

National Parks Journal



- the secret lives of frogs
- Holsworthy: airport or national park
- NPA biodiversity survey

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FRONT COVER: Green Tree Frog. Photo: Ken Griffiths



The **National Parks Association of NSW Inc.** is a non-profit community organisation which seeks to protect and conserve the complete range and diversity of natural habitats, features and species as well as significant cultural items and landscapes within New South Wales.

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National Park and nature conservation values get a battering from a vocal section of the community.

Protesters against our precious reserve and wilderness areas apparently do not know—or do not want to know—how limited these areas are as a proportion of land used for settlement, agriculture and development.

The multiple use philosophy and its terminology of stewardship sounds so plausible—but stewardship must embrace not only land used for production but also care for reserved areas, and the unique plants and animals which still survive.

Governments have a mandate on behalf of the whole community to safeguard our shared inheritance. Even with recent additions, our reserve system is far from adequate.

Conservation has been consistently underfunded, even while natural areas remain a prominent theme in tourism.

User pays and regulation by use of economics are dangerous tools, dependent on converting those best things in life once thought to be free into tradeable private commodities.

Frogs, a focus of this edition, are fascinating. But the frog of mythology which leapt into a pot of water on the fire failed to perceive the fatal incremental change in its environment, took no evasive action, and perished as the temperature rose to boiling. A lesson for us all.

Anne Reeves
NPA President

The facts about off-road vehicles and National Parks

Recently a new political party was formed—the Four-Wheel Drive Party—aiming to secure greater vehicle access to National Parks. The following information explains why this aim should not be realised.

Wilderness in parks

A road map of NSW is like a network of blood vessels, a complex web of vehicular access into what only 208 years ago was absolute wilderness.

This wilderness has now been reduced to only 4% of its previous extent. The 1.2% of NSW which has been formally declared wilderness under *The Wilderness Act, 1987*, is mostly all within National Parks and Wildlife Service reserves, which occupy only 5% of NSW.

Almost unrestricted access

In addition to the official public access system (roads) within National Parks, there are almost always some unofficial vehicle bush tracks.

The NPWS does allow the exclusive use of some of these by four wheel drives in some National Parks, against NPA policy, but not within that 1.2% of NSW which is the wilderness within those parks.

Yet the vehicle lobby wants access even to these.

Why no vehicles on park tracks?

National Parks are internationally recognised as special areas set aside for nature conservation and passive, low-impact recreation.

The NPA believes that allowing vehicle access to unformed bush tracks would not serve these aims.

More than minimal vehicle access to parks would diminish both the natural and passive recreation values of the reserve environment.

In addition to environmental concerns the NPA also believes that there should be some places where people can escape from the widespread trappings of urban life, like vehicles.

Effects of vehicles on tracks

Repeated vehicle passage causes ruts in erosion-prone soils, compacts some soils and forms bogs in damp areas. Existing tracks become wider as drivers manoeuvre around obstacles.

Creeks and streams become muddied as silt is stirred up by crossing vehicles, and areas downstream become turbid, affecting aquatic life. Fords break down creek banks, leading to erosion and siltation.

Tyres of vehicles carry weed seeds and may introduce the notorious root rot fungus *Phytophthora cinnamomi*.

Relatively unformed and difficult to access tracks become easier driving after the passage of several vehicles. A more well-defined track with vegetation pushed back encourages greater vehicle use with consequent greater impact. Formed tracks also provide easier access for feral animals.

Even the most responsible and careful drivers of off-road vehicles cannot avoid the marked physical and biological impacts of their vehicles' passage.

Unfortunately, there is also an irresponsible minority who drive carelessly and may even leave the road, and vandals who damage vegetation with winches and chainsaws, or who litter the bush and start bush fires.

Vehicle advocates claim the 'right' to enjoy nature in their own way, but there is already little restriction on vehicular access in NSW. One can enjoy all types of scenery from the road, visit all types of environment, reach all kinds of recreation grounds.

If there is a need to go still further or deeper, NPA believes that's what feet are for.

Environment News

Western woodlands need more protection

In 1992 the National Parks Association produced 'Nature Conservation in Western NSW' as part of its campaign to see western forests and woodlands protected.

New RAOU publication

Now a publication by the Royal Australian Ornithologists Union entitled *Conserving Woodland Birds in the Wheat and Sheep Belts of Southern Australia* points out that temperate woodlands are the most threatened type of wooded ecosystem in Australia.

While they once covered 10% of land in eastern and south-western mainland Australia, more than 80% of that land has since been cleared.

The remaining temperate woodlands contain a very high number of threatened plant and animals species, and serve as important refugia.

Firewood impact almost as great as woodchipping

One of the most worrying aspects of the report is the extent of the impact of logging and firewood collection. Did you know that while woodchips consume 6.4 million tonnes of wood per year, firewood production consumes 6.1 million tonnes? Most of this is from woodlands and box-ironbark forests.

**Brian Everingham
Reserves Committee**

Nature Conservation in Western NSW is available from the NPA State Council Office for \$20.00 plus \$5.00 postage. □

Irongates battle continues

The long-running conservation battle over 100 hectares of land on the banks of the Evans River has been rekindled with the decision to begin construction of the 600 home housing subdivision planned for the site, the biggest building project on the North Coast.

Bulldozing of roads through wetlands sparked previous protests and in the more recent blockades aboriginal people pointed to destruction of sacred sites. The land is a wildlife corridor between Broadwater and Bundjalung National Parks, and contains koala habitat, wetlands and rainforest.

The NSW Government says it cannot stop the development because consent was given before it was elected and the Federal Government has declined to intervene. □

Marshes to get more water

The NPA has welcomed the new Water Management Plan for the Macquarie Marshes (see NPWS News) which will raise average annual water flows to the marshes by 50,000 ML to 450,000 ML. Under natural conditions the marshes would receive around 525,000 ML.

Water releases for wildlife purposes will be linked to rainfall in the catchment to mimic natural flows, but it is not the intention to re-create the flows which were experienced before construction of the Burrendong Dam.

The Plan also removes a 300 metre buffer zone which surrounds the nature reserve and prohibited zone, and cotton farming in the former buffer will be allowed, but subject to Environmental Impact Assessment. □

Cotton proposal for Coopers Creek

A cotton irrigation development at Currareva in the Channel Country has been proposed by a Macquarie Marshes based partnership.

Coopers Creek is a major watercourse in the vast inland Lake Eyre catchment, subject to extremes of drought, duststorms and flood. A tiny slice of the Cooper catchment affects far north western NSW. Irrigation developments have also been proposed on the Paroo and Bulloo systems, two other as yet unregulated water courses in western NSW.

A local survey found most respondents oppose the proposal.

The scientific contingent from the meeting opposes the proposal on ecological grounds. For more information, contact the NPA State Council office. □

New Rural Fires Act planned

New legislation controlling the operation of the state's fire services has been foreshadowed.

The Premier Bob Carr gave notice of the changes at the end of August, saying that the new Act and name for fire brigades—Rural Fire Service—would recognise the breadth of tasks carried out by volunteer fire brigades.

While control of volunteer fire fighters will remain with local councils, the new legislation will include the review of and amelioration of fire hazards on all classes of land, and land use and environmental issues. Extensive consultation is expected before the legislation is introduced.

NPA will urge consideration of conservation concerns during the consultation period. □

80% of phone poll want forests protected and 16,000 submissions support the Forest Reserve Plan

The results of a Newspoll opinion poll released in September show that 79% of the 350 respondents want logging stopped in those NSW forests likely to be needed for a forest reserve system. The result was equally strong in country and metropolitan areas, the only significant difference being in response from younger people (18 to 34 years) who were almost 90% in favour of protecting the forests.

Opinion poll

The question asked by the survey was: *The NSW Government is about to make a major decision on the future of public forests including old growth and wilderness forests. The Government has already announced a \$120 million fund to help the timber industry adjust to change and a government inquiry has identified the forests most likely to be needed for an adequate national parks system. Do you think the Government should or should not protect these identified forests from logging?*

Almost eight in ten, 79% respondents, believed the forests should be protected. Only one in ten said the Government should not protect the forests, and 11% were uncommitted.

RACAC submissions

Some 16,000 submissions to the Resource and Conservation Assessment Council's Draft Interim Forestry Assessment Report were in favour of conservation, with most of these supporting the Forest Reserve Plan proposed by joint NSW environment groups.

Fewer than 6,000 of the total 22,000 submissions supported the timber industry.

Conservation even in controversial areas

Even in controversial areas like Eden the conservation submissions outnumbered industry supporters by more than two to one. On the far north coast, around Lismore and Murwillumbah, the ratio was four to one in favour of conservation.

Over 10,000 submissions were received in support of permanent protection of formally identified wilderness in the concurrent wilderness exhibition period.

Social impact questioned

A new study has refuted claims of social disaster from a conservation decision, saying that no more than 2.5% of any timber region's employment comes from the native forest industry.

With the \$120 million timber industry adjustment fund to provide alternative employment and compensation, social and economic impact is set to be minimal, says the author of the study, Dr Frank Vanclay, from Charles Sturt University.

Methodology politicised

The methodology of a previous study, which had pointed to a grim social scenario if logging quotas were cut, has been criticised by Dr Vanclay.

Information gathered from participants who attended regional workshops may have been overstated because of the politicisation of the issue, claims Dr Vanclay. And the consultants had confused social impacts caused by logging reductions with impacts from many other factors affecting rural towns.

Report welcomed

The latest report has been welcomed by conservationists as a reality check for the NSW government.

"The timber companies and unions are drumming up a scenario of social disaster so they can hang on to their old growth logging rights and snare as much as possible of the \$120 million of public funds on offer for restructuring and compensation, without accepting the conservation benefits which the funds were supposed to provide", said Mark Bletcher, a representative of NSW forest conservation groups. □

News from the NPWS



On August 16 the Premier, Bob Carr, announced the new *Macquarie Marshes Water Management Plan*, one of the first to cover the entire length of a river—some 700 kilometres for the Macquarie River. The new Plan is the product of two years work by the NPWS, EPA and Department of Land and Water Conservation.

The Macquarie Marshes is an area of more than 150,000 hectares of semi-permanent and ephemeral wetlands and includes the Ramsar listed Macquarie Marshes Nature Reserve of some 18,000 hectares.

The Macquarie River Valley is also an important agricultural region in NSW, producing a variety of agricultural products, such as cattle, cotton, wine, fruit and vegetables, and cereals. Some 100,000 people live along the river in the towns of Bathurst, Wellington, Dubbo, Narromine and Warren. Land use and agriculture have resulted in clearing and the decline of native vegetation and fauna. The Macquarie Valley is a prime example of the struggle between two systems—the natural environment and agricultural environment—competing for the same precious resource, water.

The new Plan establishes a Community Advisory and Audit Committee, which will monitor and audit the Plan. The Plan, which takes rainfall patterns, natural flow and river behaviour into account, will cater for both agriculture and nature, as well as providing safeguards against the overuse of water. There will be a cap on extraction of water above irrigation allocations when there are high flows, but with the possibility for irrigators to draw off excess water when it is available.

For more information, contact the NPWS on 9585 6692.

Anita Ray
Publications Coordinator

NPA Information

Heathcote park extension

Now that the Department of Mineral Resources has withdrawn its objections, the Crown lands west of the Princes Highway between Waterfall and Heathcote can be added to the Heathcote National Park—a long-standing NPA proposal. The National Parks and Wildlife Service is now referencing the area prior to its gazettal.

NPA's Southern Sydney Branch continues to lobby for the northern extension of the park through the Woronora Valley. □

Mining at Dharawal State Recreation Area?

Macarthur Branch is opposing plans for clay mining within the O'Hares Creek catchment adjacent to the new Dharawal State Recreation Area (proposed by the NPA as a Nature Reserve) and within Sydney Water Corporation's "special area" for catchment protection.

The Branch is concerned that the EIS has dealt inadequately with protection of adjoining land and endangered species.

Sydney Water has indicated that it will give its concurrence to the development. □

Central Coast Branch anniversary

Congratulations to Central Coast Branch of NPA, which is now ten years old.

Andrew Sourry has presented the Minister for the Environment with a set of proposals from the Branch for three new Nature Reserves and additions to National Parks in the region. Wambina Nature Reserve is a significant rainforest area in Matcham, part of the Branch's *Rainforest Study of the Gosford and Wyong Areas*; Ourimbah Creek/Palmgrove Nature Reserve is also part of the Rainforest Study and an area of high conservation value; and Strickland Nature Reserve, currently State Forest, but excluded from logging and classified as a Conservation Reserve by State Forests. □

Bitou Bush bash

The Mid North Coast Branch of NPA held its 17th Annual Bitou Bush Bash, at Diamond Head, with NPWS Weeds Officer, Mike Dodkin.

Originating in South Africa, Bitou Bush is one of the top six environmental weeds in Australia today, and is rife along the NSW coast.

Southern Sydney Branch is holding a Bitou Bush bash at Towra Point on Saturday October 19. See the Activities Program for details. □

Wedderburn koalas to be protected

Macarthur Branch of NPA has been advised that a Nature Reserve will be dedicated at Wedderburn, in south-west Sydney, later this year.

The Reserve will include land that was resumed from developers by the State Government to stop a housing subdivision adjacent to koala habitat. It is hoped that adjoining bushland currently owned by Council will also be included in the Nature Reserve.

Macarthur Branch was one of the first groups to draw attention to the koalas of Wedderburn. The nature reserve will be a fitting climax to the campaign. □

Olympic Nature Reserve in doubt

NPA has written to the State Minister for Environment, Pam Allan, seeking an assurance that the Silverwater Nature Reserve proposal, adjacent to the Olympic site at Homebush, will be established as promised by the Government prior to its election.

The documentation prepared by the Olympic Coordination Authority to select a successful tenderer for the Olympic Village does not preclude current or future urban development on land within the proposed Nature Reserve. □

NPA Tour of Goat Island and Sydney Harbour National Park Sunday December 15

Tour the old buildings and hear about the varied history of Goat Island. A special ferry (details on ticket) will leave Circular Quay at 10.50 am. \$15 per person (\$10 for children 12 and under). See Activities Program supplement for more details or contact Heather Roy on (02) 9918 9259.

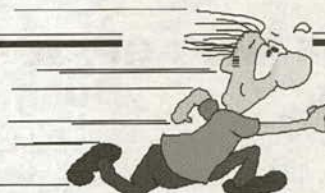
All branches and friends welcome.

NPA BUS TRIP to the historic village of Morpeth

Sunday 27 October

Join the NPA on a scenic drive and pleasant visit to Morpeth. See Activities supplement for details or call Pearl Gillott on 9798 5462.

Action Page



Information needed on Western Forests

NPA wants to hear from people with information about the environmental values of forests in Western NSW that are not already included in a National Park, Nature Reserve or NPWS reserve of some kind.

The NPA will compile a data base to assist conservation groups in the next stage of the RACAC (Resource and Conservation Assessment Council) negotiation process so that, together, we can ensure that the Government recognises the value of remnant vegetation in western NSW. Send information to Peter Innes, Biodiversity Committee, NPA State Council Office, PO Box A96, Sydney South, 2000. ■

Birds-of-Prey-watchers needed



The Royal Australian Ornithologists Union (RAOU) and the Australasian Raptor Association (ARA) will conduct their second nation-wide survey of the abundance and distribution of Australia's birds of prey—the 'BOP Watch' project.

The first survey was conducted before the release of the rabbit calicivirus. As rabbits are an important component in the diets of raptors, a decrease in rabbit numbers has implications for the raptor species—information is needed to determine just what these might be.

If you are interested in becoming a volunteer observer in the survey, or for more information, contact William Steele at the RAOU, 415 Riversdale Rd, East Hawthorn 3123, phone: (03) 9882 2622; fax: (03) 9882 2677, email: research.projects@raou.com.au ■

Contribute to the NPA Biodiversity Survey manual

NPA is about to begin producing a Biodiversity Survey Manual, a guide on how to organise and run a field survey like the popular NPA Biodiversity Surveys (see page 17).

The manual will assist other groups to run surveys that involve the community in collecting data and experiencing the environment first-hand.

If you have been involved in field surveys that use unskilled people to collect data and would like to share your experience and the lessons learned, please contact Claire Carlton on (02) 9560 4553; by fax on (02) 9233 4880 or by mail: National Parks Association, PO Box A96, Sydney South 2000. ■

Participate in heritage guide project

As part of its Heritage Guidelines Project the Australian Heritage Commission is inviting local communities, individuals and local government to help create a guide to recognising and caring for natural, historic and Indigenous heritage places.

If you know of existing guides, case studies of successful community-based heritage projects or have other suggestions to offer the authors of the guide, please contact the Commission's consultants, Context Pty Ltd, phone (03) 9380 6933; fax: (03) 9388 2496, PO Box 193, West Brunswick, 3055 or by email at context@peg.apc.org ■

Challenge Federal anti-environment stance: write now



On 3 July, Senator Warwick Parer, the Federal Minister for Resources and Energy, spoke at the CEDA's Gold Series Dinner in Melbourne.

"The Government believes that the way to sustainable development is through multiple and sequential land use policies. We will reverse the trend to single land use which has led to unbalanced and ill-considered decisions which have unnecessarily constrained access to areas for exploration and development".

"The Government accepts that there will always be some areas of exceptional environmental or cultural value or both that should not be subject to disturbance. But most areas are not like that".

"I know that industry has long been concerned at the implications for land access resulting from World Heritage listings. The Government has already undertaken that no further nominations of sites for the World Heritage List will be made without full consultation and cooperation of States and Territories".

"In relation to the establishment of forest reserves, our policy is that management will properly accommodate multiple and sequential land use principles. Our objective is to ensure that these areas remain open for exploration ... We will improve land access. We will accelerate micro-economic reform and remove unnecessary regulatory impediments".

Write urgently to Senator Hill, Minister for the Environment and John Howard, Prime Minister, Parliament House, Canberra, protesting this position. To contact Senator Parer personally phone Bob Baubino on 0419 438818. Lodge a protest with your local Federal member. Do not let this blatant anti-environment statement go unchallenged! ■

Write to Pam Allan

Write to the Minister for Environment, Pam Allan, to remind her of her pre-election promise to add a large area of Waste Service land to Georges River National Park.

Southern Sydney Branch reports that the promise now seems in doubt as some of the land has been leased out as a clay pigeon shooting range and the Waste Service plans to construct water quality devices in natural areas north of its depot.

And in Armidale, the Branch urges letters to the Minister to ask for the gazettal of the Severn River Nature Reserve additions. The land has been transferred to the National Parks and Wildlife Service, but not yet gazetted because of ongoing 'consultations' with the Department of Mineral Resources. The additions were agreed upon five years ago to replace land flooded by Pindari Dam.

Pam Allan can be contacted by writing to Parliament House, Sydney, 2000. ■

Become an NCC Bush Fire Rep

The Nature Conservation Council (NCC) needs conservation-minded representatives to be part of the state's Bush Fire Management Committees, which meet once every three months to review bush fire activities and the preparation of fuel management plans for NSW.

The NCC has a statutory right under *The Bush Fires Act, 1949*, to nominate representatives to the Committees.

Representatives are needed to promote ecological sustainability, biodiversity protection and public participation. NCC holds workshops to assist representatives.

Vacancies exist throughout the state, particularly in the Castlereagh, Western and Albury regions. If you're interested in being on a committee, talk to your local NPA Branch or ring the NCC on (02) 9247 4206 and speak to Lisa McDermott. ■



NSW Biodiversity Strategy: send in your submission

The new *Threatened Species Conservation Act*, enacted in 1995, requires the NSW Government to prepare a Biological Diversity Strategy. The Draft Strategy, prepared by the NPWS and the NSW Biological Diversity Advisory Council (BDAC), should be on public display between September 23 to November 4 (at the time of writing these dates are still subject to Cabinet approval).

The Strategy will outline a masterplan for Government and the community to protect and conserve biodiversity in NSW. It fulfils obligations under the National Strategy for the Conservation of Australia's Biological Diversity and the Biological Diversity Convention.

The Strategy will obviously cover a lot of ground. It will need a huge number of submissions to deal with this range of issues. BDAC will use the submissions to advise the Director of NPWS about changes to the Strategy.

Key issues will be the establishment of a biodiversity fund to enable the Strategy's implementation. Measures to protect freshwater and marine fish must also be included as they have been excluded from the Act.

The Strategy should be available for inspection at least from NPWS offices and the Nature Conservation Council. Check the NCC website as well. It may also be available from regional conservation centres and selected government department offices. Submissions should be made to the BDAC through the NPWS. Check with the NCC or Kim Brebach at the Threatened Species Network on (02) 92411438 for further details on the Strategy's availability.



Kim Brebach
Coordinator
Threatened Species
Network NSW ■

MEETING!! Join an NPA committee

The NPA Park Management Committee meets on the first Tuesday of each month at 6.00pm; the Reserves Committee on the second Tuesday at 6.00pm; the Marine Subcommittee on the second Tuesday at 5.00pm and the Biodiversity Committee by arrangement.

Next issue we begin a series of articles on what the committees do and how you can become involved. ■

Get involved in the NPA marine national park campaign

The NSW Government has already promised to create the first real marine national parks at Jervis Bay and the Solitary Islands, but community support is needed to ensure the promises are implemented.

In May 1996 the NPA, Australian Marine Conservation Society (NSW), dive agency PADI, Dive Australia, Scuba Diver magazine and a number of dive operators and clubs called on the Government to fulfil its pledge to establish a "comprehensive system of marine national parks".

The NPA is urging that at least 15% of the state's waters should be zoned as 'no take' areas by the year 2000, within a managed marine system. The fully protected areas should include a representative sample of all marine habitats, as well as special areas.

Contact Tim Anderson, NPA Marine Project Officer, for details on how you can be involved in the campaign. If you can distribute copies of the NPA brochure *Marine National Parks for NSW*, call Kristi McDonald at the State Council Office on (02) 9233 4660. ■



the secret lives of **FROGS**

by Ken Griffiths*



Giant Burrowing Frog. All photos: Ken Griffiths.

Those of us who live in Sydney and spend at least some time in our surrounding bushland don't need to be told of the diversity of flora and fauna on our door steps.

The frogs of this region, however, are rarely seen even by those of us who frequent National Parks like the Royal, Deua, Kanangra Boyd, Wollemi and Dharug.

But frogs have begun to get a little more attention recently, and with the aid of publications, tapes and lectures their secret lives are becoming more widely known.

Forty species in Sydney

Australia has about two hundred species of frog and about 40 species are found within the Greater Sydney Region. On a percentage basis this represents about 20% of Australia's frog

population, which highlights the importance of protecting their many natural and delicate habitats.

Ground and tree frogs

While Australia has four native families of frogs, most species belong to two families, the Myobatrachidae or Ground Frogs, and the Hylidae or Tree Frogs.

The other two families, Ranidae and Microhylidae, only have about a dozen or so species between them and they are restricted mainly to the far north of the continent, their numbers being much stronger in other parts of the world.

The Tree Frogs are readily distinguished from the Ground Frogs as they usually possess large feet with distinctive suction-like discs on the toes and fingers. Many also spend a good deal of their life above the ground in the foliage of tree branches.

The Ground Frogs have more slender digits, smaller disks, are terrestrial by nature and are usually less colourful than the Tree Frogs.

Nocturnal animals

Generally speaking, frogs are nocturnal animals. Their skin is moist and, unlike the protective scales of a reptile, loses moisture through evaporation.

Obviously, if a frog were to remain unprotected from the full strength of the sun and wind it could quickly dehydrate and die.

But some species deliberately bask in the sun and the Green & Golden Bell Frog and the Dwarf Tree Frog are two examples from within the Sydney region.

It may also be important for frogs to bask in occasional sunlight in order to maintain good health, however most species have naturally adopted a nocturnal life style.

Those species that do rest in the open during the day have developed some unique ways to reduce water loss.

By tucking their limbs tightly into their body they reduce surface area which in turn reduces evaporation. Changing to a lighter



Green and Golden Bell Frog



Red-eyed Tree Frog



Green and Golden Bell Frog

colour can also reduce the amount of absorbed radiation and some species are even able to waterproof their skin.

Mating call

In order to make it easier to find a mate, the male frog has a call. That familiar croaking sound we often hear at night is as distinctive to a frog as a face is to us.

The calls are sufficiently different so as not to attract females of a different species and so prevent hybridisation of closely related species.

Unlike a reptile, the male frog fertilises the eggs externally. When the female is attracted by the male's relentless calling he quickly attaches himself to her back and grasps her tightly with his forelimbs. In this position they are known to be in 'amplexus'.

They often get into amplexus some distance from where the eggs will be deposited so the female has to carry the male to a suitable site. Perhaps this is why females are larger than males in many species. As the female lays her eggs the male releases sperm onto them.

Incubating eggs

Throughout Australia there are several bizarre ways in which frogs incubate their eggs. Some species deposit their eggs into a chamber beneath rocks, logs or mulch in a damp environment and there they mature awaiting sufficient rain to flood the chamber thus allowing the tadpoles to swim free.

Another unusual species known as the Hip Pocket Frog actually incubates its eggs in specialised pouches on the male.

Another equally interesting species is the possibly extinct

Gastric Brooding Frog from Queensland which broods its young in its stomach.

Some species from the tropical rainforests lay their eggs beneath leaves of trees where they mature to tadpole stage when they are washed into streams by heavy rain.

Others never reach the ground, laying their eggs in pools of water trapped in plants high above the forest floor. There they mature into tadpoles and then into frogs without ever seeing a creek.

Common frogs

The most commonly seen frogs in the Sydney region belong to the Genus *Limnodynastes*, the Marsh and Banjo Frogs.

These frogs often inhabit our garden ponds and produce that frothy egg mass we see floating on the surface after a storm.

Unlike many of the uncommon and unusual species we have in Australia which rely on specialised habitats and adaptations where only small numbers of eggs are laid, the Marsh and Banjo frogs produce many hundreds of eggs in a single spawn.

Although these spawns often fall prey to natural and unnatural circumstances, enough always survive to continue the species.

Although different species will often breed at different times of the year, most share one common factor and that is the stimulation of rainfall. Those that live in our arid regions may have been imprisoned in a water tight membrane beneath the surface for a year or more.

When sufficient rain falls they make their way to the surface where the cycle of mating, laying eggs and tadpoles reaching frog stage has to take place before the pools evaporate.

Rain stimulation

Although many species spend their entire life around permanent water, they still require the stimulation of heavy rain to commence breeding.

Heavy storms and continued seasonal rain create temporary ponds and streams that allow many species to breed successfully.

Depositing spawn in pools and streams created by storms reduces the risk of being preyed upon by turtles, fish, eels and yabbies.

Habitat destruction and water pollution

There is no doubt that the biggest threat to wildlife is habitat destruction and pollution. It is important to protect and reclaim as much natural bushland as we can to preserve wildlife species.

Reptiles and frogs are no exception to the universal demise of species and in fact the frogs have a greater burden to bear in that most depend on water for an intermediate stage in their life.

So in addition to the commonly recognised problems such as feral animals, habitat degradation and destruction, frogs are also susceptible to water pollution. Sadly, creeks and rivers are used to dispose of many pollutants. Fortunately though, things are rapidly changing in that respect.

World wide decline

Frogs are on the decline world wide and although many theories are put forward, to date there has been no real solution to the problem. There is no doubt that changes to habitat and pollution are responsible in many circumstances but when species from pristine habitats begin to decline or disappear for no apparent reason there is a genuine cause for concern.



Perons Tree Frog



Tyless Tree Frog



Eastern Banjo Frog

Ozone layer and viruses

It is thought that increases in ultra violet rays due to the depletion to the ozone layer may be one cause and so too may a virus.

Although there is evidence of increased UV radiation and there have been viruses detected in frogs there is as yet no hard evidence that can pinpoint the exact problem.

Perhaps it is a combination of just two of the possible causes or maybe it is a combination of many—let's hope that the scientists working on this problem come up with some answers before it is too late for many species.

Threatened species in Sydney

Of the forty or so frogs found in the Greater Sydney Region the following six species are considered to be at risk:

The Wallum Froglet *Crinia tinnula*, The Giant Burrowing Frog *Heleioporus australiacus*, The Stuttering Frog *Mixophyes balbus*, The Red-crowned Frog *Pseudophryne australis*, The Green & Golden Bell Frog *Litoria aurea*, and the Green-thighed Frog *Litoria brevipalmata*.

These frogs are classified at risk either because their numbers have reduced dramatically over the years or because their habitat is under threat.

Olympic frog

Of late the Green and Golden Bell Frog has created a lot of attention with the colony in the Olympic site at Homebush Bay.

Their numbers have been reduced to a dozen or so isolated colonies within the Sydney Region but I can remember how common these frogs were during the sixties and seventies.

Changes to their habitat is a key factor in their decline, but the introduced Mosquito fish *Gambusia affinis*, which feeds on frog eggs and tadpoles, is also a possible culprit in the decline of this and other species.

Frogs are fascinating creatures, to learn about and to look at. Try the following hints when looking for frogs in your local environments.

looking for frogs



Striped Marsh Frog. Photo: Ken Griffiths

Frogs are secretive creatures and are not normally active by day. Of course a few tree frogs are diurnal to some degree but are still well concealed and a methodical approach to finding them is required.

By day most species are hidden beneath rocks, logs and in burrows, but some species rest on foliage and reeds and by careful observation and practice they can be found.

Do not disturb resting frogs as they lose their camouflage when they become active and easily fall prey to predators.

By far the best way to observe frogs is at night. All species are most active at night and are easily observed with good lighting. They can be found by honing in on their call or opportunistically.

Triangulation method

A reliable method for locating a frog is the triangulation method. At least three people form a circle around where they think the call is coming from. When the frog begins calling (this may take anything from a minute to much longer) they point their lights at the sound and where the beams cross is about where the frog should be.

When and where to look

The best places to look are along creeks and around the edges of swamps and lagoons. Warm damp nights during Spring and Summer are the best times to look for frogs.

Of course the very best nights are the ones you wouldn't send your dog out in, let alone wander around a muddy swamp in torrential rain yourself, however it all seems worthwhile when you come across a pair of Red-eyed Tree Frogs having fun in a pond.

Word of warning

Spotlighting for frogs is good fun because you see a whole host of other animals and insects that you would not normally encounter. Just a word of warning though, some venomous snakes and dangerous spiders are active by night and as frogs live in a wet or damp environment it makes the terrain slippery and potentially dangerous. There is also a chance of becoming disorientated in the dark and getting lost. It is always best to become familiar with the areas where you are going to spot in the daylight.

Happy frogging!
Ken Griffiths



photo gallery

Kanangra Creek Valley
Kanangra Boyd National Park, NSW
Photo: Rob Jung
April 1996

HOLSWORTHY:

Airport or National Park?

by Julie Sheppard*

On May 20 this year, the Federal Government announced that it would re-consider Holsworthy as a site for Sydney's second international airport and that a joint Environmental Impact Statement would be produced for both Badgery's Creek and Holsworthy.

The proposal is to consider the construction and operation of a second major international and domestic airport for Sydney on a site large enough for future expansion of the airport if required.

One option to be considered is the construction and operation of a 'two-runway' airport based on two widely spaced parallel runways (4000 metres and 3000 metres in length) and supporting airside and landside facilities capable of handling up to 360,000 aircraft movements and 30 million passengers per year¹.

Maps of the notional airport also show an east-west runway but this is not being considered in the EIS. No doubt it would be part of "future expansion."

Holsworthy environment

It was only a matter of days before the Government announced it would re-consider Holsworthy for an airport that the Army released the results of an Environmental Audit of the Holsworthy Training Area, intended for use as a basis for a Plan of Management.

This report spells out what many of us already knew—that

environmentally the area is extremely significant, so much so that the Australian Heritage Commission is proceeding with a recommendation for its inclusion on the Register of the National Estate.

Huge tract of bushland

The Range is 20,000 ha of the northern-most section of a huge tract of bushland which extends south to include the Dharawal State Recreation Area, and the southern water supply catchments of the Cataract, Cordeaux, Avon and Nepean Dams. Adjoining the Range to the east is the Woronora water supply catchment and the Heathcote N.P.

The Range is mostly typical Hawkesbury sandstone country with deep gullies and ravines and many pristine waterways. It forms a large proportion of the catchment of the Georges River and is responsible for input of very high quality water to the system in its upper reaches.

As part of a much larger tract of bushland extending south and east, the Range has important value as a dispersal area for fauna after fire. This was noted after the fires of January '94 when fauna from the devastated Royal National Park dispersed eastwards.

Similarly, koalas from the Georges River valley areas of Wedderburn and Kentlyn are known to use the whole range. One animal ear-tagged at Kentlyn was found in Heathcote National Park.

Rare and vulnerable species

The Environmental Audit identified 12 fauna species which are considered Vulnerable and Rare (Schedule 12 of the National Parks

and Wildlife Act, 1974). These include the Koala, Tiger Quoll, Powerful Owl, Turquoise Parrot, Broad-headed Snake, Giant Burrowing Frog, and the Greater Broadnosed Bat. A further 8 species which were not sighted but considered likely to be present are listed and include the Long-nosed Potoroo, Glossy Black Cockatoo and six different bat species. Other species of conservation significance include the New Holland Mouse, Wallaroo, White-striped Mastiff Bat and Brown Toadlet.

There were nine plant species listed as rare or threatened on the ROTAP list. Also listed were nine other species of conservation significance, three protected under Commonwealth legislation and 20 protected under State legislation.

