (72%), hunting (70%) and woodchipping (65%).

In response to the question *"what is it about forests that you value?",* those values ranked highest were aesthetic (80%), conservation reasons (46%), spiritual (25%), intergenerational equity (14%) and recreation (10%) as compared to relatively low values for economic/employment (6%) and economic goods and use (5%).

The UNE Community Attitude survey (McGregor *et. al.* 1997a) showed that at both the macro and micro scales more respondents put environmental principles before economic principles when faced with conflict between the two, finding that :

- 56.3% of the people surveyed agreed that they *"would like to see more forested land conserved, even if it means a loss of state income from timber harvesting"* as compared to 23.2% disagreeing.
- When asked if it is the case that *"Timber harvesting in native forests may have an adverse impact on the abundance of native plants and animals"*, 66.1% of people surveyed considered *"The environmental costs are too high, it might be better to compromise on forestry activities"* as compared to 15.6% considering *"This is unfortunate but we need forestry products and employment."*
- When asked if it is the case that *"Forestry jobs may be lost to create new environmental reserves. This may affect some small communities adversely, by reducing their access to basic services"*, 45% considered this *"Unfortunate for these communities but we need environmental reserves for the benefit of future generations"* as compared to 31.5% considering *"The social costs are too high, it may be better to compromise on creating environmental reserves than reduce people's access to basic services."*

Duthy (1998) undertook a 'contingent valuation study' to determine the level of community support for the dedication of Whian Whian State Forest as a new national park. Consistent with regional attitudes, local respondents to his survey identified catchment protection, endangered species habitat and preservation for future generations as the most important uses of the Whian Whian area.

As an example of the weighting provided by local communities, out of a scale of 1 to 10, use of Whian Whian as a commercial timber resource achieved a mean ranking of 3.79, compared to camping and recreation achieving 6.38, endangered flora and fauna habitat achieving 8.77 and catchment protection achieving 9.03 (Duthy 1998). Catchment protection was considered extremely important by 63% of respondents, endangered flora and fauna habitat by 60% of respondents, and enjoyment of future generations by 56%, as compared to 8% considering commercial timber resource as extremely important (Duthy 1998).

In response to the request for local people to indicate their relative priorities between sometimes opposing environmental issues, Duthy (1998) found a similar preference for

environmental concerns over economic concerns as McGregor *et. al.* (1997). For example when respondents were asked to rank utilisation versus conservation of natural resources; 43% indicated that they considered they had a balanced view, a further 43% indicated that conservation was the priority and only 14% indicated utilisation as the priority. When the issue related to employment versus the environment less people considered they had a balanced view, with those favouring employment increasing to 25% and 41% still placing environment protection above employment. Conversely, when the issue related to private development issues versus environmental protection those favouring development declined to 7% while those favouring environmental protection increased to 71%. (Duthy 1998).

Duthy (1998) concluded *"The dedication of Whian Whian SF as a new national park is supported by the level of valuation, the amount of voluntary labour available, and the consistency with national park management objectives of the majority of the more important uses."*

The value to the community of such 'non-use' conservation values is hard to quantify. The general community may well regard some conservation values, such as habitat critical for the survival of a threatened species, as 'priceless'. Though to enable comparisons with 'use values' it can be useful to estimate the monetary value of quantifiable aspects.

Bennett's (1998) rule of thumb for forest protection benefits is that non-use values are worth three times the value of recreational use.

Duthy (1998) found from his sample of the local community that the mean willingness to pay for the non-consumptive use and non-use values of Whian Whian State Forest was $18.89 per respondent per annum, which was extrapolated to $2.25 million per annum across the local area. As Duthy did not account for the value of Whian Whian to the broader community, his estimation can be considered extremely conservative given Whian Whian's state, national and international significance.

Aside from direct economic valuations, there is a need to consider the 'irreplaceability' of conservation values along with the 'replaceability' of resource values. Many conservation values have a high irreplaceability in that they occur in a limited number of localities, while logging for most products can be undertaken at a large number of localities and thus have high replaceability. As noted by Bennett (1998):

> *"In general, forest protection benefits are likely to increase through time whereas the opportunity costs will most probably remain static. These differential growth rates are largely the result of the degree to which substitute goods are available for both the timber and non-timber forest products. Timber products are easily substituted. … The non-timber, or protection values, of forests are, however, much more difficult to substitute. For instance, habitat for endangered species cannot be readily "manufactured". Recreation in constructed or artificial sites may not be considered as providing the same experience as time spent in a protected forest reserve."*

4.1.2. Use values

There is a need to consider all the economic values provided by the region's public lands, these include water supply, timber, carbon storage, honey production, recreation and tourism. It is equally important to identify the impacts of one use upon others. For example logging of mature trees significantly decreases the availability of nectar and water, thus it has a negative impact on these other economic attributes.

Timber values

For the Comprehensive Regional Assessment (CRA), Bennett (1998) used two approaches to quantify timber values:

static analysis - where the *"opportunity costs can be viewed as the value that the benefits of protecting the forests must exceed for it to be in the best interests of the community overall for the forests to be reserved from timber production"*;
dynamic analysis – which accounts for *"the differential growth rates for the alternative streams of benefits"* to *"provide a more complete picture of the forest protection choice".*

Bennett (1998) assessed that the foregone timber harvesting benefits resulting from a reduction of 15,880 cubic metres per annum in the volumes of large high quality logs (along with associated products) being processed in the Upper North East. He identified that this volume of timber would have a static value of $9.47 million to $17.01 million (or $596 to $1,071 per cubic metre of large high quality sawlogs) depending on the discount rate applied and associated profit. Using the dynamic analysis Bennett identified the value as $43,750 to $193,243 (or $2.76 to $12.17 per cubic metre of large high quality sawlogs).

Based on values used by Bennett (1998) and with a static analysis, the combined value of the producer's and consumer's surplus for 900 cubic metres of large high quality logs (and associated products) per annum would range from something like $536,400 (at a discount rate of 8% under a producer's profit scenario of 20%) to $963,900 (at 5% discount and 10% profit).

Bennett (1998) notes *"in general, forest protection benefits are likely to increase through time whereas the opportunity costs will most probably remain static. These differential growth rates are largely the result of the degree to which substitute goods are available for both the timber and non-timber forest products. Timber products are easily substituted. … The non-timber, or protection values, of forests are, however, much more difficult to substitute. For instance, habitat for endangered species cannot be readily "manufactured". Recreation in constructed or artificial sites may not be considered as providing the same experience as time spent in a protected forest reserve."*

Bennett (1998) considers that *"The static approach therefore overestimates the extent of the opportunity costs associated with protecting the forest".*

Similarly, James (1998) identified that for a 15,880 cubic metre drop in volumes of large high quality products (and proportional declines in associated products) the direct impacts would be a reduction in the value of output by $3.8 million and loss of employment for 24 people.

<u>Water values</u>

All forests are important for water supply, though this importance increases in relation to the numbers of people and the value of industries a catchment supplies. For the more significant catchments water supply should be a "*primary consideration in decision-making affecting the catchment"* and not an incidental consideration as it often is now.

The Sydney Water Inquiry was established following the 1998 Sydney water contamination crisis, in part it concluded (McClellan 1998):

> *"The health of the catchment is a fundamental responsibility of our community, both for this, and subsequent generations. I have concluded that immediate action must be taken to establish appropriate management and regulatory structures to ensure the catchment is not further compromised and, if possible, existing problems minimised or removed. … We must not allow vested interests to inhibit the creation of effective planning, regulatory and management structures for the catchment.*
>
> *"The problems of the catchment demand a strong and effective response. A modern treatment plant is not a substitute for proper catchment management. Protecting the catchment provides the best long-term protection for Sydney's drinking water. …*

"Under the current arrangements, the catchment is managed to allow a range of activities. Water quality considerations may be diminished in favour of agricultural, urban and rural residential, forestry, mining and other developments. …

"In my view, this situation cannot be allowed to continue. … From now, water quality should be the primary consideration in decision-making affecting the catchment. This has significant implications for proposed future developments in the catchment. …

"There is a need to develop directions, catchment wide strategies and water quality objectives to guide management activities and development decisions in the catchment. …

"I also believe it is appropriate to give one agency specific responsibility for managing Government-owned land in the Inner Catchment. In my view, the National Parks and Wildlife Service is best placed to manage these areas for both water quality and broader ecological considerations, provided it is resourced adequately."

Dargavel *et. al*. (1995) note *"There are very large costs associated with providing water storage for urban water supply, so that decrease in stream flow may mean that greater or earlier investments in dams become necessary. Similarly, increased siltation of streams due to upstream economic activities may require dredging of dams or construction of new ones before they are due. These both impose costs on urban water consumers. Sediment from logging activities can increase the cost of municipal water treatment."*

Read, Sturges and Associates (1992) identified the current marginal willingness to pay for water at the tap as 30c, 60c and 80c per KL, which *"correspond to prices 'in the stream' of 26c, 53c and 70c".* Read, Sturges and Associates adopted a *"preferred estimate of water price of $530 per ML at the tap"*.

Read, Sturges and Associates (1992) determined that the economic worth of water and timber from the forests of the Thomson Dam catchment, in Victoria, was maximised by either no logging at all or by strip thinning combined with a rotation length of 200 years. These two options had a 'Net Present Value' of $147 and $169 million, respectively, above continued logging under the current system.

Recreational Values

Public land is a highly valued resource, providing the only natural areas for recreation for many residents. The Centre for Coastal Management (1993) note *"as indicated by the recreationalist survey … the most significant source of recreational forest visitation comes from the residents of the local government area".*

People primarily visit forests for passive experiences, *"enjoying the scenic beauty, tranquillity, solitude, smells and sounds of nature in undisturbed natural areas with family groups"* (Buultjens *et al* 1998).

For 1984 the annual visitation to the Border Ranges National Park was 18 466, Nightcap National Park 17 556 and Washpool National Park was 2 250, this gives a total of 38 272 (NPWS 1985). By 1990 the visitation rates had almost quadrupled to 148 800; Border Ranges NP - 43 800, Nightcap NP - 70 000, Washpool NP 35 000 (NPWS 1991).

Tourism is promoted as the worlds' largest industry, and is rapidly expanding worldwide, with expectations it would double in value from $3.4 trillion in 1994/5 to $7.2 trillion in 2005 (Buultjens *et al* 1998). Tourism can have significant regional impacts, for example in 1996/97 there were estimated to be over 1.2 million visitors to the local government areas of Ballina, Byron and Ballina, resulting in visitors staying almost 4.4 million nights and spending some $295 million in the region (Buultjens *et al* 1998). Tourism is thus a major contributor to the regional economy.

Tourism is the most rapidly expanding sector of the regional economy. It is thus essential that its socio-economic values be accounted for and appropriate opportunities explored. The act of converting a State Forest to a National Park can increase its recreational value, as noted by Buultjens et. al. (1998) *"National Parks are an international concept and this recognition has the potential to attract both domestic and international tourists".*

Buultjens *et al* (1998) note:

> *"The natural environment is perceived to be one of the most important tourist attractions for Australia, and in particular of the north east NSW region. Forested areas represent a significant proportion of tourism and recreational attractions in natural environments … Furthermore, this demand is increasing significantly, with a 48 percent increase in National Park visitation in NSW and a 66 percent increase in bushwalking between 1989 and 1994 …"*
>
> *"Overall, nature based tourism in forested areas is increasing, with the NPWS forecasting a 2.25 percent per annum growth in visitation levels …*

Buultjens et. al. (1998) consider:

> "Visitation in the UNE over the next twenty years will increase from 2,828,201 in 1997 to 4,202,558 in 2017 and consumers' surplus will increase from between $57.4 million to $85.3 million. Expenditure, in the same period, will increase from between $59.7 million and $74.7 million to between $88.7 million and $111 million, and employment will increase from between 1,131 and 1,980 to between 1,680 and 2,942. In the LNE visitation will increase from 2,828,201 in 1987 to 3,268,839 in 2017 and consumers' surplus will increase from $44.7 million to $66.4 million. Expenditure, in this same period, will increase from between $46.5 million and $58.2 million to between $69.1 million and $86.5 million, and employment will increase from between 880 and 1,540 to between 1,308 and 2,288."

The Kuring-gai Colledge of Advanced Education (1988) found that of visitors to the rainforest parks of New England and Dorrigo 37% were local visitors, 12% were 'day-trippers' from outside the region, and 51% 'overnight visitors' from outside the region. The average daily expenditure per visitor were estimated as $34, $59 and $89 respectively. Of this expenditure 39% has been estimated to flow directly into local wages (Kuring-gai Colledge of Advanced Education 1988), which has an employment flow on effect of 2.06 (employment multiplier).

In 1995 for the Dorrigo National Park the average expenditure per person associated with visits was found to be $175.03 and for the Gibraltar Range National Park it was $73.45, respectively with 35% and 23% spent on accomodation, 20% and 15% spent on meals, 14% and 27% spent on shopping, 20% and 25% spent on cars, 9% and 8% on fares, with the remaining 2% classed as 'other'(Powell and Chambers 1995). For the Dorrigo National Park, 11% of this, an average of $20.10 per person, was assessed as being expended in the township of Dorrigo and the surrounding area. With 160,000 visitors per annum Powell and Chambers undertook and input/output analysis to assess that;

> *"the total impact associated with visits to the Dorrigo National Park generated $3.6m in regional output; $2.0m in regional value added activity; $1.3m in regional household income; and 59 jobs. This represented 7 per cent of output, 6.5 per cent of value added activity and household income and 7 per cent of employment in the Dorrigo region."*

Using the same data, Bennett (1995) undertook an assessment using the Travel Cost Method (TCM) to identify the net economic benefit, or the consumer surplus, for the parks. Bennett identified *"the amount the surveyed visitors would be willing to pay for their experience at the park, in excess of what they have to pay"* as $17.33 per visit to Dorrigo National Park and $15.83 per visit to Gibraltar Range National Park. Bennett identified the economic value of recreation use of Dorrigo as $2,772,800 per annum and Gibraltar Range

as $633,200 per annum, which equated as present values (at a 7% discount rate) of almost $40m and about $9m respectively.

Based upon the Dorrigo and Gibraltar data, updated to 1996/97, Buultjens *et al*'s (1998) assessment for the Comprehensive Regional Assessment used the figure of $20.30 per visit as the assumed consumers surplus per visit, $21.14 to $26.44 as the assumed regional expenditure per visitor, and employment of 4-7 jobs per 10,000 visitors.

The Inquiry needs to recognise that forests have both use and non-use values that need to be taken into account when identifying the costs and benefits to the community from use of public forests. Use values include timber, water supply, carbon storage, recreation and tourism, all of which are usually compatible except logging. Non-use values include aesthetics, wildlife, ecological function value, option value, existence value and bequest value.

4.2. Removing Public Subsidies

Forests NSW native forests operations are operating at a substantial financial loss. A situation that is expected to worsen dramatically into the future. NSW taxpayers are going to have to pay many millions more every year to prop up this unsustainable industry that is running down the value of the public's assets.

The subsidisation of the timber industry has been going on for decades despite repeated suggestions to remedy the situation. As noted by the Public Accounts Committee (1990):

> *"... native forest asset valuations really only consider replacement costs, a satisfactory inventory of native forests is lacking, there is no accounting for the non-timber values inherent in the native forest, ... and numerous subsidies enjoyed by the Commission ... are not quantified in the accounts." (p21)*
>
> *"The State's timber processing industry is heavily subsidised by the public sector. Chief among the subsidies are under priced raw materials (in the case of Eucalypt logs), and failure to bear the full costs of road construction and maintenance which are attributable to the industry's operations. As a result of these subsidies, sawmilling businesses which would be marginal or non-viable in their present form are able to continue operating and to continue resisting the pressures to change their inefficient methods of operation." (p31)*

Pugh (1992) found that the then Forest Management Areas of Urbenville, Murwillumbah, Casino West and Grafton operated at a financial loss of $1,090,000 (in 1991 dollars) over the ten years 1981/82 to 1990/91. In 1987/88 the Forestry Amendment Act gave an additional subsidy to the Forestry Commission by relieving them of the interest payable on their accumulated debt of some $110 million! They were supposed to pay a dividend to Treasury in return, though failed to do so in 1987/88 or 1988/89 (PAC 1990 p27).

While Forests NSW now attempt to hide the subsidisation of logging public native forests by including their accounting with plantations, it is evident that they are still operating at a substantial loss. In response to questions on notice from the General Purpose Standing Committee No.1 Budget Estimates 2009-10, the Forestry Minister Steve Whan identified that Forests NSW's native forest operations ran at a loss of $8.1 million in 2009/10, stating:

> *Given, as reported by the Auditor General in 2009. that the current cash flow of Forests NSW Native Forests Operations Branch is negative, any NPV calculation now will result in a valuation of zero.*

The Auditor General (2009) wonders how Forests NSW will perform in the future, given that:

> *... Native forest operations operated at a loss of $14.4m for 2007-08. We are unable to conclude if this is the result of inefficient operations, or because prices do not reflect the true cost of meeting wood supply commitments or a mixture of both.*

Not only are Forests NSW losing money, the public are losing a natural resource and environmental values. There is no resource rent being paid to the community, so we are being duded twice, as noted by URS (2008):

> *Extracting resource rent from the use of the state's forest resources – resource rent is the additional profit above "normal" business profits that can be gained by providing access to a natural resource. Because resource rent is in excess of normal business profits, there is a rational for governments to collect some of this rent on behalf of the owners of the resource – the community.*

URS (2008) note:

> *Low returns to public forestry and plantation agencies distribute income from taxpayers to the forest industry, as do subsidies to plantations and wood processing plants. The distortion in returns to forestry created by the range of poor economic policy settings reduce returns and lead to underinvestment for the longer term by both the private and public sectors.*
>
> *…*
>
> *To the extent that the market failure relating to social rates of time preference is not addressed through these policies, then future generations will be worse off. This will also be the case if there is poor transparency and reporting of native forest operations with clear achievement of environmental objectives.*

It is often claimed that Forests NSW can operate at a loss because of the public good they provide. Though URS note that "Forests NSW received a contribution from the state government for community service obligations of approximately $9.5M pa. In 2006/07 expenditure on community service obligations was $11.1M". Their claims as to what constitute community services are dubious.

4.2.1. Costs Increasing

Despite repeated claims by Forests NSW that they can turn the situation around and operate at a profit on their native forest operations, this is increasing unlikely due to the entrenched pricing distortions and subsidies built into the current system, the declining yields, and the increasing costs of accessing whatever timber is available.

Partington and Stevenson (Forests NSW 2004b) warn that *"Only 50% of the native forest volume is easily accessible - on slopes less than 20º and more than 50m from an exclusion boundary. Harvesting practices and costs will need to address the issue of difficulty of access in order to meet current native forest commitments".* This means that the costs and difficulty of obtaining available timber will increase into the future.

Partington and Stevenson (Forests NSW 2004b) also consider *"we understand that there may be an increasing need to harvest crops previously considered unmerchantable" … "areas previously considered unmerchantable are now being reclassified as merchantable as the constraints on available timber become more severe".*

The Auditor General (2009) supports the contention that obtaining whatever timber is available will become increasingly expensive:

> *Over the last five years, harvest and haulage prices for all north coast products increased 45 and 36 per cent respectively. Central Region advised that harvesting is becoming more difficult as they are moving into more remote areas with lower yield per hectare and steeper terrain.*

Regional staff believe that the last five years of wood supply agreements for the north coast (i.e. 2018-2023) will be the most difficult, with Forests NSW increasingly accessing timber further away from sawmills.

With increasing costs involved in obtaining the timber available and an apparent need to buy out more quota and compensate millers for shortfalls, Forests NSWs losses can be expected to rapidly escalate into the future.

4.2.2. Roads and Bridges

There has been an ongoing failure to account for indirect subsidies resulting from the impacts of logging trucks on roads and bridges and the associated costs.

The State Pollution Control Commission (1975) noted that:

"Several submissions, in particular from local councils, commented on the damage to secondary roads by heavy woodchip vehicles. Experience in Tasmania is said to show that the damage is not trivial"

The Department of Planning (1994) note that while they recognise *"road pavement damage from logging trucks may be considerable (as identified in a number of submissions) it has not been possible to quantify this ..."*

Dobinson (1985) notes that road pavement damage increases in relation to the fourth power of axle load and that therefore a truck loaded to the permissable limit do 14,000 times the damage of an average car to road pavements. He further notes that bridge life depends on the extent of concentrated load by an axle group and the gross weight of the vehicle on the bridge.

Quantifiable, but usually unaccounted, costs include damage to council roads and bridges by logging trucks. At a 1990 rate of 4 cents per net tonne/kilometre this is quite significant (PAC 1990 p34).

The Inquiry needs to acknowledge that logging of public native forests in NSW does not pay a resource rent to the community and is operating at a considerable financial loss. It also needs to be recognised that costs are rapidly escalating and timber volumes declining. The Inquiry needs to identify means of removing public subsidies to the timber industry and returning a resource rent to the community from the commercial use of public resources

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Appendix 1

Extract from Environment Australia (1999) Response to Disturbance of Forest Species in CRA Regions in NSW- Upper North East and Lower North East Regions.

FORESTRY Disturbances identified and their impacts ranked relative to ALL IDENTIFIED DISTURBANCES.