Aboriginal and European heritage sites

The Audit found the area extremely rich in aboriginal archaeological sites, listing 295 and noting that there are potentially many more than that number, as no comprehensive survey has been done.

Macarthur Branch knows of at least another 25 that have been found since the report was written. The sites include pigment art, engravings, grinding grooves, water channels and occupation deposits in shelters and in open context.

The area also has a very rich and varied European heritage. There is much evidence of the settlers who attempted to farm the area before 1912 when the Army took over. These sites include magnificent stone walls, wells, stone culverts, remains of stone

National Parks Association

ACTIVITIES SUPPLEMENT

November-December 1996

The NPA offers a range of activities including Branch meetings, lectures, theatre parties, car camps, canoeing and kayaking, abseiling, sailing and bushwalks. The different grades of bushwalks are described below.

Easy Day Walks: Distance 10-15km, mainly on tracks, relatively flat terrain. Suited to most people.

Medium Day Walks: Distance up to 25 km, mainly on tracks, or shorter distances through trackless open bushland. Suited to people of average fitness.

Medium-Hard Day Walks: As for medium, but includes rougher terrain such as heavy scrub or rock scrambling.

Hard Day Walks: Distances up to 30km over relatively easy terrain, or shorter distances over some difficult, trackless, rugged terrain. Suited to fit people with walking experience.

Easy Full-Pack Walks: Distances up to 15km per day, over relatively easy terrain. Suited to people with at least some experience of medium day walks.

Medium Full Pack Walks: Distances up to 25km per day, and may involve a few larger ascents and descents. Suited to fit people with experience in full pack walking, or at least medium day walks over trackless terrain.

Medium-Hard Full Pack Walks: As for medium grade, but includes rougher terrain such as heavy scrub or rock scrambling. Suited to fit people with at least experience in medium grade pack walks.

Hard Full Pack Walks: Strenuous walks involving long distances or many steep ascents or descents, or very difficult terrain. Suited to fit and experienced bushwalkers.

Exploratory Full Pack Walks: Walk in terrain unfamiliar to the leader. Suited only to fit and experienced bushwalkers.

Search and Rescue

Leaders should leave full details with a responsible person. The NPA is affiliated with the Confederation of Bushwalking Clubs, which maintains a voluntary Search and Rescue section to assist those in difficulties in the bush. In the event of an overdue party or other incident ring the following NPA contacts:

Lyn Gett: (02) 9236 2904 (w), (02) 9645-1395 (h);

David Shepherd: (042) 26 6565

Richard Thompson (02) 9414 8307 (w), (02) 91441 392 (h)

You may also contact Search and Rescue via pocket pagers by phoning (from anywhere) 016 020. Ask the operator to send your message including return phone number, to pager number 277 321.

Liability

Every person participating in an activity conducted by the National Parks Association does so as a volunteer in all respects, and as such accepts responsibility for any personal injury, however incurred. The Association, its office-bearers and walks leaders cannot accept liability in regard to any injury or damage suffered by any person while engaged in any NPA activity.

Bookings

Give reasonable notice to leaders if you wish to join an activity and verify all transport details. Members must book for all activities where a limit is specified. Persons leading activities for the NPA do so on a voluntary basis and may decline any person's request to attend. Obtain the leader's permission before inviting friends or bringing children on activities. Owners of ropes on abseil trips are entitled to place a levy on their use.

The inaugural Woodford to Warragamba has just finished—a really great day of walking followed by a terrific BBQ. And there was an excellent turnout of NPA members (and hopefully future members) to enjoy the day. Our thanks to the main organisers—Greg Bridge and Phil Foster and the many helpers from Blue Mountains and Sydney Branches.

Definitely a top day so look out for it next year!!

If you missed the W to W, don't worry because our November-December Program has plenty to offer, with some really interesting special activities.

On Nov 2-3, Peter Witt leads a trip to the Wollongambe River—a nice area but numbers are limited so book early. If you wish to canoe instead, Caryll Sefton on the same weekend leads a canoe trip to Morton. And watch out for her trip on Nov 16-17 and advance notice for a canoe trip in January.

Ian Hancock has an excellent trip on Nov 1—looking at European and Aboriginal heritage in Scheyville National Park. Not to be missed! But if you do...try the Tree and Shrub recognition day led by Brian Saunders on the same day. Another special interest trip is the Wetlands study day arranged by Brian Everingham on Nov 16.

On Nov 23 Judith and Nick Hill are walking by moonlight all night from Woodford finishing with breakfast near the end at Glenbrook—they always come up with something interesting!!

December brings lots of good activities: Try Malcolm January's Grand Canyon walk on Dec 01; Herbert Frey's walk also in the Grand Canyon on Dec 21; a bike ride in Wollongong on Dec 22 arranged by Pam Robinson; or finish the year with a walk around the harbour to Manly on Dec 28 with Francis Smrdel.

We also have two NPA "community" events coming up. On Dec 1 Vivien Dunne is organising a picnic at Euroka (in the lower Blue Mountains)—a great chance to meet fellow members. And then on Dec 15, don't forget the NPA Ferry trip, guided tour of Goat Island and Christmas picnic.

Have a beautiful Christmas

Richard Thompson

Please Note:

While walks vary greatly in difficulty, dangers such as poor weather, river crossings, rock climbing and other hazards can be encountered and cannot always be anticipated. Participants on NPA activities must ensure that they have adequate fitness and that they are suitably equipped. Participants must also make sure that they are aware of the conditions likely to be encountered and have adequate experience for the activity which they intend to undertake.

If in doubt, participants should talk with the leader to obtain further information about the activity.

NPA CHRISTMAS TOUR
Goat Island and
Sydney Harbour National Park
Sunday December 15

Tour the old buildings and hear about the varied history of Goat Island from its early aboriginal occupation to a human waste dump, to a storage area for explosives, when 200 convicts worked on constructions, to a base for the Sydney Water Police, a bacteriological station to investigate the Bubonic Plague when it reached Sydney in 1900 and now as a part of the Sydney Harbour National Park.

A special ferry (details on ticket) will leave Circular Quay at 10.50 am. We will spend 1 1/2 hours 11 to 12.30 pm on a guided tour, then an hour to enjoy a picnic in pleasant grassy surroundings, leaving the island at 1.30 pm.

Bring a packed lunch and something to sit on. No food available on the island. NPA will supply Christmas cake.

Send \$15 per person (\$10 for children 12 and under) and a self-addressed stamped envelope to Heather Roy, 34 Hilltop Rd, Clareville Beach, 2107. Cheques to be made out to Sydney Branch National parks Association of NSW Inc. Please book early - limit 100. Bookings must be received at least one week before tour. Ring Heather for further information on (02) 9918 9259.

Organised by Sydney Branch. All branches and friends welcome.

BITOU BUSH ERADICATION

Towra Point Nature Reserve
Saturday 19th October
(and any day for next three weeks)
Morning working party
with BBQ lunch

*Gold opportunity to learn
 about bush regeneration*

All equipment supplied

Contact: Vivien Dunne

(02) 9522 6508

email: dunne@mail.enternet.com.au

or NPA office (02) 9233 4660

Xmas Picnic in the Park

Sunday 1st December

Euroka Clearing

Blue Mountains NP - near Glenbrook

*Bring a picnic, bring the family
 and join NPA members for lunch.*

BBQ's available.

*Optional easy afternoon walk around
 Fern Glen*

Details: Vivien Dunne

(02) 9522 6508 (Ph/Fax) or

dunne@mail.enternet.com.au

NPA BUS TRIP TO PICTURESQUE MORPETH

Sunday 27 October

Join the NPA on this scenic drive and pleasant visit to Morpeth—enjoy wandering amongst the many attractive old buildings and craft shops (a marvellous place to buy your Christmas presents). Enjoy a stroll through the Wild Flower Reserve Common (a nice place for a picnic lunch).

We will provide morning tea on the way. Bring your own lunch or sample the delights of Morpeth's tea shops and cafes. Coach leaves Central at 8.30 am and returns 5.30pm—more details on the ticket. Bookings essential.

Please send a self-addressed stamped envelope for return of ticket and a cheque for \$25 made out to the National Parks Association NSW Inc Sydney Branch to Pearl Gillott, 32 Cardinal Freeman Village, Clissold St, Ashfield, 2131. Ring Pearl on 798 5462 for any other information.

Retreat from
the everyday



You can sit on the verandah,
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the lake, stroll to the
ocean across the high dunes
or just listen to the wind
in the casuarinas...

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wallabies regularly seen. Perfect
as a weekender or home for CFS/
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we offer a regular program of
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focus on nature interests.

Sept - Nov 96 Program

Agile Arachnids

Join an expert in Trapdoors for a fun
weekend of spider details (6 - 8 Sept)

Bushwalking the Grounds

Walk the trails used in the past by conser-
vationists and bushwalkers. (27-30 Sept)

Australian Mammal Fauna

An introduction to mammals with walks,
talks, trapping and spotlighting. (4-6 Oct)

Bird Songs

Learn more about bird calls - mating,
alarm and territorial. (11-13 Oct)

Heathland Ecology

The unique plant community of heath has
a fascinating ecology. (15-17 Nov)

For more information, call the
Wardens on (042) 360 195,
or write to
Barren Grounds Bird Observatory
Po Box 3
Jamberoo 2533



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Calendar of Activities: November-December

27 Oct Sun **Bus Trip to historical Morpeth**

See separate advert for details or ring Pearl Gillott on (02) 979 85462.

25-27 Oct Fri-Sun **SHOALHAVEN RIVER**

ILLAWARRA

Easy No limit

Leader: Jim Chapman 042 963633

Shoalhaven River west of Nowra. The intention is to suss out camping potential of Mongalowe River flowing into Shoalhaven west of O'Allens Ford. Meet me at the ford Saturday or join me Friday. Ring for details.

2 Nov Sat **HEATHCOTE N.P.** SYDNEY

Easy/medium No limit

Leader: Jean Blackman No need to contact

8.50am train suburban platform to Heathcote ETA 9.40.

Meet leader for circular walk via Scouters Mountain.

Mirang Pool. All on tracks 12-14km with steep sections.

2 Nov Sat **FISHERS GHOST PARADE** MACARTHUR

Why not put on a backpack and join the parade.

Campbelltown. Phone Barry Durman (046) 341 359.

2 Nov Sat **WOLLEMI N.P.** SYDNEY

COLO RIVER

Medium Limit: 12

Leader: Anthony Dunk (02) 9957 2202

450m ascent/descent, 10km. Steep track down to

junction of Canoe creek and Colo River. Gentler rock-

hopping return up shady Canoe creek. Lots of time for

swimming and exploring this remote stretch of the Colo.

Map: Colo Heights 1:25,000

3 Nov Sun **BLUE MOUNTAINS N.P.** SYDNEY

Medium Limit: 20

Leader: Greg Bridge H. 9804 6490 after 8pm

W. 9437 6655

Circular walk linking spectacular Fortress Gorge, the

escarpment peaks of Lockleys Pylon and Fortress Hill.

250m ascent, 16km, 60% track, 40% trackless. Extremely

scenic, varied and unusual walk.

Map: Katoomba

2-3 Nov Sat/Sun **WOLLEMI N.P.** BLUE MTS.

Medium full pack/easy canyon Limit: 10

Leader: Phil Foster 047 513404

Wolgan Valley area. Walk up a beautiful creek to a dark,

interesting canyon. Good quality forest in the creek,

high walls and a first-class canyon. No abseiling - may

get wet feet. We'll camp in the valley and explore the

next day. Bring a torch.

2-3 Nov Sat/Sun **BLUE MOUNTAINS N.P.**

BLUE MTS.

Medium pack walk Limit: 12

Leader: Peter Witt 063 555 144

Bell, Wollongambe River and return. 400m. ascent

14km return, trackless.

A magic place to spend a weekend. A walk through

trackless terrain to a sandy floored camp cave on the

banks of the upper Wollongambe River. There are

wonderful swimming holes and sections of canyon to

explore. No tents needed, you do not even have to get

your feet wet.

Map: Wollongambe 1:25,000

2-3 Nov Sat/Sun **MORTON N.P.** BLUE MTS.

Medium pack walk Limit: 15

Leader: Mark Goodson 047 393 898 (7-8.30pm Mon-

Fri)

Yalwal - Belmore Flat - Bundundah Creek - Danjera

Dam. Ascent 600m over 2 days, 25km. A wonderful trip

is assured for all as we savour the crystal clear pools,

grand vistas from rugged escarpments and a soft

grassy campsite. Mostly 60% on tracks with generally

light scrub only, when off the path spring flowers are a

bonus.

Map: Yalwal 1:25,000

2-3 Nov Sat/Sun **MORTON N.P.** ILLAWARRA

Easy canoe No limit

Leader: Caryll Sefton 042 842004

Easy two day paddle from Bendeela to Tallowa Dam on

Lake Yarrunga in Kangaroo Valley. Canoe hire available,

life jacket compulsory. Time for relaxing and swimming.

5 Nov Tue **MANLY** SYDNEY

Easy/medium No limit

Leader: Jean Blackman No need to contact

Meet leader Chatswood interchange for 9am bus 136 to

Beacon Hill school. Walk to Manly via Allenbury Gully,

Manly dam and lagoons - no thunderstorms this time!

Undulating 12-14km on tracks.

9 Nov Sat **BLUE MOUNTAINS N.P.**

ILLAWARRA

Medium Limit 20

Leader: Herbert Frey 042 711 846 (8-10pm)

Govetts Lead, Pulpit Rock, Perrys Lookdown, Blue Gum

Forest, Junction Rock, Govetts Leap, 600m descent/

ascent on tracks, 15km.

9 Nov Sat **ROYAL N.P.** STHN. SYDNEY

Easy/medium Limit: 6

Leader: Eric Stone 9546 7128 Mon-Fri 7-9pm week of

walk. Waterfall station - McKell Ave. - Fosters Flat -

Forest Path - Couranga track, approx. 16km all on

tracks. Map: CMA Royal N.P.

Take plenty of water on your walk

10 Nov Sun **MINNAMURRA RIVER** ILLAWARRA
Easy canoe No limit
Leader: Ronda Guy 042 377 048
Paddle from Swamp Road to the river entrance. Optional walk around spit to beach, swimming. Life jackets compulsory.

10 Nov Sun **SCHEYVILLE N.P.** HAWKES/CUMB
Easy 5km No limit
Leader: Ian Hancock (045) 73 6323 (W)
or: Kathy Ware (045) 73 6169
European and Aboriginal heritage. Another specific focus walk. Visit the historical buildings and learn of their heritage value. We will also be looking at some Aboriginal sites within the Park. Bring a pack lunch.

10 Nov Sun **HEATHCOTE N.P.** SYDNEY
Tree and shrub recognition Limit: 25
Leader: Brian Saunders 9523 5681
Meet at Waterfall station car park at 9.30am for Kingfisher Pool area. Amble along with frequent stops on the tracks and in the cool glens around West Waterfall. 6km 100m ascent. Easy tracks. Spot the trees and the shrubs and get them identified. Bring booklets like Burnum Burnum's "Wild Things" and help out the leader. Features a search for the mysterious Yelgun Cave near Kingfisher Pool. Map: Royal N.P.

10 Nov Sun **ROYAL N.P.** SYDNEY
Medium Limit: 25
Leader: Malcolm January 9416 7915
Karloo track, Gurumbulla Ridge, Engadine track 15km, 400m ascent, good track if somewhat rugged. Down to Karloo Pool, early swim! Up to ridge line - plenty of blackout - descend to head of navigation - another swim - back to start.

9-10 Nov Sat/Sun **MYALL LAKES N.P.** STHN SYDNEY
Medium full pack Limit: 15
Leader: Brian Everingham 02 9520 9341
30+ km. This will be a mixture of off-track walking around the shores of Myall Lake and beach walking. 100m ascent. Time for swimming but we may need to carry water. Map: Bombah Point, Myall Lake

9-10 Nov Sat/Sun **NEWNES** SYDNEY
Medium Limit: 10
Leader: Henry Fairlie-Cuninghame 9449 8725
Base camp with exploratory day canyoning. Camp a few km down Wo gan river from Newnes. Visit Starlight canyon and Devils Pinch canyon on the 2 days, starting at the bottoms so as to avoid abseils. Height and distance not known, rough terrain. Starlight canyon is dark, requiring a torch. The name alludes to the myriad of glow worms. Map: Mount Morgan 1:25,000

Wear a hat and take sunscreen

9-10 Nov Sat/Sun **KANANGRA BOYD N.P.** SYD
Medium/hard pack walk Limit: 12
Leader: George Daniel 02 9449 4769
Day 1: 130m asc. 16km, track and creek rock hopping
Day 2: .990m asc. 15km ditto. Kanangra Walls - Crafts Wall - Pages Pinnacle - Gingra Creek, Kowmung river and return. A wilderness walk - historic interest, Old Cedar Rd. route along Gingra Creek - Hakia makes it a tough, scratchy experience. Not the shortest route to Kowmung but scenically rewarding.
Map: Kanangra CMA - Gangerang Sketch (M. Dunphy)

11 Nov Mon **LECTURE POSTPONED**
See entry for Monday 25th November

12 Nov Tue **WYRRABALONG N.P.** SYDNEY
Easy/medium No limit
Leader: Jean Blackman No need to contact
12-14km, level tracks. 7.50am train country platform to Wyong. Meet leader. Bus to Toukley, circular walk Red Gum Forest via Canton Beach.

16 Nov Sat **BLUE MOUNTAINS N.P.** SYDNEY
Medium Limit: 20
Leader: Greg Bridge H 9804 6490 W 9437 6655
14km, 750m ascent, mostly tracks. Nellies Glen, 6ft track, Water Board ladders, Golden stairs, Rennies Tunnel, Devils Hole. Circular walk linking some unusual features of the Katoomba area. Rennies Tunnel provides the return link between the Jamison and Megalong valleys and is 700m long, knee deep in water and averages 1.5m in height - oh what fun!
Map: Katoomba

16 Nov Sat **TOWRA POINT N.R.** STHN. SYDNEY
Leader: Brian Everingham (02) 9520 9341 Limit: 15
Wetlands Nature Study 12km mangroves and sand. The emphasis is on observing and understanding how this important wetland habitat operates. Bring binoculars but be prepared for wet feet and be prepared to get tired. We will be exploring.

17 Nov Sun **MITTAGONG** MACARTHUR
Leader: Jim Long 046 264 021
Lake Alexander ringtrack.

17 Nov Sun **COLO RIVER** HAWKES/CUMB
Easy/medium No limit
Leader: Tanya Bolesic 045 77 6632
Bob Turners Track. A beautiful walk down to the river. Meet at 10am at the parking area at the top of the track - access from Putty Rd. Bring swimmers and pack lunch.

16-17 Nov Sat/Sun **BLUE MTNS N.P.** SYDNEY
 Medium full pack Limit: 15
 Leader: Peter Fox 9799 9402 H 9662 5741 W
 500m descent, 600m ascent, 26km, tracks, steps,
 steep descent and ascent, creek crossings. Mt. Victoria
 - Victoria Falls - Grose River - Blue Gum Forest - Junction
 Rock - Evans Lookout - Braeside Walk - Blackheath.
 Enjoy a weekend in the Grose Valley with time to relax.
 Maps: Katoomba and Mt. Wilson

16-17 Nov Sat/Sun **BUNGONIA SRA** ILLAWARRA
 Easy Limit: 15
 Leader: Teddy Curtis 042 297 509
 Base camp at cars, full facilities, easy walks, swimming,
 camp fee. Book one week before camp.

16-17 Nov Sat/Sun **MORTON N.P.** ILLAWARRA
 Easy canoe No limit
 Leader: Caryll Sefton 042 842 004
 Paddle from Tallowa Dam to Fossickers Flat on Lake
 Yarrunga in the Shoalhaven Gorge and return. Time for
 relaxing and swimming. Life jackets compulsory.

19 Nov Tue **LANE COVE N.P.** SYDNEY
 Easy/medium No limit
 Leader: Jean Blackman No need to contact
 9am train suburban platform to Thornleigh. Meet leader,
 walk to Turramurra via Avondale Dam, 12-14km on
 tracks.

23 Nov Sat **THIRLMERE LAKES N.P.** ILLAWARRA
 Medium No limit
 Leader: Col Meharg 042 842 004
 Undulating walk on firetrails to Little River. Magnificent
 Blue Gum Forest. Swimming. 16km.

23 Nov Sat **BLUE MTNS N.P.** SYDNEY/BLUE MTS.
 Medium night walk Limit: 25
 Leader: Nick Hill 047 392 871 around 7pm
 Woodford to Lapstone (south side) 30km on fire trails. A
 walk with a difference. We will leave Woodford station
 at dusk and then walk all night finishing with breakfast
 near the end. Nearly down hill all the way except for the
 climb out 150m. to the station. See the Red Hand Cave
 by moonlight. Maps: Katoomba and Penrith

23 Nov Sat **GEORGES RIVER N.P.** SYDNEY
 Easy No limit
 Leader: Jean Blackman No need to contact
 8.59am train, suburban platform to Panania. Meet
 leader, walk along river to Padstow via Boardwalk, 12-
 14 km on tracks.

23 Nov Sat **ROYAL N.P.** SYDNEY
 Medium/Hard Limit: 20
 Leader: Rosemary MacDougal 9428 5668 H
 9265 3000 W
 19km on tracks. Heathcote - Audley - Winifred Falls -
 Anice Falls - Deer Pool - Marley - Bundeena.
 Map: Royal N.P.

24 Nov Sun **BLUE MOUNTAINS N.P.** SYDNEY
 Medium Limit: 12
 Leader: Henry Roda 9948 2715
 Starting from Valley Rd. Wentworth Falls, to Empress
 Falls, down to Vera Falls and junction of Valley of Waters
 and Jamison Creeks. From the junction we are going
 downstream to explore Prince Regents Glen to satisfy
 my curiosity. Rock hopping may be involved on this
 stretch and nimble feet are required. Ascent 600m.
 Map: CMA Katoomba

24 Nov Sun **ROYAL N.P.** STHN. SYDNEY
 Easy Limit: 6
 Leader: Eric Stone 9546 7128 Mon-Fri 7-9pm week of
 walk
 Waterfall station - Uloomah track - Karloo track - Heathcote
 station approx. 12km, all on tracks.
 Map: CMA Royal N.P.

24 Nov Sun **BOWEN MOUNTAIN** HAWKES/CUMB
 Medium No limit
 Leader: Brad Sichtler 045 72 5804
 Mostly trackless walk alongside Devils Hole Creek,
 through semi-rainforest and Devils Hole Gorge, then
 moderate climb out along ridge.

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23-24 Nov Sat/Sun **HEATHCOTE N.P.** SYDNEY
Easy full pack Limit: 12
Leader: Steve Bennetts 9411 4908
Waterfall to Heathcote, 150m ascent, 20km, tracks with short scrubby rockhop. Follow scenic Bullawarring track to find 'Kingdom Come' (Boobera Pool), an idyllic camp site on Woronora River. Lazy afternoon around the pool. Sunday leisurely return via Miara Pool. Suit first overnight walk. Map: Royal N.P. CMA

23-24 Nov Sat/Sun **KANANGRA BOYD N.P.** SYD
Full pack Limit: 20
Leader: Richard Thompson 9144 1392 (7-9pm)
Megalith Ridge to Kowmung river. 600m desc/asc. 14km off track. A short trip visiting a great part of the upper Kowmung. A chance to explore the lower reaches of Morong Deep.

25 Nov Mon. **COMBINED ACTIVITY** SYDNEY
Final Lecture URBAN WILDLIFE - FLORA & FAUNA and END OF YEAR FESTIVE SOCIAL from 6.30pm, Hallstrom Theatre, Australian Museum, William St. City. See Branch Newsletter for full details.

25-30 Nov Mon-Sat **KOSCIUSKO N.P.** ILLAWARRA
Easy day walks/canoeing Limit: 20
Leader: Grahame Burgess 042 615 799 Talbingo area, Blowering Reservoir, Hume and Hovell track, day walking, canoeing options. Life jackets compulsory.

26 Nov Tue **BRISANE WATER N.P.** SYDNEY
Easy/medium No limit
Leader: Jean Blackman No need to contact
8.16am train country platform to Woy Woy. Meet leader. Short bus ride to Umina. Walk to Pearl Beach up to waterfall then to arboretum around Green Point rocks back to Umina. Approx. 12km, tracks, rocky and steep, some beach.

30 Nov Sat **KU-RING-GAI CHASE N.P.** SYDNEY
Easy/medium No limit
Leader: Norma Whitmore 9872 4679 no need to contact
Sphinx - Bobbin Head - Apple Tree Bay - Mt. Ku-ring-gai station. Train to Turrumurra leaves Central 9am. Meet at bus bay on east side at 9.40am. Finish Mt. Ku-ring-gai station. 200 m ascent, 11km on tracks.

send your walk plans direct to Richard Thompson

30 Nov Sat **KU-RING-GAI CHASE N.P.** SYDNEY
Easy afternoon walk No limit
Leader: Alex Tucker 9451 4028 no need to phone
Route will depend on weather, number of children etc. Meet 1.30pm at Water Tower, Yulong Ave. Terrey Hills. Swimming and BBQ tea possible.

30 Nov Sat **ROYAL N.P.** ILLAWARRA
Easy No limit
Leader: Wes Sweet 042 722 625
Walk from Wattamolla to Big Marley Beach, Deer Pool, and return via Little Marley. Tracks and beach walking, swimming, 12km. Meet 9.30am Wattamolla Kiosk.

1 Dec Sun **BOUDDI N.P.** SYDNEY
Easy Limit: 20
Leader: John Hestelow 9476 4195 Mon-Thur 7-9pm week of walk
Start at Killcare Surf Club, walk along Putty Beach towards Maitland Bay (swim break). Walk up to Mt. Bouddi 152m ascent and then follow the scenic highway back to Killcare Surf Club. 12km.

1 Dec Sun **BLUE MOUNTAINS N.P.** SYDNEY
Easy Limit: 25
Leader: Malcolm January 9416 7915
Evans Lookout - Grand Canyon 300m ascent, 7km good track but lots of steps. Another unique piece of the Blue Mountains.
Map: Katoomba

30 Nov-1 Dec Sat/Sun **WOLLEMI N.P.** ILLAWARRA
Lilo with full pack Limit: 15
Leader: Bruce Fenton 042 714 340 H
042 762 288 W
Culoul Range, Hollow Rock, Wollemi Creek, Colo River, Boorailk, Hollow Rock. 350m ascent/descent, 20km. off track. Floating down the Colo! A great way to start summer, come along and enjoy this spectacular area. Maps: Six Brothers, Colo Sketch

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ROYAL BOTANIC GARDENS SYDNEY
Mrs Macquaries Road, Sydney NSW 2000, Australia

30 Nov- 1 Dec Sat/Sun **BLUE MTNS N.P.** SYDNEY
 Medium pack walk Limit: 10
 Leader: Henry Roda 9948 2715
 Camping at Saint Helena Crater. Starting from Springwood via Magdala Crk and Bunyan LO to the crater and returning via Western Ck. and Magdala Ck. Mainly on tracks except along Western Ck. which can be scrubby in places. Approx. 15km. 200m ascent.
 Map: Springwood CMA

1 Dec Sat **XMAS PICNIC** SYDNEY
 Picnic at Euroka Clearing in Blue Mtns NP. Call Vivien Dunne (02) 9522 6508 or see advert p 2 for more details.

3 Dec Tue **ROYAL N.P.** SYDNEY
 Fun day walk/row No limit
 Leader: Jean Blackman No need to contact
 8.35am train to Loftus. Meet leader, walk to Audley, take boats for row up Kangaroo Creek. 6-7kms. A request for those that missed last time. \$5. No experience needed.

7 Dec Sat **BLUE MOUNTAINS N.P.** SYDNEY
 Medium Limit: 8
 Leader: Henry Roda 9948 2715
 An exploratory walk on cliff ledges of Radiata Plateau. Down Bottle Neck Pass via ledges to Megalong Head and climb out by way of a chain. No great distance involved but may be heavy going.
 Map: Katoomba CMA

7 Dec Sat **BLUE MOUNTAINS N.P.** SYDNEY
 Medium/Hard Limit: 15
 Leader: Rosemary MacDougal 9428 5668 H
 9265 3000 W
 Hazelbrook - Victor Falls - Terrace Falls - Bedford Pool - Aeroplane Hills - Darwin's Walk - Wentworth Falls. 150m desc/asc. 17km, half km. off track only.
 Maps: Katoomba & Jamison CMA

8 Dec Sun **ROYAL N.P.** ILLAWARRA
 Medium Limit: 20
 Leader: Des Towne 042 615 855
 Loftus, Audley, Winifred Falls, Anice Falls, Maianbar, Bundeena, all on tracks, 200m steep ascent, undulating, swimming.

8 Dec Sun **BLUE MOUNTAINS N.P.** SYDNEY
 Easy No limit
 Leader: Sandy Johnson 9489 3500
 Circuit above the Kanimbla Valley from Medlow Bath. Down Wonderland track to Marks Tomb, Tuckers Lookout and sunbath. Return by Valley of the Glens, Flying Fox and Three Brothers. 100m asc. 10km, tracks.
 Map: Katoomba CMA

7-8 Dec Sat/Sun **ROYAL N.P.** SYDNEY
 Pack walk Limit: 15
 Leader: George Daniel 9449 4769 (7-9pm)
 Bundeena to Otford via the coast track, 13km each day. The coast track with time to enjoy it. Magnificent views, Fig. 8 pool visit - Camp at Curracurrang. Apple pie at Otford. Camp permits to be obtained. Maps: RNP Tourist CMA, Port Hacking & Otford Topos, CMA

7-8 Dec Sat/Sun **WOLLEMI N.P.** SYDNEY
 Full pack walk Limit: 20
 Leader: Richard Thompson 9144 1392 H (7-9pm)
 Colo River via Canoe Creek, 500m desc/asc. 10km. Basically a bludge swimming trip. Spectacular views.

10 Dec Tue **KU-RING-GAI CHASE N.P.** SYDNEY
 Medium No limit
 Leader: Jean Blackman No need to contact
 Take 190 bus from Wynyard, departs 8.30am to Palm Beach. Meet leader for ferry to West Head circular walk from Mackerel Beach. 12km walk, steep sections, with possible swim.

14 Dec Sat **BLUE MOUNTAINS N.P.** SYDNEY
 Easy/medium Limit: 20
 Leader: Greg Bridge 9804 6490 H after 8pm
 9437 6655 W
 Pisgah Rock, Erskine Creek, Jack Evans track. 300m desc/asc. 15km. 70% creek walking. Circular, scrambling descent via Pisgah Rock to a long lunch at one of the best, and cleanest, swimming holes in the mountains. After lunch follow the Creek with 2 more swim stops then a relatively easy track exit and return to cars. Great summer walk. Map: Penrith

14 Dec. Sat **BLUE MOUNTAINS N.P.** SYDNEY
 Medium No limit
 Leader: Jean Blackman No need to contact
 9.02am train country platform to Glenbrook. Meet leader for walk down the gorge to Lapstone 10-12km with rock hopping. Swim possible.

15 Dec. Sun **MORTON N.P.** ILLAWARRA
 Medium/Hard Limit: 15
 Leader: Teddy Curtis 042 297 509
 Walk down Meryla Pass to Griffins Farm and Lake Yurunga, and return, swimming. 22km all on tracks, 550m ascent and descent.

15 Dec. Sun **BLUE MOUNTAINS N.P.** SYDNEY
 Medium Limit: 10
 Leader: Henry Roda 9948 2715
 Start and finish NP & WS Visitors Centre, Glenbrook. Walk via Red Hands Gully to Kanuka Brook 2km west of Red Hands Cave. Explore Kanuka Brook downstream to Glenbrook Ck.
 Mainly on tracks except Kanuka Brook where rock hopping may be needed. Approx. 13km. Map: CMA Penrith

15 Dec. Sun **LANE COVE RIVER** ILLAWARRA
 Easy canoe No limit
 Leader: John Bell 042 273 928
 14km picturesque paddle from the harbour to Fullers Bridge with a further short paddle beyond the weir to wash our canoes in fresh water. Life jackets compulsory.

15 Dec. Sun **SYDNEY HARBOUR N.P. (GOAT ISLAND)** SYDNEY
 Leader: Heather Roy 9918 9259
 Ferry trip, guided tour and Christmas picnic on island. See details in advert. All branches and friends welcome.

14-15 Dec. Sat/Sun **KANANGRA BOYD N.P.**

BLUE MTS.

Box Creek - Kowmung River and beyond. Day walks from a base camp fr. cars

Limit: 15

Leader: Mark Goodson 047 393 898 (7-8.30pm M-F.)

Picture this: A superb 5 star campsite only 30 minutes walk from the road. From this idyllic base we will explore some truly wild and scenic country before returning to wine and dine for a Christmas party amongst the granite tors and plummeting waterfalls. Gourmet bushwalkers most welcome! Maps: Kanangra & Shorters Hill 1:25,000

14-15 Dec. Sat/Sun **WOLLEMI N.P.** BLUE MTS.
(DUNNS SWAMP)

Car camping with canoes

Limit: 16

Leader: Peter Witt 063 555 144

Lithgow, Ilford, Rylstone. A wonderful weekend camp. Bring your own canoe or the leader can arrange hire. A flooded sandstone canyon, magic, paddling, swimming and walking. Long neck turtles and an aboriginal site. Suitable for babies to octogenarians.

17 Dec. Tue. **BOUDDI N.P.** SYDNEY

Medium No limit

Leader: Jean Blackman No need to contact

8.15am train country platform to Woy Woy. Meet leader. Bus to Rip Bridge. Walk round Maitland Bay and return. Possible swim. 12-14km on tracks with steep sections.