Species	Disturbance	Rank	Comments
MAMMALS (excl. bats)			
Red-legged Pademelon	logging - reduction of midstorey	3	in rf and wet sclerophyll - reduced leaf litter etc
Common Wombat	climate change	?	
Hastings River Mouse	logging - loss of hollows	3	need hollows in butt cavities of old growth
Broad-toothed Rat	climate change	3	
Dusky Antechinus	logging - altered hydrology oldgr-regr	2	affects litter moisture - reduces food (see Alberts Lyrebird)
Koala	Intensive logging that removes the critical tree size classes from the stand (may be frequent or single and intensive)	3	Logging that fails to retain stems in the 30-80 DBH size class
Squirrel Glider	Intensive logging that removes the critical tree size classes from the stand (may be frequent or single and intensive)	3	Removal of large trees and hollows, includes firewood collection
	High frequency burning	2	
Yellow-bellied Glider	Intensive logging that removes the critical tree size classes from the stand (may be frequent or single and intensive)	1	Logging that fails to retain a high proportion of large trees and hollows
	High frequency burning	3	
Greater Glider	High frequency burning	2	
	Intensive logging that removes the critical tree size classes from the stand (may be frequent or single and intensive)	1	Logging that fails to retain a high proportion of large trees and hollows
Eastern Pygmy-possum	High frequency burning	1	
BATS			
Nyctimene robinsoni	Logging of wet sclerophyll	2	of wet sclerophyll
	Regeneration burn	5	regeneration
	Weed invasion	3	lantana and others
	Roading	5	
	Climate change	5	
	Altered hydrology/microclimate - oldgrowth-regrowth	3	
Pteropus alecto	Logging of sclerophyll	3	of sclerophyll - loss of older trees
	Climate change	6	
	Weed invasion	4	
	management burns	3	
Syconycteris australis	Logging of sclerophyll	3	coastal sclerophyll with banksia understorey
	management burns, including illegal	1	
	Weed invasion	2	
Pteropus poliocephalus	Logging of sclerophyll	3	
	Climate change	6	
	Weed invasion	5	less restricted to rainforest remnants than P. alecto
	management burns	3	
Kerivoula papuensis	Logging - loss of hollows	2	

Species	Disturbance	Rank	Comments
	Logging - loss of understorey	2	
	Weed invasion	3	
	Frequent burning	1	
	Altered hydrology/microclimate - oldgrowth-regrowth	3	
Chalinolobus nigrogriseus	Logging - loss of hollows & oldgrowth	2	
	Logging - loss of understorey complexity	4	
	Frequent burning	4	
Myotis adversus	Altered hydrol old-regrowth - altered flow	3	
	Altered hydrol old-regrowth – sedimentation	3	
	Logging - loss of hollows	4	
	Frequent burning	4	
Mormopterus beccarii	Logging - loss of hollows	1	
	Logging - loss of understorey complexity	5	
	Frequent burning	3	impact on invertebrates
Vespadelus troughtoni	Frequent burning	3	
	Clearing - fragmentation	4	
	logging - loss of foraging habitat	3	
Miniopterus australis	logging - loss of foraging habitat	3	
	logging - loss of hollows	5	
	Frequent burning	3	
	Altered hydrology/microclimate - oldgrowth-regrowth	3	
Chalinolobus dwyeri	Frequent burning	2	
	logging - loss of foraging habitat	3	
Vespadelus pumilus	Logging - loss of hollows & oldgrowth	2	.
	Logging - loss of understorey	3	
	Frequent burning	3	
	Altered hydrology/microclimate - oldgrowth-regrowth	3	
Rhinolophus megaphyllus	logging - loss of foraging habitat	3	
	logging - loss of hollows	5	
	Frequent burning	4	
	Altered hydrology/microclimate - oldgrowth-regrowth	3	
Saccolaimus flaviventris	Logging - loss of hollows & oldgrowth	1	
	Frequent burning	3	
Nyctophilus timoriensis	Logging - loss of hollows	1	
	Logging - loss of understorey complexity	2	
	Frequent burning	3	
Nyctophilus bifax	Logging - loss of hollows	4	
	Logging - loss of understorey	3	
	Frequent burning	3	
	Weed invasion	4	
Scotorepens orion	Logging - loss of hollows & oldgrowth	2	
	Logging - loss of understorey	4	
	Frequent burning	4	
	Altered hydrology/microclimate - oldgrowth-regrowth	5	
Falsistrellus tasmaniensis	Logging - loss of hollows & oldgrowth	1	
	Logging - loss of understorey	3	
	Frequent burning	3	
	Weed invasion	4	

Species	Disturbance	Rank	Comments
	Altered hydrology/microclimate - oldgrowth-regrowth	4	
	Climate change	2	
Scotoeanax rueppellii	Logging - loss of hollows & oldgrowth	1	
	Logging - loss of understorey	3	
	Frequent burning	3	
	Altered hydrology/microclimate - oldgrowth-regrowth	4	
Miniopterus schreibersii	logging - loss of foraging habitat	4	
	logging - loss of hollows	5	
	Frequent burning	4	
	Altered hydrology/microclimate - oldgrowth-regrowth	3	
Scotorepens balstoni	Logging - loss of hollows	2	
	Logging - loss of understorey	4	
Scotorepens greyii	Logging - loss of hollows	2	
	Logging - loss of understorey	4	
	Frequent burning	5	
	Altered hydrology/microclimate - oldgrowth-regrowth	5	
Mormopterus norfolkensis	Logging - loss of hollows	1	
	Logging - loss of understorey	4	
Mormopterus planiceps	Logging - loss of hollows	2	
	Logging - loss of understorey	4	
Nyctinomus australis	Logging - loss of hollows	1	
	Frequent burning	3	
Mormopterus sp 1	Logging - loss of hollows	2	
	Logging - loss of understorey	4	
Scotorepens sp 1	Logging - loss of hollows	2	
	Logging - loss of understorey	4	
	Frequent burning	5	
	Altered hydrology/microclimate - oldgrowth-regrowth	5	
BIRDS			
Double-eyed Fig-parrot	weed invasion	4	in lowland remnants (exotic vines)
	logging	5	eucalypt adjacent to lowlands - subtropical and dry rainforest
Red Goshawk	logging	4	
	weed invasion	7	
	changed fire regimes	5	
Regent Honeyeater	logging that reduces age classes	3	reduced age class, decreased nectar
	changed fire regimes	4	
Black-breasted Button-quail	any logging	3	alters microclimate and removes shelter
	high frequency burning	2	
Swift Parrot	logging that reduces size class of trees	2	
Wompoo Fruit-dove	logging that reduces size class of trees	1 (2 JS)	Of fleshy fruit trees in wet sclerophyll forest
	weed invasion	2	In lowland remnants
Rufous Scrub-bird	logging	2	that alters microclimate and litter dynamics - of wet sclerophyll
	climate change	1	
	management burns	2	
Albert's Lyrebird	logging	3	that alters microclimate and litter dynamics
	climate change	2	
	weed invasion	2	by lantana following logging of wet sclerophyll on higher nutrient sites
Eastern Bristlebird	Altered fire regimes	1	
	Climate change	2	

Species	Disturbance	Rank	Comments
Square-tailed Kite	logging	2 (3 JS)	increases structural density through reducing age classes, decreased nectar prod.
Red-tailed Black-Cockatoo	Logging	2	loss of large, old, dead trees
Barred Cuckoo-shrike	weed invasion	1	
Painted Honeyeater	logging	2	Yellowbox forest only
Rose-crowned Fruit-dove	logging that reduces age classes	2	of mesomorphic midstorey
Glossy Black-Cockatoo	logging that reduces age classes	1 (DM,SG) 2 (HR,JS)	of eucalypts and allocasuarina
Paradise Riflebird	logging that reduces age classes	1	
	management burns	3 (1 JS)	
Superb Fruit-dove	logging that reduces age classes	2	of mesomorphic midstorey
Regent Bowerbird	Logging	1	Logging that affects fruit lower strata
	Logging	2	Logging that affects fruit lower strata
	Weeds	1	In remnants and gallery strips
Olive Whistler	climate change	1	
	logging	3	immediate response only
White-eared Monarch	weed invasion	2	of remnants
Pale-yellow Robin	Logging	1	Logging that encourages dense low stratum
Pacific Baza	logging that reduces age classes	2	
	weed invasion	2	of remnant gallery forest
Grey Goshawk	Logging that reduces age classes	2	
Gang-gang Cockatoo	Logging that reduces age classes	2	Loss of old trees
Noisy Pitta	Logging	3	Removes the large rainforest trees changing microclimate and reducing food supply
	Weeds	1	
Brush Bronzewing	Altered fire regimes	2	
Little Shrike-thrush	Logging	1	Loss of older age classes
	Weeds	1	
Little Bronze-Cuckoo	Weeds	2	
Russet-tailed Thrush	Logging	2	Increases understorey density and changes moisture regimes
Musk Lorikeet	logging that reduces size class of trees	2	
Chestnut-rumped Heathwren	Altered fire regimes	1	
Prince Edward Lyrebird	management burns	2	
Yellow-tufted Honeyeater	high intensity logging	3	
	weed invasion	3	lantana - suppressing understorey recovery
	management burns	1	
Red-backed Kingfisher	Logging	2	Change in forest structure with young regeneration
Marbled Frogmouth	selective logging wet scler	1	
	Aust group selection	1	
	reducing forest age	1	
	weed invasion	1	
	thinning	1	

Species	Disturbance	Rank	Comments
Powerful Owl	logging which reduces prey mammals	1	Where arboreal mammals are reduced - dependent on regime and location
	fire which reduces prey	2	Where it reduces prey
	nest and roost site dist	3	by logging and recreational birdwatching
Sooty Owl	logging which reduces prey mammals	1	Where arboreal and terrestrial prey are affected
	nest and roost site dist	2	
	fire which reduces prey	4	frequent burning where reduces ground mammal abundance
Masked Owl	logging which increases structural density of forest	2	Where affects mid to ground layer - affects manoeuvrability
	fire - high frequency	3	
	nest and roost site dist	6	
Barking Owl	fire - high frequency	2	
FROGS			
Litoria castanea	introduced weeds	5	
	altered hydrology - earthworks	2	
Litoria brevipalmata	altered hydrol - oldgr - regrowth	?	
	oldgrowth logging	?	
	changes in soil moist - roading	?	
	changes in soil moist -logging	?	
	logging - removal large dead fallen trees	?	
	logging - reduced leaf litter input	?	
Litoria piperata	siltation from logging	?	
	siltation from roading	?	
	introduced weeds	?	
Mixophyes fleayi	change in soil moist - logging	2	
	change in soil moist - roadding	2	
	logging - reduced litter input	2	
	introduced weeds - lantana	3	lantana
Litoria aurea	introduced weeds	5	
Assa darlingtoni	changes in soil/litter moisture	1	
	climate change	4	
Philoria sphagnicolus	changes in soil/litter moisture	1	
	climate change	5	
	altered hydrology and stream flow	2	
	siltation from logging	6	
	siltation from roading	6	
Mixophyes iteratus	change in soil moist - logging	1	
	change in soil moist - roadding	1	
	logging - reduced litter input	1	
	introduced weeds - lantana	3	
	siltation from logging	3	
	siltation from roading	3	
	altered hydrology - oldgr-regr	3	
Philoria loveridgei	altered hydrol - oldgr-regr	2	
	change in soil/ litter moist-log	1	
	change in soil/ litter moist - road	1	
	siltation from logging	5	
	siltation from roading	5	
Litoria subglandulosa & daviesi	siltation from logging	1	
	siltation from roading	1	
	altered hydrology- old-regrowth	3	
	change in soil moist - logging	4	
	change in soil moist - roading	4	
	burning - frequent	2	
	oldgrowth logging - removal hollows	3	
	logging - removal fallen trees	2	