21 Dec Sat **KU-RING-GAI CHASE N.P.** SYDNEY

Easy afternoon walk No limit

Leader: Alex Tucker 9451 4028 no need to phone

Route will depend on weather, number of children etc. Meet 1.30pm at Water Tower, Yulong Ave. Terrey Hills. Swimming and barbecue tea possible.

21 Dec Sat **BLUE MOUNTAINS N.P.** ILLAWARRA

Medium Limit: 20

Leader: Herbert Frey 042 711 846 (8-10pm)

Neates Glen, Grand Canyon, Junction Rock, Govetts Leap, Cliff Top Track, Evans Lookout, Neates Glen. 550m ascent/descent on tracks, 16km.

22 Dec Sun **WOLLONGONG** ILLAWARRA

Easy bike ride No limit

Leader: Pam Robinson 042 841 662

Beautiful level bike ride from Thirroul to Wollongong Harbour and return, all on cycle track along northern Wollongong beaches.

22 Dec Sun **LANE COVE N.P.** SYDNEY

Easy/Medium Limit: 25

Leader: Malcolm January 9416 7915

Chatswood to Thornleigh via Blue Gum Creek and Lane Cove River. 17kms, mostly good terrain, 250m ascent. Hopefully enough water in the creek for a splash.

24 Dec Tue **SYDNEY HARBOUR N.P.** SYDNEY

Easy No limit

Leader: Jean Blackman No need to contact

Meet leader Circular Quay for 9am ferry to Manly. Walk to Spit Bridge 10km on tracks. Return bus to city, Manly, Chatswood.

25-29 Dec. Wed/Sun **SHOALHAVEN RIVER**

ILLAWARRA

Easy

Limit: 15

Leader: Teddy Curtis

042 297 509

Relaxing Christmas at Coolendel on the Shoalhaven River, all facilities, swimming, walking, canoeing.

26 Dec-4 Jan **CROAJINGALONG NP**
CLINTON ROCKS TO MALLACOOTA

Medium overnight

Limit: 14

Leader: Geoff Bailey 042 360 445 W 042 360 787 H

Clinton Rocks - Wingham Inlet - Mallacoota along beaches and over headlands. 100m, 120km.

COASTAL CRUISE VII

Join me for some of the finest coastal cruising available. We commence cruising with accommodation and a 3 course meal at Gypsy Point Lodge before being transported to the start of the walk.

8 days and a food drop later we are picked up at Mallacoota and returned to Gypsy Point Lodge for another 3 course meal and accommodation. Tempted? Then give me a call.

28 Dec Sat **SYDNEY HARBOUR N.P.** SYDNEY

Easy No limit

Leader: Frances Smrdel 9635 8836

Spit Bridge to Manly. Meet under the Spit bridge in the park on the Manly side at 10am. Walk to Manly with swimming on the way. We get to Manly about 2.30-3pm for more swimming or enjoying Manly sites. Easy 8km, 200m ascent, lovely views of the harbour.

28 Dec Sat **ROYAL N.P.** SYDNEY

Medium No limit

Leader: Jean Blackman No need to contact

8.44am train country platform to Waterfall ETA 9.24am. Meet leader. Walk down Kangaroo Creek up to Heathcote, 12km, rocky, some trackless. Swimming. Visitors welcome.

29 Dec Sun **BLUE MTS. N.P.** SYD/BLUE MTS.

Very easy No limit

Leader: Judith Hill 047 392 871 7pm after 15 Dec.

Fairlight to Riley's Mountain and back 10km. Visit this little known area of the Blue Mts. N.P. which is on the "wrong" side of the Nepean River. Entry is via Mulgoa village. A lazy day with good views. Map: Penrith

31 Dec Tue **ROYAL N.P.** SYDNEY

Medium No limit

Leader: Jean Blackman No need to contact

9.08am train country platform to Helensburgh ETA 10am. Meet leader for circular walk, 12km, some off-track. Scramble down Wilsons Creek, back up Burgh track for 4pm train.

31 Dec Tue **BRISBANE WATERS N.P.** SYDNEY

Easy No limit

Leader: Barbara Guest 9416 3770 no need to contact

Woy-woy, Warrah - Pearl Beach. Train Central to Woy Woy at 9.47am. Leader joins train at Hornsby. Bus to Patonga, walk Pearl Beach. Views, swimming, 180m ascent, 8km.

Every Wednesday **ALL AROUND SYDNEY** SYD
Medium day walks No limit
Leader: Ralph Newbould 9579 4889 not Tuesday evening
and not between 6-8pm
Ralph organises walks for each Wednesday, distance
approx. 12 to 20km. Ascent approx. 200m. Mostly on
tracks with some scrambling and rock hopping. Route
is decided approx. 2 weeks before the walk. Phone at
least two days before the walk for details.

**If you would like to lead a walk,
contact Richard Thompson on
(02) 9144 1392 (h).
Send your walks plans direct to
Richard. Deadlines for coming
walks: Jan/Feb walks to Richard by
October 11; March/April walks by
December 4.**

ADVANCE NOTICES

3-5 January (Fri-Sun) **KANANGRA BOYD N.P.**
Three day trip to middle Kowmung. Middle day to be
spent swimming and wandering along river. Great fun
trip. Richard Thompson 9144 1392 H.

4-10 Jan Sat-Fri **SHOALHAVEN RIVER**
ILLAWARRA
Medium white water canoe Limit: 20
Leader: Greg Carthew 042 265 472
Paddle kayaks or canoes from Sewells Point to Tallowa
Dam, grade 1-4 rapids, one day portage at start,
competent white water paddlers only. If no water then
another venue. Life jackets and helmets compulsory.

6-9 Jan Mon-Thur **KOSCIUSKO N.P.** SYDNEY
Easy/medium Limited by availability of accommodation
Leader: Bill Hall 9481 0591 between 7.30-8.30pm
Mt. Kosciusko - Dead Horse Gap - Cascade Track - Blue
Lake - Merritts Walk - Rennix Track. 20km maximum. A
series of day walks originating from Thredbo base.
Pleasant walking conditions (weather permitting) over
the top of Australia. Magnificent views and wild flowers.

11-19 Jan Sat. **MURRUMBIDGEE RIVER**
ILLAWARRA
Easy canoe trip
Leader: Caryll Sefton 042 711 741
200km easy flowing water from Jugiong to Wagga
Wagga. Base camping en route.

20-25 Jan Mon-Sat **MURRAY RIVER** ILLAWARRA
Easy canoe No limit
Leader: Greg Carthew 042 265 472
Paddle the upper Murray from Khancobin to Talmalmo,
swift current, willow hazards on bends, beautiful relaxed
paddle. Life jackets compulsory.

24-27 Jan Australia Day Long Weekend
COBBERAS-TINGARINGY N.P. BLUE MTS.
4 day pack walk, medium grade Limit: 12
Leader: Mark Goodson 047 393 898 7-8.30pm M-Fri.
Cowombat Flat - Cobberas No.2, Moscow Peak -
Cobberas No.1, tracks and trackless.
Remote, rugged and incredibly scenic, the extraordinary
Cobberas range is a bushwalkers delight. Grassy
campsites, views that seem to go on forever and few
people make it. This is an area really worth experiencing.
If time permits an optional side trip to climb the Pilot is
possible. Map: Suggan Buggan 1:50,000 CMA

15-23 Feb Sat/Sun **MILFORD TRACK NEW**
ZEALAND ILLAWARRA
Easy Limit: 20
Leader: Nell Stetner (Illawarra WEA Ramblers)
042 854 379
Walk the Milford track, fully accommodated Sydney-
Sydney \$2,295. Option available of extending to do
other walks.

1997 1. **SOUTHERN NSW/VICTORIA N.Ps.**
2. **FAR WEST NSW/S.A. N.Ps.**
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ON THE TRACK



The Inaugural **Woodford to Warragamba Walk**

*by Richard Thompson**

For a long time Greg Bridge had expressed the hope that the NPA should have a walk similar to the famous K to J walk run by Sydney Bushwalkers each year. The Katoomba to Jenolan is a 43km day walk attracting a large crowd of walkers and many additional people just there to support the activity or attend the post walk dinner at Caves House.

Where to walk?

But where could we run our own walk? Such a walk needs: to have a real sense of going from one place to somewhere far removed; to have attractive scenery; to be located close to Sydney for transport; to consist mostly of open firetrails to cope with large numbers of walkers; to be challenging but still allow walkers of all standards to participate; and to have access to good facilities for a post walk picnic.

The matter remained unsolved until early this year when Greg came up with the idea of running the walk from Woodford to Warragamba Dam. The location seemed perfect—it fitted the needs exactly, especially because it allowed people to walk lesser distances (from either the Oaks Picnic Area or Jack Evans trackhead) if they did not wish to walk the full 32km from Woodford.

So the W to W was born and advertised in the NPA Activities Program. Soon Phil Foster, from Blue Mountains Branch, was keen that his

Branch get involved. The walk appeared a good way of promoting the branch and he offered to arrange local support for the walk.

Telephone calls kept coming in to both Greg and Phil. The numbers on the walk kept growing, reaching around 130 when bookings were stopped just before the day. Logistics became increasingly difficult. We had to get a lot of people back from Warragamba—first a car shuttle was planned then a bus was hired and finally a second one was needed. And Phil kept having to phone the butcher to order yet another 5 kilograms of sausages!!

Large group

August 24 dawned a beautiful day—cool but sunny. A large group assembled at Woodford for the start of the long walk. After preliminary instructions we set off at a good pace along the firetrail towards the Oaks - 18 km away. Meanwhile at Glenbrook, people had begun arriving to be registered and then transported out to the Oaks. Greg, Phil and many helpers were kept busy arranging all this.

Thanks to the great support, things went really well and the Oaks group set off around 10:30 am. The Woodford group also walked well and arrived at the Oaks right on target at 11:30 am to a welcome feed of oranges provided by Phil's helpers. After setting off for the Jack Evans track they met the other group briefly during a lunch break. Erskine Creek was crossed and the two groups merged for the final walk along the fire trails to Warragamba Dam and a huge photo session.

Rumours had been circulating all day that there would be a glass of wine for those arriving at the BBQ. These turned out to be true and soon a great BBQ was underway. It was great to see so many NPA walkers at once.

Happy walkers

The W to W was a very successful day with 130 happy walkers. Donations paid for the expenses, providing a small contribution to State Council. There were also sales of publications and, hopefully, a number of new members.



Naturally, the W to W only worked because of the hard work of many people. Greg and Phil were the main people responsible for the success of the day, but there were many others from Blue Mountains branch and from Sydney branch. These were superb in arranging the BBQ and assisting in the running of the walk. Thank you to all who helped.

And next year ... it will be on again in mid-August with an additional starting point from Glenbrook (24 kms).

So look out for the second W to W classic and—don't forget, book early!

NATIONAL PARKS ASSOCIATION BRANCH MEETINGS:

ARMIDALE BRANCH: Second Thursday of the month at 7.30pm, Uniting Church, Rusden Street, Armidale.

BERRIMA (SOUTHERN HIGHLANDS) BRANCH: Third Friday of alternate months. Contact Secretary for details. 048 72 1116.

BLUE MOUNTAINS BRANCH: Third Wednesday of the month at 8pm. Springwood Neighbourhood Centre.

CENTRAL COAST BRANCH: Third Thursday March, May, July, September, November 7.30pm, Bateau Bay Progress Hall.

CENTRAL WEST BRANCH: Second Friday of the month, 6-8pm, at Bathurst Information and Neighbourhood Centre (Phone 063 315284 for information).

CLARENCE VALLEY BRANCH: First Monday of the month at 7.30pm, Grafton High School Common Room.

HUNTER BRANCH: Fourth Wednesday of the month at 7.30pm, Uniting Church Hall, 24 Milson Street, Charlestown.

MYALL SUB-BRANCH: Fourth Thursday of the month at 7pm, Hawks Nest Community Centre.

HAWKESBURY-CUMBERLAND BRANCH: Third Wednesday of the month at 7.30 pm at Tebbutt Room, Windsor Library, (045) 73 6169

ILLAWARRA BRANCH: Subject to the discretion of the Committee business meetings may be held first Tuesday of the even months, phone (042) 841 662.

LACHLAN VALLEY BRANCH: Third Wednesday of the month at 7.30pm, Parkes Neighbourhood Centre.

MACARTHUR BRANCH: Second Wednesday of the month at 7.30pm, Ambarvale High School.

MID NORTH COAST BRANCH: Third Monday of the month at 5.30pm, Council Committee Room, Hay Street, Port Macquarie.

MILTON BRANCH: First Wednesday of the month at 7.30pm, Room 10, Ulladulla Primary School.

SOUTHERN SYDNEY BRANCH: First Wednesday of June 1996 and September 1996 at 8pm, Engadine Anglican Church Hall, 4 Waratah Road, Engadine.

SYDNEY BRANCH: See Members' Diary (in Sydney Branch newsletter) for details.

TAMWORTH-NAMOI BRANCH: Third Friday of the month at 8pm, No. 1 Oval Pavilion Kable Avenue, Tamworth. Phone Ron Webster for details: (067) 66 4296.

THREE VALLEYS BRANCH: Last Tuesday of the month at 7.30pm, at Parkhouse Residence, Grassy Head Road, Grassy Head.

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The Basin, a swimming spot on the Georges River. The proposed airport would be on the ridge line in this photo. Photo: J. Sheppard.

buildings, a once thriving vineyard complete with grape-crushing vats and even still sites where 'moonshine' was brewed.

The National Trust considers Holsworthy one of Australia's "key cultural heritage landscapes" and is preparing to list the area as a landscape conservation area.

Environmental destruction

The airport currently proposed is THREE times the size of Kingsford Smith Airport and is to have room for "future expansion".

The construction of the runways, terminals, associated buildings and transport links will involve complete destruction of all the natural environment and heritage items on the site and beyond. There will no doubt also be large scale clearing to create a buffer zone to protect the airport from bushfires.

Flood levels and water quality

Ravines will have to be filled to create enough flat land for an airport in this area, which was rejected in the 1985 MANS Study because of the rugged terrain.

The importation of vast amounts of fill from who-knows-where poses serious threats in terms of weeds and sedimentation of waterways.

The hugely increased volume and velocity of run-off from the vast expanses of hard surfaces is likely to affect flood levels in the low-lying areas of the Georges River

downstream. The degraded quality of run-off from the site is a threat to the Georges River itself.

Impact on fauna, aboriginal sites and reserves

Fauna species like the Koala stand to have an even more precarious hold on existence than they already have. With their range significantly reduced and disturbed they risk being forced into isolated pockets of habitat from which they cannot extend their range or escape if that area is under threat, for example by fire.

At least 50 known Aboriginal archaeological sites will be destroyed if the airport is built on the location shown on the map. As the precise location of runways and infrastructure is not known, the number could be much higher.

The values of the Dharawal State Recreation Area (already on the Register of the National Estate and now included as part of the Blue Mountains World Heritage nomination) and the Heathcote National Park will be severely affected if this airport is built.

Pollution and social effects

In addition to the direct effects on this high conservation value environment, an airport of this size, with the associated increase in traffic and industry will only add to the already seriously polluted air of Sydney, particularly in the south west.

This is intended to be a 24 hour a day, no curfew airport which stands to seriously affect upwards of half a million people in the densely populated urban areas of Campbelltown, Liverpool, Fairfield, Bankstown and Sutherland Shire. The hapless residents of areas like Menai will be hemmed in between Kingsford Smith Airport and Holsworthy and will be doubly affected. It is laughable to read in the Draft Guidelines for the EIS that they speak of addressing noise factors relating 'to a new airport development at a semi-rural location'.

Rushed EIS

The whole procedure of the joint EIS has the hallmarks of a very rushed job. The Draft Guidelines were initially on display for only one month. (Those for the original proposed EIS for Badgery's Creek earlier this year were exhibited for over two months). The Federal Environment Protection Authority extended the time by two weeks after three rowdy public meetings convinced them that they had a problem.

The EIS is intended to be completed by December/January, that is, in less than 6 months! Without extended studies it will be an inadequate EIS, relying solely on existing studies like the Army's Environmental Audit, which the consultants themselves acknowledge to be a very

preliminary survey, conducted only during February 1995.

We stand to lose significant environmental, European and Aboriginal heritage without even knowing what was there.

EIS deficiencies

The EIS is not looking at off-site impacts from associated infrastructure developments like transport links.

The EIS is not looking at any other sites apart from Holsworthy and Badgery's Creek. Since the original MANS Study of 1985 rejected Holsworthy, it is now claimed that the technology to address the problems of Holsworthy has been developed.

Alternative sites outside of the Sydney Basin should also be re-examined with the same advances in technology in mind.

Why Holsworthy?

Many people still regard the Holsworthy proposal as a joke, a furphy, a smokescreen. From everything we have seen and heard from Government sources, it is far from that. The Badgery's Creek site is too small for the International Airport that is now envisaged. Only vast further expenditure on more land acquisition would make the Badgery's Creek site large enough.

Holsworthy presents the Government with an airport for nothing. The land is already government-owned and the airport would be built and operated by private interests.

The Badgery's Creek site could then be sold off for housing and the Government would make a tidy profit. It's as simple as that!

No second airport in the Sydney Basin

Macarthur Branch opposes both Badgery's Creek and Holsworthy sites on environmental grounds and because our members would be affected by either proposal.

NPA State council has endorsed our stance against Holsworthy.

Macarthur Branch's view is that wherever you put an airport within the Sydney Basin the quality of life of hundreds of thousands of people will be directly affected through noise pollution and indirectly by air pollution.

The specific environmental effects of Holsworthy would be devastating but the Badgery's

Creek proposal also poses threats to the environment, especially with its proximity to the Blue Mountains and the Nepean River.

How to get involved in the Holsworthy campaign

Many studies need to be done before it is decided if a second international airport is needed, and a suitable site chosen. There have been no studies, for instance, of the projected growth of airline travel beyond the 2000 Olympics to justify the need for an airport of the size proposed.

There is also a view that fossil fuels will run out very early in the 21st century, or become so expensive that airline travel will not be the affordable commodity that it is now and that travel could well be less as a consequence.

If an airport is needed a wide survey of potential sites must be undertaken. Goulburn is a city that is lobbying strongly for the airport with a Very Fast Train link to Sydney, yet it must be remembered that there will be some environmental impacts to this proposal too. Careful investigation must precede any decision. A headlong rush into a decision must be avoided.

A 'No Second Airport in the Sydney Basin' Alliance has recently been formed. If you are interested in becoming involved in this campaign, contact Bob Walshe of Sutherland Environment Centre on (02) 9545 3077.



Photos: Top: The Wedderburn koalas are known to use the whole of the Holsworthy Range—a vital dispersal area.

Left: *Boronia serrulata* (native rose) was not included in the species list for the Army's Environmental Audit. This specimen was photographed on the range; an example of the incompleteness of the Audit.

Right: Aboriginal rubbing grooves. One of 320 known aboriginal archaeological sites on Holsworthy. One such site has 243 grooves.

Photos: Julie Sheppard

Biodiversity Survey training weekend:

exercises in organising and early mornings.

by **Nicholas Carlile** and
Claire Carlton*

The NPA held its fourth Biodiversity Survey in the last weekend of June. This time, emphasis was not so much on how much information could be collected, though this was certainly one of the outcomes, but on the best survey methods to use with semi or untrained volunteers.

The area chosen was close to Sydney and with easy access—Kings Waterhole in Wollerni National Park.

The location is mostly dry sclerophyll forest with heath understorey but swamps and rocky ridges and some moist gullies provided a range of habitats for different science disciplines to explore and reveal their biodiversity secrets.

Photos by N. Carlile



The base camp was initially inhabited by a few hardy souls on the night before the main invasion. As these keen bods trickled in throughout the evening the temperatures dropped just to remind us that we were actually silly enough to camp out in the middle of winter.

There were no reports of snow by the next morning but the frozen tent flies were enough to make people reach for the woollies.

Village atmosphere

Within hours of the first arrivals, with the welcome warming sun, the place began to take on a village-like atmosphere.

People were meeting up again with fellow surveyors from previous weekends in the open area around the rising shapes of canvas control tents. Others were busy finding that perfect piece of flat ground for a tent that would look surprisingly inviting by the latter half of the coming evening.

Expert shovellers were attempting to be a late inclusion in the toilet-erecting team for the Olympics, only to be disappointed in finding that after all their efforts it wasn't a recognised sport (well maybe it'll have exhibition status by the year 2000).

Others still could be seen returning from short forays away into the bush with pieces of plant matter, or scribbled lists in note books, but all muttering strange Latin words that left a glint of success in their eyes. Yes, it looked like we were shaping up for a fine survey weekend.

Assignments explained

By lunchtime on the Saturday the masses were drawn together and the finer details of the weekend explained to them although this was only news to those who had not remembered to read the material that was sent to them.

The Team Leaders were made known to their assigned assistants and with a flurry of data sheets they went off together into their respective huddles to be initiated into the secrets of data collection.

The anxious moments of the participants were manifested in the surrounding environment when a sudden squall blew through the camp, threatening to wipe the survey from the face of the area.

All was saved, however, and put at ease by the tightening of ropes and the announcement that dinner would be promptly served by 7pm.

Evening talks

As the afternoon wore on the teams were fully briefed and set to go where no survey had gone before, but not before a good few cups of tea and a quiet night around the camp fire.

The evening was made that bit more enjoyable by talks given by Team Leaders on their respective disciplines and how each discipline was brought together in a total survey to gain that extra insight into an area's biodiversity.

The talks were punctuated at times by the distant screeching of night birds and the howling of dingoes (on a nearby hill an extra keen bunch of surveyors were trying to hold their own talks with the native fauna using a megaphone play-back system).

Both groups enjoyed their respective communications and then came together to feast on a meal prepared by the all encompassing talents of the camp cook and her ever changing team of helpers (it was up to everybody to assist at some time with the running of base camp).

By the time the spotlight groups had returned from their searches of the taller woody parts of the area, the insect light traps had been turned off and the camp had slipped into sleep.

A restful night for all was tempered only by thoughts of what the following day would bring and

the hopes that a nature call would not be needed by sleepers before the arrival of first light.

Early morning

By the time the bird and mammal teams were off into the early Sunday morning to hone their identification skills the rest of the camp had spluttered into life.

The geologist group had planned a hike of The Long March proportions to unravel the lay of the land before dusk.

Water quality test kits were stowed into backpacks for the trips to trickles and torrents that made up the local water ways. Anything that lived or swam in these watery worlds would not escape the data sheets as this aqueous team were out to gain all that could be gotten from the muddy depths.

The two botany groups made off to unravel the tangles of forests and heaths and give a name to all that grew there.

The frog people were out to find further amphibious habitats than

to be out basking in the not-so-warm sunlight on the ridges that these herpetologists were traversing.

Not even the smallest fauna of the invertebrate world was to be left undocumented as the entomologist group sorted through the catches of the previous night and planned their array of collecting techniques for the following 36 hours.

Scope of survey

The extent of the combined tasks undertaken by these committed people was mind-boggling in the extreme. But such is the scope of a biodiversity survey that all this and more needs to be covered if an area is to be adequately documented.

It was all taken in the stride of the coordinator and team leaders as the common goal of the time in Wollemi was clear: To design a workable system that would collect adequate data but also provide training for participants, involvement of communities, a

sound basis of information that could be used and built on by all manner of environment bodies.

Most importantly the weekend was aimed at fine-tuning the system of surveying so that it could be easily repeatable for any group that may wish to carry it out.

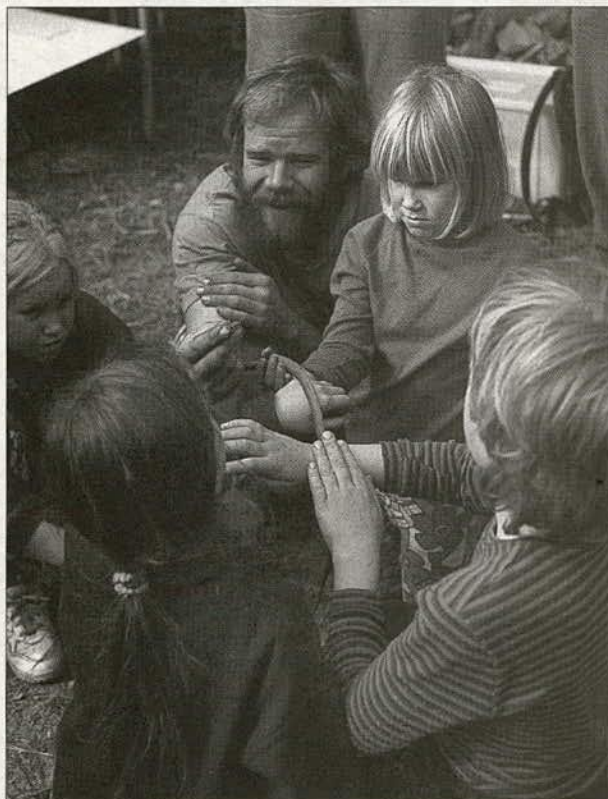
Dinner and discoveries

On the rest of the Sunday the camp area saw the ebb and flow of eager documenters of the environment as teams came in, refuelled and then took to the scrub again.

With the coming of evening the camp kitchen became the intense focus of the small community. From its canvas folds the whirring of knives and stirring of pots were shortly followed by the aroma of the coming meal.

The Team Leader talks were again part of the early evening process but the examples of each discipline's relevance was highlighted by some of the discoveries made over the previous 24 hours.

The dinner's highlight was



the local camps waterhole.

No stone was to be left unturned (but all carefully returned to their original positions) if the reptile people were to have their way. It was a foolish lizard that was going

definitely the dumplings in golden syrup that formed the desert, with people coming back for thirds and fourths!

Singing under the stars

The late evening saw vocal chords limbered up and a few guitars emerge for the ever-persistent singing under the stars.

This strange rite grips even the most mild mannered person. The intoxicating combination of copious chocolate and a good dose of wood fire smoke can find the participant up until all hours and then waking the following morning strangely sore-throated.

Busy morning

The Monday morning saw the well drilled teams (!!!?) back in action, once the layer of ice had been brushed off their day packs.

Most teams were kept busy until late morning when the lure of the final meal drew them back to camp.

By this time the action of disassembly of what had been home for the weekend slowly got into gear. The willing hands saw equipment packed and tents stowed at a frantic pace and before we knew it, it was time for the final group photo and the collection of a simple memento of the weekend.

The various bits of excess perishable foods soon found willing homes and goodbyes between the now field-hardened surveyors were exchanged.

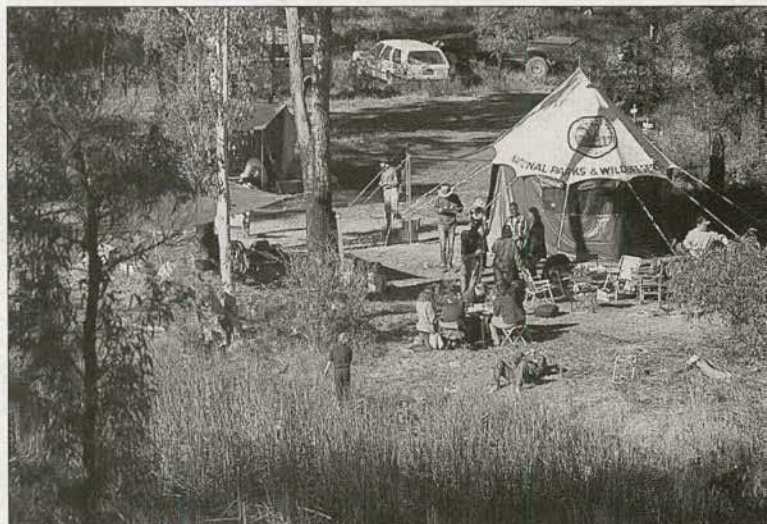
Biodiversity manual

The experiences from this weekend will be documented and added to the lessons learned from previous surveys, to produce a "How to ..." manual for those who would like to hold surveys. With funding provided by the HNMCT (spell out) this product should see the light of day by mid-1997. As for the data obtained by the Survey Training Weekend, most has found it's way onto the NSW Atlas for flora and fauna being compiled by the National Parks and Wildlife Service. The rest of the information is being turned over to the local NPWS district to assist them in the management of Wollemi National Park.

Thanks to all

Many thanks to everyone who helped to bring the survey together and to all who attended. All your efforts are greatly appreciated. If you are interested in getting involved in future NPA Biodiversity Surveys call Claire Carlton on (02) 9560 4553.

* Claire Carlton is NPA Senior Vice-President and Nicholas Carlile is Technical Officer of the Environmental Survey and Research Division of the NPWS.



ANNUAL REPORT: President's Report

Environmental gains

The year has seen some remarkable environmental gains. Expansion of our national park estate means that areas like Ben Halls Gap, Cöolah Tops, Dharawal, Goobang and Torrington, all on NPA's proposal list for many years, are now reserved. Additions out west, in the pipeline for some time, include Gundabooka, Tarawi and a slice of country on the Culgoa. Some of the new areas are additions and consolidations to existing reserves, as at Bongil Bongil, Tomaree and Wollemi.

There remain other long-standing proposals still held up by competing interests, like Maroota and key sections of Jervis Bay.

Eight out of sixteen Wilderness areas under consideration have now been declared; regrettably most fall short of the total area identified, while yet another round of consultations has opened the way for more objections.

The advances go a good way towards fulfilling the pre-election promises of the now elected Carr Government but there is still a lot more that is needed.

NP&W Act

As a result of amendments during the last session of State Parliament, a suite of Regional Reserves, predominantly urban parks such as Centennial and Parramatta, have been placed under the National Parks & Wildlife Service Act.

The opening of the Act also enabled lobbying to gain a number of improvements—better definitions; tenure for State Recreation Areas on a par with National Parks and Nature Reserves; and restriction of Trusts to just three areas.

Sadly, mining interests have continued to block anything but State Recreation Areas in a number of areas of nature conservation value; and in one instance—the landswap intended to compensate for flooding of part of Severn Nature Reserve—a condition of the Development Approval for the Pindari Dam expansion, reservation has so far been vetoed altogether.

The high profile debate over east coast forests should result in further reservations under the National Forest Policy. However, recent Federal moves to dilute the original 15% benchmark for a reserve system could threaten a satisfactory outcome. Nevertheless reservations and wilderness declarations are anticipated as an outcome of the Comprehensive Regional Assessment process under the NSW RACAC process.

With these gains occurring, the National Parks Association needs to work as never before to counteract misunderstandings and fears that nature conservation poses a threat rather than a public benefit for the future of us all. Demands for access also pose threats to the integrity of important areas.

Council and Executive

State Council has continued to meet every third month, enjoying the hospitality of Macarthur Branch, Milton Branch and Sydney Branch, returning to Mitchell Park for the August AGM. Thanks to all those behind the scenes who ensure the arrangements run smoothly.

The Executive met at the homes of Brian Everingham, South Sydney, Graham Douglas, Macarthur, and at Kosciusko NP.

After what has to be record 30 years, Senior Vice President Paul Barnes has decided to 'retire' from all but State Council and Parks and Reserves Committees—a very special tribute is due to "Mr Parks".

Hon. Secretary Karl Rommel, has sadly found that his demanding new position with BHP cannot be reconciled with a home life and NPA Executive membership.

Thanks to all, especially Linna Mitchell, Hon. Treasurer of many years standing, who has so cheerfully carried the growing load of accounting responsibilities.

Planning day

A Forward Planning Day in February helped to lay the foundations for determining priorities and achieving outcomes. We benefited from the experience of Patrick

Medley, from Cooper Lybrand, who worked with representatives from some of our Branches, Council Committees and Executive members.

An important message was the need for improved links amongst Branches and State Council with some comment on the need for growing our membership.

This influenced the budget decision for a survey proposed by Jason Shauness to gain a better understanding of who we are, what members expect and what this means in terms of future operations and fundraising. The report, by Business Students at the University of Technology, Sydney, led to a special workshop for the August Annual Meeting, focusing on membership development.

Staff arrangements

A year ago we looked forward to expanded activity in the State Council Office with the appointment of Jason Shauness as Executive Officer. Regrettably his employment coincided with a downturn in income and rising costs. In developing our budget for the current year, the Executive agreed to his proposal that his employment conclude at the end of his first full year. Proposals to re-structure State Council staffing to a financially more realistic two-full time positions, one primarily on policy and promotion, one administrative, is now well under way.

Penny Roberts has continued to provide a helpful and supportive presence for Branches, and to maintain the information flow on key conservation issues. In addition to her work on the New Areas Bill initiated and her work with State Council Committees, she has had a special focus on the proposed BHP Gas Pipeline proposal.

Through the year we have farewelled Office Coordinators Carol Davies and Pip Walsh, Carol to branch out in a recycling business and Pip to a position with the NSW Australian Heritage Commission, together with a second part-time position at the World Wide

Fund for Nature. She is also alternate delegate to State Council for Lachlan Valley Branch and a Biodiversity Committee member.

Sadly their replacement, Jo-Anne Franklin, had to leave us early in the New Year following the death of her father. Former volunteer and recent graduate Kristi MacDonald has now been appointed Administration Officer.

The running of the office would not be possible without the volunteer time of members. We have also had some expert help from retired librarian Annette Wilson in organising our reference material; and from Mike Thompson and Ray Mitchell on computer management.