Species	Disturbance	Rank	Comments
Mixophyes balbus	change in soil moist - logging	2	
	change in soil moist - roadding	2	
	logging - reduced litter input	2	
	introduced weeds - lantana	3	
	siltation from logging	3	
	siltation from roading	3	
	altered hydrology - oldgr-regr	3	
Philoria kundagungan	altered hydrol - oldgr-regr	2	
	change in soil/ litter moist-log	1	
	change in soil/ litter moist - road	1	
	siltation from logging	5	
	siltation from roading	5	
	logging - removes fallen trees	3	
	logging - reduced litter	3	
Litoria olongburensis	altered hydrology etc earthworks	1	
Philoria sp 2 (undescribed)	altered hydrol - oldgr-regrowth	2	
	change in soil/ litter moist - road	1	
	change in soil/ litter moist -logging	1	
	siltation from roading	5	
	siltation from logging	5	
	logging - removes fallen trees	3	
	logging - reduced litter	3	
Philoria sp 3 (undescribed)	altered hydrol - earthworks	2	
	change in soil/ litter moist - road	1	
	siltation from roading	4	
Litoria revelata	altered hydrol - oldgr - regrowth	?	
	oldgrowth logging	?	removal of hollows/n cavities
	changes in soil moist - roading	?	
Pseudophryne bibronii	altered hydrology - earthworks	?	
	change in soil moist - logging	?	
	change in soil moist - roading	?	
Litoria pearsoniana	siltation from logging	4	
	siltation from roading	4	
	altered hydr - oldgrowth-regrowth	2	
	change in soil moist - logging	4	
	change in soil moist - roading	4	
	old growth logging - removal cavities	4	
	logging - removes large fallen trees	4	
	logging - reduced litter input	4	
Heleioporus australiacus	siltation from logging	3	
	siltation from roading	3	
	altered hydrology - earthworks	3	
	burning - frequent	2	
	change in soil moisture - roading	3	
	change in soil moisture - logging	3	
	weeds	3	
Pseudophryne australis	siltation from logging	3	
	siltation from roading	3	
	altered hydrology - earthworks	3	
	burning - frequent	2	
	logging - reduced litter	5	
	weeds	3	
Litoria barringtonensis	siltation from logging	4	
	siltation from roading	4	
	altered hydr - oldgrowth-regrowth	2	
	change in soil moist - logging	4	
	change in soil moist - roading	4	

Species	Disturbance	Rank	Comments
	old growth logging - removal cavities	4	
	logging - removes large fallen trees	4	
	logging - reduced litter input	4	
TURTLESs			
Elseya georgesi	Roading - construction and maintenance assoc with logging	1	
	Logging - siltation - local	2	
	Logging - siltation - upstream	2	
Elseya purvisi	Roading - construction and maintenance assoc with logging	1	
	Logging - siltation - local	2	
	Logging - siltation - upstream	2	
Elseya sp2 (Gwydir & Namoi Rivers)	Roading - construction and maintenance assoc with logging	3	
	Logging - siltation - local	3	
	Logging - siltation - upstream	3	
	Illegal netting	2?	
Emydura sp (Bellingen River)	Roading - construction and maintenance assoc with logging	3	
	Logging - siltation - local	3	
	Logging - siltation - upstream	3	
Emydura sp1	Roading - construction and maintenance assoc with logging	3	
	Logging - siltation - local	3	
	Logging - siltation - upstream	3	
LIZARDS			
Ophioscincus truncatus	Weed invasion - lantana	3?	
	Logging - changing canopy structure	1	
	Logging - dessication - altered microhab	1	
Cautula zia	Logging - changing canopy structure	1	
	Logging - loss of large ground logs	1	
	Logging - dessication - altered microhab	1	
	Logging that reduces age/size structure	1	
	Climate change	1	for potential to be affected
Coeranoscincus reticulatus	Any fire	2	
	Logging - changing canopy structure	1	
	Logging - loss of large ground logs	1	
	Logging - dessication - altered microhab	1	
	Weed invasion	3	
	Logging that reduces age/size structure	1	
	Grazing and associated burning	3	
Ctenotus eurydice	Fire - any except wildfire	2	
Saproscincus challengeri	Any fire	2	
	Logging - changing canopy structure	1	
	Logging - loss of large ground logs	1	
	Logging - dessication - altered microhab	1	
	Logging that reduces age/size structure	1	
Saproscincus galli	Any fire	1	
	Logging - changing canopy structure	1	
	Logging - dessication - altered microhab	1	
	Logging that reduces age/size structure	1	
Saproscincus rosei	Any fire	1	
	Logging - changing canopy structure	1	
	Logging - dessication - altered microhab	1	
	Logging that reduces age/size structure	1	
Eulamprus kosciuskoi	Any fire	3	
	Weed invasion	3	
	logging - altered microhab - altered flow	1	

Species	Disturbance	Rank	Comments
	Climate change	2	potential to influence reserve selection
Hypsilurus spinipes	Any fire	1	
	Logging - changing canopy structure	1	
	Logging - dessication - altered microhab	1	
	Weed invasion	2	
	Road maintenance	1	
Lampropholis caligula	Any fire	1	
	Weed invasion	1	scotch broome
	Climate change	1	
	Logging - altered microhab - old-regrowth	1	
Lampropholis elongata	Any fire	2	
	Climate change	1	
Saltuarius swaini	Any fire	3	
	Weed invasion	3	
	Logging - changing canopy structure	1	
	Logging - dessication - altered microhab	1	
	Logging - loss of large trees and hollows	1	
Saltuarius wyberba	Any fire	2	
	Logging - altered microhab - old-regrowth	2	
	Logging that reduces size and age class	2	
	Logging - loss of hollows	2	
Calyptotis ruficauda	Any fire	2	
	Logging - changing canopy structure	2	
	Logging - dessication - altered microhab	2	
Eulamprus murrayi	Any fire	1	
	Logging - changing canopy structure	1	
	Logging - dessication - altered microhab	1	
	Weed invasion	2	
	Logging that reduces age/size structure	1	
Eulamprus tenuis (N pop only)	Any fire	1	
	Logging - changing canopy structure	1	
	Logging - dessication - altered microhab	1	
	Weed invasion	3	
	Logging that reduces age/size structure	1	
	Logging - loss of hollows	1	
Eulamprus tryoni	Climate change	1	
Tympanocryptis diemensis (northern)	Any fire	1	
	Logging - altered microhabitat - reduced ground cover and litter	1?	
Tympanocryptis lineata pinguicollis	Any fire	1	
	Weed invasion	1	
Saproscincus oriarus "North Coast sp"	Any fire	1	
SNAKES			
Cacophis harriettae	Any fire	1	
	Logging - loss of fallen logs	1	
Hoplocephalus bitorquatus	Any fire	1	
	Logging - loss of large treesl, stags and hollows	1	
	Logging - loss of fallen logs	1	
Hoplocephalus stephensii	Any fire	1	
	Weed invasion	3	
	Logging - changing canopy structure	2	
	Logging - loss of large treesl, stags and hollows	1	
	Logging - loss of fallen logs	1	

Species	Disturbance	Rank	Comments
Tropidechis carinatus	Any fire	2	
	Logging - loss of large treesl, stags and hollows	2	
	Logging - loss of fallen logs	2	
Austrelaps ramsayi	Any fire	3	
	logging - altered microhab - altered flow	3	
	Climate change	2	
Drysdalia coronoides	Any fire	1	
	Climate change	2	
Cacophis krefftii	Any fire	1	
	Logging - loss of large logs	2	
Acanthophis antarcticus	Any fire	1	
	Logging - altered microhabitat - reduced ground cover and litter	2	
Hoplocephalus bungaroides	Any fire	1	
	logging - loss of large trees, hollows and stags	1	

ATTACHMENT C

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Beautiful Lies Correspondence

John Benson

The issues discussed in Tim Flannery's Beautiful Lies raise a complex but important debate with major ramifications for how we manage the Australian landscape. The debate is about vegetation structure and fire ecology. It's also about the way simplistic statements made by reputable authors such as Tim Flannery can be used to justify ongoing damage to the Australian landscape.

First, I must refute some accusations Dr Flannery made in QE11 in response to a letter by the NSW Minister for the Environment, Bob Debus. Flannery suggested that I and a professional colleague (Phil Redpath) had helped to write or had influenced the content of this letter. He also asserted that we had published an "outright lie" about his writings on Aboriginal burning frequency.

Debus challenged Flannery's assertion that increased bushfire intensity is due to less regular burning and that a run of intense fires has caused species extinctions in places such as Royal National Park near Sydney. He argued that there are other explanations for species loss including the introduction of exotic predators and that the fires in the Park were due to extreme climatic conditions. Arson has also increased in recent decades. To support some of his case Debus cited a scientific review paper that I co-authored on the nature of pre-European vegetation and fire regimes in southern-eastern Australia.[1] That paper questioned Flannery's previous writings on these subjects, particularly parts of his 1994 book, The Future Eaters.

In his response to Debus, Flannery suggested that Redpath or I contributed to the Debus letter before it was published. This was not the case. Neither of us was aware of it until after it was published. However, we agree with its content. Although changed fire regimes may have played a role in some species extinctions in Australia, this has probably been insignificant compared to the impacts of domestic stock, exotic predators and European land use practices.

Flannery also wrote that we had stated that he had said that Aborigines burnt the landscape annually. In our article we stated that the early explorers' statements were used to give an impression this was the case. In his book The Future Eaters Flannery used the term "frequent" in describing Aboriginal burning practices. However, he failed to qualify this by mentioning Aborigines did not burn everywhere "frequently". The idea that Aborigines "more or less annually" burnt most of the country has been stated in places such as the booklet prepared by Ryan et al, The Australian landscape – Observations of Explorers and Early Settlers.[2] They refer to Flannery's writings to support their case. This booklet is discussed below.

Fire and the mega-fauna

In The Future Eaters, Tim Flannery states that the Aborigines burnt the land "frequently". This supports his hypothesis of a human blitzkrieg that caused the mega-fauna extinction. In brief, Flannery considers that the Aborigines hunted the mega-fauna to extinction within 2000 years of their arrival 40,000–50,000 years ago. He proposes that this led to a profusion of vegetation that fuelled large-scale bushfires which in turn led to the Aborigines frequently burning the bush to control

fuel levels. Flannery asserts that this frequent burning changed the previous vegetation into open grassy woodland and grasslands. He then asserts that a cessation of Aboriginal burning since European settlement led to a regrowth of shrubby vegetation and this caused species extinctions particularly of medium to small-sized native mammals. This is why in Beautiful Lies and elsewhere Flannery suggests re-introducing frequent burning to manage the bush now.

To the lay reader this sounds like a plausible hypothesis – it is certainly ingenious in its scope. However, it is not supported by much scientific evidence and it is likely that the hypothesis is wrong. Climate change over millions of years was the main director of vegetation change in Australia. Fires have raged on this continent for millions of years including during the times of the mega-fauna. The evidence for this lies in soil cores and palaeo-botanical research some of which is beautifully summarised in Mary White's book *After the Greening: the Browning of Gondwana*. Australia's flora have adjusted to the drying out of the continent as it drifted north into lower latitudes by developing hard wax-covered leaves, reduced transpiration, hard woody seed coats, underground root systems that allows vegetative re-sprouting and other features. Many of these features are also advantageous to plants surviving fire.