Branches

The Branches have taken a lead role on issues within their particular regions throughout the year. Neville Schrader of the Lachlan Valley Branch broke the news of the Parkes goldmine tailings dam waterbird kill, and continued to take a prominent role in challenging the environmental acceptability of the Lake Cowal goldmine proposal.

Up north the Armidale Branch has continued its tradition of soundly researched and logically argued submissions including on a series of State Forest EISs; and in defence of various Reserve proposals. Tamworth has celebrated the long overdue protection of Ben Halls Gap, while Macarthur has been vigorous in its objection to the intrusion of a rifle range into the proposed Dharawal National Park.

Committee projects

Thanks to all the members of the Park Management, Reserves, and Biodiversity Committees and their respective Convenors and Secretaries: Paul Barnes and Marjorie White for PMC, Alan Catford for Policy Review; Marion Hawley and Brian Everingham for Reserves; Roger Lembit and Pip Walsh for Biodiversity.

The organised multi-disciplinary biodiversity surveys, under the wing of the Biodiversity Committee, have taken off in a most exciting way with a major ten-day study in the upper Abercrombie River (now one of the new reserves) and a special long-weekend training

weekend in June at Mellon Swamp. Thanks are due to the many experts who have given their time, and to Claire Carlton for getting and holding it all together. Claire, with the Young NPA group, has also been responsible for the new Membership Brochure.

Tom Fink has accepted the task of convening a working party to follow up on the Otford Declaration—aimed at the reconciliation of Aboriginal needs and NPA nature conservation concerns.

Meetings and groups

Meetings have taken place with Robyn Kruk, Director General of NPWS and her Senior Staff; Neil Shepherd, Director General of the Environment Protection Authority; Deputy Director Lisa Corbyn and senior staff, who hold meetings with peak conservation groups; and Colin Gillatly, Director General of Lands & Water Conservation.

NPA is represented on a great number of other groups. Members of our Executive, Council and Committees serve on the Nature Conservation Council, the Australian Committee for IUCN, the Confederation of Bushwalkers, the Inland Rivers Network and the Australian Wetlands Alliance. John Clarke is the NPA nominee to Green Games Watch.

Grahame Douglas has made an enormous contribution during his six years on the National Parks Advisory Council. Minister Allan declined to accept our endorsement for a further term, following Grahame's accepting a position with Upper House Cross Bench members Alan Corbett and Ian Cohen. The Minister has appointed another of our nominees, Stephen Lord, a longstanding NPA member.

Anne Reeves has been appointed to the new Water Advisory Council and the Grassy Ecosystem Reference Group (established after the Government hived off the grassland regions under SEPP46 to a regional planning approach).

Appointments through the Nature Conservation Council include Roger Lembit, Biodiversity Advisory Council; Grahame Douglas, Bushfire Council and Anne Reeves, State Environment

Protection Community Consultation Forum.

Members also serve on most of the NPWS Advisory Committees; on Total Catchment Committees, Bushfire Committees and Local Government Planning bodies.

Membership changes

Membership has remained fairly stable at between six and seven thousand in the nineteen Branches. Our membership is diverse, some well known, others less so. This year saw the passing of NPA Life Member Milo Dunphy, a well known and outstanding advocate for parks and nature conservation.

Corporate Plan evaluation

Legislative strategies are part of our campaigns on marine conservation and retention of native vegetation and we maintain active involvement in work of the Environmental Liaison Officer.

The South Coastal Region study is almost complete and will be followed by a North Coast study. The report on Marine Protected Areas was launched in late 1995.

Park Management Committee has commented on a series of Draft Plans of Management and met with relevant personnel to discuss management issues.

Water and Wetlands have been a focus, with participation in the Ramsar Convention on International Wetlands, meetings of the Australian Wetlands Alliance, links with the Inland Rivers Network and Marine and Coastal Community Network, and representations to the Government on reform in water administration. Tim Anderson, NPA's honorary Project Officer, has produced a promotional leaflet on Marine National Parks.

The bi-monthly Journal has continued as a flagship, keeping members in touch and informed. Innovations in layout and content by Editor Kathy Fook have met with approval.

Looking ahead, to our fortieth birthday year, 1997, the Association has plenty of challenges old and new to address. We will need your continued support to do so.

Note: This report has been edited for space requirements. Contact the State Council office for a copy of the unedited version.

ANNUAL REPORT: Treasurer's Report

for year ending 31 March 1996

Audit Opinion

In my opinion, the financial statements present fairly in accordance with applicable Accounting Standards and the requirements of the Charitable Fundraising Act 1991 (NSW), the Associations Incorporation Act 1984 (NSW) and Part VIII Section 53 of the Constitution of the National Parks Association of NSW Inc, the financial position of the National Parks Association of NSW Inc as at 31st March 1996 and the results of its operations for the year then ended.

John C McAuley
Registered Company
Auditor
30th July 1996
Lithgow NSW

1994/95

74,154
75,527
153,210
6,585
40,470
6,329
382
27,109

383,766
67,344
7,173
14,422
7,527
15,946
38,232
65,142
81,221
19,564
62,105

378,676

5,090

133,353

138,443

=====

CONSOLIDATED ACCOUNT RECEIPTS AND PAYMENTS

1995/96

RECEIPTS

Donations Received 50,375
Grants Received (Note 2) 83,564
Membership Fees & Subscriptions 162,757
Interest & Dividends 7,341
Sales of Publications/Books/Calendars 54,656
Journal/Newsletter Advertising Income 5,138
Journal/Newsletter Sales 199
Fund Raising Activities & Functions 40,011

404,041

LESS: PAYMENTS

Administration 58,057
Depreciation 6,413
Subscriptions/Affiliations 16,517
Meetings & Committees 12,775
Fund Raising Activities Expenses 26,576
Cost of Sales of Publications/Books/Calend 36,891
Salaries & Wages 98,919
Journal/Newsletter Publication Expenses 81,266
Operating Expenses 9,214
Conservation & Campaigns 78,047

424,675

EXCESS OF RECEIPTS OVER PAYMENTS

Accumulated Surplus at the Beginning of the financial year 138,443

ACCUMULATED SURPLUS AT THE END OF THE FINANCIAL YEAR 117,809
=====

GOVERNMENT FUNDED ACTIVITIES ACCOUNT GRANTS TO VOLUNTARY CONSERVATION ORGANISATIONS

1994/95

22,926
10,000
33,950

66,876

66,876

RECEIPTS

Commonwealth Government Grants
State Government Grants
Dept of Planning National Estate Grants Scheme(NEGS)

83,564

PAYMENTS

Audit Fees 1,000
Bank Charges 2,044
Cleaning 170
Conservation & Campaigns 50,163
Consultants Fees/Salaries Specific to NEGS 21,646
Duty Tax - Federal/State 559
Fax Machine - Leasing & Line Charges 1,278
Telephone 6,569
Postage 10,360
Printing & Stationery 8,521
Conferences 1,115
Rent 9,637
Affiliation Fees 2,745
Electricity 537
Insurance & Workers Compensation 4,949
Salaries
Executive Officer 0
Office Co-ordinator 25,465
Research Officer 27,722
Environmental Liaison Officer 1,000
Clerk Bookkeeper 5,920
Project Officer 337
Super,Travel,Training,Amenities 4,695

1,302

30

3,247

410

19,267

765

Subscriptions
Registration & Incorporation
Photocopying
Printing - Annual Report
Printing-Field Activities Program/Newsletter
Delivery & Courier - Office

(144,577)

EXCESS OF PAYMENTS OVER RECEIPTS

=====

1995/96

22,926
10,000
50,638

1,200

2,900

85

33,099

44,948

584

1,906

8,809

10,517

9,537

1,810

14,000

3,164

1,343

3,463

24,846

27,787

27,667

1,900

7,780

1,923

7,016

98,919

1,347

30

5,389

482

25,555

406

269,493

(185,929)

=====

CONSOLIDATED ACCOUNT BALANCE SHEET

1994/95			1995/96
	MEMBERS' FUNDS		
133,353	Accumulated Funds 1st April 1995		138,443
5,090	Add: Excess of Receipts over Payments for the Year		(20,634)
138,443	Accumulated Funds 31st March 1996		117,809
=====			=====
	Represented By:		
	CURRENT ASSETS		
306	Petty Cash		908
123,549	Cash at Bank		65,561
6,695	Investment		59,240
5,934	Stocks/Inventory		6,726
136,484			132,435
	FIXED ASSETS		
19,892	Office Equipment/Furniture/Partitions (At Cost Less Depreciation) (Note 4)		19,034
156,376	TOTAL ASSETS		151,469
	Less: RESERVES		
8,300	Life Membership Fund	6,800	
9,633	Reserves for Committed Conservation Projects	26,860	
17,933	TOTAL RESERVES		33,660
138,443	NET ASSETS		117,809
=====			=====

STATE COUNCIL ACCOUNT STATEMENT OF RECEIPTS AND PAYMENTS

1994/95			1995/96
	RECEIPTS		
72,102	Donations Received		47,998
22,926	Grants Received-Commonwealth Government Grant		22,926
10,000	-State Government Grant		10,000
33,950	-DOP Nat'l Estate Grant Scheme (NEGS)		47,688
151,515	Membership Fees & Subscriptions		162,717
542	Interest Received		418
2,571	Sales of Publications		2,821
8,103	Fundraising Activities/Functions		18,370
6,209	Journal Advertising Income		5,018
382	Journal Sales		189
18,276	Branch Subsidy		7,080
326,576			325,225
	PAYMENTS		
58,829	Administration	52,384	
14,085	Branch Allowances/Subsidies	14,298	
6,889	Depreciation	6,182	
13,312	Subscriptions/Affiliations	13,085	
6,827	State Council Meetings & Committees	11,880	
8,722	Fundraising Activities Expenses	16,723	
1,459	Cost of Sales of Publications	4,134	
65,142	Salaries & Wages	98,919	
77,068	Journal Publication Expenses	74,278	
16,788	Operating Expenses	8,708	
30,471	Conservation & Campaigns	13,861	
21,646	Consultants Fees/Salaries Specific to NEGS	44,948	
			359,400
5,338	EXCESS OF RECEIPTS OVER PAYMENTS		(34,175)
17,739	Add: State Council Fund Balance 1st April 1995		23,077
23,077	Balance at 31st March 1996		(11,098)
=====			=====
	Represented by:		
	ASSETS		
75	Petty Cash	75	
(6,529)	Bank Account	(28,584)	
8,300	Investments	6,800	
5,534	Stocks Inventory	6,284	
18,468	Fixed Assets	18,047	
15,162	Other Assets	19,940	
			22,562
	LESS: RESERVES		
8,300	Reserves - Life Membership Fund	6,800	
9,633	Reserves - For committed Conservation Projects	26,860	
			33,660
23,077	NET ASSETS		(11,098)
=====			=====

These transactions are an extract from the Consolidated Account Receipts & Payments.

Letters to the Editor



Readers are welcome to respond by letter to other letters, articles and features in the *National Parks Journal*, or to write on any topic of their choice. Preference will be given to short, concise letters. Other letters may be edited or not included, as space permits. Please be aware of libel and defamation laws! All views expressed are those of the authors and are not necessarily shared or endorsed by the NPA.

PS to Milo obituary

Thank you for publishing my obituary for Milo Dunphy but allow me to clarify the words *'Towards the end of his career Milo Dunphy expressed some disenchantment ...'* which appeared in the final paragraph.

Editing of the article seems to have dispensed with some of my words. What I wrote was that *'Milo expressed some disenchantment with the direction of Australia's environmental movement ...'*.

I was referring to Milo's well publicised criticism that because environmental organisations are increasingly involved in government studies, they may be less able to bring pressure to bear on governments.

At the end of his life, Milo seemed as strongly committed to his own environmental philosophy as ever, and not at all a person who could be described as disenchanted with his career as an environmentalist.

I would not like people to think otherwise because of any comment attributed to me in the NPJ.

Peter Prineas
Chair, Nature Conservation
Council of NSW
12 July

An editor's job is never easy! Sometimes reduction of the article is necessary because of space restrictions, as in this case. My apologies if this led to any misunderstanding.

However, I'm sure those who knew Milo would not misinterpret the comments. **Ed.**

'Bush basher' replies to criticism

Paul Bateson (letters Aug NPJ) is concerned about my use of the term 'bush bashing' in an article about my Katoomba to Mittagong walk in March. He questioned whether this walk was indeed 'minimum impact' and consistent with our role as NPA bushwalkers.

The vast majority of club bushwalkers, and especially those from the NPA, are very aware of avoiding damage to sensitive areas. In general, I think that we are quite successful in this.

The term 'bush bashing' has been used by generations of walkers. In my experience, it generally refers more to the damage inflicted on the walker than on the bush! The part of the walk in question was along a marked route on the Nattai—a route which appears in a number of books. It is perhaps a measure of the toughness of the bush along the river that no track has established itself despite the passage of many walkers.

Over the years in the Kanangra area I have seen quite a number of informal tracks become established by use. It is hard to know if this is a good or bad development. The existence of these tracks reduces the wilderness experience and causes some local damage. But they do act to restrict walkers to definite locations and reduce more widespread damage. And at least the damage done is minor compared with the big issues such as clearing of bushland, feral animals, and exotic plants.

There is no doubt that a track will establish itself along the Nattai—pressure from Sydney will ensure this. Should we as NPA walkers not have been part of this inevitable process? I really don't know the answer!

Richard Thompson, Field Activities Convenor
August 15

Bushwalking cramps

I am a member of NPA who enjoys bushwalking but I have been having problems with muscular cramps if I push myself too hard. I would be interested to hear of the experience of others.

Having enough water is very important. It should be possible to calculate the minimum requirements, but one litre plus liquid from fruit would be minimum. Aspirin is helpful but can be dangerous because in the case of an accident there could be excessive bleeding. Magnesium Aspartate tablets before and during the walk, Biquinate tablets when cramps occur, sports drinks which contain magnesium, one third tea-spoon of magnesium sulfate (epsom salts) added to drink, Glucodin in fruit juice—all can be useful. Caffeine must be avoided except perhaps weak tea. Some foods can increase the risk.

Ray McFadyen,
29 August 1996

More bush care; less bush walking

The question raised by Paul Bateson (Letters NPJ Aug '96) and Richard Thompson (pp15-16) about whether bushwalking can be conceived as a conservation activity opens up broader issues, I believe.

It is subsumed under the larger question: How ought we to relate to nature in a context in which native environments are increasingly scarce and threatened, and human culture ever more demanding? I'd submit that we don't yet know the answer, but that we need to explore every avenue in attempting to find one.

The value of indigenous bush, all would now surely agree, is far greater than its ability to afford us recreational, psychological and aesthetic benefits—however important these things may be to us.

And while the NPA walks program may have political, membership and some educational spin-offs, as Richard suggests, bushwalking is only one of the ways in which we can usefully relate to natural bush. It is perfectly possible to enjoy a day of energetic tramping without learning a thing about the ecology of the area tramped through! And it's certainly unlikely that the tramp returns direct benefits to the bush.

I would like to suggest that as well as seeking to familiarise its members with the bush through the walks program, NPA also does more to promote the burgeoning bushcare movement and the various educational programs (TAFE and National Trust Bush Regeneration courses for instance) that support it.

For starters, I can offer the following information:

1. Jennie Whyte, Landcare's Urban Specialist, has identified 450 community groups working across 42 local council areas in the Sydney region on projects including bushcare, rivercare and dune care.
2. The Blue Mountains Conservation Society journal, *Hut News*, July issue, listed 21 bushcare groups.
3. NPWS Volunteer Programs:
North Metropolitan District (Ku-ring-gai National Park): Chase Alive Program 9457 9322
Lane Cove National Park Volunteer Bush Regeneration: Lynn Rees, 9412 1811
Garigal National Park (Forrestville) Bush Regeneration Program: Robert Blackall 9451 3479
Sydney Harbour National Park District (includes the islands): Samantha Olsen 9337 7018
South Metropolitan District (includes Royal National Park, Georges River etc): 9542 0666.

Victoria is well-served by *Indigenotes* (the journal of the Indigenous Flora and Fauna Association) in this regard; it publishes listings of the many local groups involved in bushcare programs throughout the state. However, there is no such comprehensive source of information for other states. Could the NPA see its way clear to providing something similar?

Gail Abbott
Balmain
14 August

Sounds like a great idea for a future journal. **Ed.**

Walking and access not the same as conservation

Richard Thompson claims that bushwalking and conservation are two sides of the same coin (NPJ Aug '96). I do not agree.

I have been walking with bushwalkers whose sole aim is to 'do the walk', striding energetically along the track, seeing little and appreciating less. Others walk more slowly, deep in conversation with fellow walkers about family and work, also seemingly blind to the intricacies of the bush about them. The most enjoyable fellow walkers, in my experience, are photographers, willing to take the extra time, and trained to a keen way of seeing the beauties of nature. Point 1: Bushwalkers are not necessarily at all concerned with appreciating the environment they walk in.

While there are many human benefits from bushwalking—relaxation, the relief from noise and crowds, a chance to share experiences with friends, the uplifting effects of magnificent views, physical challenges—it seems to me that some walkers are more concerned with their rights as walkers rather than the rights of the bush to protection.

Remember how indignant bushwalkers became when Sydney Water said that no humans should have access to catchment areas in the Blue Mountains? Walkers' 'rights of access' were challenged. Much like the off-road vehicle lobby, these bushwalkers seem to think that human beings have the right to go anywhere, even pristine wilderness, as long as they walk!

For me, this human-centred view has little place in a true conservation ethic. Surely there should be places in our besieged world where no human beings go—in vehicles, on horseback, or on foot. If bushwalkers accepted this conservation restriction then they may even be taken more seriously by the other groups who want access to everywhere. Point 2: Bushwalkers can be more interested in the benefits of the activity to themselves, rather than the environment it occurs in.

There are also many conservationists who are not bushwalkers. So where does their motivation come from? They may never have been on an overnight pack walk, have no interest in driving or walking in rough conditions or challenging their physical limits by walking and climbing in trackless terrain. They may prefer to look out over a wilderness rather than 'bushbash' through it, content to leave some places entirely to the wild creatures who have been driven from areas now devoted to human beings. Yet their lobbying efforts are no less effective than those who like to walk in the bush. Point 3: Conservationists can be motivated by ideals other than direct experience.

I challenge the NPA to become a true conservation organisation and accept the 'no human access' principle for some areas. If NPA can advocate 'no take' zones in marine parks, surely the 'no access' argument is not beyond the pale for land areas.

Janelle Howard
Murwillumbah, 6 August

Reading Reviews

How to choose quality environmental literature for children

First of all, as with any book, environmental children's literature must have 'kid appeal'—attractive cover design, illustrations and print styles. Non-fiction books should present clear and accurate information. Fiction should tell a good, gripping story.

Good green books promote an awareness of important ecological principles, such as the interdependence of all living things with the natural environment. The best green books also encourage an understanding of the diversity, fragility and beauty of the natural world.

Annual Environment Award

To help people identify quality children's books which encourage a caring attitude towards the environment, the Wilderness Society has established the annual Environment Award for Children's Literature.

The 1996 Environment Award was won by Jeannie Baker for *The Story of Rosy Dock* and Densey Clyne for her Small Worlds series of non-fiction books—*Spotlight on Spiders*, *It's a Frogs Life* etc.

Recommended Australian Environmental Childrens Literature: Picture books

- ☐ *V for Vanishing* by Patricia Mullins
- ☐ *Secrets of the Rainforest* by Margaret Dunkle and Dailan Pugh
- ☐ *The Fisherman and the Theefyspray* by Paul Jennings and Jane Tanner
- ☐ *Where the Forest Meets the Sea and Window* by Jeannie Baker
- ☐ *The Best Beak in Boonaroo Bay and The Hunt* by Narelle Oliver
- ☐ *The Paddock* by Lillith Norman and Robert Roenfeldt
- ☐ *The Wonder Thing* by Libby Hathorn and Peter Gouldthorpe
- ☐ *Cry Me a River* by Rodney MacRae
- ☐ *Yakkinn the Swamp Tortoise* by Guundie and Gerald Kuchling

Non-fiction

- ☐ Australian Animal series by Pauline Reilly *Emu; Brolga; Kangaroo; Platypus; Python; Kookaburra* etc.
- ☐ *Who Did That?* by Jill Bruce and Jan Wade
- ☐ *Life in a Rotten Log* by Kathie Atkinson
- ☐ *We the Earth* by Katherine Scholes and Shane Nagle
- ☐ *Go Green! What You Can Do to Help Save the Planet* by John Elkington and Julia Hailes
- ☐ *Australian Frogs: Amazing Amphibians* by Jill Morris and Lynne Tracey
- ☐ *The Australian Animal Atlas* by Leonard Cronin and Marion Westmacott
- ☐ *Wild Australia Close Up* by Tina Dalton and Garry Flemming

available from
National Parks
Association
State Council Office

Australian National Parks
Pocket Diary
\$9.75 plus \$1.00 p&h

Australian Wildflowers
Pocket Address Book
\$9.50 plus \$1.00 p&h

Now is the season for publishing field guides, or so it seems from the abundance on the market at present—many of them re-releases due to ongoing demand.

Get ready to go exploring with these handy pocket-sized aids to identification and appreciation of the great Australian outdoors.

Field Guide to Australian Flowering Plants: Melaleucas

Ivan Holliday

New Holland \$24.95

A new edition of this important field guide and the only one to feature beautiful melaleucas from all around Australia. Over 140 species are included with full descriptions, drawings, photographs of the flowers and diagnostic details to assist identification by curious gardeners and naturalists alike. Iv an Holliday is a well known expert in this area.

Tracks Scats and other Traces

Barbara Triggs

Oxford \$29.95

Another reprint, this time with a change of title and all the original detailed information. Gives descriptions of tracks, scats (droppings—for the uninitiated) and sings required for tracing everything from the common Brushtail Possum to the slightly more shy Short-beaked Echidna. Enables the daytime sleuth to identify nocturnal animals rarely seen in their natural habitat. A much sought after guide. Comprehensive illustrations for easy identification.

Field Guide to Aboriginal Rock Engravings

Peter Stanbury and John Clegg

Oxford \$29.95

Until the virtual revolution in Aboriginal art during the seventies, when the oldest art tradition in the world began to be captured in contemporary fashion on canvas, much of what was preserved of indigenous Australian art was in the form of rock engravings.

This guide to the least known and most subtle examples of Australian art covers the history, cultural significance and interpretation of various rock art from around the Sydney and east coast region. Visit the art gallery of the great outdoors and take a well-guided tour courtesy of this unique field guide.

Gwen Elliot's Australian Garden

Hyland House \$39.95

With the proliferation of gardening books on the market it's difficult to keep abreast of all the latest compilations of growing guides and gardening tips. This particular title boasts of being the most comprehensive book on growing and using Australian Plants ever written. Whether or not this is entirely true, it is certainly an extremely well-researched guide, set apart from the rest by the extensive and lavish use of colour photography to illustrate the full array of native plants.

Thoughtfully laid out, factual and beautifully presented, this hard back will make a fantastic gift for someone beginning a garden or looking to make a feature of Australian native plants suitable to their region.

A Companion Guide to Bush Food

Jennifer Isaacs

Landsdowne \$19.95

If you own the Bush Food guide, or even if you don't you'll want to add this guide to native tucker to your bushwalking library. Beautifully illustrated with colour photographs, the guide contains an informative listing of the more common bushfoods, their location and use. Perfect for glovebox or backpack, with caution next time you're out wandering you can do some tasting straight from the bush. The fruit found on that ubiquitous beach plant more commonly known as Pigface really do taste like salty strawberries.

Delicious—but not comprehensive enough to outdo the larger format, more detailed Bush Food.

Reviews by Greenbooks 94 Liverpool St Sydney (02) 9261 1919

Kakadu and the Top End

Matthias Breiter

Kangaroo \$19.95

This really is the most comprehensive guide for its size to Australia's largest terrestrial National Park. Divided into two distinct sections, the first deals with the practicalities of getting there, accommodation and what to see and do in the park, while the second covers the natural history and management of Kakadu.

Thoughtful inclusions are chapters on mining and mineral leases, colour photos of the amazing flora and fauna—at least one third of all Australian birds can be found in Kakadu at one time of year or another—and a detailed coverage of Kakadu's Aboriginal Heritage.

Besides the sheer abundance of rock art to be found is some of the most spectacular and varied Australian scenery. If this book is any indication Kakadu is well worth a visit—or three.

The Japan we never knew

David Suzuki and

Keibo Oiwa

Allen & Unwin \$21.95

Subtitled 'A journey of discovery' this really is a special look at a country that most of us recognise as an economic superpower and destroyer of the environment but actually know little else about.

One of the world's most well known and influential environmentalists, David Suzuki delves into his genetic background (he's Canadian but has the face of a Japanese) to discover the people behind the stereotypes. What he uncovers are all manner of individuals acting for social and environmental change in a land that is often shocking in its extreme. The focus is Japan but the message is universal—it is one of inspiration and hope and the extension of true understanding to our fellow human beings. A must read—along with all the other Suzuki titles.

NATIONAL PARKS ASSOCIATION PUBLICATIONS

NPA Guide to National Parks of Northern NSW
\$35 plus \$5.00 p&h

NPA Guide to National Parks of Southern NSW
COMING SOON!

available from
State Council Office
(02) 9233 4660



Photo: Nicholas Carlile

The National Parks Association held its fourth Biodiversity Survey in June. Turn to page 17 to read about the survey and find out how you can be involved in future activities.

Managing the State Forests

The Pilliga Management Area



Plan of Management for the Pilliga Management Area

SUMMARY

For State Forests to continue to meet the needs of the community now and well into the future they need careful long term planning.

It is the Forestry Commission's responsibility to balance the conservation of its forests with our requirements for wood, recreation and other forest resources.

Planning for these forests is based on the Commission's Indigenous (native) Forest Policy. This policy is published and available for purchase.

For planning purposes, State Forests are

divided into planning areas such as Pilliga. A management plan is published for each area. It contains the Commission's aims and objectives for that area, and the methods designed to achieve them based on the natural and cultural resources of the forests. These plans are also available for purchase.

This booklet is a short summary of the 1986 Pilliga Management Plan which applies for the next 5 to 10 years.

For more information readers should consult that plan and the Commission's forest policies.



The Pilliga – the largest expanse of inland plains forest in Australia.

Objective

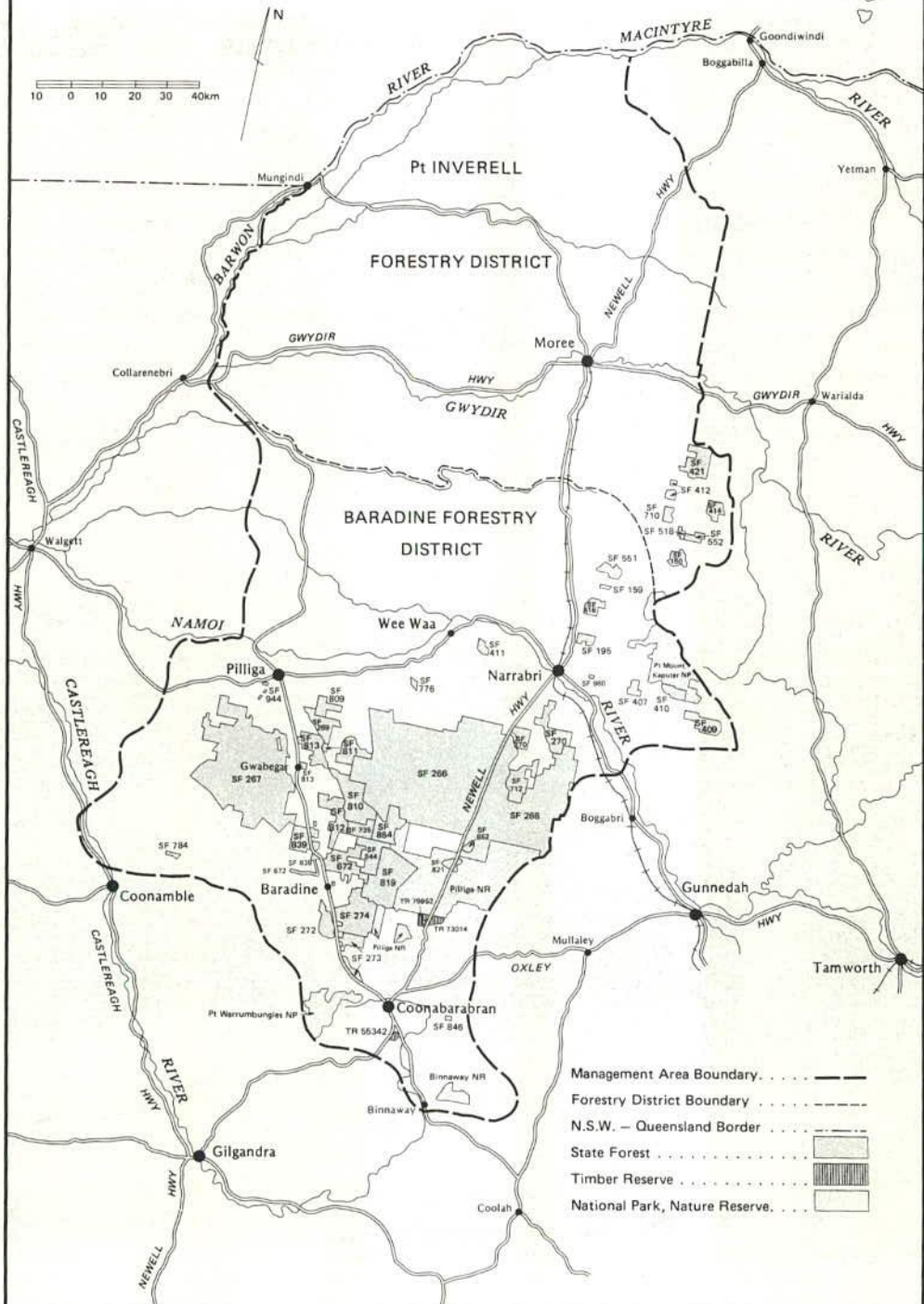
The principal objective of this plan of management is to protect and manage the forest ecosystems to ensure that the forests

continue to thrive and support dependent flora and fauna while meeting our need for timber.



Moema State Forest, cypress pine forest after a century of management.

PILLIGA MANAGEMENT AREA LOCALITY MAP



Geography and ecology

The Management Area consists of all Crown-timber lands in Baradine Forestry District and the western part of Inverell Forestry District. The 33 State Forests totalling 421 218 hectares are within seven local government areas and the State electorates of Castlereagh and Barwon. The largest towns are Coonabarabran, Baradine, Narrabri and Moree.

About 57 per cent of the Area is undulating country including the lower foothills of the Warrumbungle and Nandewar Ranges; only 3 per cent is steep. The remaining flat country covers the north-western section of the Pilliga Forests and the valley floor at Terry Hie Hie. The Area extends as far as the Queensland border but the bulk of the State Forests are between the Warrumbungle Range and the Namoi River.

The Pilliga Forests south of the Namoi River and the Nandewar Forests east and north-east from Narrabri are administered from Baradine. Inverell District administers the Terry Hie Hie Forests in the foothills and valleys of the Nandewar Ranges as well as some leasehold lands north from Moree.

The climate is typical of the western slopes and plains in that rainfall is variable but evenly distributed throughout the year. The average rainfall in forests near the ranges is 700 mm per annum, reducing in the western areas to about 450 mm per annum.

Climatic features influencing the ecology of these forests include the frequent periods of severe drought, rare periods of extended saturation and the relatively low frequency of fire.



The Pilliga is a vast area of undulating country reaching to the Warrumbungle Range.



The vegetation of the Pilliga consists of mixed cypress pine and eucalypt forest.

Pilliga forests comprise an environment which has been substantially modified by Aboriginal, and later, European influences on natural ecosystems.

Vegetation consists of mixed cypress pine and eucalypt forest with a scrubby understorey. White cypress pine proliferates over most soils, occurring over 80 per cent of the Area. It disappears from the heaviest soil types, where belah, box, and buddah grow, and from the poor skeletal soils of the low ridges where broadleaved ironbark, bloodwood, scribbly gum, black cypress pine and curricabah occur. Narrowleaved ironbark grows best on deep sandy soils with good sub-soil moisture similar to those favoured by white cypress pine and an association of these two species is found on almost 40 per cent of the forests.

Other species commonly growing with white cypress pine include red gum, apple, box and bullock. There are many species of understorey shrubs including wattles, native broom, hop bush, sheoaks, and a profusion of ground plants noted for their spectacular flower display in spring.

White cypress pine aggressively colonises new sites (in the absence of severe wildfire and/or grazing); it is a prolific seed producer and extensive areas of thick regeneration result when climatic conditions are favourable. The lateral root system soaks up moisture very efficiently so that ground vegetation does not usually grow. White cypress pine however, lacks the characteristics of dominance and culling through competition which are displayed by eucalypts. Larger trees may eventually develop as a



Narrowleaved ironbark can occur in almost pure stands.

result of natural thinning by fire, droughts or grazing. Generally, little or no growth takes place in thick stands of white cypress seedlings unless they are thinned – by good management practice, or other agents such as wildfire.

In contrast, ironbarks and other eucalypts are not as susceptible to death by fire and regenerate in this harsh climate primarily through coppice growth. These eucalypts thin themselves naturally because unlike white cypress pine the most vigorous trees grow to the detriment of the weaker trees.

These forests are home for a surprisingly wide range and density of animals and birds

considering the climatic extremes, the xerophytic (adapted for dry conditions) nature of the flora and the relative lack of surface water.