Even if the Aborigines did rapidly extinguish the mega-fauna through hunting pressure, other species would most likely have taken over their herbivore niches. In any case, we know that invertebrate animals account for much of the herbivory of Australian vegetation. As for the loss of small mammals due to cessation of burning after European settlement, this seems an illogical argument since they require vegetation cover to protect them from predators. Cover is lost with frequent burning but is gained when there are long inter-fire periods. To add to the debate, there is evidence that early graziers burnt some areas more than the Aborigines (see Benson and Redpath 1997 for detailed references and discussion about this). Furthermore, recent research at Cuddie Springs south of Walgett in north-western NSW by Judith Field of the University of Sydney points to an 8000-year co-existence (from 36,000 to 28,000 years ago) of Aborigines with the mega-fauna. If Judith Field's data is accurate, it not only challenges Flannery's Future Eaters blitzkrieg hypothesis but also the consequences of that hypothesis about the scope of Aboriginal burning regimes. Field considers climate change may have played a major role in the extinction of the mega-fauna.

Regrowth and land clearing

The other aspect of this debate involves regrowth of vegetation and this relates to the discussion on fire above. The people who are the greatest advocates for clearing vegetation in NSW and Queensland are dry-land grain croppers, cotton growers and beef cattle graziers. Big agribusinesses are involved along with some wealthy farmers. Publications such as The Australian Landscape – Observations of Explorers and Early Settlers, professional rural lobby groups and influential individual farmers have used Flannery's and other popular writers' views about fire and regrowth to justify land clearing. They state that there has been massive regrowth of woody vegetation (shrubs and trees) due to a cessation of Aboriginal burning and by clearing it they are restoring it to a pre-European vegetation structure. This is largely nonsense but it has fooled some politicians and bureaucrats.

These people are clearing land to grow crops, not to restore some notion of a natural vegetation structure. If they were simply thinning regrowth it would be less of a problem for the environment. However, one cannot count a wheat crop as an environmental gain. Cropping wipes out most native species, destroys much of the

soil biota and replaces them with an exotic monoculture. It's not as if we don't have lots of cleared country. In most parts of the Australian wheatbelt less than 20 per cent of the original extent of native vegetation remains. Yet they are trying to clear more of this despite documented species and ecosystem decline and the long-term ramifications of rising salinity levels to agricultural production. And they are pushing the grain belt further into marginal land at a time when climate change scenarios are predicting less reliable rainfall in these regions.

Nyngan is a town of about 3000 people on the western edge of the NSW wheatbelt. The surrounding countryside has moderate to poor soils and an unreliable and relatively low rainfall. It is marginal cropping country. Some landholders want to convert grazing country to crops to cash in on the better commodity prices for grains than for sheep or cattle. This requires them to clear the country. In fact, they want to clear about 80 per cent of the private land in the region. Recently massive areas have been cleared in the region leading up to the introduction of new vegetation management laws in New South Wales. This has mostly been done without permission under current laws. The land clearers in the Nyngan region argue they are clearing "woody shrubby regrowth". However, in clearing the shrubs they sometimes also clear everything including old eucalyptus and wattle trees. More importantly, they are sowing annual crops so this radically impacts on the environment. The farmers say the woody regrowth is causing soil erosion and the shrubs have grown due to a lack of Aboriginal burning – thereby reflecting Flannery's writings. An expert science panel reviewed the literature on soil erosion in relation to woody regrowth. It reported that site management, seasonal conditions and grazing pressure are most important in determining ground cover and therefore erosion.[3] It is possible that the loss of topsoil after 150 years of excessive grazing, particularly during drought periods may have created conditions that favour the survival of shrub species over herbaceous plants. Nevertheless, this does not suggest that shrub species did not occur in those areas, but rather are advantaged by the prevailing land management activities.

The creation of a myth

In 1995 a booklet was published titled The Australian Landscape – Observations of Explorers and Early Settlers. It was compiled by David Ryan a former fire management officer with State Forests of NSW, Jim Ryan an ex-hydro engineer and landholder from the town of Bredbo on the NSW Southern Tablelands and Barry Starr who was then an employ in the former NSW Department of Land and Water Conservation (Murrumbidgee Region). The timing of the publication of this booklet coincided with the introduction of the first regulations in New South Wales to control land clearing. These regulations were in response to a public outcry over land clearing rates in New South Wales and the impact this was having on landscape functioning, river systems, wildlife and soil salinity.

The Ryan booklet was financed by the NSW Farmers Association and the former NSW Department of Land and Water Conservation. One could interpret it as a propaganda tool to convince those in power that clearing land was restoring the landscape to a notional natural state. It relied on the selective use of quotations from early explorers and some popular texts to support its case. One of these was Tim Flannery's The Future Eaters and Flannery has repeated similar statements in his essay Beautiful Lies.

In our 1997 article, Phil Redpath and I exposed major flaws in the Ryan booklet. A review of its historical references showed that different interpretations could be made

of historical journal passages when they are read in their full context and when other passages are taken into account. The scientific literature on species-fire interactions, also reviewed in our 1997 article, cast further doubt on the claims in Ryan et al and in Flannery's writings on fire and vegetation. Yet the views of Ryan et al have been perpetrated as a myth by some farmer lobby groups, elements of the forest industry and others in order to justify frequent widespread burning and clearing native vegetation.

This is not just an esoteric academic debate. It impacts on the sustainable management of the natural resources of this fragile continent. It is about the way some loosely researched material in Tim Flannery's The Future Eaters and in his essay Beautiful Lies are taken as scientific fact and used by those intent on continuing the degradation of the Australian landscape for economic gain without being made accountable for the long-term effects of consequences such as salinity.

Other controversies

Much of Beautiful Lies is drawn from Flannery's earlier book The Future Eaters. I have no qualms with most of the essay's content including the sentiments expressed in the chapters titled "The Founding Lie", "White Liars", "The Colonial Drain", "Fighting for the Future", "Australia Adrift" and "Sweet and Sour Nation". These discuss some important social issues and matters to do with sustainable management of rural lands including the problems of over-allocation of water, soil erosion and degradation and salinity. Flannery is right to raise these big natural resource issues but he is wrong to criticise the benefits of the national reserve system and wilderness to the conservation of biodiversity and natural ecosystems and by default to our own sustainability.

Beautiful Lies contains several controversial statements, some of which were debated on the ABC Radio National Earthbeat program in April 2003. The participants in this debate were Flannery, a New Zealand whale expert Mike Donahoe, and me. Besides the issue of fire frequency, the radio debate covered these matters:

Cats: In his essay Flannery states that there is no evidence that cats caused the extinction of any species or animal in Australia. During the radio debate I handed Flannery a copy of a definitive review paper on this topic compiled by Sydney University researchers that reveals that up to seven species of animal may have become extinct due to predation by cats by 1850.[4] Other factors such as sheep and changed fire patterns may have played a role but you cannot state, as Flannery does in Beautiful Lies that cats did not cause any extinctions.

Sustainable whaling: It seems Flannery fell for Japanese propaganda about sustainable harvesting of Minke whales by repeating their hypothesis that the relatively large numbers of Minke whales may be inhibiting the recovery of large, rarer whales such as the South Right Whale through competition for food. Mike Donahue shot this hypothesis down by revealing that Minke whales eat different food than Southern Right Whales and that illegal whaling by the Russians in the 1970s was mostly to blame for the lack of recovery of the Southern Right Whale.

Wilderness, the reserve system and Aboriginal burning

In the chapter “The Dead Hand” Tim Flannery plays down the importance of the “flagship” battles won by the environment movement such as protecting special places such as Frazer Island and the Franklin River, stopping whaling, saving tracts of forest from the chainsaws and establishing a system of conservation reserves and wilderness area to sample biodiversity and protect landscapes. He considers that reserves have failed to protect species from becoming extinct because they were intensely managed by Aborigines through the application of frequent fire and now are not.

Fire doubtless has a role to play in species management. By studying the ecology of a range of species that occur in an area, an appropriate fire regime can be implemented including through controlled burning if that is required. And burning to protect property is not in question here. However, species extinctions from natural remnants are most likely explained by the direct and indirect impacts of fragmentation of the landscape – a fact well established in scientific literature.

Taking Royal National Park near Sydney as an example, it is now surrounded by an urban sprawl, is encroached upon by domestic pets including dogs and cats, the voracious fox is common and pollution of waterways is difficult to control. These factors explain the loss of wildlife. You cannot just blame this on altered fire regimes due to a cessation of frequent Aboriginal burning. In any case we do not know how the area was burnt by Aboriginal people, although, paradoxically, recent charcoal evidence from Gibbon Lagoon near the town of Bundeena suggests that fire may have increased in frequency since European occupation of the region.[5] This is the opposite scenario to what Flannery suggests. Besides, when it comes to assessing fire frequency the most informative approach to study is the life cycle of a number of species of plants and animals that exist in an area.

Researchers have demonstrated that a fire-free interval in the order of 8–25 years is required to maintain biodiversity in shrubby sandstone country around Sydney, including Royal National Park. This possibly mirrors long term El Nino climate patterns. However, it needs to be emphasised that appropriate inter-fire intervals vary for different types of vegetation in different locations across Australia, a fact recognised in many bushfire management planning instruments.

In Beautiful Lies Flannery questions the concept of wilderness, suggesting it supports terra nullius. He has stated that the Aborigines managed all of the landscape therefore none of it (other than the uninhabited Lord Howe Island) was wilderness at the time of European settlement. In a recent article in the Sydney Morning Herald about the Wollemi National Park wilderness west of Sydney, Flannery was quoted as stating that Aboriginal people ought to be allowed to hunt in the area using four-wheel drives and guns because they originally managed these areas.

Over thousands of years Aboriginal people would have traversed every part of Australia but it is doubtful they intensively fire-stick managed all of it as was suggested in the 1950s and 1960s by anthropologists such as Tindale and Rhys Jones. Aboriginal numbers were limited (300,000–1,000,000 for the continent) and they concentrated mostly where Europeans now live or farm – on higher nutrient soils that produce more game and edible plant life. I agree that Aborigines may have regularly patch-burnt some grassy woodlands, grasslands, areas around camps and access routes. However, shrubby places such as Wollemi National Park are so low in nutrients it is doubtful that many Aborigines could have survived there other than for short visits, let alone intensively managed the whole 500,000 ha area. The recently discovered art sites in Wollemi may confirm the area was visited for certain purposes.

The biology of species reveals more about how places may have been burnt either by Aborigines or by natural fires. Many reserved lands in south-eastern Australia contain groups of plant species that are intolerant of being burnt every few years. Some vegetation types such as rainforest or saltbush cannot survive frequent fire at all and may become locally extinct. It is unlikely that Aboriginal people would have burnt too frequently if it affected food resources in rainforest or wetter forests. However, they may have regularly patch-burnt grassland areas to stimulate native yams that were a staple diet in south-eastern Australia. The point is that different types of vegetation were probably burnt differently by the Aborigines. However, it beggars belief that such small numbers of people could have burnt the whole country all of the time as is suggested by some popular writers.