Severe drought is the one climatic factor which can cause extensive reductions in the populations of both flora and fauna species of the Area. This may be compounded by the occurrence of wildfire. Conversely, flora and fauna species proliferate in a series of wetter years.

An exceptional feature is the scattered occurrence of remnant rainforest species such as red ash.

The community

Aborigines of the Kamilaroi tribe lived in tribal groups along the Namoi River and its tributaries west of Boggabri. Pilliga, meaning "swamp oak" was their name for the area. Little evidence exists about the cultural history of these tribes except for scattered remnants such as middens, axe grinding grooves, scar trees, stone implements and the recorded observations of the first European explorers and early settlers.

In 1818 explorers John Oxley and George Evans traversed the southern edge of the Management Area. Allan Cunningham's and then Major Mitchell's parties traversed the north eastern part of the Area in 1827 and 1831 respectively.

Reports and sketches from early explorers mention that where today forests stand, there were grasslands, woodlands or open forests dominated by large cypress pine or eucalypts. Only the ridges were covered

with scrub. Aborigines had developed a refined broadscale method of native animal husbandry using fire to perpetuate native grasslands. Their hunting fires as well as fires started by lightning burnt the seedlings and kept the woodlands open. Game was attracted to new grass shoots and was easier to find and catch in open areas.

European squatters with cattle moved in from 1830 and by the mid-1800s large grazing leases had been taken up on the extensive grassy plains and open woodlands. In 1875 it was estimated that there were 25 000 sheep, 30 000 head of cattle and 10 000 horses within the limits of the present Pilliga forests. Aboriginal hunting grounds were taken over by grazing animals often after physical conflict between squatters and Aborigines. In addition, contact with Europeans exposed Aborigines to diseases which were previously unknown and many of them died.



European squatters settled the Pilliga in 1830. This grave site of an ex-lifer convict and small child is one of the many reminders of early settlement.

A very detailed story of settlement of the Pilliga area and subsequent development of Pilliga Scrub is told in Eric Rolls' book *A Million Wild Acres*.

Many of the large forest runs were abandoned in the late 1800s because of drought, rural depression, and the prolific invasion of pine and eucalypt scrub. Thousands of grazing animals and many native animals died following severe droughts in the late 1870s. Heavy rains between 1878 and 1885 created the right conditions for a large crop of seedlings and a combination of lower stock numbers and reduction of burning allowed this thick scrub to take over grazing land.

Attempts to resettle the lighter soils of this forest country, particularly when the railways were constructed through the Area between 1881 and 1902, and after the First World War, were unsuccessful. The scrub which regenerated in the late 1880s and early 1890s continued to spread. However, plagues of rabbits (introduced to Pilliga area about 1900) prevented further natural regeneration from occurring even in wet years.

Small scattered sawmill settlements were established throughout the forests during the early 1900s at such places as Ceelnoy, Wombo, Rocky Creek, Wooleybah, Euligal Crossing, and Terry Hie Hie. Inhabitants

eked a living from the land, by sawmilling or sleeper cutting, and running stock as the opportunity arose.

Simultaneously the wheat, sheep and cattle industry continued to develop and prosper on the heavier soils of the plains.

Construction of large water storage dams on major rivers such as the Namoi since the 1950s has allowed high value irrigation farming to develop. The cotton and vegetable oil industries have provided a significant boost to the rural economy of the area since the 1960s.

Increased mechanisation has generally led to more efficient farming and timber milling techniques, lower labour requirements, and better transport systems, resulting in an increase in the size of the average rural holding or sawmilling industry. It has also led to the demise of the smaller rural and sawmilling settlements and villages, in favour of limited growth in larger rural towns. Rationalisation of rural industries and population distribution is continuing.

Forest-based industries within the Management Area currently account for the livelihood of about 3 per cent of the regional population but a much high proportion of the population of Baradine and other smaller settlements.



Underwood's sawmill at Rocky Creek on Eulagil State Forest. Circa 1930 (I Jack).

Management history

Sections of the "million wild acres" of the Pilliga Management Area have been managed for over one hundred years. The earliest reservations of cypress pine and eucalypt forests in the Pilliga area were made in 1875.

The value of the timber resource of the extensive white cypress pine forests in the region was recognised by the then Forest Conservancy Branch of the Department of Mines which appointed the first Forest Ranger, James Ward, to Wee Waa in 1877. Early forest management focused on monitoring and preventing the unrestricted taking of timber, by for example a minimum stump diameter on white cypress pine, initially of 60 centimetres and later of 30 centimetres.

In response to increased interest in sawing the termite-resistant white cypress

pine in the Pilliga, the newly-formed Forestry Commission opened the Northwest Regional Forestry Office at Narrabri in 1911. The first foresters carried out timber assessments from horseback. As a result of this work, 182 500 hectares of State Forests were dedicated in 1917.

In the period 1926–1930 subdivisinal survey and further timber assessment was carried out. This assessment provided forest resource information to be used in the preparation of amended Working Plans.

During the period 1930–1939 many men were employed on unemployment relief work, manually thinning large areas of thick cypress regeneration emanating from the 1890s and constructing roads. To ensure that these State Forests had a more secure tenure, most were dedicated as National Forests in 1937. Plagues of rabbits



Road construction with unemployed relief workers, 1930.

Pre - 1890s

Eucalypt and cypress pine woodland, with grassy understorey.

1890s

Dense cypress pine and other species regeneration.
Scrub — developing under mature eucalypt and pine woodland trees.

1900s to 1950s

Harvesting of mature cypress pine and ironbark and thinning of dense regeneration promotes a two-aged cypress pine forest, with scattered eucalypt.

1950s to 1980s

Continued harvesting of all older pine and ironbark and thinning of regeneration together with new crops of pine seedlings creates a more diverse cypress pine and eucalypt forest.

The present

A diverse forest with abundant cypress pine of all sizes and scattered eucalypt of various species and a range of sizes.

Forest management over the last hundred years has produced an increasingly productive forest resource with greatly enhanced conservation values.

prevented further natural regeneration of cypress from occurring even in wet years.

The Second World War disrupted this construction phase of forest management. There were few restrictions on removal of large cypress pine logs and this led to an imbalance of numbers in tree size classes. After the war the forests were reassessed and forest types mapped during "The Pilliga Management Survey" in the period 1946 to 1952. This enabled new Working Plans to be drawn up with the main objective to build up the stock of larger-sized trees depleted during the war.

In the 1950s myxomatosis killed most of the rabbits, so widespread cypress regeneration following heavy rain developed at a great rate for the first time since the 1890s.

A further assessment was carried out in 1965 incorporating permanent forest inventory plots from which forest growth would be monitored. The data from this assessment were incorporated in the first Management

Plan for the Pilliga Management Area which was produced in 1968.

Since then the State Forests in the Bogabri and Terry Hie Hie areas have been added to the Pilliga Management Area.

Forests are a renewable resource but must be managed so that a proper balance can be maintained between conservation and economic values. All forest values are protected by the Preferred Management Priority (PMP) System. This means that in forestry land use, management must suit the resource. Where part of the forest ecosystem has special or unusual values these values are acknowledged and given a ranking so that those values with priority receive special emphasis or overall priority in the management of that area.

The system is illustrated on PMP maps which then provide basic geographic guidelines for planning the multiple use of the forest.

Forest management since 1887 has produced an increasingly productive forest

resource with greatly enhanced conservation values. This has been achieved while these forests have yielded as major products more than 1.9 million cubic metres of cypress pine sawlogs (enough for about 140 000 houses), and more than 5.5 million ironbark sleepers since 1929 (about 8 000 kilometres of line).

Present and future management

The 1986 Management Plan has been produced to ensure that these forests continue to be managed for our benefit now and in the future.

The Plan specifies that timber harvesting from the white cypress pine forests will maintain and enhance the forests' productivity and conservation values. This will be done by harvesting older trees as they reach maturity and by thinning the younger trees. Non-commercial thinning will be undertaken to encourage tree growth in dense cypress

regeneration. The natural regeneration properties of cypress pine ensure the continued replacement of the trees so cutting will be done at a rate that allows for a sustained yield.

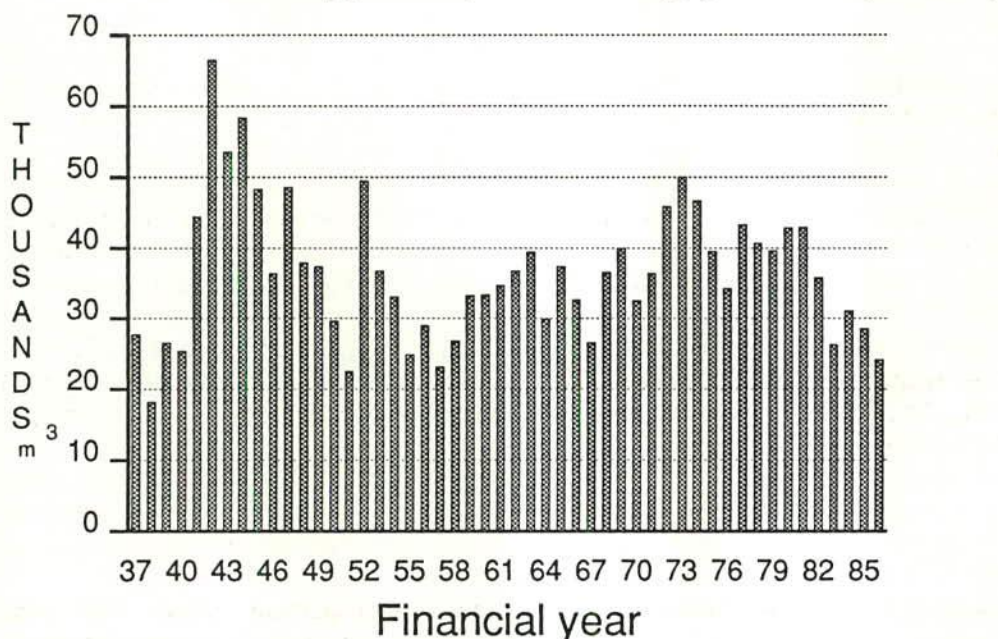
Production of ironbark sawlogs, poles and other timbers will be continued from over-mature and defective trees; actively growing trees will be retained for future production.

The Plan specifies that in all logging operations conservation values will be maintained by retaining forest strips along major stream channels, by retaining a proportion of all tree species and by keeping a sufficient number of old hollow trees suitable for wildlife habitat.

Provision has been made in the plan to continue monitoring the growth of forests, revise the yields of various timber products and continue research so that the forest system is conserved.

Pilliga management area

Past cypress pine sawlog yield (cubic metres)



Maintaining forest resources

Wood production

Cypress pine and ironbark timber from these forests has been used extensively by European man for over 150 years. The early settlers built huts from cypress pine and fences and stockyards from ironbark, box and oak.

The maximum annual rate of cypress pine sawlog production from Pilliga Management Area has been set at 53 000 cubic metres; for ironbark sawlogs at the current level of 14 000 cubic metres and ironbark sleepers also at a maximum fixed by current levels of cutting.

Other hardwood timber products harvested include fencing, bridge-building, and mining timbers, and firewood. Limits on production have not been set because of the generally minor nature of these operations.

Cypress pine sawlogs are processed into sawn timber in five sawmills which provide timber for housing frames, strip flooring,

weatherboards, feature panelling, and fencing for local, Sydney, Melbourne and other markets. The industry is still expanding and the maximum yield is not yet being harvested.

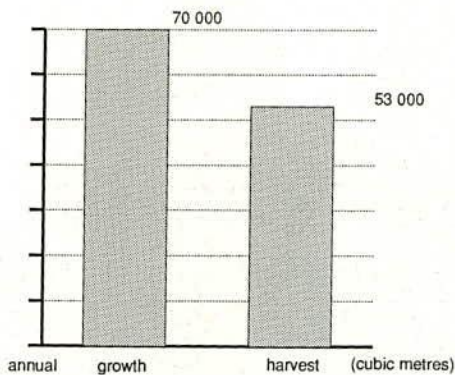
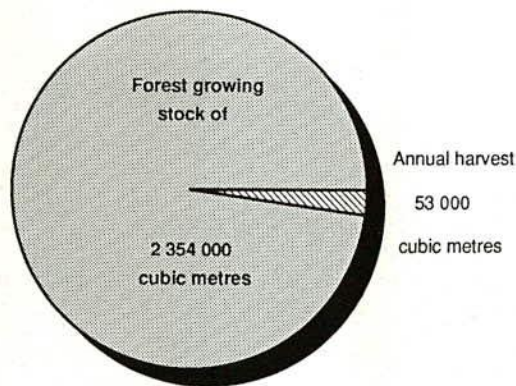
Ironbark sleepers are sawn by about 35 sleeper cutters; the majority of this timber goes to the State Rail Authority of N.S.W.

A high technology sawmill and processing plant processes ironbark fence posts and droppers which possess excellent electrical insulation properties for electric fences. These are marketed in Australia and overseas. Sawn ironbark is also used for special orders such as bridge girders and sawn fence posts. Residues from ironbark sleeper operations are converted into sawn timber and used for fencing horsestuds and other farms.

Firewood is an under-utilised resource; most is cut for local domestic use.

Hardwood mining timber is produced from Pilliga East State Forest on an intermittent basis for coal mines near Gunnedah.

Sustaining the forest



The Pilliga cypress pine forests grow an estimated 70 000 cubic metres each year. Since harvesting is restricted to 53 000 cubic metres a year, the forests are being managed on "sustained yield", that is they are able to more than renew the amount harvested.

Fire protection

Historically, fire has had the most damaging impact on the health and growth rates of these forests.

Dry electrical storms in summer are the major cause of wildfires. Damage is most severe when the fires occur after a number of good seasons when cypress pine stands are invaded by heavy ground cover, which becomes inflammable in dry times.

District Fire Plans set out the methods of protection, such as grazing and hazard reduction burning, and the necessary mechanisms of fire fighting. These include the development of firetrails, provision of water supply and the co-operation with neighbours and local bushfire brigades. Where possible, bush fire brigades are linked to two-way radio networks.

Grazing

Approximately 50 areas covering about 52 000 hectares of State Forest are leased or oc-

cupied for grazing. Stock carrying capacities are light, with water being a limiting factor particularly for drought relief grazing. Grazing is managed to ensure that adequate regeneration of trees and ground cover occurs. The Plan provides for fence and water supply construction to encourage grazing.

Grazing is not permitted in sensitive areas containing rare or unusual flora or fauna, and is restricted in areas suitable for other uses such as recreation, or sites of historical, cultural or conservation value.

Beekeeping

About 600 apiary sites are held under permit allowing beekeepers to follow the flowering of the bloodwood, ironbark and gum species as well as the many flowering shrubs. These forests are a valuable area for the breeding of bees and honey production, as they are free from the chemicals used extensively on surrounding farmland.



Grazing is one of the multiple uses of the Pilliga forests as well as a management tool to control regeneration and improve fire protection.



Schwagger's Bore and picnic site , Pilliga East State Forest. This site is maintained as a reliable water supply for firefighting, grazing, beekeeping and recreation.

Broombush

Provision is made in the Plan to continue the intermittent harvesting of broombush from the broom plains of the Area which yield an average of 110 tonnes per annum, for use in urban fencing.

Water catchment

Forests of the Pilliga Management Area provide stable water catchment areas for the tributaries of the Namoi and Gwydir Rivers. The Pilliga Forests also protect the aquifer beds which feed into the Surat section of the Great Artesian Basin.

Recreation and education

The dry and extensive nature of these forests makes them unsuitable for the intensive

recreational usage that occurs in the coastal forests.

However, local residents and visitors consistently use the forests for such activities as picnicking, motor bike riding, bush walking, photography, viewing of wild flowers and wildlife, camping, restricted hunting of feral animals such as pigs, rabbits and goats, or simply a day's drive. The forest drives and low-key picnic areas provided are used in the autumn to spring period, with peak usage being during school holidays.

Local schools organise educational visits to the forests and students from the University of New England in Armidale make regular study tours.

Conserving flora and fauna

Together with the adjacent Mt Kaputar National Park and Warrumbungle National Park, these 33 forests assist in providing an important wildlife refuge and a diverse range of western slopes and plains forest habitat in an area generally cleared for agriculture.

In addition, a total of 3 200 hectares has currently been set aside from these forests in seven preserved areas (Flora Reserves and Forest Preserves), primarily to protect representative areas of a range of forest types. A mosaic of 150 000 hectares of different kinds of forest is also undisturbed.

Trees or forests of particular conservation value are protected under PMP classification., such as the "Kil-larney Tree" left and the nesting site of these fledging square-tailed kites below. (D. Johnson).



Under PMP policy some plants have been identified as vulnerable and/or restricted to small areas. These include *Eriostemon ericifolius*, scrub myrtle (ooline), *Prostanthera cruciflora* and two species of *Macrozamia*. These will be protected even if they are not currently included in reserves, as will some cypress pine sites and interesting brigalow associations.

The diversity of habitats and the low intensity of logging ensures that the wide range of wildlife, adapted to these dry forests, is not detrimentally disturbed.

The return of a scrubby understorey over extensive areas of forest is favouring the influx and population growth of such birds as the emu and the mallee fowl. Fire protection measures have ensured that koala populations have increased. Some other threatened fauna whose needs are being investigated include the bush stone curlew, the brush-tailed rock wallaby and the coral snake.

Archaeological values

Archaeological values are significant in several forest sites where there is positive evidence of Aboriginal occupation and culture. Such signs as axe grinding grooves, caves, and scarred shield trees occur in restricted areas, and there are also diffuse signs of open campsites near some streams.

Such areas are already protected from disturbance under the PMP classification, and the most significant are being included in new flora reserves. Notification of these sites has been given to the National Parks and Wildlife Service for their centralised record of Aboriginal sites.

Historical values

The sites of old inns, bush sawmills, bush homesteads, old bush graves and cattle yards are reminders of the pioneering hardships of the early European settlers. These are likely to disappear as the forest continues to regenerate and known sites are being identified and protected under the PMP classification system.



Known Aboriginal relics and sites are protected, such as this scar tree on Culoora State Forest.

More information

Further information and copies of the Management Plan for the Pilliga Management area may be obtained from:

The Regional Forester,
Dubbo Region,
Forestry Commission of
New South Wales
Monash and Chelmsford Streets
Dubbo.

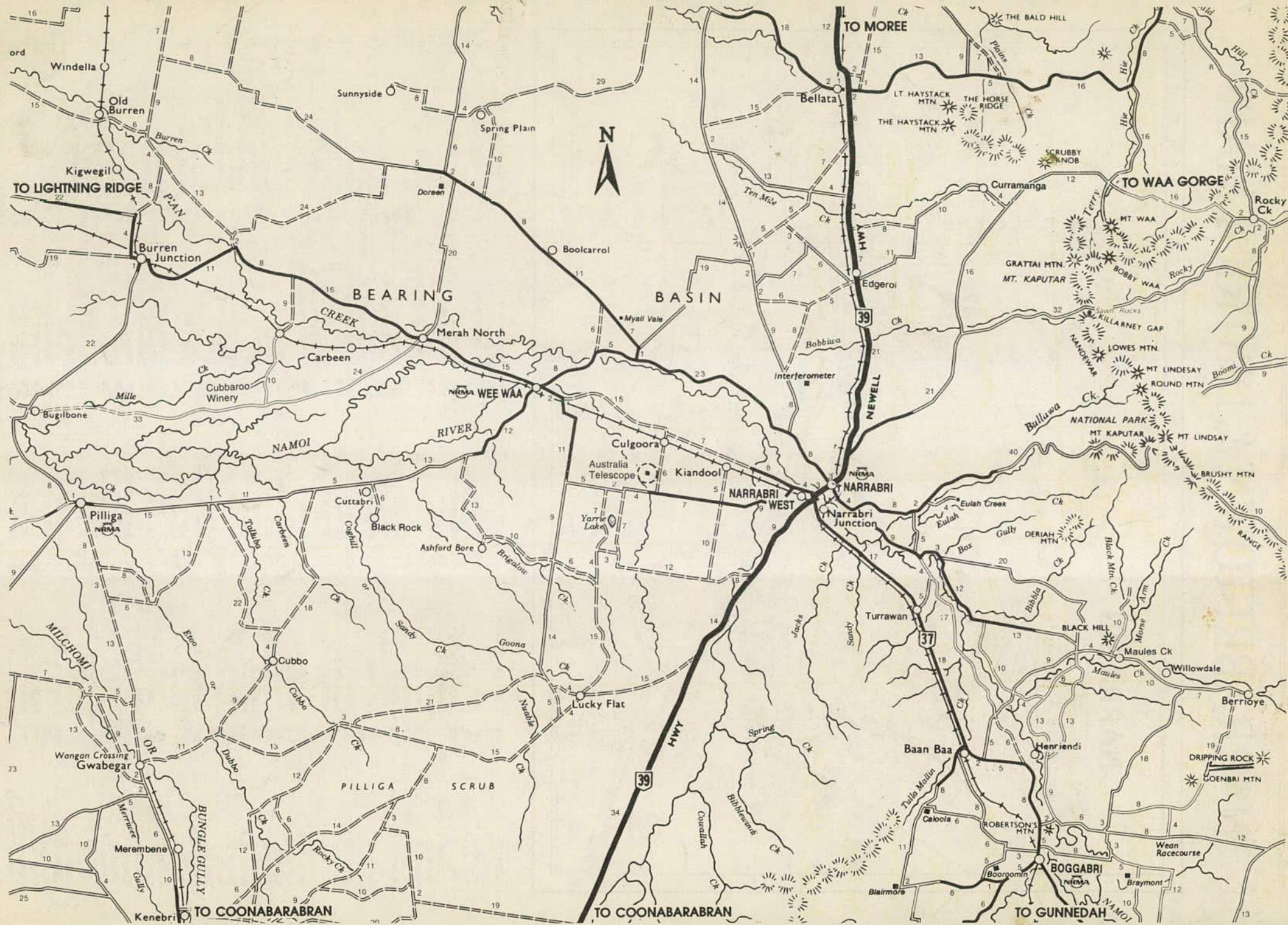
Telephone (068) 826977.

OR

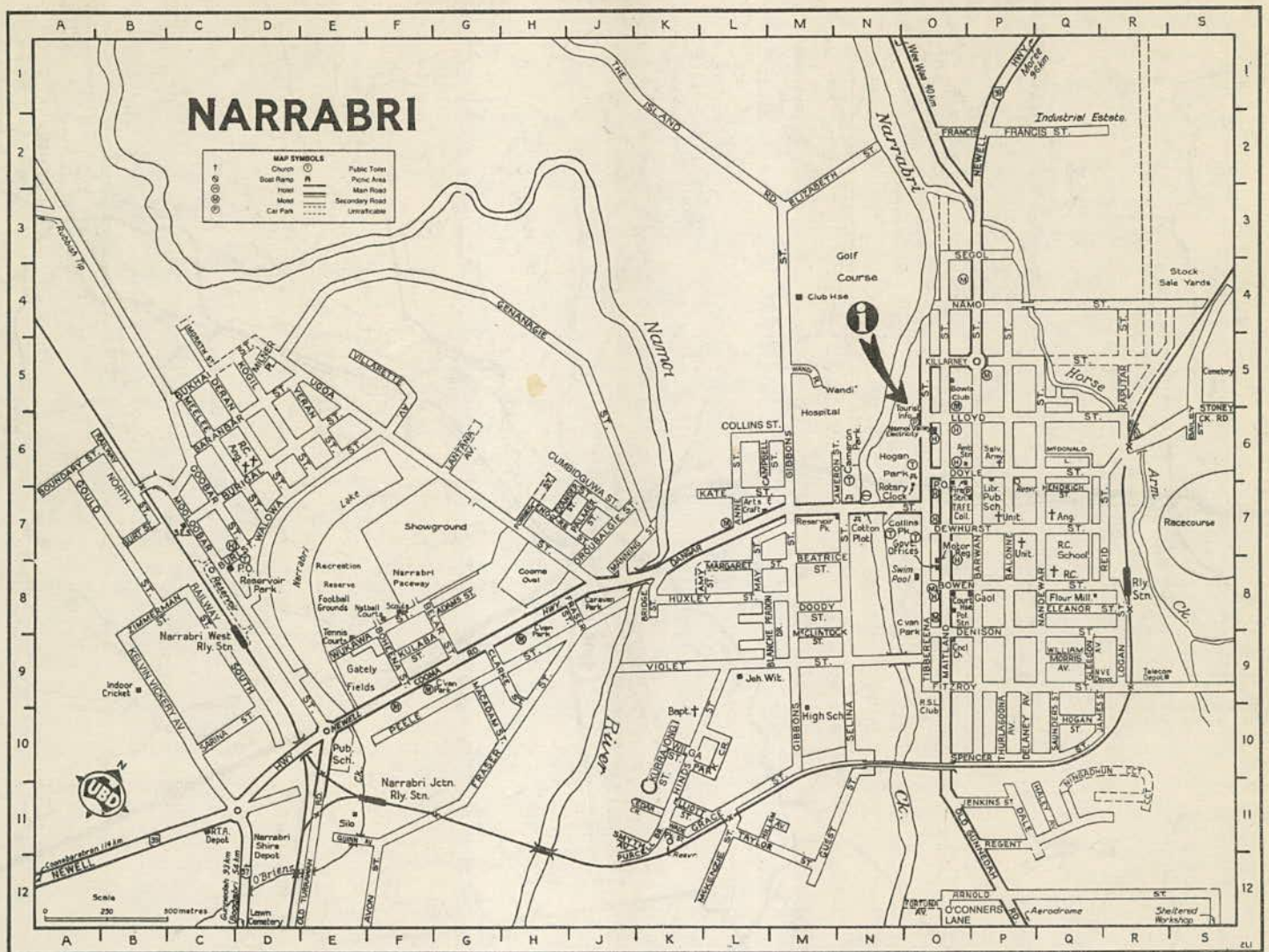
Forestry Commission
of New South Wales
95-99 York St, Sydney.
Telephone (02) 2341567.

Larry Carey - DF.





NARRABRI TOWN & DISTRICT MAPS



Adams St.	G8	Court House	O8	High St.	O4	Moolooaba St.	C7	Rubbish Tip	A3
Aerodrome	O12	Dale St.	O11	Hillam Av.	L11	Morath St.	C5	Salvation Army	P6
Alexander St.	H7	Dangar St.	L7	Hinds St.	K11	Motor Registry	O7	Sarnia St.	C10
Ambulance Station	P6	Delaney Av.	P10	Hogan Park	N6	Namoi St.	O4	Saunders St.	O10
Amy St.	K8	Denison St.	P9	Hogan St.	O10	Namoi Valley Council		Scouts	F8
Anglican Church	D6/O7	Deran St.	C5	Hospital	M5	Depot	R9	Segol St.	O3
Anne St.	L7	Dewhurst St.	O7	Hunt St.	R6	Namoi Valley County		Selina St.	N10
Arnold St.	O12	Doodly St.	M8	Huxley St.	K8	Council	O6	S.E.S.	C7
Arts and Crafts	L7	Doyle St.	O6	Indoor Cricket	B9	Nandewar St.	O8	Short St.	P3
Avon St.	F12	Drive-in Theatre	O12	Industrial Dr.	O4	Narrabri Pace Way	F8	Showground	F7
Bailey St.	S6	Droubalgie St.	J7	Industrial Estate	O1	Narrabri Shire Depot	D11	Silo	E11
Balonne St.	P8	Eleanor St.	O8	James St.	O10	Newell Hwy.	G9/P2/S11	Smyth Av.	J11
Baptist Church	K10	Elizabeth St.	M3	Jehovah's Witnesses	L9	Ningadhun Crct.	O11	Spencer St.	O10
Baranbar St.	C6	Elliott St.	K11	Jenkins St.	P11	O'Connors La.	O12	Stock Sale Yards	S4
Barwan St.	P8	Fire Station	P6	Kaputar St.	R5	Old Gunnedah Rd.	P11	Stoney Creek Rd.	S5
Beatrice St.	M7	Fitzroy St.	O9	Kate St.	L7	Old Turrawan Rd.	E12	Swimming Pool	O8
Belar St.	G8	Flour Mill	O8	Kelvin Vickery Av.	A8	Palmer St.	J7	T.A.F.E. College	O7
Blanche Peardon Dr.	M9	Football Grounds	E8	Killarney St.	O5	Park Cr.	L10	Taylor St.	L11
Boheena St.	F9	Fortuna Av.	O12	Kitchener St.	H8	Peele St.	F10	Tennis Courts	E9
Boundary St.	A6	Francis St.	O2	Kogil St.	D5	Police Station	O8	The Island Rd.	J2
Bowen St.	O8	Fraser St.	G10/J8	Kulaba St.	F9	Post Offices	DB/O7	Thurlagoona Av.	P10
Bowls Club	O5	Gately Fields	E9	Lantana Av.	G6	Public School	E10	Tibbereena St.	O9
Bridge St.	K8	Gately St.	F10	Lawn Cemetery	D12	Purcell Dr.	J12	Tourist Information	O6
Bukhai St.	C5	Genangie St.	H4	Lenore St.	H7	Quinn Av.	E11	Ugoa St.	E5
Buri St.	C8	George St.	P2	Library	P6	Racecourse	S7	Uniting Church	P7
Burigal St.	D6	Gibbons Rd.	M6/M10	Lloyd St.	O6	Railway Stations	C9/F11/R8	Villarette Av.	E5
Burt St.	B7	Gleeston Av.	O9	Logan St.	R9	Railway St. North	B6	Violet St.	K9
Cameron Park	N6	Golf Course	N3	Macadam St.	G9	Railway St. South	C8	Wade St.	K11
Cameron St.	N6	Goobar St.	C6	McClintock St.	M8	Regent St.	P11	Wandi Pl.	M5
Campbell St.	L6	Gould St.	A7	McDonald La.	O6	Reid St.	R8	Walowa St.	D7
Caravan Park	H9/J8/O8	Government Offices	O8	McKenzie St.	L11	Reservoir	CB/P6	William Morris Av.	O9
Cedar Cr.	K11	Grace St.	L11	Maitland St.	O9	Reservoir Park	DB/M7/K11	Wukawa St.	E9
Cemetery	S5	Guest St.	M11	Manning St.	J8	Roman Catholic		Yeran St.	E5
Charlotte St.	K7	Gumbidguwa St.	G5	Margaret St.	L8	Church	D6/O8	Zimmerman St.	B8
Clarke St.	G9	Haley Av.	O11	Marion St.	S11	Roman Catholic School	O7		
Collins Park	N7	Hendrich St.	O7	May St.	L8	Rotary Clock	N6		
Collins St.	K6	High School	M10	Meelee St.	C6	R.S.L. Club	O10		
Cooma Oval	H8			Milner Pl.	D5	R.T.A. Depot	C11		
Cooma Rd.	F9								
Cotton Plot	N7								
Council Chambers	O9								



Parts
BARADINE
SF 672

WITTENBRA
SF 274

YARRIGAN
SF 272

YEARINAN
SF 273

FREEHOLD
(RICKERT)

FREEHOLD
(SCHMIDT)

Pilliga
NR (gazetted 1991)
District

TR 73014

Part
YAMINBA
SF 821

TR 79962

Baradine

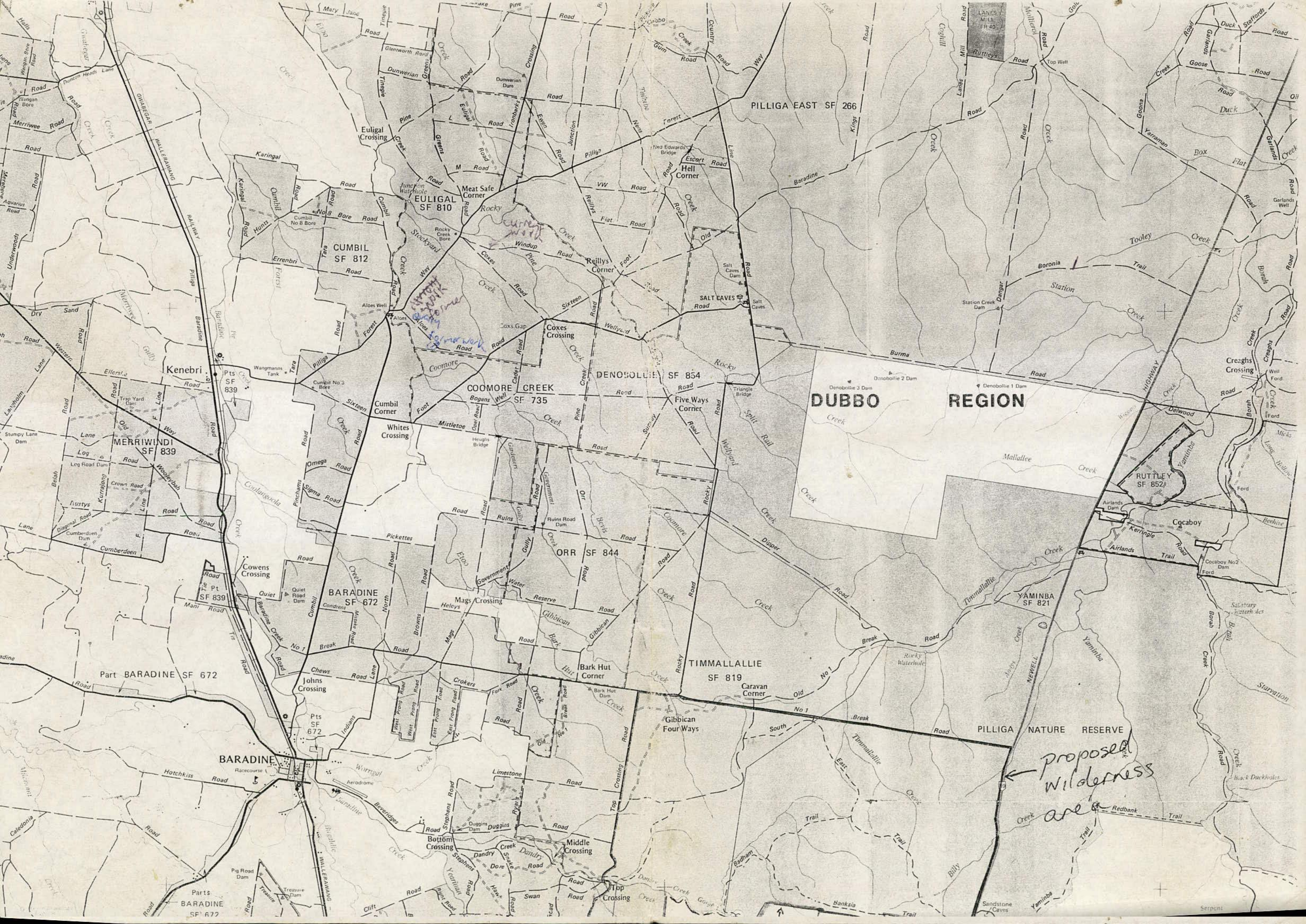
potential corridor
between Pilliga
and Warrumbungle

WARRUMBUNGLE NATIONAL

PARK MOUNT

COONABARABRAN

BABY
SF 846



PILLIGA EAST SF 266

EULIGAL SF 810

CUMBIL SF 812

MERRIWINDI SF 839

BARADINE SF 672

ORR SF 844

DENOBOLLIE SF 854

DUBBO

REGION

RUTTLEY SF 852

YAMINBA SF 821

TIMMALLALLIE SF 819

PILLIGA NATURE RESERVE

proposed wilderness area

BARADINE



PILLIGA EAST SF 266

EULIGAL SF 810

CUMBIL SF 812

DENOBOLLIE SF 854

COOMORE CREEK SF 735

DUBBO

REGION

RUTTLEY SF 852

ORR SF 844

BARADINE SF 672

TIMMALLALLIE SF 819

YAMINBA SF 821

BARADINE

PILLIGA NATURE RESERVE

proposed wilderness area

Vegetation changes in the Pilliga forests: a preliminary evaluation of the evidence

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Abstract

Changes in the vegetation of Australia since white settlement have been much discussed in recent times. In particular, the changes that have been reported to have occurred in the Pilliga forests in northern New South Wales have been used as a reference for other areas of the State. Two periods of pine regeneration are believed to have occurred in the Pilliga, but preliminary research concerning the history of these forests has uncovered various sources of information indicating that the story is a more complex. Climatic data, archival records and the biology and ecology of various flora and fauna are examined in this paper in a preliminary attempt to gain a more accurate picture of change or stability in the vegetation of this region.

Introduction

The Pilliga Forests of northern New South Wales are often referred to as the 'Pilliga Scrub' and these two terms, 'forest' and 'scrub', reflect long held conflicting perceptions about the nature of this environment.

The most widely accepted view of the origin of the forest country is presented by E. Rolls (1981) in: *A Million Wild Acres*. This book, hailed as an Australian classic by Murray (1984), offers the opinion that prior to European settlement the present forest country comprised a mosaic of open woodland and grassy plains that was maintained by regular Aboriginal fires. The initial exclusion of fire by early graziers, heavy stocking, above average rainfalls between 1879 and 1887, reduced stocking and the reintroduction of fire,

encouraged extensive pine regeneration and the eventual abandonment of many grazing runs. No similar pine regeneration event is believed to have occurred until after the wet year of 1950, the fire of 1951 and the reduction of rabbit numbers by *Myxomatosis*. This paper will question the details of this sequence of events because there is a scattered body of evidence which is in conflict with the general model. For example:

1. Although all of the forest area seems to have been claimed by pastoralists by the 1880s, there is little evidence that the core of the forest east of Baradine Creek was ever heavily grazed, or even entirely occupied.
2. Survey maps from the 1870s to the 1930s depict vegetation boundaries in this core area which are remarkably similar to those of today.
3. A number of primary sources describe thick

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scrub and pine regeneration events at other times.

4. Although the Forestry Commission management plan (Forestry Commission 1986) generally accepts this model (but with a significant anomaly in the timing of the nineteenth century regeneration event), archival data and past management objectives indicate that earlier foresters had a different appreciation of the environment.

Resolution of these conflicts requires a detailed examination of all the evidence for change or stability in the vegetation and it is the purpose of this paper to begin this process.

Location

The State Forests of the Pilliga, (Figure 1), situated north of Coonabarabran in northern New

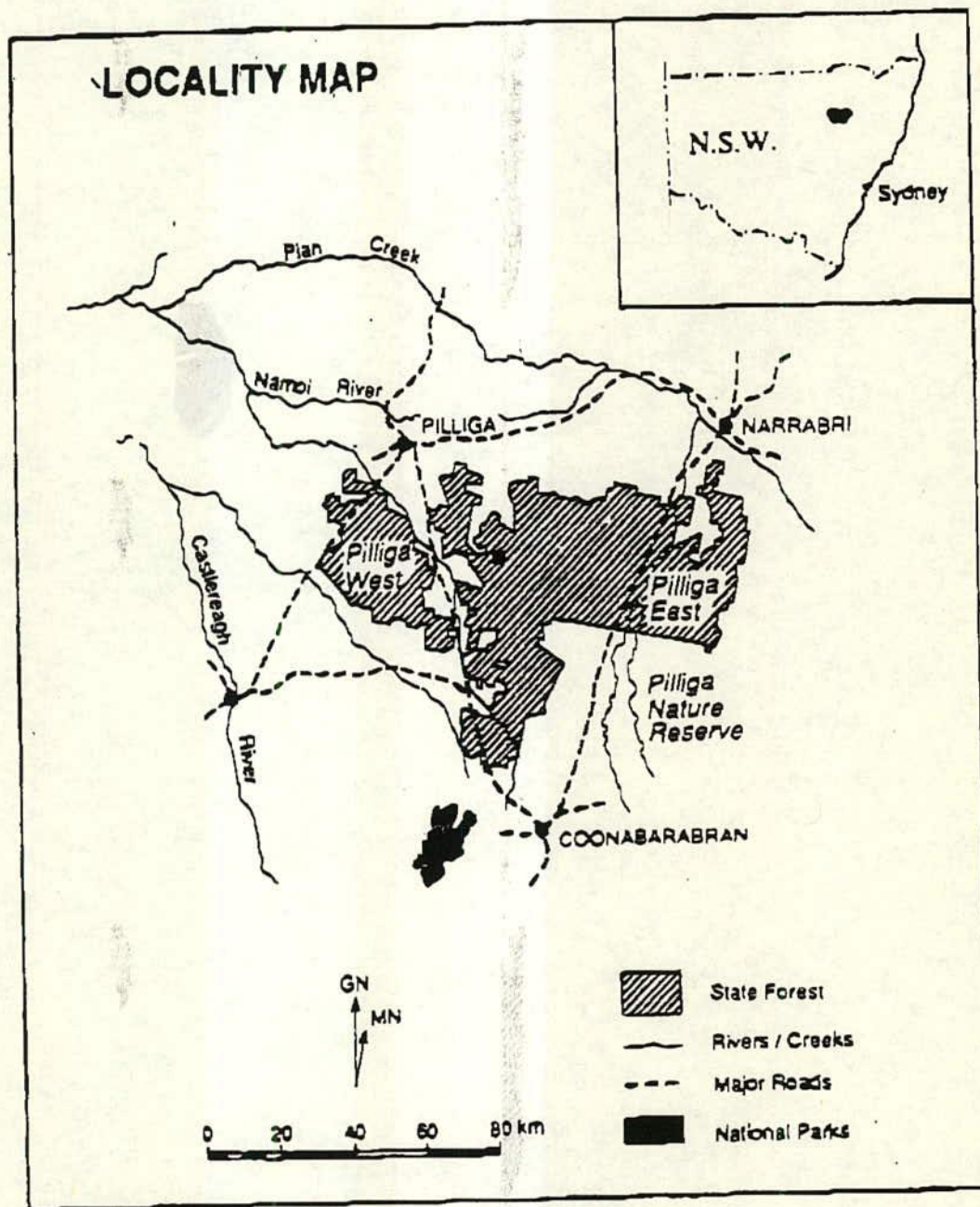


Fig. 1. Location of the Pilliga State Forests, New South Wales, Australia.

South Wales, cover an area of 400,000 ha and constitute the biggest single mass of dedicated native forest in the State.

The geology of this area is of non-marine, Jurassic, Pilliga sandstone which dips to the north-west and flanks part of the Great Artesian Basin (Brown *et al.* 1977). Outcropping sandstone is common in the southern sections of the forests whilst to the north it is covered by extensive sediments deposited by dendritic streams draining north and west. These sediments become finer towards the Namoi River (Mitchell *et al.* 1982). The climate is warm sub-humid with variable rainfall averaging 450–700 mm per annum and showing a slight summer maximum.

There are two parts to the forest; an area covering the main river valleys and Pilliga west which has been settled at various times, and an inner core which is predominantly covered in cypress pine and ironbark forests and woodlands and broom plain scrubs (mainly *Melaleuca uncinata*).

As part of an ongoing series of projects including detailed examination of the soil stratigraphy and vegetation, the history of pre-European and European settlement in the Pilliga Forests is being examined. In particular, we are looking at historical documents for evidence of changes in the vegetation over the past 172 years in an effort to distinguish between those changes which may have been driven by climate and those which may have been initiated by changes in land use.

The accepted view

As noted earlier, Rolls (1981) presents the most widely accepted view of the sequence of events which is assumed to have taken place in the forests of the Pilliga and which has been repeated by others including Austin and Williams (1988). Two periods of pine regeneration are recognised; between 1879 and 1887 and in 1950/51. Of the first period Rolls (1981) claims that by the 1870s settlement in the Pilliga area was more or less complete and at that time there had been no regular burning for about 25 years and that domestic stock had displaced native herbivores (rufous rat-

kangaroos). As a consequence of this, pine spread from the ridge country and invaded clear valley floors, and wire and spear grass replaced better species. The graziers began to burn in an effort to control unfavourable grasses and pine scrub encroachment. Weather patterns also had an important influence. Rolls claims that the period 1875–1878 was droughty and that 1879 was very wet, the cattle market was depressed and additional sheep were put on the grass which was burnt to clear seed and give the stock green pick with the consequence that '... where the fires ran years of pine seed came to life.' (Rolls 1981, p 183–184). Similar factors of a reduction in grazing pressure (from rabbits), wet seasons and a major fire are used to explain the second regeneration event in 1950/51. A quotation summarises his argument;

'The four or five good years between 1879 and 1887 were the only years in which it was possible for the new forest to come away. By the next good rains in the 1890s there were sufficient rabbits, as enthusiastic eaters of seedlings as the disappearing rat-kangaroos, to stop most new tree growth. The extent of the country to be abandoned was determined by the 1890s. Except for a thickening of the undergrowth in places in the several wet years following the breaking of the 1902 drought, there was little more growth of pine or scrub until 1951, when a huge fire germinated seedlings (sic) on land soaked by heavy rain in 1950. At the same time myxomatosis destroyed the rabbits. And the lovely tangle which is the modern forest came to life.' (Rolls 1981, p 205).

Evaluation of the model

The validity of this general model needs to be questioned on five important points:

1. The reality and significance of the stated climatic events.
2. The evidence for pre-existing pine scrubs, other periods of regeneration and the actual timing of the main events.
3. The significance of stored seed.

4. The significance of rat-kangaroos in reducing pine regrowth.
5. The significance of fire in relation to pine regeneration.

The weather patterns

Rolls argued that '... the four or five good years between 1879 and 1887...' (Rolls 1981, p 205) were the important years for pine regrowth in the Pilliga. This climatic pattern and the drought between 1875 and 1878 are difficult to confirm because the only official records starting that early are from Narrabri on the north eastern edge of the region. At this station the record shows that rainfall was 24% below average in 1875, average in 1876, and 26% below average in 1877; droughty perhaps but not extreme, although Nicholls (pers. comm.) has confirmed that 1877 was an El Niño year and that a large part of western New South Wales was in severe drought. Rainfall was 44% and 36% above average in 1878 and 1879 respectively and there were only three good years (above average rainfall), rather than 'four or five' within his critical period, these being 1879, 1885 and 1886 (Bureau of Meteorology 1989).

From 1881 rainfall records are also available for Baradine and Coonabarabran. All three stations show similar patterns and can be accepted as representing the Pilliga. At each station 1886 and 1887 were wet years, 1888 was dry, and the early 90s were very wet. This period finished in 1892 at Baradine, and 1894 at Coonabarabran and Narrabri. The years 1886, 1889 and 1890 rank in the ten highest rainfall records at all stations and at Narrabri 1890 is the wettest year on record with the total rainfall being 103% above average (Bureau of Meteorology 1989). If several consecutive wet years are significant in setting pine seed and allowing germination and establishment as Lacey (1973) indicates, then the period 1889 to 1892/94 seems likely to be more important climatically than the late 1870s as the actual regeneration period. This suggestion is supported by the acceptance of the 1890s as the

period of regeneration by the Pilliga Management Plan (Forestry Commission 1986).

The circumstances of the 1950/51 regeneration event also supports this conclusion because the rainfall at all three stations was well above average between 1947 and 1950 (with the exception of 1948 at Coonabarabran) and 1950 was the wettest year on record at Coonabarabran and Baradine and the second wettest at Narrabri. Between 1892 and 1947 there were no other such extreme consecutive wet years.

These five decades of lower rainfall follow the patterns identified by Pittock (1975) and appear to have been generally unfavourable to cypress pine regeneration. There were some other periods of pine regeneration however, for example: at Gilgandra in 1917/18 when rabbits were recorded as attacking seedlings and destroying that crop (Forestry Commission 1918) and in 1932/34 in the east Pilliga forests where there had been no sheep grazing and very few cattle (Lindsay 1948).

The 1950/51 regeneration event first became apparent throughout most of the natural range of the white cypress pine in 1953/54 when the seedlings from the 1952 seed year (Forestry Commission 1953/54) were overtopping the grasses. This observation is consistent with the normal two year flowering and cone formation cycle (Lacey 1973) but also indicates that weather conditions for some years after 1953 must have been favourable for seedling survival. Soil moisture levels for a couple of years after the record wet of 1950 were probably high despite average or below average rainfall and the years 1954, 1955 and 1956 were again much wetter than average. We suspect that this coincidence of a subsequent wet period was important in consolidating the regeneration and that this also has a parallel in the 1890s rainfall sequence but not in the 1880s.

So far our review of weather patterns has only examined rainfall, but it is also believed that temperature is important in that mild summers are necessary for seedling establishment (Forestry Commission 1986).

Pre-existing scrubs and other regeneration events

No research has been done on the occupation of the forest area by the Kamilaroi aborigines but the few sites that have been recorded are only short distances from main creeks and it seems likely that they rarely visited the forest core.

The journals of Oxley (1820), Sturt (1833) and Mitchell (1839, 1848) describe journeys down the Lachlan, Bogan and Macquarie rivers and all specifically mention on many occasions that the lighter red soils away from the rivers often supported dense scrubs including *Callitris* sp. It is notable that there are more references to the difficulties of traversing such 'dreadful scrub' country when the explorers made side trips away from the river, or were using pack animals rather than wheeled vehicles which confined them to clearer country.

It is apparent that at the time of first exploration pine scrubs did exist in parts of northern and mid-western New South Wales and southern Queensland but unfortunately there are few records which relate directly to the Pilliga. Oxley crossed the area of the present Pilliga Nature Reserve in 1818 and commented on the density of ironbark saplings but apparently had no trouble in the open valleys and it was along these main valleys that settlement started in the 1840s. All of the forest areas seems to have been claimed by pastoralists by the 1880s but there is little evidence that the core of the forest east of Baradine was ever heavily grazed or even entirely occupied.

Our examination of records shows the majority of runs held were along the main watercourses; the Namoi River and Baradine and Bohena Creeks, as well as in the foothills of the Warrumbungles. These runs were maintained as cattle stations until the cattle market low of 1875 when sheep were introduced. As reported in Rolls, various runholders had access to other runs further into the core of the forest, but it is unknown at present how often they ventured in there and how many stock they ran. Rolls reports that one manager of a combined property never ventured into this area for fear of being lost (Rolls 1981 p 190).

As earlier settlers departed, runs were divided and/or combined and occupation licenses were issued, some of which cover our area of study. Stocking rates are as yet unknown.

It is reported that the Crown did not receive any rental from the Pilliga later than the year 1888 (Forestry Commission n.d.), a fairly good indication that its use was very little indeed. The settlement was along the rivers and on the flats - it was known that the country in the core was both poor and scrubby.

Other evidence of what the core area was like can be gained from reports and survey maps of the 1870s to the 1930s. In 1878 railway surveyors working on the eastern side of the Pilliga commented on 'the marvellously dense scrubs' of the poor sandy soils as if they had long been there (Carver 1878). In 1880 the Surveyor General called for reports from all his Land Commissioners and surveyors on the extent, age and significance of the pine scrub on leased lands all over the west and the response concerning the Pilliga region was that the country contained very extensive indigenous scrubs on poor sandy soils which were of no value for grazing or agriculture. The scrubs were not then believed to be recent but had been present since before first settlement (Anon 1881).

Survey maps depicting vegetation boundaries in the core of the forest show remarkable similarities to the present vegetation patterns.

Figures 2 (a) and 3 (a) are tracings from topographical surveys conducted in 1914 (Lands Dept. 1914a & b). Figures 2 (b & c) and 3 (b & c) are tracings from air photographs taken in 1938 and 1970. Figure 2 shows an area adjacent to Etoo and Rocky creeks (Central Mapping Authority 1974, Cubbo 1:50,000, grid ref. 603703). The area west of the creeks has been settled; the remainder has been little touched. Allowing for the nature of the 1914 survey it seems that the boundaries of the deep sands and the broom plains have not changed, at least in this century. In the 1914 survey, the surveyor recognised areas of thick forest ('thick forest of Pine, Ironbark, Oak, Box and Budda' [Lands Dept. 1914a]) to the north and south of the sands and

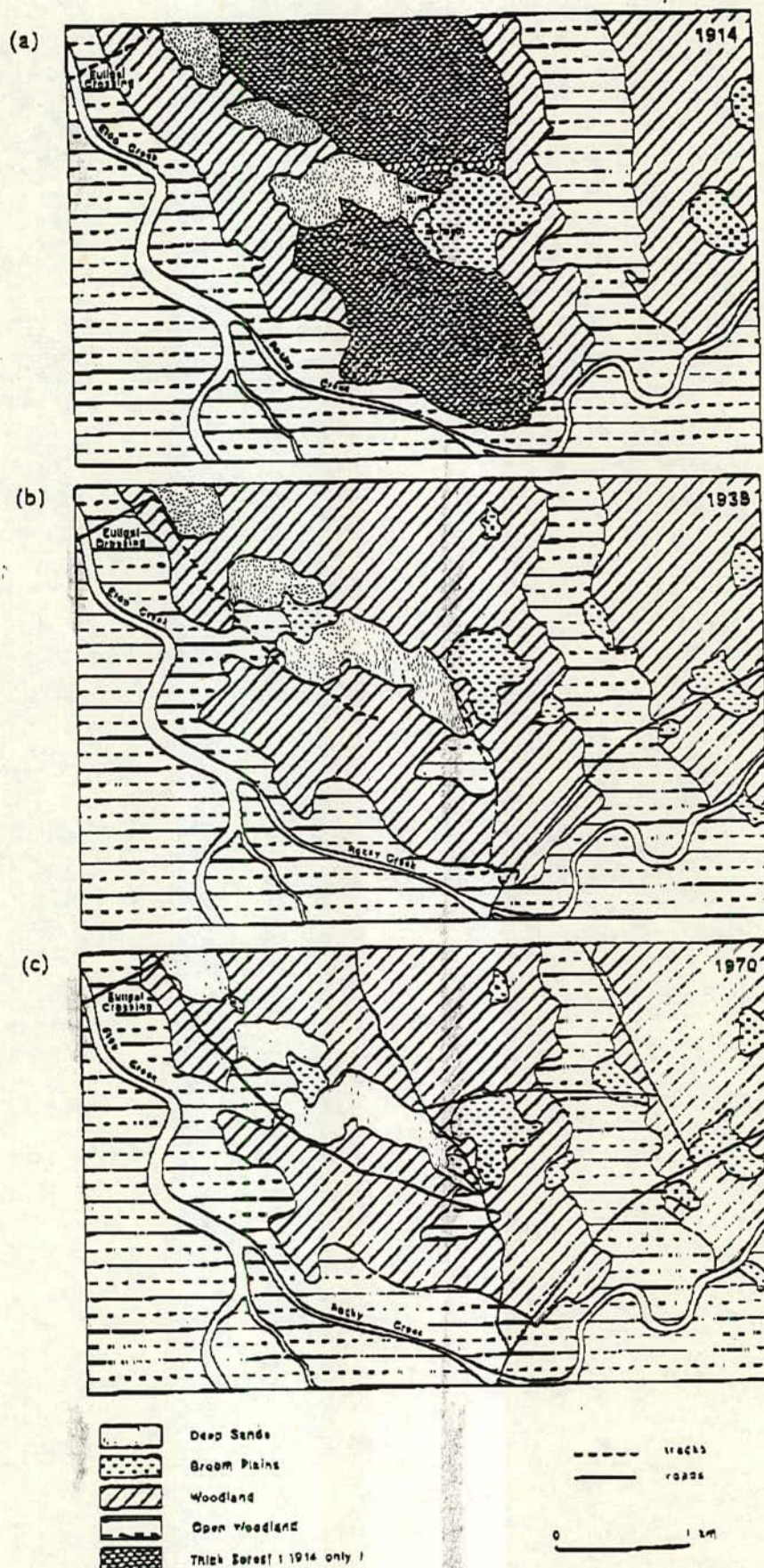


Fig. 2. Tracings from a 1914 survey (a) and airphotographs taken in 1938 (b) and 1970 (c), of the Ettoo and Rocky Creek area in the central western portion of the Pilliga State Forests (Fig. 1).

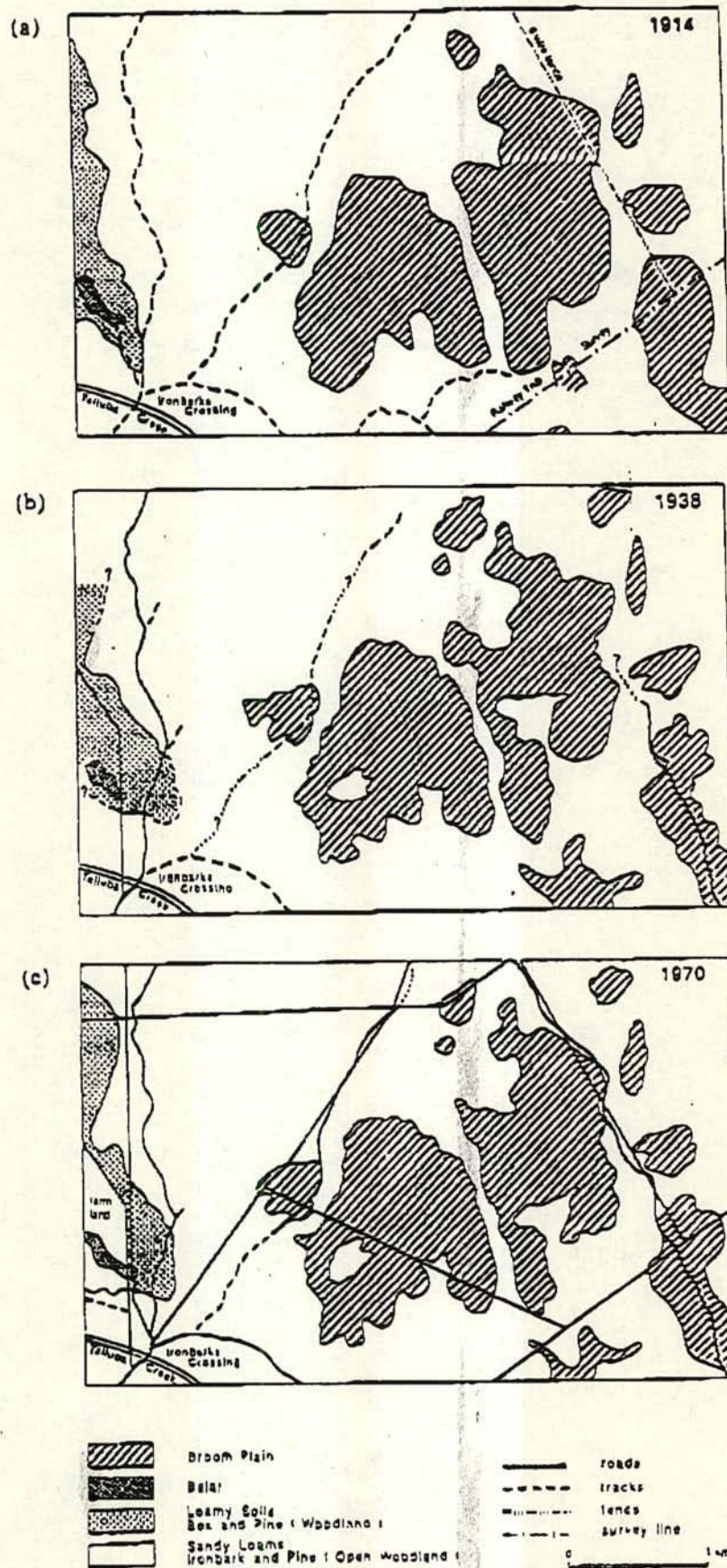


Fig. 3. Tracings from a 1914 survey (a) and airphotographs taken in 1938 (b) and 1970 (c), of the area north and east of Ironbarks Crossing slightly north east of the area in Figure 2.

the central broom plain. While problems arise here with the exact meaning of a 'thick forest', these denser areas are not obvious on the air photographs of later years; a reversal of the expected trend if the forest was becoming denser.

Figure 3 is of an area north and east of Ironbarks Crossing on Talluba Creek (Central Mapping Authority 1974, Cubbo 1:50,000, grid ref. 615714). Again, the vegetation patterns seem not to have changed since 1914 (Lands Dept. 1914b), and indications are that the density is also similar.

Nineteenth century maps covering the core of the forest are rare. McClean's 1847 map of squatting districts on the Liverpool Plains shows settlement along the Macquarie, Castlereagh and Namoi Rivers. Other maps include the 1874 map of the Coghill run which gives some information regarding the vegetation, and two portion plans dating from 1878 in the Parish of Dunwerian (Lands Dept. 1878) give similar information. Chatfield was the surveyor for these portions, and although his fieldbook numbers are noted on these plans, we have not yet been able to locate them. Portion plans only cover a small part of the forest, but the notes regarding vegetation detail in 1878 closely match the vegetation on 1970 air photographs and on the ground at the present time.

The importance of stored seed

Rolls (1981) suggests that large stores of pine seed were available on mature trees or in the soil prior to the regeneration years and he implies that this was another important factor in the successful events. This idea was widely held by early observers including Fosbery (1913), but is not supported by the studies of Lacey (1972, 1973) which showed that seed was normally shed in a period of about four weeks in summer and that viability under field conditions was as low as 1% several months after seedfall.

The evidence for the role of rat-kangaroos in reducing pine regrowth

Rolls (1981) suggested that grazing of young pine by rufous rat-kangaroos was an important factor limiting regrowth densities. He presented no evidence for this statement which was apparently drawn from a single comment on the prevalence of rat-kangaroos (species unidentified) made by Oxley (1820 p 270). We have so far been unable to find any other primary source confirming the identity of the rat-kangaroos in the Pilliga and no evidence that they were at all partial to young pine.

The significance of fire in relation to pine regeneration

Rolls (1981) and most nineteenth century observers believed that fire was an important factor in successful pine regeneration. There is, however, no clear relationship between the extensive fires in the Pilliga in November 1951 and the germination of 1952 seed. Many mature cypress pines survived these fires even after being defoliated (Forestry Commission 1951/52), pine regeneration was apparently just as successful in areas which were not burnt elsewhere in the Pilliga, and it was abundant over most of their natural range in the absence of fires elsewhere in the State.

Fire is known to be an important thinning mechanism in young pine stands (Lacey 1973) because seedlings have a high mortality (Wilson & Mulham 1979), but whether it is significant in other ways is not clear and this topic also requires further study.

Conclusions

We have no argument with the observation that increasing densities of woody shrubs are a very serious management problem in many parts of the rangelands in New South Wales as described by Booth (n.d.) and that white cypress pine is one of

the problem species in lighter soils on the higher rainfall margin. What this paper takes issue with is the general belief that there were only two main periods of pine regeneration in the Pilliga area and dense shrub cover was virtually unknown at the time of first settlement when open woodlands and grassy plains were believed to be the norm.

Climatic records suggest that there were two main opportunities for extensive pine regeneration and that Rolls (1981) may have incorrectly identified the first of these by about a decade. We also have evidence that pine did regenerate at other times in the twentieth century but may not have survived well because of rabbits or subsequent unfavourable weather.

To judge from the land settlement patterns around the Pilliga it seems to be important that we differentiate the central core of the forests where our evidence indicates that there has been little change in the vegetation, from areas to the west of Baradine Creek, especially Pilliga West State Forest where pine regeneration did close over former grazing lands in the 1890s. Even as recently as 1912 a soils map by Jensen (1912) labelled the central region 'almost unknown'. It is only since good road access was provided by the Forestry Commission after the 1930s that it has become accessible.

Most of the fieldwork that we have been doing in the past few years has centred on the Dunwerian area in the core of the forest. Here we are gathering evidence which seems to point to a remarkably stable vegetation pattern over the past century. The pattern is governed by a factorial complex dominated by soil characteristics, in particular moisture.

Work thus far has been of a preliminary nature only, but has opened up several interesting lines of evidence which we plan to follow up. These include:

1. Tree-ring studies which will help us to establish the pattern of pine regeneration over the past 100 or so years. Preliminary tree-ring counting from pine in the core area indicates a wide scatter of tree ages which would tend to support the hypothesis that regeneration is fairly well spread and not confined to two main events.
2. A closer examination of the available climatic records including temperature and the ENSO phenomenon.
3. A closer examination of the historical records which might exist in obscure places or in the memories of settlers' descendants. We need to sort out what stock was in the forest, where, how many and when.

Acknowledgements

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Pilliga Wilderness Assessment Report

INCLUDING AN ASSESSMENT OF THE PROPOSED KAMILAROI WILDERNESS

Prepared by the Director-General, NSW National Parks and Wildlife Service
December 1995



Glossy Black-Cockatoo

**NSW
NATIONAL
PARKS AND
WILDLIFE
SERVICE**

Summary

THE PROPOSAL

In June 1994 a written proposal was received for the identification and declaration of about 29 000 hectares of land in the central west of New South Wales as the Kamilaroi Wilderness.

The proposed area lies in the south of the Pilliga Scrub just north of Coonabarabran, to the west of the Newell Highway (Map 1). It is centred on Dandry (Baradine) Creek. The proposal includes the south-western part of Pilliga Nature Reserve, two timber reserves, a small portion of vacant Crown land and parts of Timmallallie and Wittenbra State Forests.

The areas for each tenure are:

Pilliga Nature Reserve	16 990 ha
Freehold land	4 000 ha
State Forest	6 280 ha
Wittenbra State Forest	330 ha
Timmallallie State Forest	5 950 ha
Timber Reserve	1 530 ha
Vacant Crown Land (Water Reserve)	16 ha
Total	28 816 ha

The area of freehold land included in the proposal has since been purchased by the New South Wales National Parks and Wildlife Service (NPWS) and will shortly be gazetted as an addition to Pilliga Nature Reserve.

The area proposed as the Kamilaroi wilderness is illustrated on Map 2.

DESCRIPTION OF THE AREA

The proposed Kamilaroi wilderness is part of the Pilliga Scrub, an area of regional and national importance for nature conservation, water catchment protection and scenic amenity.

The natural heritage values of the Pilliga Scrub include:

- the largest area of native vegetation remaining in the central part of New South Wales and the largest tract of inland plains forest remaining in Australia;
- diverse vegetation communities, from open forests and woodlands to dense heath and shrubland;
- several species of rare and threatened plants;
- numerous plant species of biogeographic importance, including some which are more typical of coastal regions and found in the Pilliga at their western limit and arid land species found at the eastern limit of their distribution;
- habitat of endangered species of native fauna, including the glossy black-cockatoo, the regent honeyeater, the Pilliga mouse and the koala; and
- scenic beauty consisting of sandstone cliffs, hidden gorges and spectacular wildflower displays.

It also contains a number of significant pre-contact archaeological sites.

DEFINITION OF WILDERNESS

The *Wilderness Act 1987* provides that an area may be identified as wilderness by the NPWS Director-General if:

- (i) the area is, together with its plant and animal communities, in a state that has not been substantially modified by humans and their works or is capable of being restored to such a state;
- (ii) the area is sufficiently large to make its maintenance in a natural state feasible; and
- (iii) the area is capable of providing opportunities for solitude and appropriate self-reliant recreation.

Thus the criteria used in this assessment are naturalness, size, and opportunities for solitude and appropriate self-reliant recreation.