The national conservation reserve system and wilderness areas are the prime means of ensuring the survival of species simply because it is unlikely they will be grossly changed by humans. This contrasts with bushland on private land that is being cleared or over-grazed and some state forests that are being felled at unsustainable rates. At least our national parks are being professionally managed, albeit on limited budgets, by well-trained people who are dedicated to maintaining biodiversity. To downplay the importance of the national reserve system is foolhardy, yet this is what Flannery does in Beautiful Lies. However, most biologists (me included) agree with Flannery's call to improve the sustainable management of the ecosystems across rural landscapes as this is the matrix between the conservation reserves. This (mainly private) land is vital to the long-term survival of numerous species and to future agricultural production. For these reasons a number of scientific colleagues and myself have been calling for a cessation of broadscale land clearing for over a decade now and have endeavoured to persuade governments to help farmers rehabilitate over-cleared regions! In that decade about six million hectares of bushland in Queensland and between 500,000 ha and 1 million hectares of bushland in New South Wales have been cleared. The next year or so will see if the politicians are serious about stopping this onslaught. Most of the public certainly want it stopped.

After the ABC radio debate on Beautiful Lies Tim Flannery lent over to me in the studio and said "I guess I should do better checks on my facts." I agreed. Tim Flannery does himself a disservice by not doing so. He has a gift for writing and raises some important issues. However, he sometimes covers topics in which he lacks expertise and is therefore prone to make erroneous statements. These have been used by some as justification to destroy more land and wildlife habitat. Without losing his enthusiasm for environmental issues, Tim Flannery should check details more thoroughly when he pens articles for popular consumption.

John Benson

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Acknowledgements

I thank Phil Redpath for commenting on the text. The views expressed in this article are my own and are not necessarily those of the New South Wales government.

John Benson is a Senior Plant Ecologist at the Botanic Gardens Trust, Sydney. He has published over 100 papers and reports on vegetation, environmental policy, threatened species and landscape management. He helped to establish the reserve system in New South Wales, was involved in formulating threatened species programs, has studied rural ecosystems and more recently has been influential in bringing about natural resource reforms in New South Wales.

Attachment D

HUMANE SOCIETY INTERNATIONAL

Friday 29th June, 2012

Horse Riding Review
Office of Environment and Heritage NSW
P O Box A290
SYDNEY NSW 1232
online: http://www.environment.nsw.gov.au/policies/drafthrsridstrat.htm
email: horse.riding@environment.nsw.gov.au

Dear Sir/Madam,

Re: Draft strategic directions for horse riding in NSW national parks and reserves

Humane Society International, the Colong Foundation for Wilderness, The Wilderness Society, Sutherland Shire Environment Centre and Total Environment Centre (the Groups) are opposed to the initiatives proposed in the draft strategic directions for horse riding in NSW national parks and reserves. These initiatives will result in environmental degradation of areas specifically set aside for conservation. The 3000 kilometres of trails currently available to horse riders is already causing damage to the park estate.

The Groups are opposed to any horse riding access through wilderness areas and all existing routes on easements through wilderness, including the Bicentennial National Trail, also should be closed to riders. The integrity of the NSW wilderness estate must be restored, not further compromised by further rounds of access deals for user groups.

Wilderness describes a specific approach to conservation land management, with the governing intent being to minimize disturbance of an area. The management principles of the *Wilderness Act* specify:

'A wilderness area shall be managed so as:

a) to restore (if applicable) and to protect the unmodified state of the area and its plants and animal communities;
b) to preserve the capacity of the area to evolve in the absence of significant human interference; and
c) to permit opportunities for solitude and appropriate self-reliant recreation.'

To quote a National Parks and Wildlife Service (NPWS) position paper of 1999 on the Bicentennial National Trail (BNT): 'The Service considers horse riding is incompatible with principles a) and b) and does not fulfil the definition of 'appropriate self-reliant recreation'. Horse riding is not regarded as self-reliant because the means of travel is not powered by the person and is regarded as inappropriate because it is not undertaken with any formal wilderness areas in Australia and the impacts generally degrade wilderness areas.'

In May 1988, the Executive Officer of the BNT made a written commitment to the Colong Foundation for Wilderness that the route was determined to ensure that the BNT did not '*encroach on any existing or future Wilderness Areas*.' Despite this undertaking, when the Trail was opened, the Washpool, Guy Fawkes, Macleay Gorges, Werrikimbe, Curracabundi, Murruin and Tabletop wilderness areas were bisected, compromising wilderness values. These wilderness compromises permit continued use for recreation activities, including horse riding, that would otherwise be unacceptable and terminated under wilderness management.

The Australian Horse Alliance now cynically argues that the Bicentennial Trail 'shows that the impact of horse riding on wilderness is light' (SMH 18 June, 2012). Contrary to this assertion, the excision of the Trail from declared wilderness causes a very significant compromise of the integrity of the NSW wilderness estate.

And despite this major concession, the Alliance has remained dissatisfied. It now seeks broad-acre access to all wilderness areas. Unlike vehicles, horses can go just about anywhere, so that the severe environmental impacts arising from horse riding can cover wide areas if such access were granted.

Horse riding impacts are so severe that horse riding should be banned first and foremost in accordance with the *Wilderness Act* from all wilderness areas, and secondly, from national parks and other areas where nature conservation is the primary objective. It is not just a matter of few enthusiasts. Usage figures indicate a growing number of commercial operations and these activities are not appropriate for protected natural areas.

The NPWS 1997 position paper on horse riding in wilderness states that 'Horse riding is one such activity that is incompatible with the protection and management of wilderness values, and therefore is excluded from these areas.' … 'From experience throughout NSW, elsewhere in Australia, and overseas some of the principal environmental impacts of horse riding can be summarised as follows:

- destruction of vegetation caused by horses trampling plants through wandering off trails or widening existing trails;
- accelerated erosion of tracks, especially on highly erodible soils, through loosening and breaking up the trail surface by horses' hooves leaving an unstable surface that may be readily removed by water during the next rain;
- sedimentation due to accelerated trail erosion, causing siltation of water courses, impeding the flow of water, adversely effecting aquatic flora and fauna, and encouraging weed growth;
- altered watercourse patterns where a proliferating track network may impose an altered or entirely new drainage pattern on the natural system and interrupt water flow, which can effect downslope vegetation communities significantly;
- increased rates/risks of weed introduction and spread;

- greater access via track proliferation, the number of unauthorized horse trails is often greatest near a park's boundary and these provide for other damaging activities, such as motor bike riding, bicycle riding, and rubbish dumping;
- water pollution from horse manure which finds its way into water systems and greatly increases the level of nutrient, bacterial and viral input causing potential health hazards; and
- disturbance of native fauna by the noise of horses and riders, the disturbance of vegetation, and the fragmentation of habitat.'

For all these reasons the Groups are strongly opposed to pro-access working groups pressuring for horse riding access in parks and reserves. The nature conservation purpose of national parks and wilderness areas should not be lost through a process of further compromises and concessions arising from the three working groups established under the draft strategic directions document.

We appreciate that the OEH is carrying out the instructions it has received from the Coalition of NSW Horse Riders, via its outdated 2006 Memorandum of Understanding (MoU) with the NSW Liberal Party and the NSW Nationals.

This NSW Government has displayed a degree of unconcern with the administrative details of deregulation of environmental protection, even in national parks. The blunders in this policy area are accumulating, for example shooting in national parks. To allow a small horse riding lobby group to direct OEH to redefine wilderness out of existence based on the claims that horse riding is an appropriate '*self-reliant*' activity for reserve areas is another unfortunate policy error.

In this matter, however, there are no significant political motives to excuse this bad strategic direction. The Groups request that the trial of horse riding in wilderness be set aside as wrong in law and wrong for reserve management.

The Groups support the National Parks Association's views on self-reliant activities regarding visitor use in protected areas. Such activities are those that require minimal support and are pursued with high regard for causing minimal impact on the environment. The NPA considers that self-reliance relates not only to the equipment used but also to the conduct of activities. A minimal impact code of conduct should be followed for all activities in national parks. Only self-reliant activities should be permitted in wilderness areas.

Self-reliant at the very least:

- does not require infrastructure (man-made modification of the landscape);
- does not have an adverse environmental impact;
- does not require a motor or mechanical aid;
- does not involve large groups of people; and
- does not include use of an animal.

Some examples activities that are not self-reliant are:

- motor bike riding;
- bicycle riding;
- horse riding;
- fixed infrastructure for camping;

- recreational hunting; and
- large groups of bushwalkers.

The expansion of horse riding use in national parks and nature reserves would make it logically difficult for OEH to refuse a range of similar animal-assisted transport uses within protected areas. Other modes of animal-assisted transport including the use of beasts of burden such as asses, mules, donkeys, goats, dogs, buffalo, oxen, camels and even elephants will seek permission if this draft strategic direction is approved. In 1991 llama treks were even proposed for Kosciuszko National Park but the proposal was then suspended due to internal debate within the NPWS.

The approval of further horse riding, which is being presented as traditional and a heritage issue, will actually lead to a proliferation of non-traditional and damaging uses. National parks, reserves and even wilderness areas could be at risk of becoming a Disney Land. The protected area estate will never be able to cope with the increased diversity of uses. Concessions for horse riders, mountain bike riders, resort owners and shooters must surely make other additional concessions easier to negotiate.

If approved, the draft strategic direction for horse riding could see use of horse drawn carriages in parks on management roads. Mineral earth park roads are generally unsuitable for carriages drawn by beasts of burden, including horses. Carriages will no doubt become bogged, stuck on narrow sections of road and topple off steep tracks unsuited for horse drawn traffic. The draft strategic direction needs to state explicitly that park management roads are unsuitable for horse drawn carriages.

The management intent to limit use to park management roads will only cause increased dissent amongst park visitors. Horse riders will not remain on roads, but use walking tracks, park beaches, camping sites favoured by other users, even picnic areas. Instead of diverting these high impact users to other public lands, including state forests, the draft strategic direction is a formula for future conflict and increased disputes over park management.

The Groups call on the OEH to ban horse riding in all national parks and reserves, including wilderness areas. Such a ban would not greatly affect horse riding recreation, as access through 90 per cent of NSW would remain available to riders.

There are countless peaceful rural roads, forest roads and stock routes that provide riders with endless recreational opportunities. Horse riders, regardless of their background, are mainly interested in the horse and riding, rather than with the preservation of the natural environment.

The BNT has never been, but should be, subjected to public exhibition, comment and review

In 1994, Milo Dunphy wrote that ‘the horse riders’ Bicentennial Trail is the summit of disregard for the statutory management of the NSW park system. Management plans result from an extensive two stage public consultation process which often involves thousands of submissions. But the Bicentennial Trail organisers located

their trail through a number of parks and, with a few private meetings with NPWS, published it widely.'

The situation today regarding the Bicentennial Trail in parks remains substantially the same as it was in 1988. There has been no exhibition of the route of the trail by the NPWS for public comment. At least seven declared wilderness areas have been restricted and fragmented to accommodate the Trail.

Substantial public comment and review on this controversial Trail is required. Some wilderness proposals were subject to four rounds of public comment and review. A horse riding trail bisecting the state should be subject to at least one round of public comment.

The most recently declared Curracabundi Wilderness provided an easement for BNT that bisected the declared area. Three highly significant but declining Brush-tailed rock-wallaby populations are located where the Trail traverses the Curracabundi National Park. Pet dogs often accompanying their horse riding owners on journeys along the BNT would be able to harass these threatened wildlife populations. Neighbours have informed OEH staff that BNT users have brought dogs along the BNT within their property and OEH has no reason to doubt this claim.

The horse riding lobby could also seed the new Curracabundi Wilderness with a feral horse population, as it has in Kosciuszko National Park. Horse lovers using the BNT like to see the wilderness well stocked with this pest. Any new feral horse outbreaks in the area would need to be vigorously suppressed. The Guy Fawkes feral horse imbroglio need not be repeated here and the best means to prevent this potential and significant, adverse impact is to keep the BNT closed.

St John's Wort, *Hypericum perforatum*, is both an environmental and agricultural weed. It competes with indigenous plants, particularly understorey species in open woodlands (CRC 2008). Sites of infestation in reserves include stockyards along the Curricabark River BNT route within the Curracabundi Wilderness. A neighbouring farmer claimed that he was still trying to eradicate St John's Wort which had been introduced to his property in this region 15 years ago by horses training for an event.

It is certain that the re-opening of this route will spread St John's Wort along the Trail route and onto neighbouring farms.

Public interest in wilderness versus horse riding

In 1992, 1600 submissions were received on the Kanangra-Boyd Wilderness Assessment Report that was on display for six months. Of the 1600 submissions, just 7 supported the continuation of horse riding within the identified wilderness.

In 2010, 38 submissions were received on the Curracabundi Wilderness Assessment Report that was on display for a month. Of these, 34 submissions called for the BNT to remain closed, while 4 requested that it be re-opened. Notwithstanding the fact that the Trail is currently closed due to the wishes of local land owners, the OEH is now committed to re-opening the Trail that passes three Brush-tailed rock wallaby colonies.

There is far more interest in retaining the integrity of wilderness, and there are few who will benefit by destroying the wilderness idea. Yet this NSW Government seems to ignore these statistics and is intent of redefining wilderness for a minority interest that has already been granted very many concessions in its favour that are detrimental to the wilderness estate.

Inversion of the precautionary principle

Release of the draft strategic direction for horse riding in NSW national parks and reserves will shift the onus of proof regarding environmental impacts from the proponents of horse riding to the defendants of national parks, reserves and wilderness areas.

The OEH strategic direction is required to apply the precautionary principle to horse riding in its national parks and reserves, as part of its application of the principles of ecologically sustainable development as defined in the *National Parks and Wildlife Act, 1974*.

In 2009 the Chief Judge of the Land and Environment Court, Brain Preston explained that the precautionary principle would be triggered when "there is a threat of serious or irreversible environmental damage and there is the requisite degree of scientific uncertainty." In this situation "a decision-maker must assume that the threat of serious environmental damage is no longer uncertain but a reality. The burden of showing that this threat does not in fact exist or is negligible, effectively reverts to the proponent of the project." The OEH is wrong to reverse this duty care as the proponents have not adequately proven that horse riding is a negligible threat to national parks, reserves and wilderness areas.

The Colong Foundation was recently informed that the OEH had received scientific evidence from the horse riding lobby (see http://www.australianhorsealliance.asn.au/) regarding the impact of horse riding in national parks. This information is insufficient for the OEH to conclude that a serious threat to the environment does not exist. The horse riding proponents haven't discharged the burden of proof against the proposed activity. The misapplication of adaptive management techniques through the strategic directions initiative would in no way release the proponents from their responsibilities under the precautionary principle.

The list of environmental impacts caused by horse riding as specified by the former NPWS is not adequately addressed by the scientific evidence provided by horse riding proponents. Further, the annihilation of the wilderness idea by legislation or administrative device is a further serious threat to the environment.

Horse-riding is an important risk factor in weed dispersion

Horse riding in national parks and wilderness areas would increase dispersion of weeds in national parks, reserves and wilderness areas.

Horses that are ridden for pleasure are often given access to a diverse range of feed sources. These sources include pastures that contain weed species eaten by horses and also dried stock feeds which also often contain weed seeds as well (Landsberg et al. 2001).

Weed seeds can survive passage through a horse and for some species it is a substantial proportion of the number of weeds ingested (St John-Sweeting and Morris 1991, Taylor 1995, Cosyns and Hoffman 2005). These weed seeds may be excreted several days after ingestion with a peak at 3 to 5 days (St John-Sweeting and Morris 1991). One study found that horses can excrete more than 1000 viable seeds a day (Taylor 1995) and another found almost 400 seeds per litre of dung (Cossyns and Hoffman 2005). Results from 11 international studies show that seed from at least 216 species are viable after passing through horses, and 45 of these species are serious environmental weeds (Pickering et al. 2010).

The Australian Horse Alliance does not dispute these facts but rather argues that there are lots of other problems, so horse riding impacts don't count (see (http://www.australianhorsealliance.asn.au/environmental_fact_sheet.htm). This defeatist position probably arises from self-interest and fails to acknowledge that many national parks and wilderness areas are relatively free of weeds. For a national park, nature reserve, wilderness or state conservation area, any introduction of a new weed species to an area currently free of that weed must surely be a significant environmental impact.

Horses will even accidentally ingest the seeds of unpalatable weeds. In *Noxious Weeds of Australia*, Parsons and Cuthbertson (2001) note of ragwort: 'Animals do not usually eat ragwort heads when in seed but this can happen accidentally when stock are fed contaminated hay. In such cases, seedlings have been observed growing from horse dung...'

Weed seeds can also be introduced attached to the horse (especially the tail) or horse gear (Liddle and Elgar 1984). Noogoora burr (*Xanthium occidentale*), for example, has been observed to be carried in horse hair 16 days after exposure to a marked paddock.

An adult horse is not only a serious weed vector, it is also a virtual mobile fertiliser plant, depositing 17-26 kilograms of dung and 5-7 litres of urine a day (Matsui et al. 2003, cited in Pickering et al. 2010). Richard Smallwood of the Australian Horse Alliance's claim of 'minimal, minimal' environmental impact (*SMH*, 18 June 2012) is contradicted by the daily amount of equine waste, which is very large relative to that of other weed vectors.

Horse manure and urine provides nutrients, moisture and protection for seed germination as well as the addition of nutrients to soils and waters, so that the environment ends up favouring weed establishment, particularly in infertile environments (Landsberg et al. 2001; Pickering et al. 2010). Horse manure can also insulate weed seedlings from frost and protect them from physical damage.

Weed seeds dropped from horses may survive several years in the soil until conditions suit their establishment (Campbell and Gibson 2001; Torn et al. 2010) and may be dispersed into new areas by water flow, erosion or animals.

Horses damage vegetation, create bare patches and cause soil disturbance, which opens up space for weeds, increases solar radiation and increases the availability of nutrients (Phillips

and Newsome 2001, Quinn et al. 2010). Soil disturbance is a major contributor to weed invasion, and horse hoofs are far more damaging than boots.

Horse riding in wilderness area will promote the rapid dispersion of the invisible killer, *Phytophthora cinnamomi*, as well as other pathogens, weeds and erosion. Horse riding should be considered to be an important risk factor for weed invasion, especially in wilderness areas where other vectors for this pathogen are less prevalent, for example vehicle tyres.

Past surveys of horse damage to NSW parks

In 1997 a NPWS survey found horse riding to be a high impact recreational activity (Conroy, B. and Harden B.). At that time the NPWS noted that:

- 59 parks were subject to horse riding, and it was reported as a cause for concern in nine parks; horse riding caused severe impacts in a further seven and was a significant conservation issue for another eight; while 21 parks were subject to commercial horse riding operations;
- Over 70 per cent of parks used by horse riders suffered damage to vehicle tracks and native vegetation;
- Walking tracks, camp sites and stream banks were also damaged; and
- Weeds were spread and streams polluted by horse riding within parks.

Today, many park rangers are disappointed at the failure of political leadership to stand up for NSW national parks and reserves, and oppose further horse riding access that will degrade these precious areas. The Groups support the common sense understanding that horse riding causes significant environmental impacts to the last remnants of the natural environment protected in our national parks and reserves.

Studies and observations confirm that horse riding causes significant soil loss and vegetation damage in park areas. In Ku-ring-gai National Park for example, horse riding caused a metre deep erosion channel on the Sandy Kooyong horse trail in only five years of use. Similar excavations are found in Garigal National Park. These impacts arise because the average horse weight is seven times the average walker and being steel shod, hooves cause much greater damage to tracks than the feet of walkers.

Peter Jacobs' Alpine Planning Project Report states that 'A horse, with its rider and saddle, weights on average, over 500 kilograms - over seven times heavier than the average pedestrian. Horses are steel shod and their weight comes down on a relatively small impact area.' When a horse trots, canters or gallops its impact on the ground is increased.

Horses have greater physical impacts on trails than either humans or native mammals. They are large, heavy animals, and their hooves (particularly when shod) have relatively small surface area. The maximum impact force of a horse's hoof when galloping on hard soil has been estimated at 8.89 kN (Frederick and Henderson 1970, cited by Liddle and Chitty 1981), which is more than 6 times

greater than the force of a human heel on flat ground (Harper, Warlow and Clarke 1961, cited by Liddle and Chitty 1981).

The Groups support the continued prohibition on horse riding in wilderness, which is the explicitly stated NPWS wilderness policy. This 2005 policy states that 'horse riding and other forms of animal transport will not be permitted in wilderness areas' (clause 3(d)).

Strategic adaptive management is a form of experimental mismanagement

The Office of Environment and Heritage is considering using an adaptive management framework to regulate horse riding in national parks, reserves and wilderness areas. Under this approach, once certain environmental impact thresholds are reached, certain management activities are initiated, such as restricting horse riding use. These thresholds would be things like erosion or weed invasion. The horse riding activities would then be permitted until this threshold is reached.

The Groups call this sort of strategic adaptive management, 'experimental mismanagement' because the risks of environmental degradation from horse riding are known, and whether an area can recover once degraded is unknown. For example, the attempted removal of a new weed in a wilderness valley is a high risk management action.

Again, the precautionary principle is being inverted, this time by placing the onus on park managers have to assess that a level of environmental damage is sufficient to justify taking management action. The Groups believe that the precautionary principle should be applied and horse riding prohibited, instead of undertaking experimental mismanagement.

The Strategic Adaptive Management (SAM) process is proposed by the OEH to assess recreational impacts. The SAM process will create unwarranted expectations in horse riders, that so far includes the visiting of wilderness and the redetermination of park management to allow more horse riding.

The Coalition of NSW Horse Riders, comprising the Australian Horse Alliance, Snowy Mountains Bush Users Group and the Snowy Mountains Horse Riders Associations are very keen on the SAM process. The Coalition wants SAM adopted for the preparation of all park management plans.

It is a process that lends itself to the conduct of subsequent management experiments to test the so-called appropriateness of management outcomes, such as the trial of horse riding in wilderness areas.