WILDERNESS ASSESSMENT AND IDENTIFICATION

The assessment of an area for wilderness qualities is not limited to areas nominated under the Act. The *Wilderness Act* permits the investigation of any land in New South Wales for its wilderness qualities. An area greater than that proposed has been assessed. This was done in order to avoid the duplication of effort that additional wilderness nominations in the district would have involved. Throughout the report, the area assessed for wilderness values (illustrated on Map 3) is described as 'the assessment area'. The assessment area included (in addition to the proposed area) the majority of Pilliga Nature Reserve, a large proportion of Pilliga East State Forest, parts of Bibblewindi and Denobollie State Forests, all of Ruttley and Yaminba State Forests, some freehold land and a large area of vacant Crown land.

As a result of this assessment, three areas of land totalling approximately 123 000 ha have been found to satisfy the criteria for wilderness and are thus identified as wilderness. In the report, these areas are described as 'the identified Pilliga wildernesses'.

The identified Pilliga wildernesses comprise land under the following tenures:

Pilliga Nature Reserve		73 110 ha
State Forest		29 045 ha
Denobollie State Forest	40	
Pilliga East State Forest	18 650	
Timmallallie State Forest	9 755	
Wittenbra State Forest	330	
Yaminba State Forest	270	
Timber Reserve		1 530 ha
Vacant Crown land		7 065 ha
Water Reserve	15	
Land reserved for		
future public requirements	120	
Land reserved from sale	6 930	
Freehold land		12 365 ha
owned by NPWS	4 000	
privately owned	8 365	
Total		123 115 ha

The identified Pilliga wilderness includes the majority of Pilliga Nature Reserve, two timber reserves, parts of five freehold blocks, a large area of vacant Crown land, and parts of Pilliga East, Denobollie, Yaminba, Timmallallie and Wittenbra State Forests. Two major roads run through the area: the Newell Highway and the Number One Break Road. These are excluded from the identified Pilliga wildernesses. One Crown road (part of Yearinan Road) is included.

DECLARATION OF WILDERNESS

This report recommends that all public land identified as wilderness:

- be declared and managed as wilderness; and
- be reserved under the *National Parks and Wildlife Act 1974* as additions to Pilliga Nature Reserve.

It is also recommended that the owners and lessees of all private lands identified as wilderness be approached regarding the protection of wilderness on their lands through voluntary conservation agreements. No private land is recommended for declaration as wilderness unless and until a conservation agreement has been negotiated.

It is further recommended that no upgrading or further development occur on the Number One Break Road and the Newell Highway which are excluded from wilderness declaration.

Further details of these recommendations are given in the attached Options Report.

The Minister for the Environment, after considering the final advice provided by the Director-General of NPWS, will consult with Cabinet before any area is declared as wilderness in the Pilliga.

PUBLIC EXHIBITION OF REPORT

This assessment report will be placed on public exhibition for a period of four months. Submissions are invited from all interested individuals, community groups, organisations and government authorities. Final advice to the Minister for the Environment will be prepared after all submissions have been collated and summarised.

Comments and submissions relating to this proposed wilderness and the assessment as detailed in this report should be sent no later than 29 May 1996 to:

The Director-General
NSW NPWS - Western Zone Office
PO Box 1007
DUBBO NSW 2830

Further information can be obtained from the Coonabarabran District Office of National Parks and Wildlife Service, on 'phone (068) 42 1311.

PLEASE NOTE

The areas of land and tenure given in this report are approximate (usually given to the nearest 10 hectares) and calculated from topographic maps. They should be used only as a guide.

Glossary of Terms

Proposed wilderness: This is the area of land that has been nominated under the terms of the *Wilderness Act 1987*. It can be proposed by any individual or organisation and can include privately held land and public land. A wilderness proposal does not affect the title of the land and does not allow any additional public access to private land.

Identified wilderness: This is land that has been **assessed** by the NPWS as meeting the criteria of the *Wilderness Act*. Identified wilderness does not automatically become part of a declared wilderness.

Declared wilderness: This is land that has been gazetted by the Government as a wilderness area. No private land can be declared without written agreement of the landholders, including lessees. The aims of wilderness management are to restore degraded areas to wilderness condition and to protect wilderness values from threats such as weeds and feral animals.

The assessment process: Once a proposal for wilderness identification is received, the NPWS has two years to complete an assessment of the proposal. Affected landholders are individually notified by letter and invited to comment on the proposal. The NPWS assesses proposed areas under the criteria of the *Wilderness Act*. The NPWS then exhibits the assessment report for public comment.

Public exhibition: An assessment report prepared by the NPWS is exhibited for a period of four months. During this time, any individual or group can comment on the assessment report in a written letter or submission. All submissions are considered by the Director-General of the NPWS when preparing the final advice to the Minister for the Environment, recommending which areas – if any – should be declared wilderness.

The declaration process: The Minister for the Environment has the authority to declare identified wilderness in national parks as wilderness. She can also negotiate wilderness protection agreements with other ministers and statutory authorities to ensure protection of wilderness values on other public lands. Government policy however provides that the decision to declare a wilderness area, even in national parks, is made by Cabinet. Private land can only be declared as wilderness with the agreement of the landholder, including lessees.

Land resumption: In NSW, privately held land can sometimes be compulsorily resumed by the Government for certain purposes such as major roads. However, it is Government policy that there will be no compulsory land resumption for wilderness management. The *Wilderness Act* does not provide for land resumption.

Wilderness conservation agreement: This is a voluntary agreement between a landholder and the Minister for the Environment for the management of private land as part of a neighbouring wilderness. It does not necessarily allow any additional public access to the private land. Ownership of the land is retained by the landholder.

Management trail: These are roads or trails used for management purposes such as fire management and pest species control. In declared wilderness areas and in nature reserves these trails are not open for casual public use.

Buffer zone: Buffer zones are not used for wilderness management in NSW. Declared wilderness areas should be large enough to provide their own buffers to minimise impacts from less natural areas.

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Part 1: Introduction

A wilderness is a large natural area of land which, together with its native plant and animal communities, is not substantially modified by human activity.

The *Wilderness Act 1987* provides the basis for the identification, protection and management of wilderness in New South Wales. This legislation permits any person or organisation to propose that an area of land be identified as wilderness, declared to be a wilderness area or added to an existing wilderness area. If the proposal is not made by the owner of the area of land concerned, the Director-General of National Parks and Wildlife is required to notify the owners of the area. Nominations made under the Act must be considered and advice provided to the Minister for the Environment within two years.

On 8 June 1994 a written proposal was received from a local resident, Mr Richard Rickert, for the identification and declaration of the Kamilaroi wilderness area. This area is located just north of Coonabarabran and includes the south-western part of Pilliga Nature Reserve, parts of Timmallallie and Wittenbra State Forests, two timber reserves, a water reserve and an area of freehold land. The two blocks of freehold land have since been purchased by the National Parks and Wildlife Service (NPWS) and will shortly be gazetted as an addition to Pilliga Nature Reserve. A copy of the proposal is included in this report as Appendix 1.

The proposed area has been assessed under the criteria of the *Wilderness Act* as required by Sections 7(4) and 5(1)(b) of the Act. Other areas not covered by the proposal have also been assessed, as permitted by Section 5(1)(a) of the Act. This was done in order to avoid the duplication of effort that additional wilderness nominations would have involved.

The assessment area comprised three discrete areas, separated from each other by major roads – the Number One Break Road and the Newell Highway.

All landholders in the area were notified, including those neighbouring the areas to be assessed. State Forests of NSW (SFNSW) and the Department of Land and Water Conservation – agencies directly responsible for the management of some parts of the nominated area – were also notified, along with all other relevant land management agencies. Comments were sought from these, as well as local councils, local Rural Lands Protection Boards and the local member of the Legislative Assembly. The attached 'Summary of Submissions - Initial Stage' analyses and discusses all issues raised in submissions received to date from local landholders, and from government and non-government organisations.

This assessment report presents a definition for wilderness and the criteria for its assessment. The assessment area has been investigated in terms of these criteria. Three distinct areas totalling some 123 000 hectares have been identified as wilderness. The public lands identified as wilderness are recommended for declaration as wilderness. The attached 'Options for the Protection of the Pilliga Wildernesses' details the recommendations for the declaration of the Pilliga wilderness areas.

Part 2:

Definition of Wilderness and Criteria for Identification

2.1 DEFINITION

The definition of wilderness relevant to this assessment is that contained within the *Wilderness Act*. Section 2(1) states that a wilderness area 'means lands declared to be a wilderness area under this Act or the *National Parks and Wildlife Act 1974*'.

The *Wilderness Act* also provides a definition of those attributes which qualify an area as wilderness under the Act. Section 6 states:

- (1) *An area of land shall not be identified as wilderness by the Director-General unless the Director-General is of the opinion that -*
 - (a) *the area is, together with its plant and animal communities, in a state that has not been substantially modified by humans and their works or is capable of being restored to such a state;*
 - (b) *the area is of a sufficient size to make its maintenance in such a state feasible; and*
 - (c) *the area is capable of providing opportunities for solitude and appropriate self-reliant recreation.*

Section 6 also states:

- (2) *In forming an opinion under subsection (1), the Director-General may consider any relevant circumstance, including -*
 - (a) *the period of time within which the area of land could reasonably be restored to a substantially unmodified state;*
 - (b) *whether, despite development which would otherwise render it unsuitable, the area of land is needed for the management of an existing or proposed wilderness area; and*
 - (c) *any written representations received by the Director-General from any person (including a statutory authority) as to whether the area of land should be identified as wilderness.*

Enlargement of this definition is provided by Section 9 which deals with the management principles for wilderness areas:

A wilderness area shall be managed so as -

- (a) *to restore (if applicable) and to protect the unmodified state of the area and its plant 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.*

On this basis, wilderness in New South Wales can reasonably be taken to be areas which are:

- not substantially modified;
- large enough to be maintained in this state;
- able to afford a feeling of solitude; and
- able to permit self-reliant recreation.

The *Wilderness Act* determines that the first attribute is not an absolute and allows for restoration under certain circumstances. None of these attributes is unique to wilderness. It is their occurrence together in a natural area that makes it a wilderness.

The Act also pre-supposes the primacy of the 'biocentric' view on wilderness identification and management over the 'anthropocentric' view. Under the latter, wilderness is perceived 'primarily from a sociological or human-oriented perspective; the naturalness of the wilderness is less important than maximizing direct human use' (Hendee *et al.* 1990). By contrast, the biocentric philosophy 'emphasizes the maintenance of natural systems if necessary at the expense of recreational and other human uses' (Hendee *et al.* 1990). While the Act's definition recognises both components, Sections 9(a) and 9(b) firmly set management of the State's wilderness in a biocentric context.

2.2 CRITERIA FOR ASSESSMENT

The *Wilderness Act* defines the essential attributes of a wilderness, but there remains the need to establish criteria or indicators (Lesslie *et al.* 1987) by which these characteristics can be measured. This has been the subject of some research and debate, both overseas and in Australia, details of which can be obtained from other sources (Helman *et al.* 1976; Wilderness Working Group 1986; Lesslie & Taylor 1985; Lesslie *et al.* 1987; Hendee *et al.* 1990). Despite this history, the selection of wilderness indicators and the evaluation of areas by them remains 'complex, variable, and inevitably judgmental' (Lesslie *et al.* 1987). The indicators adopted for this assessment reflect the wilderness attributes defined in the Act and are set out below with a brief explanation and background.

2.2.1 Naturalness

Measurement of naturalness (the lack of modification) of any system is difficult. Wilderness areas are those which have remained in a largely primitive condition, usually evidenced by the presence of a substantially unmodified cover of native vegetation (Helman *et al.* 1976; Wilderness Working Group 1986).

There are no completely undisturbed ecosystems existing in the world today. Even in the most apparently pristine environments, such as Antarctica, the impacts of modern society and its works are present. Therefore, any measurement of naturalness is not a test of the absence or presence of modification but instead is an assessment of the degree of modification.

Disturbance (ie. lack of naturalness) due to human activities could be measured by changes in the key components of ecosystems (Franklin 1990). These key components include:

- functional ability (eg. rate of nutrient cycling and provision of habitat);
- structure (spatial arrangement of species);
- composition (species diversity, age-class distribution, population size and relative abundance); and
- successional patterns (long-term changes).

Changes in structure and composition are most easily measured (although not necessarily most important) and also have the advantage of an often direct relationship with the recreational values of wilderness.

Two methods used previously for measuring naturalness in wilderness surveys were considered for use in this assessment.

Laut *et al.* (1977) developed four broad descriptive categories of native vegetation disturbance.

- I. **Undisturbed Natural:** Vegetation is mostly in a natural state. If it has been disturbed (e.g. due to cutting or grazing) this has taken place sufficiently long ago for substantial recovery to have occurred.
- II. **Disturbed Natural:** Moderately used (e.g. for selective timber harvesting or light grazing) but with the original composition and structure of the vegetation is basically intact. Likely to recover within a relatively short period should disturbance cease.

- III. **Degraded Natural:** Intensively used. The basic structure of the vegetation has changed and recovery is likely to be a long process if possible at all. No deliberate attempts to replace native species with introduced species or to effect change through fertilisers.
- IV. **Cultural:** Native vegetation has largely or completely been replaced by exotic plants as a direct result of deliberate attempts to establish an unnatural system.

Lesslie *et al.* (1987) have developed a procedure which is 'essentially descriptive and couched in terms of a hierarchy of degrees of biophysical alteration'. This procedure is based on five classes of naturalness:

- I. Unused by European people: no apparent ecosystem perturbation;
- II. Low intensity use, now ceased: structuring vegetation and/or soils relatively stable under disturbance; perturbed but not under significant stress;
- III. High intensity use, now ceased: structuring vegetation and/or soils relatively sensitive to disturbance; perturbed but not under significant stress;
- IV. Low intensity use, continuing: structuring vegetation and/or soils relatively stable under disturbance; perturbed and under stress; and
- V. High intensity use, continuing: structuring vegetation and/or soils relatively sensitive to disturbance; perturbed and under stress.

Both systems are qualitative and prone to inconsistency and ambiguity. Lesslie *et al.*'s method lends itself to implementation by computer, a particular benefit for initial broad scale survey work. It has been the basis for the broad scale mapping of wilderness in Australia under the National Wilderness Inventory (Lesslie, Taylor & Maslen 1994).

Given the limitations in time and resources available for this assessment, the well-defined areas in question and the desire for consistency with previous assessments conducted under the *Wilderness Act*, Laut *et al.*'s system was adopted. This classification also incorporates the capacity for assessing the possibility of recovery from disturbance.

The following forms of development, or land use, were considered acceptable within the **Disturbed Natural** category:

- four-wheel drive tracks, fire trails, logging or mining tracks;
- fence lines, minor tanks and bores; and
- more intensive developments or modified areas which are limited in extent, capable of restoration or important for the management of a contiguous wilderness area (Helman *et al.* 1976; Wilderness Working Group 1986).

Areas classed as **Cultural** included those containing:

- permanent settlements;
- major and permanent all-vehicle roads connecting settlements;
- a high proportion of deliberately introduced species for the purposes of primary industry (eg. pine plantation, pasture).

The *Wilderness Act*, in Section 6(1)(a), allows for the identification of areas as wilderness which are 'capable of being restored' to a wilderness condition, though the period of time needed for ecosystem recovery must be considered. The restoration time will differ from one ecosystem to another.

Ecosystems are complex and self-sustaining natural systems comprising living organisms and the non-living elements of the environment. While self-sustaining and (in a sense) stable, all natural ecosystems are dynamic (Recher *et al.* 1986). They are adapted to a particular array of natural disturbances. A major objective of wilderness protection is the conservation of natural patterns of disturbance and the capacity of ecosystems to respond to them. The recovery of ecosystems following human-induced disturbance is determined by factors such as the type of disturbance, its duration, scale and frequency.

Restoration is assisted recovery, usually to a pre-determined desired state. The *Wilderness Act* defines this state as 'not substantially modified'. In considering when this has been achieved, or whether it is capable of being achieved, a number of factors are pertinent (Cairns 1986):

- biological relevance – the desired state must be a realistic measure of community or ecosystem condition;
- social relevance – it must be a condition meaningful to a range of users; and
- legal relevance – it must be a condition which meets the Act's requirements.

The end point of restoration for the purposes of the Act is not a return to pristine conditions. It is more useful and realistic to relate it to a reference condition which already occurs within the area and which meets the wilderness definition.

2.2.2 Size

Large size has historically been considered an essential attribute of wilderness (Helman *et al.* 1976). Generally two size criteria have been used:

- an area needs to be large enough for users to 'feel satisfied they have established contact with the wilderness' (Helman *et al.* 1976); and
- an area needs to be large enough to sustain its natural systems.

The experiential and recreational attributes of wilderness are not put in any specific size framework in the Act. This issue is discussed in Section 2.2.3.

Research in the field of island biogeography has demonstrated that the size of an area can be an important determinant of species diversity in both true islands and habitat islands (ie. natural vegetation in a sea of modified environments). Reduction in area results in loss of species (Slatyer 1975), as does fragmentation of habitat (Diamond 1975). This biological impoverishment occurs both at the time of, and after the reduction in size of, a natural area (Pimm 1986). It must be stressed, however, that the relationship between species and area derived from island biogeography has been found to be unreliable in a number of field studies, both over-predicting and under-predicting losses of species (Pimm 1986). Hence the criteria for design of nature reserves based on island biogeography have been subject to criticism (eg. Higgs & Usher 1980; Margules *et al.* 1982; Boeklen & Gotelli 1984).

Reserved, natural areas should contain populations of plants and animals which are both large and diverse enough to represent the genetic variability of those populations and to persist indefinitely (barring natural extinction). This becomes a matter of determining minimum viable population (MVP) sizes for 'target' species – species with comprehensive area requirements whose protection would simultaneously provide for the rest of the area's biota (Recher *et al.* 1986). Top level predator species are usually chosen. This theory also suggests that areas with greater habitat heterogeneity ought to buffer populations against environmental variation (Gilpin & Soule 1986).

This may be seen as a simplistic approach. As Gilpin and Soule (1986) state:

the probability of extinction cannot be pegged to population size alone ... there will be no 'magic number', no single MVP that is universally applicable to all species.

On the basis of these theories and a limited number of Australian studies, Helman *et al.* (1976) concluded that a wilderness 'core' area of about 25 000 hectares with a 'buffer' area of similar size may be at or near the lower size limit necessary to protect wilderness conservation values in forested country in eastern Australia. This work has considerably influenced the survey of and debate on wilderness size in Australia. As a minimum critical size for wilderness, this recommendation has gained wide and often uncritical acceptance. In the light of more recent analysis, it may not be justifiable in modern wilderness assessments and is not used in this report.

The concept of a buffer or management zone has not been followed in recent studies of wilderness (Wilderness Working Group 1986; Lesslie *et al.* 1987). The zones do not always

offer protection from external influences and legislative control of such problems is a more flexible and practical solution (Wilderness Working Group 1986). Wilderness should be large enough to ensure sustainability independent of a buffer zone, even if this means that areas which have been substantially modified are included to ensure appropriate management.

A number of useful guidelines on the size of natural areas offer the necessary framework for interpretation of the Act (Wilcove *et al.* 1986):

- a large natural area is more likely to capture and maintain diversity of features, species and genes within a region than a small area;
- a large proportion of any remaining area of highly fragmented habitats should be targeted for protection in order to avert (or at least minimise) the biotic collapse which models suggest can occur in such systems;
- large fragments will often be the only refuge for species which exist at low densities or who are habitat specialists;
- large fragments often serve as sources of immigrants for marginal populations in neighbouring small fragments;
- the trend is for large fragments to be eroded unless protected; and
- small parcels of habitat require more active and costly management to ensure that wildlife populations maintain their full complement of genes, species and functions (Ryan 1992), without any guarantee of success (Wolke 1991).

2.2.3 Solitude and Recreation

There have been a number of approaches in defining the recreational and experiential indicators for wilderness on the basis of size or remoteness (Helman *et al.* 1976; Lesslie *et al.* 1987). The Act only requires wilderness areas to be 'capable of providing opportunities for solitude and appropriate self-reliant recreation'.

Solitude is not defined in the Act. The Macquarie Dictionary defines it as

1. the state of being or living alone; seclusion. 2. remoteness from habitations, as of a place; absence of human life or activity. 3. a lonely, unfrequented place.

Opportunities for solitude, in this sense, cannot be quantified. Solitude is a highly subjective attribute that will vary from person to person. An enthusiastic bushwalker may only experience solitude when immersed in bush a full week's walk from the nearest point of access. Others may experience the same sensation by walking into a wilderness a few hundred metres from their vehicle on a boundary road. There is no justification or legislative need to class one experience as more important or more fulfilling than the other.

Indicators that attempt to measure this attribute (eg. Lesslie *et al.*'s (1987) Remoteness from Access) on such a distinction are artificial, arbitrary and often ambiguous. They are not used in this assessment. Any area which is capable of affording even the most basic feeling of solitude meets this attribute standard (this alone does not make the area a wilderness as other attributes must also be satisfied).

Appropriate self-reliant recreation is an attribute which falls into the same category as solitude. It is not defined in the Act but it can reasonably be taken to mean any form of recreation which:

- does not utilise motorised or other forms of transport (eg. horses) in place of walking, rafting and the like (ie. self-reliant); and
- does not diminish the biological integrity of the area by ensuring minimal impacts (ie. is appropriate to the biophysical capabilities of the area).

The forms that this type of recreation will take will vary from user to user.

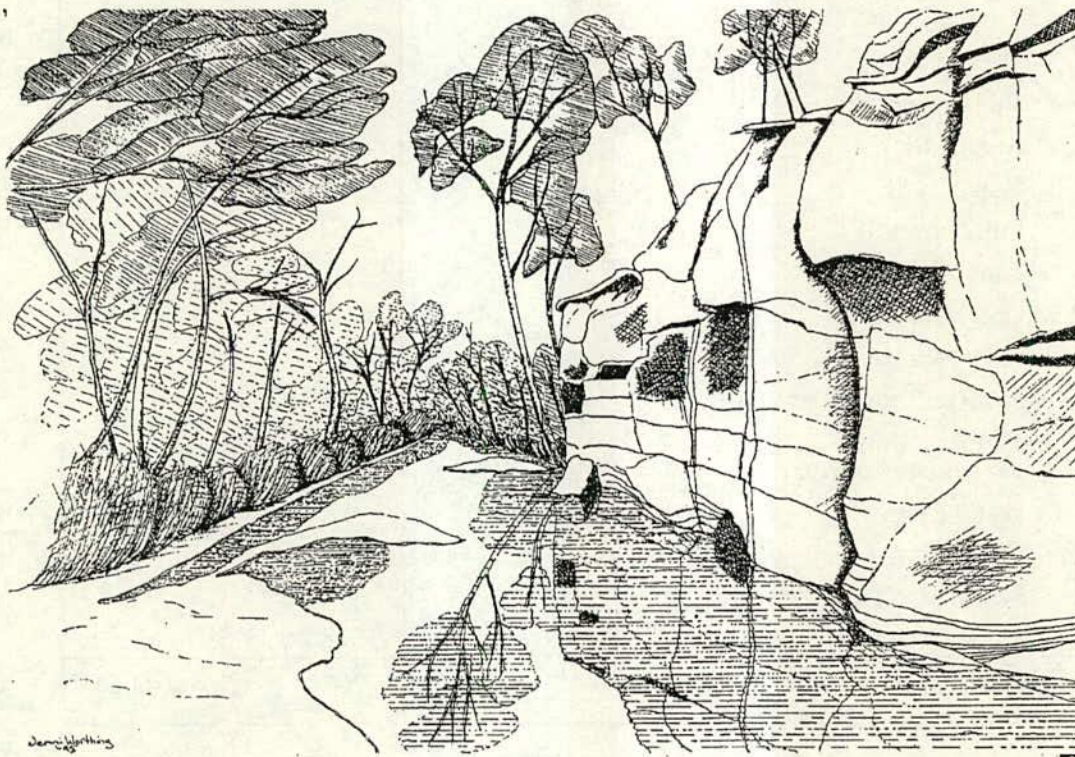
According to Helman *et al.* (1976), the recreational benefits of wilderness may include:

- physical exercise in stimulating surroundings;
- satisfaction of a yearning for adventure;
- separation from the pressures and tensions of modern society; and
- the long term mental health of the community.

Historically, especially in the United States of America, many wild areas were originally reserved for their value as recreational areas (Stankey *et al.* 1990; Hendee *et al.* 1990; Robertson *et al.* 1992) with little or no consideration of their ecological values.

An area's capacity for providing opportunities for basic self-reliant and appropriate recreation is usually demonstrated by an existing recreational use which meets the standard of being self-reliant.

Black Duck Waterhole, Borah Creek, Pilliga Nature Reserve



Part 3: Description of the Proposed Kamilaroi Wilderness and the Assessment Area

The Pilliga Scrub is the largest area of native vegetation remaining in the mostly cleared central division of New South Wales. Apart from the Pilliga, over 95% of this part of the state has been cleared (Date 1992a). Located approximately 400 km north-west of Sydney, the Pilliga covers in excess of 500 000 hectares north of Coonabarabran (see Map 1) and is the largest single tract of inland plains forest in Australia (FCNSW 1987).

3.1 THE PROPOSED AND ASSESSMENT AREAS

The proposal covers approximately 28 800 hectares, located in the rugged southern part of the Pilliga Scrub between 15 and 35 km north of Coonabarabran. A copy of the written proposal is included as Appendix 1.

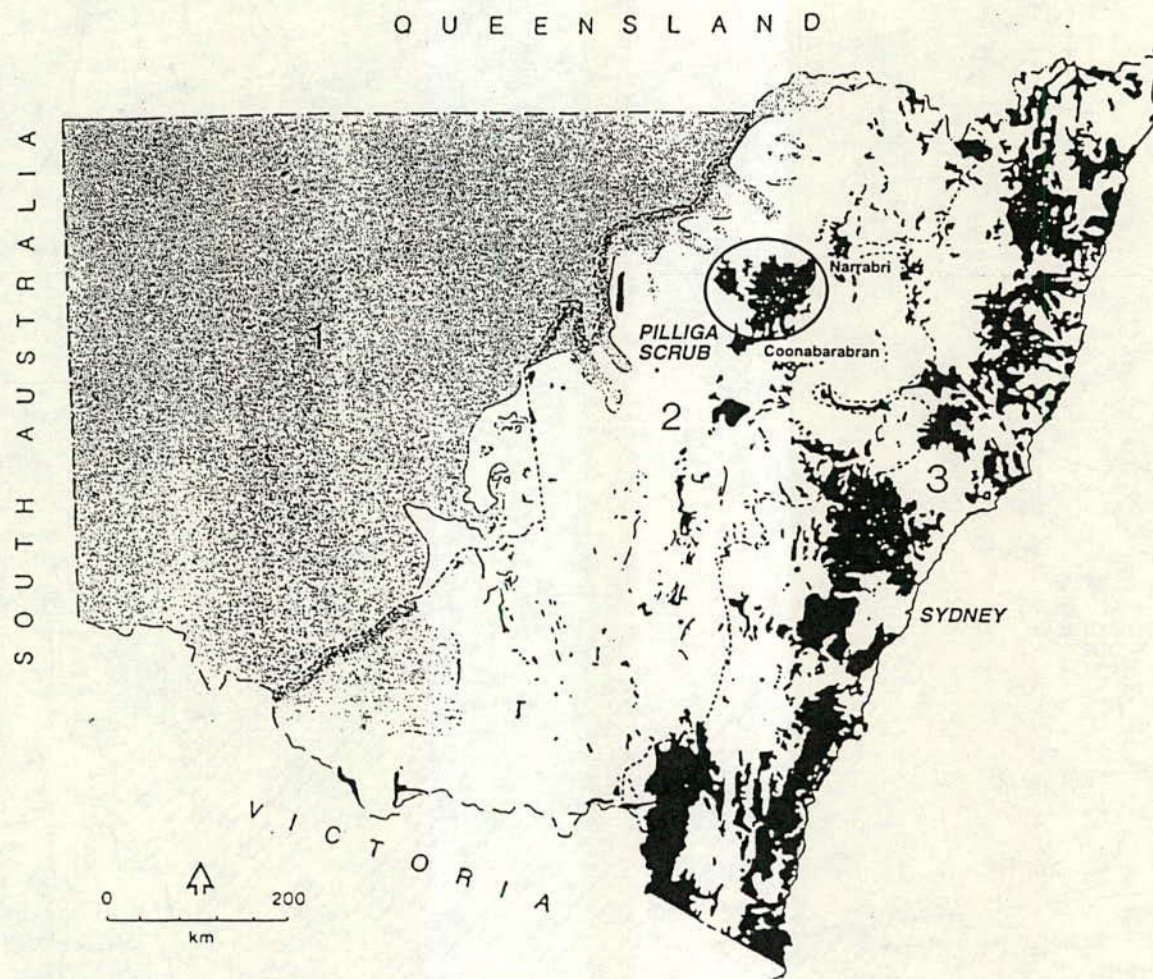
The extent of lands within the proposed area is shown in Map 2 and the schedule of land tenures provided in Table 1.

Table 1 Schedule of tenures for the proposed Kamilaroi wilderness and the assessment area.

Tenure	Proposed area (ha)	Assessment area (ha)
Pilliga Nature Reserve	16 990	74 010
State Forest	6 280	99 460
Wittenbra SF	330	330
Timmallallie SF	5 950	11 760
Denobollie SF	0	270
Bibblewindi SF	0	2 850
Ruttley SF	0	620
Yaminba SF	0	1 900
Pilliga East SF	0	81 160
Lanes Mill FR	0	570
Timber Reserve	1 530	1 530
Vacant Crown Land	15	8 655
Reserved from sale		8 520
Reserved (future public requirements)		120
Water Reserve	15	15
Freehold	4 000	10 990
owned by NPWS	4 000	4 000
privately owned	0	6 990
Total	28 815	194 645

MAP 1:

Location of Pilliga Scrub



Remnant vegetation:

- uncleared forests, woodlands and shrublands
(unmodified to highly modified)
- uncleared arid woodlands, shrublands, grasslands
and riverine forests (highly modified)
- cleared lands (completely modified)

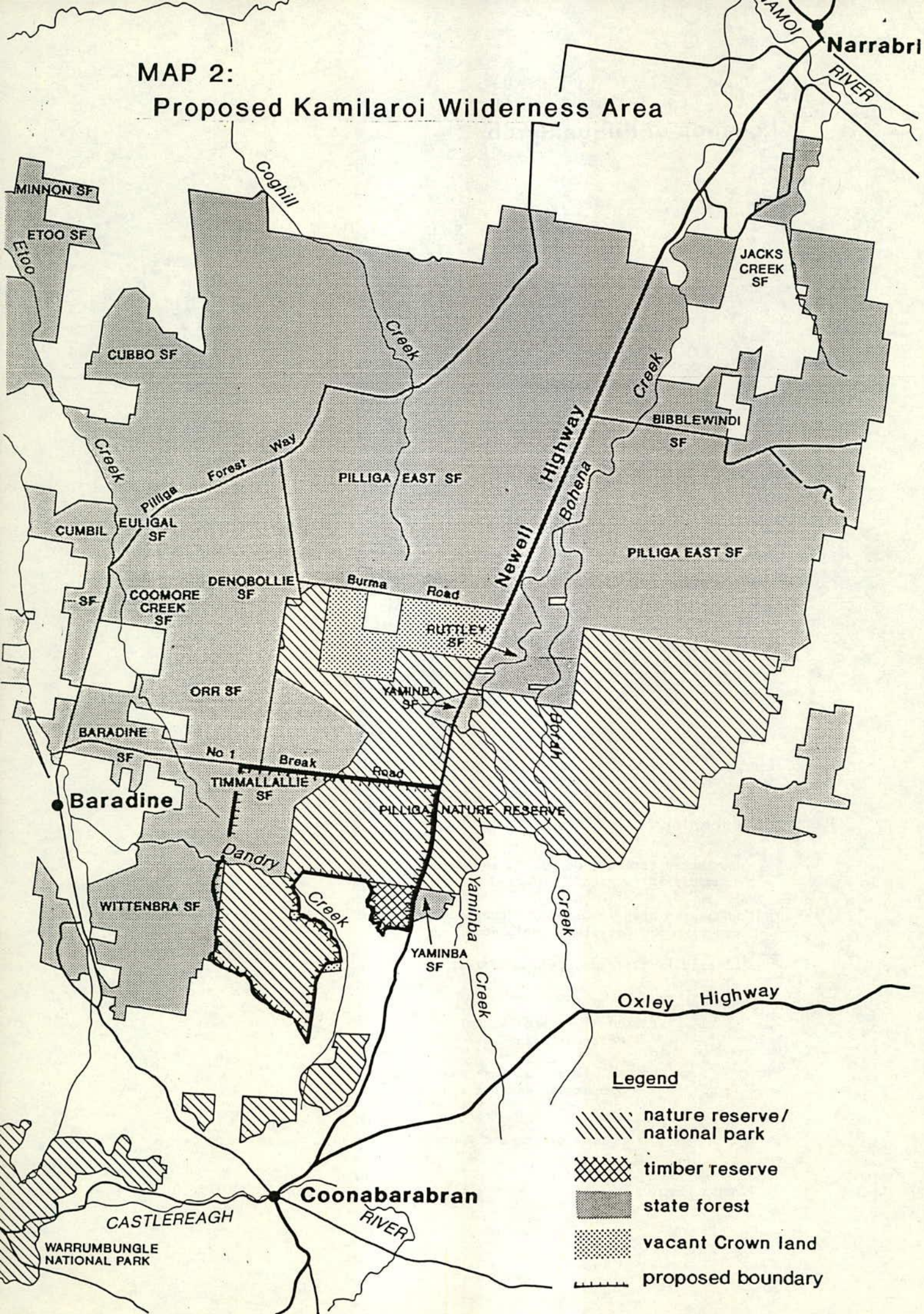
Provinces:

- 1 WESTERN (leased lands)
Western Plains
- 2 CENTRAL (includes the 'Wheatbelt')
Slopes and Eastern Plains
- 3 EASTERN
Coast, Ranges and Tablelands

Source: Benson (1987)

MAP 2:

Proposed Kamilaroi Wilderness Area



The proposal was prompted by the start of works on the subdivision of the 'Schmidt lands' – 4 000 ha of freehold land, largely surrounded by Pilliga Nature Reserve. Although approved by Coonabarabran Shire Council in 1990, minimal roading only commenced in 1994. Soon after the nomination was made, the peak conservation groups in New South Wales requested the Heritage Council to impose a permanent conservation order over the land 'to prevent subdivision, roading, clearing or damage to native vegetation' (Pugh *et al.* 1994). No conservation order was placed on the property. The area was purchased by NPWS in December 1994 and will shortly be gazetted as an addition to Pilliga Nature Reserve.