The SAM process is actually a diversion, as horse riding in national parks is actually regulated through the Coalition of NSW Horse Riders' 2006 MoU with the NSW Government. As a result, the intent of SAM will be more horse riding access, regardless of damage to the natural environment, until such a time as 'scientific

based and appropriate evidence shows that there will be serious and irreversible detrimental impacts' (MoU, cl 3, pg 2).

This provision undermines the primary nature conservation purpose of parks and reserves. Through SAM, the public interest in the conservation of native flora and fauna and of wild lands becomes subjugated by horse riding interests. The SAM will be just a fancy way to dress up the out of date political deal stitched up by the Coalition of NSW Horse Riders.

There is also no need to develop regional access consultative forums for horse riders, or to broaden horse rider representation on regional advisory committees as proposed by the draft Strategy. Such moves will only distort park management toward misuse, against the primary purpose of the park, nature conservation.

The bias of the horse riders is revealed by the responses of horse riders to park management plans. Nearly all believe that the risks to flora and fauna, soil, catchments, water conservation of increased horse riding use are insignificant and overstated.

Those adversely affected by increased horse rider access, the conservationists, take a much more precautionary view of the risks posed by the proposed activities of horse riders.

Experimentation, called adaptive management, may overcome the lack of site-specific information by a series of horse riding trials that will measure the impacts for various levels of access. From an objective, scientific viewpoint it would better to have a significant increase in horse riding use so that the impacts can be more easily measured. Such experiments, however, would unnecessarily damage the ecological integrity of the national parks and wilderness areas.

The political problem of getting unsuitable users out of parks and reserves is not well addressed by the proposed trial management approach. In other words, Strategic Adaptive Management is a politically inept and probably a non-reversible experiment involving most of the National Park estate in the mismanagement of horse riding.

The retention of shacks in Royal National Park and the ski resorts are examples of non-reversible mismanagement. The proposals for horse riding in the draft Strategy, while promising adaptation, will if adopted by the NSW Government, only open up the national park estate to degradation. The promised adaptation of horse riding use to mitigate environmental degradation will always be resisted by horse riding interests.

The Groups consider that continued exclusion of horse riders is essential to protect the ecological integrity of national parks and wilderness areas.

Scientific monitoring of the wilderness trial

The claim by horse riding groups that they can prevent environmental impacts through regulation is not credible, and contrary to the existing scientific evidence and reserve management for other threatening activities.

The management approach of establishing thresholds for potential concern from environmental and social impacts that would then trigger management responses is not supported by the Groups. As previously stated, this approach would be contrary to the Precautionary Principle, and tolerates degradation.

The Groups do not support horse riding in wilderness, as a trial or other form of horse riding access in wilderness, national parks or nature reserves. The trial would be illegal under the *Wilderness Act, 1987.*

If the NSW Government instructs the OEH to conduct a horse riding trial in a wilderness, it is essential that adequate scientific monitoring records the environmental and social indicators before any horse riding occurs.

The science undertaken by OEH scientists Richard Kingsford and Michael Dunlop, and other scientists nominated by stakeholders should be independent and subject to peer review. If the trial does not generate good science, then the trial will tend to become a cynical justification exercise.

The monitoring of environmental impact must rely on adequate ecological baseline data collected over a sufficient period of time, as determined by the independent scientists appointed to oversee the wilderness trial.

Further, Wadbilliga National Park is mentioned in the draft strategic directions document as one of the possible sites for the horse riding trial in wilderness.

We have evidence that suggests that the horse riders may have illegally re-established a bridle trail into the Brogo Wilderness, possibly with assistance (see Attachment 1). The Groups request that the evidence of illegal wilderness clearing, innocently collected as a trip report by local bush walkers, be properly investigated as a matter of priority by OEH head office staff.

If the illegal clearing of declared wilderness inside the Wadbilliga National Park was by horse riders, and the Groups suspect that is the case, then the NSW Government has all the objective evidence it needs.

The NSW Government should rule out horse riding and tear up its MoU with the Coalition of NSW Horse Riders.

More wilderness declarations are needed

There is only about five per cent of NSW left in a wilderness condition. We have altered 95 per cent of NSW so that it is no longer restorable to a wilderness condition. To have a balance of land use, the NSW Government needs to protect ALL wilderness capable of restoration and effectively manage wilderness.

Restarting a wilderness declaration program in NSW is warranted because the wilderness estate has enjoyed limited progress for the last seven years, with only about 206,000 hectares being declared. The national park estate, meanwhile, has grown to 7 million hectares or nine per cent of NSW.

The Office of Environment and Heritage has only reserved about 2.5 per cent of the 4 per cent of NSW that the Wilderness Working Group identified was in a wilderness condition in 1985. Since 1985, however, the known wilderness estate has increased with the identification of new areas such as Curracabundi, Donneybrook West, Mummel Gulf, Chaelundi, Cataract, Cathedral Rock, Bald Rock. It is also of concern that about one third of the identified wilderness is not formally protected under the *Wilderness Act, 1987*.

To ensure the ecological integrity and resilience of core reserve areas, the NSW Government and the executive of OEH should re-prioritise wilderness protection and management, and refocus on nature-based national park and reserve management.

Interconnected conservation programs are demonstrated in many places along the Great Escarpment were the wilderness areas are linked together as a series of stepping stones amongst a network of other protected areas. The Curracabundi, Mummel Gulf and Werrikimbe wilderness areas are one example of an increasingly integrated conservation program.

To open up these wilderness areas, nature reserves and national parks to horse riding will expose the core reserve areas to environmental degradation. Along with shooting in national parks and reserves, horse riding will help to defeat the entire apparatus of nature-focused land conservation management established for NSW protected areas.

The Draft Strategic Directions for horse riding in NSW national parks and reserves is the wrong direction for nature conservation in NSW.

Thank you for the opportunity to comment of this draft strategy.

Yours faithfully,

Keith Muir
for the Groups

Please forward correspondence on this submission to:
The Colong Foundation for Wilderness Ltd
Level 2, 322 Pitt St
SYDNEY NSW 2000

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Attachment 1/- Wadbilliga Wilderness – possible illegal clearing by horse riders of a bridle track in one of the proposed trial sites.

Wadbilliga National Park: **A bushwalk over the ANZAC Day Long Weekend 24-26 April 2010**

Party: Dan Clark, Gabe Nelson and Sarah Truscott

Route: refer to attached map

Day One: Bega Swamp – Yankee Creek

Dan heading off into the scrub on the ridge, day one

Started off at 9.30am after leaving Dans truck just (GR723200, 5953300 – past bend in the road) and began by following what was presumably an old logging road for approximately 1 km before this petered out and we headed bush on a bearing. The ridge was quite tricky to navigate in parts as we headed towards the knoll at GR726000, 5952700 – made the mistake at one point of dropping off the top of the ridge line (which was of very low relief, but still worth remaining on, out of the head waters of the creeks falling away to either side – denser veg in these). The knoll signalled the beginning of our descent off the escarpment down towards Yankee Creek below.

Once we had found the descent ridge (after heading off a little too soon, we sidled round and got on the ridge proper), there was a very large amount of fallen timber ranging in age, which we weren't expecting and this slowed progress considerably to 1km/hour in most parts. It appeared that this ridge hadn't been burnt for 20+ years? It was quite physically draining by all accounts with all the under/over and around, Gabe being almost at breaking point (being the least experienced with off track walking)! By lunch at GR728175 (saddle between two knolls), we hadn't quite made the progress we were hoping for, with the constant up and downs along the successive knolls being slow going through the scrub and so at about 4pm (GR729650, 5952750), we decided that dropping straight down into Yankee Ck would be a better gamble than continuing to follow the ridge right down to the creek (which probably would have had us there after dark, in the shortening daylight hours).

The gamble paid off, and we were able to reach the ford of Yankee Creek at around 5pm and then camp on the old road (GR731300, 5954200) for the night (see photo to left). Lovely valley to camp in, moon on the rise and no one else to be seen! Not too much of an issue with the firewood collection either…

Breaking camp, next to Yankee Creek

Day Two: Yankee Ck – Brogo River

A relatively late start (everyone needing a sleep in and enjoying peace and quiet of being out in the bush) was had, and we followed the road down to Yankee Flat – wished we had had more time on the Saturday afternoon to reach this in the daylight as it is a beautiful location and would be well worth a return visit to camp. Left the road (after taking it to its dead end on top of the spur, then bashing down the side creek back to the main creek) and headed downstream, crossing backwards and forwards to miss most of the bends. Yankee Creek was very easy to cross in all places. As I was looking for the way ahead at one spot, Dan by chance looked up the slope a little to discover what appeared to be an old benched track, which seemed to be recently cleared and blazed, much to our surprise. Provided for easier walking in parts, but it was a bit disturbing just how much cutting of vegetation and clearing had occurred in many parts (see pictures at left).

Following a blazed route downstream on Yankee Creek (above) and the many fresh blazes in tress along the route (below)

Continuing downstream, we had a brief break (GR732250, 5959150) at a huge old myrtle (Dan reckons 'the biggest EVER!'), and decided to head up and over the ridge into Brogo River as the ridges around here seemed better going than what we had experienced the previous day. This proved correct, and we made good time up to the high point of (GR731750, 595995) for lunch. Found sections of blazed route again on the way up to this high point, which at first we thought may be an old bridle trail, but then suspected may have been as a result of remote area fire crews? Either way, LOTS of blazing, considered somewhat unnecessary…

We dropped down off the ridge to a fantastic vantage point over the Brogo pictured below left, (GR731750, 596400) after lunch and headed into a gully of loose scree to avoid the cliff line below this. After hitting the river, we headed about a kilometre upstream for an early camp on a sand bank at a bend in the river. Moon and star gazing was a very pleasant way to pass the evening. Only a passing shower disturbed us.

Day Three: Brogo River – Bega Swamp

As we headed up onto a low spur just across the creek from our small campsite on the sand bank, we stumbled across a large and unsightly campsite we hadn't seen the day before (GR731150, 596100) which had been cleared, blazed, trees cut down and burnt, rubbish left on the ground and hanging in the trees (see photos at right). We then followed the burnt ridge up 900m in elevation to the top and then came across the remote area fire crew's drop in point (a cleared helipad). This was the boundary for the recent fire which had cleared the path to this point, and we continued along the ridge through unburned but still quite open woodland. Up onto the escarpment and had lunch in a grassy clearing (GR724650, 5956750) in the sun which was welcome considering the cold wind and temperature. We continued on for Bega Swamp across the low lying ridge (making sure to stay out of the headwaters of the creeks this time! Although the scrub was not nearly as dense here) and made it back to the truck by 3.30pm. The last few kilometres skirting around Bega Swamp was following horse and cattle tracks, of which there was much evidence in the form of droppings.

A fun trip all in all. Great country to walk in!

Sarah Truscott
29 April 2010

Top: Dan in the campsite which had been heavily cleared, with trees cut down, rubbish left everywhere and tins, etc hanging in trees with washing lines.

Middle: cut trees in the camp on Brogo River

Bottom: The helipad which marked the end of the burnt section of the ridge