The proposal covered only a very small part of the Pilliga forests – an area which has long been recognised as containing wilderness (see section 3.2). It was anticipated that future wilderness proposals would be received for the Pilliga. In order to avoid the uncertainty created by future proposals, and to avoid the duplication of effort and expense involved, all areas in the Pilliga likely to meet the criteria of the *Wilderness Act* were assessed. The assessment area contained three discrete areas, separated from each other by the Number One Break Road (a two-wheel drive dirt road which links Baradine to the Newell Highway) and the Newell Highway (a sealed interstate highway). The assessment area is shown in Map 3. The schedule of land tenures for the assessment area is given in Table 1.

In summary, the assessment considered:

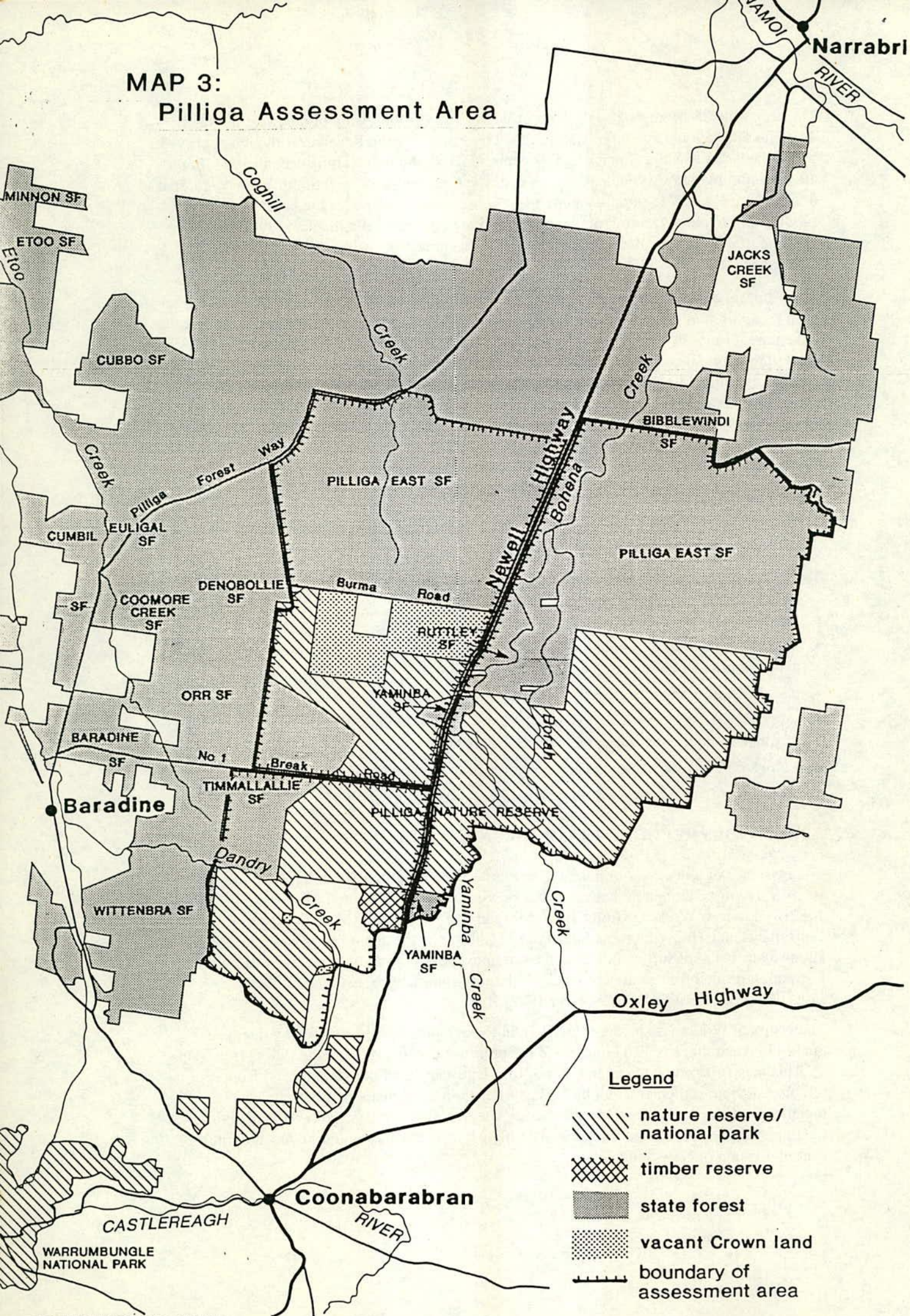
- all of Pilliga Nature Reserve, including freehold land recently purchased by NPWS as an addition to the reserve;
- a water reserve (WR61938), now almost an inholding in Pilliga Nature Reserve, managed by the Department of Land and Water Conservation;
- two timber reserves (TR73014 and TR79962);
- parts of Wittenbra, Timmallallie, Denobollie and Bibblewindi State Forests, all of Ruttley and Yaminba State Forests, and a major proportion of Pilliga East State Forest;
- part of Lanes Mill Flora Reserve;
- several freehold properties, three of which are small inholdings in state forest, one is on Burma Rd and the rest are in the Dandry Creek area;
- a block of Crown land which is reserved for future public requirements; and
- six blocks of vacant Crown land which are reserved from sale.

3.2 PREVIOUS RECOGNITION OF PILLIGA WILDERNESS

The existence of wilderness or potential wilderness in the Pilliga Scrub has been highlighted in several reports, though no boundary has previously been delineated (eg. Mitchell *et al.* 1982; Wilderness Working Group 1986; Morgan & Terrey 1992). Manidis Roberts Consultants and The Wilderness Society (1992) describe the area to the east of the Newell Highway as being of sufficient size and naturalness to qualify as wilderness, with 'minimal restoration needed for this area to reach wilderness significance' (Manidis Roberts Consultants & The Wilderness Society 1992).

The National Wilderness Inventory (NWI), in the computer-based survey of wilderness quality in Australia, has also highlighted the presence of wilderness in the Pilliga (see Map 4). This map is based on the overlaying of four landscape qualities (remoteness from access, remoteness from settlement, biophysical naturalness and aesthetic naturalness) which together produce a map of wilderness quality (Lesslie *et al.* 1993). The NWI map highlights the importance of the Pilliga forests as the only extensive area of wilderness quality in the central division of New South Wales.

MAP 3:
Pilliga Assessment Area



INSERT MAP 4

The current management of Pilliga Nature Reserve under the *National Parks and Wildlife Act* resembles the management of an area as wilderness (Prineas 1994). Thus there is likely to be no major changes in management of the Nature Reserve if wilderness is declared. Management implications of wilderness declaration are discussed in the attached Options Report.

3.3 BIOPHYSICAL SETTING

3.3.1 Geology

The geology and topography of the assessment area are completely unlike those of the nearby Warrumbungle and Nandewar Ranges. These ranges arose due to localised volcanic activity less than 20 million years ago. The processes of erosion have produced a spectacular landscape of volcanic formations and soils derived from basalt.

In the Pilliga, erosion over a much longer period of time has produced a more muted landscape, with less dramatic changes in relief. Two land systems have been identified in the assessment area: the dissected Bugaldie Unit and the undulating Cubbo Unit (Mitchell *et al.* 1982). The underlying geology is Pilliga Sandstone, a quartz lithic sandstone with associated conglomerate, siltstone and shale beds, which date from the Jurassic period (about 150 million years ago). The surface geology is dominated by Quaternary sands deposited following the erosion of the sandstone (Dept of Mines 1968). Soils are coarse- to fine-textured sandy solodic soils (SCS 1983) with few areas of sandy loam. The soils are of low fertility and considered to be impoverished in phosphorous, nitrogen and many trace elements (Vincent & Crofts 1958).

In the proposed area and in parts of the rest of the southern half of the assessment area, the landscape is a dissected sandstone plateau with extensive rock outcrops, cliffs and caves. The most famous of these caves is Sandstone Caves, located close to the Newell Highway in the south of Pilliga Nature Reserve. Isolated remnants of the plateau outcrop in the range which runs north along the eastern edge of the assessment area, including Baileys Peak and the Willala Hills. An extensive sandstone cave system occurs in the Willala Hills. Soils are highly erodable. They tend to be skeletal on the ridges, and sandy and sometimes deep along drainage lines.

North and west of the plateau, the terrain softens into undulating and featureless country with few rocky outcrops and deeper sandy soils. In a few places clay soils are found. Where drainage is very poor gilgais can form. These are crater-shaped depressions which can hold water for long periods following rain and are the feature of Gilgai Flora Reserve, which lies to the north of and outside the assessment area.

Altitudes range from 560 m above sea level in the south-east to less than 260 m in the north-west of the assessment area. Drainage is northerly, towards the Namoi River. Major tributaries of the Namoi in the assessment area include Borah, Bohena and Yaminba Creeks in the east, Coghill and Rocky Creeks in the north-west, and Dandry (Baradine) Creek in the south-west. None of these creeks has permanent flowing water.

3.3.2 Climate

The area has a low to moderate rainfall which varies markedly from year to year. In some years the Pilliga can be extremely dry; in others it can be saturated. Rainfall is fairly evenly distributed through the year, with a slight summer peak. The driest months occur during spring. The towns of Coonabarabran and Narrabri, due to the influence of nearby ranges (the Warrumbungle and the Nandewar Ranges, respectively), receive greater rainfall than the bulk of the Pilliga Scrub. For example, the average annual rainfall at Coonabarabran is over 700 mm whereas at Baradine it is about 600 mm/yr. Most of the assessment area is expected to receive on average between 500 and 600 mm/yr. Evaporation over the year is greater than

rainfall. As a result, streamflow is sporadic and only follows long, heavy rain. The Pilliga is important as a major site of ground water recharge into the Surat section of the Great Artesian Basin (FCNSW 1987).

Temperatures in the area are mild in winter and hot in summer. Many days in excess of 40°C can be experienced in summer and many nights in winter are below zero. Thunderstorms are common in summer. Dry thunderstorms occur frequently between October and December, while thunderstorms with rain occur during January and February.

Rocky outcrop, the Bugaldie Unit, Pilliga Nature Reserve



3.3.3 Flora

A comprehensive botanical survey in the assessment area has not been completed. Data from preliminary surveys indicate that the Pilliga has a very high diversity of native plant species and that, because of the clearing in the surrounding areas, many of these are restricted to the Pilliga (Date 1992a). Recent surveys have discovered plant species which are new to the region and even a species which is new to science (Hitchcock 1990). Several rare or threatened plants are known from the area. These are listed in Appendix 2.

In the Pilliga, there are only limited areas of true 'scrub', that is, areas covered by low trees or shrubs. Indeed, most of the area supports forest and woodland, either dominated by eucalypts or cypress pines. Over 500 plant species have been recorded from the Pilliga. These

combine to form 30 distinct vegetation communities. State forests in the assessment area have been mapped broadly for forest type and broad-scale vegetation mapping of the nature reserve has also been completed (Holme 1991). Through funding from the Murray Darling Basin Commission, this mapping is being refined as part of the Basin Care Project and is projected to be released in September 1996 (K. Ritman, LIC, pers. comm.).

The distribution of vegetation communities within the Pilliga is influenced by the variation in land systems (Mitchell *et al.* 1982) which, in turn, influence soil fertility and depth, availability of moisture and protection from desiccating influences. Fire history, in particular the timing between fires and the time since the last fire, also influences the distribution and dominance of species and communities.

On the dissected sandstone plateau, the vegetation varies between the rocky slopes and the valley floors. On the skeletal soils of the ridge lines and slopes there is a woodland of black cypress pine (*Callitris endlicheri*), narrow-leaved ironbark (*Eucalyptus crebra*), broad-leaved ironbark (*E. fibrosa*), rough-barked apple (*Angophora floribunda*), tumbledown gum (*E. dealbata*), white (also known as brown) bloodwood (*E. trachyphloia*) and red stringybark (*E. macrorhyncha*). On wide valley floors, the vegetation is a woodland or open forest of boxes (such as yellow box (*E. melliodora*) or white box (*E. albens*)), Blakely's red gum (*E. blakelyi*), Baradine gum (*E. chloroclada*) and rough barked apple, with the occasional kurrajong (*Brachychiton populneum*) and white cypress pine (*C. glaucophylla*). The understorey is dominated by shrubs, such as wattles (*Acacia* spp.), cassinias and tea-trees (*Leptospermum* spp.), burrawangs (*Macrozamia* spp.) and, in some areas, by grasses. Rock ferns (*Cheilanthes distans* and *C. sieberi* var. *sieberi*) are common, but their fronds are shrivelled except following rain. The moist microhabitat found in narrow, shaded gorges, permits profuse fern and moss growth. Lichens and mosses encrust some of the rocky outcrops, and lichens can grow in profusion on the bark of cypress pines.

In the undulating country which is more typical of the assessment area, there is a highly diverse mosaic of open forest, woodland, mallee and heath communities. Forest communities are extremely varied with dominant tree species ranging from narrow-leaved, mugga (*E. sideroxylon*), blue-leaved (*E. nubila*), silver-leaved (*E. melanophloia*) and broad-leaved ironbarks, Pilliga (*E. pilligaensis*) and fuzzy box (*E. conica*), brown bloodwood, smooth-barked apple (*Angophora leiocarpa*), scribbly gum (*E. rossii*) and cypress pines (both black and white). Areas of flat, poorly drained soil support a dense closed heath, such as that found in Lanes Mill Flora Reserve in the north of the assessment area, which contain a high diversity of shrub species, including broombush (*Melaleuca uncinata*). White cypress pine and narrow-leaved ironbark occur as scattered trees on islands of better-drained soil. In dense stands of cypress pines, the understorey – including the grass and herb layer – is almost completely absent and litter is quickly broken down. In this way these fire-sensitive species are protected from fire (Lacey 1973). In other parts of the forest, especially under ironbarks, a dense shrub layer dominated by Dwyer's mallee gum (*E. dwyeri*), tumbledown gum, casuarina, hopbushes and wattle species may be present.

The diverse shrub and herb layers produce spectacular and brightly coloured wildflower displays which are reminiscent of the coastal sandstone forests (Rolls 1981). These displays are a feature of the assessment area during late winter and spring, and are uncharacteristic of the other forests of the slopes and plains (Rotherham *et al.* 1975). They feature 'coastal' species including

- ground flowers (terrestrial orchids (*Diuris punctata* and *Calochilus robertsonii*), riceflower (*Pimelea linifolia*), flannel flower (*Actinotus helianthi*), bushflag (*Patersonia sericea*), flax lily (*Dianella revoluta*) and fringed lily (*Thysanotus tuberosus*));
- vines (such as devil's twine (*Cassytha* spp.) and false sarsparilla (*Hardenbergia violacea*)); and

- shrubs (such as cassinias, boronias, dogwood (*Jacksonia scoparia*), five corners (*Stryphelia triflora*), urn heath (*Melichrus urceolaris*), parrot pea (*Dillwynia retorta*) and silver banksia (*Banksia marginata*)).

Many of these are found in the Pilliga at the western limit of their distribution. Even some of the tree species can be found in coastal habitats, including the rough-barked apple, broad-leaved ironbark and black cypress pine. Of particular note is the extensive stand of red ash (*Alphitonia excelsa*) around the base of Willala Mountain, a species which in New South Wales can also be found adjacent to warm coastal rainforests.

A very low number of exotic plant species has been recorded from the assessment area, comprising less than 4% of the total number of recorded species (Harden 1995). A discussion of the impact of introduced plant species is given in section 4.1.6 (Weeds).

3.3.4 Fauna

The variety in vegetation communities provide a range of habitats for native animals. Several surveys for fauna have been carried out in the Pilliga Nature Reserve and elsewhere in the Pilliga in the past two decades, the most recent being prompted by the Fauna Impact Statement for forestry operations in the state forests and timbered Crown lands of the area. Surveys in the area have not been comprehensive – for example, reptiles and amphibians have been poorly studied, as have invertebrates (apart from those which are pests of white cypress pine). However, these surveys have located endangered species and have discovered the Pilliga mouse – a new species of mammal, previously unknown to science. Endangered species known or expected to occur in the nominated area are listed in Appendix 3. The presence of such diversity of animals which are considered endangered on a state-wide basis highlights the natural significance of the Pilliga as a large remnant in an otherwise cleared region (see section 4.1.8 (Natural significance)).

The Pilliga mouse was first discovered in 1975 (Fox 1983) and described as a separate species on the basis of genetic analysis (Fox & Briscoe 1980). This is an old endemic rodent which, unique among Australian rodents, has a highly restricted known range (Lim 1992). With the extensive clearing of the slopes and plains, it is probable that this species has experienced a serious contraction in range (Lim 1992). It is now only found in the Pilliga Scrub, with many capture sites located in the assessment area. It is most often found in areas of dense understorey that have not recently been burnt (Lim & Johnson 1991). This dense shrub layer also provides suitable habitat for other small mammals including the pygmy possum.

Three endangered macropods are known from the assessment area, or have been sighted nearby: the brush-tailed rock wallaby, rufous bettong and black-striped wallaby. Several colonies of brush-tailed rock wallabies are known from the corridor linking the proposed area and Warrumbungle National Park. An undiscovered colony may occur within the assessment area. The colony once known from Willala Hills has disappeared, as has the population at Mount Kaputar National Park to the north-east of the assessment area (Short & Milkovits 1990). The decline of the brush-tailed rock wallaby has occurred throughout New South Wales and Victoria. It is due to many causes. It commenced last century with hunting pressure encouraged by the wallaby bounty and the market for pelts prior to the First World War. Current threats include predation by foxes and cats, and competition for food and shelter by goats.

Rufous bettongs are known from Pilliga East State Forest to the north of the assessment area and a small wallaby fitting the description of a rufous bettong has recently been sighted in the proposed area. The Pilliga populations are significant because in New South Wales, rufous bettongs are now largely confined east of the Great Dividing Range north of Coffs Harbour (Schlager 1981), with isolated populations in the Torrington area west of Tenterfield and in the Barrington Tops (NPWS 1991). They used to be quite common on the western slopes

with their range extending from Victoria to Queensland. An indication of their previous abundance can be found in the records of the tens of thousands of bounties paid for rufous bettongs at the turn of the century (Schlager 1981).

The black-striped wallaby was probably never common. It has disappeared from much of its range due to forest clearance. It remains in small colonies associated with thick shrubby understoreys and closed forest margins adjacent to either pasture or open, grassy forests. A population has been recorded from the Pilliga just north of the assessment area.

A large and healthy population of koalas is found in the assessment area. This mammal is confined to eucalypt forests and woodlands of eastern Australia where favoured feed trees are present. These include white box (*Eucalyptus albens*) and bimple box (*E. populnea*) (DoP 1995), both of which are found in the Pilliga. Koalas are primarily arboreal but need to come to ground to change trees, to travel through territories during the mating season, or to seek shade. They are not well-adapted to moving on the ground and are most at risk at this time. The main threats to koalas are clearing of habitat and vegetation corridors, attacks from domestic and wild dogs, and vehicle accidents.

High numbers of birds can be found in the Pilliga and these are the best-studied component of the fauna. Over 200 species have been recorded (Mitchell *et al.* 1982). Some of these are sedentary and reside permanently in the forests and woodlands; others are nomadic visitors; for others, the Pilliga forms a vital part of a regular migratory route. The Pilliga provides an over-wintering site for the swift parrot, which migrates from its breeding areas in Tasmania. The area is also very important for migratory bats. During good flowering years, bats (such as the little red flying fox) include the Pilliga in their migratory route between the north and south coasts.

Almost a third of all Australian parrots and cockatoo species have been recorded from the Pilliga (Rolls 1981; Forshaw & Cooper 1988). The population of glossy black-cockatoos which live and breed in the Pilliga has been described as the largest west of the Great Dividing Range (Date & Paull 1994). The glossy black-cockatoo has a specialised diet, exclusively eating the seeds of casuarinas. In the Pilliga, its main food sources are bullock (*Allocasuarina leuhmannii*) and *Casuarina diminuta*. Like many other endangered species in the Pilliga, including the turquoise parrot, several owls, the squirrel glider and the greater long-eared bat, the glossy black-cockatoo requires mature hollow-bearing trees for nesting.

There are also a high number of diurnal birds of prey in the Pilliga forests. Up to 15 species have been recorded or could be expected from the area, including the wedge-tailed eagle, little eagle, brown goshawk, grey goshawk, square-tailed kite, whistling kite and peregrine falcon. Peregrine falcons have nested on a rocky outcrop above Sandstone Caves (Morris 1981) and also at Willala Mountain. Six species of owls have been recorded from the Pilliga, including the endangered masked and powerful owls (Rolls 1981), and possibly the eastern grass owl (Paull 1994). Other nocturnal birds of prey include the tawny frogmouth and the owl nightjar. The large forest owls occupy large, well-separated territories which, in fertile coastal forests, have been estimated to be 1000 ha. These permanent territories are likely to be much larger in the Pilliga.

The Pilliga and the neighbouring Warrumbungle Range form one of the few areas frequented by the regent honeyeater (Menkhorst 1993), although it may only be an irregular visitor appearing in good flowering years (Webster & Menkhorst 1992). A nomadic medium-sized honeyeater, this bird is specialised to box-ironbark eucalypt associations and is reliant on a small number of favoured sites. It is decreasing in both range and numbers (Kennedy 1990) and is nationally considered Endangered (ANCA 1994). Threatening processes include significant reductions in the extent and quality of its old-growth box-ironbark woodland habitat, and competition from introduced honey bees and aggressive honeyeaters for nectar (Garnett 1992; Webster & Menkhorst 1992; Menkhorst 1993). Important food trees include large-flowering eucalypts such as white box, yellow box, Blakely's red gum and mugga

ironbark, especially healthy, abundantly-flowering mature trees. Several have been recorded from the assessment area. A pair of regent honeyeaters has been observed nesting in Wittenbra State Forest, just to the west of the assessment area (Date & Paull 1994).

The malleefowl is another nationally Endangered species once known to occur in the Pilliga and still expected there (Garnett 1992). Despite its name, this bird is not restricted to mallee and can be found in woodland and shrubland on sandy soils. It has disappeared from much of its former range, apparently due to a number of factors including habitat clearance and fragmentation, high fire frequency, competition from sheep, rabbits and goats, and predation by foxes. Fire in particular is a major influence on breeding success, as this ground-dwelling bird rarely breeds in an area that has been burnt in the past 15 years. Breeding densities are highest in areas of thick understorey, typically areas not burnt for 40 years (Benshemesh 1994).

The Pilliga is an area of overlap where coastal species are found at the western limit of their distribution and arid land species are found at their eastern limit. Coastal species found at their western limit include several mammals (such as the eastern pygmy possum and brush-tailed phascogale), birds (including the fuscous honeyeater) and reptiles (including the pale-headed snake). Western species found at their eastern limit include the red-tailed black-cockatoo, chestnut quail thrush, Port Lincoln ring-neck parrot and Major Mitchell cockatoo.

Several introduced species are naturalised in the Pilliga. These include insects such as European honeybees and cactoblastis moths, and mammals such as domestic mice, rabbits, goats, pigs and European foxes. A discussion on the impacts of introduced animal species is given in section 4.1.7 (Feral animals).

Pilliga mouse



3.4 CULTURAL SETTING

3.4.1 Aboriginal Cultural Heritage

The Pilliga was once part of the territory inhabited by the Gamilaroi (Kamilaroi) nation. At the time of European settlement, their country extended from the Upper Hunter north into southern Queensland, bounded in the west by Walgett and Coonamble and in the east by Tamworth and Goondiwindi (Dixon *et al.* 1990; Millis 1992). It was a numerous nation whose influence was probably extending through increased levels of trade and inter-marriage at the end of 18th century (Dixon *et al.* 1990).

There are few historical accounts of traditional Aboriginal life in the area. It is suspected that the Pilliga, because of the low fertility of the soils and low productivity of the forests, would not have had a resident population. Rather, it would have formed part of the home range for several groups. It is not known whether the Pilliga was visited on a regular basis or only when good seasons produced abundant food resources (such as seeds (including cycad, kurrajong and acacia seeds), game and fish). The broom plains in the north of the assessment area contain an abundance of plant foods (Roberts 1991).

Archaeological sites have been used to determine something of the pre-contact life among the Gamilaroi. Many archaeological sites are known from the Pilliga and surrounding areas and new ones are being discovered. This is directly as a result of surveys over the past decade (eg. Roberts 1991) because most sites are unnoticeable to the untrained eye, sometimes distinguished only by the presence of stone artefacts. Prior to the recent surveys, few sites were known from the Pilliga (Bowdler 1982).

Most evidence of Aboriginal life in the area is from open camp sites and rock shelters. The margins of watercourses and rocky waterholes were favoured camp sites, with the largest and most complex found near large, permanent waterholes. Some camps were long-term base camps, indicated by evidence of stone tool manufacture and repair (Roberts 1991).

The Bugaldie Unit in the south of the assessment area, with its broken sandstone cliff lines, contains a number of rock shelters and overhangs. Some of these have axe-grinding grooves, archaeological deposits and art (both paintings and engravings). The material collected from shelters just outside the assessment area includes wooden and bone artefacts, food remains, fibres and skins – material rarely preserved in New South Wales (Roberts 1991).

Scarred trees provide other evidence of the use of the area by Aboriginal people. Tree scars result from the removal of some of the bark. This could be to manufacture an object such as a shield or a food carrier, or it could be as a special marker, such as the marking of graves or as family markers (Rundle 1993).

The Pilliga was visited for special ceremonies. A bora ground is located in the south of the assessment area, after which Borah Creek was named. The bora was the most sacred ceremony for Gamilaroi men. It was a set of rituals of male initiation, held at specially prepared sites, at which young men received a 'buurr' or belt of manhood (Dixon *et al.* 1990). Boras would attract crowds of men from considerable distances. For the name 'Borah Creek' to have perpetuated since European settlement of the area, the boras held at this site must have been large and must have occurred well after the settlers arrived. It is not known when this ground was last used. The last Gamilaroi bora was held at Wee Waa north of the assessment area in 1905 (Dixon *et al.* 1990).

The settlement of the Liverpool Plains and Peel Valley by squatters in the 1820s led to several violent clashes between the Gamilaroi and the new settlers. A policy of 'shoot on sight' was adopted by many of the NSW Mounted Police, squatters and their farm hands, and several massacres occurred (Millis 1992). Tribal life broke down as access was denied to traditional nomadic routes, ceremonial sites, hunting grounds and water holes. By the 1850s,

most of the resistance had disappeared and the remaining Aboriginals lived on the runs (Rolls 1981). Many were used as general farm hands and shepherds, though employment was sporadic. The last tribal Aboriginal people in the Pilliga died at the beginning of this century (Rolls 1981).

In 1900 the outlawed Aboriginal brothers, Jim and Joe Governor, travelled through the eastern part of the assessment area as part of their chase evading one of the largest ever police efforts in northern New South Wales. They raided properties for supplies on Bohena and Borah Creeks just outside the assessment area (Rolls 1981).

The first formally notified Aboriginal Reserve near the Pilliga was created in 1892 at Burra Bee Dee, located approximately 10 km to the east of Coonabarabran and about 20 km to the south of the assessment area (McGuigan n.d.). Other reserves were gazetted near Wee Waa and Narrabri to the north of the assessment area, near the village of Pilliga to the north-west and near Baan Baa to the east. A large and informal reserve of approximately 2 000 ha also once existed on Bohena Creek (McGuigan n.d.). Following the passing of the *Aborigines' Protection Act* in 1909, all Aboriginal people were required to live in proclaimed reserves. The reserve at Pilliga (Minnom Mission) was one of the principal government-run stations in the Gamilaroi's territory (Millis 1992). The reserves at Pilliga, Cuttabri and Narrabri are considered culturally significant to Aboriginals living in the area today (Rundle 1993).

Because of the high level of contact between settlers and the Aboriginals of the Gamilaroi nation, the English language now contains many words derived from their language. These include animal names such as bilby, budgerigar, brolga and galah, and names for Aboriginal ceremonies, including the word 'bora' (Dixon *et al.* 1990). There are few people who know more than a scattering of words of this once widely-spoken language. The Gamilaroi however is still identified by Aboriginal people today as a major tribal group in New South Wales (Creamer n.d.). The importance of the assessment area to its indigenous people is reflected in the pending land rights claim for a portion of vacant Crown land located south of Burma Road.

3.4.2 Non-Aboriginal Cultural Heritage

The history of the Pilliga since European settlement is the story described in detail in Eric Rolls' book *A Million Wild Acres* (Rolls 1981).

The first Europeans to visit and describe the assessment area were the surveyor John Oxley and the members of his exploration party during a very wet August 1818. The party traversed the proposed Kamilaroi wilderness area, following the course of Dandry (Baradine) Creek. They described the Pilliga as a desolate place and had great difficulty navigating a route suitable for their pack horses in the saturated conditions.

Settlement of the Liverpool Plains and the Namoi Valley followed about twenty years later, with squatters claiming the better grazing lands on the edges of the Pilliga. A large run which included the eastern section of the assessment area was squatted by John Robertson, later Premier of New South Wales. His cattle grazing enterprise in the Pilliga failed. Leasehold properties were claimed in the heart of the Pilliga from the 1850s and all of the forest had been claimed by pastoralists by the 1880s. By this time, sheep had replaced cattle as the stock on most properties. Settlement and development however were concentrated to the more productive areas along the major rivers, and parts of the Pilliga escaped occupation and heavy grazing (Norris *et al.* 1991).

Most grazing ventures in the heart of the Pilliga failed due to the poor soils and the scarcity of water. Many of the leases were abandoned in the early 1880s. After 1888, most of the leases had lapsed and no rent was received for the lease of lands in the eastern Pilliga forests (Norris *et al.* 1991). Surrounding permanent natural water holes, small portions of freehold land (some only 16 ha) were claimed and granted. Three of these small portions remain in the

assessment area at Creagh's Crossing and Airlands, near the confluence of Borah and Yaminbah Creeks. There was however a population of 'scrub dwellers' in the Pilliga, mostly in the forests near Baradine outside the assessment area. Most were employed at bush mills, or found income from a combination of sleeper cutting, the dingo and wallaby bounties, or from trading kangaroo and wallaby skins. Following the 1951 fire, most scrub dwellers moved out of the forests.

The core of the forests was 'almost unknown' early this century (Jensen 1912 quoted in Norris *et al.* 1991). Few people lived there, and the only roads in the area were rough bush tracks used for timber getting. Access to the assessment area last century was limited to a coach and stock route along Borah Creek linking Coonabarabran and Narrabri, and Creagh's Road to Boggabri (known today as Delwood Trail). A coach station and inn were built at Airlands to cater for the teamsters using the stock route which was formally gazetted in 1875.

An extensive program of constructing road access to the forests commenced in the 1930s by State Forests of NSW (then the Forestry Commission of NSW) using depression labour. The travelling stock route fell into disuse with the construction of the Newell Highway following the Second World War. The Newell Highway was upgraded during the late 1960s and now forms part of the Federal highway network.

Recognition of the importance of the Pilliga forests as a source of white cypress pine led to the appointment of the first forestry ranger in 1877. Forest reserves were proclaimed during this time north of the assessment area, close to Narrabri. Pilliga West State Forest and parts of Pilliga East State Forest were formally dedicated in 1916. The tenure of Pilliga East State Forest was further secured by the declaration of Pilliga National Forest in 1935. Ruttley State Forest was dedicated in 1935.

Several mills were located in the Pilliga forests. Those closest to the assessment area included the Underwood's mill at Rocky Creek, Beavis' mill at Mollieroi Crossing on Coghill Creek, Schwager's mill on Little Rocky Creek and Grosser's mill on Scratch Road (Rolls 1981). A small mill operated in the assessment area on Bohena Creek.

During the Second World War, logging in the Pilliga was unrestricted and there were concerns at the end of the war that the timber resource had been seriously depleted (FCNSW 1987). As part of a post-war management survey, mapping of the vegetation of the existing state forests was undertaken. Most of the assessment area was not mapped as, at the time, the majority was vacant Crown land. In 1949 the northern half of the assessment area was added to Pilliga East State Forest in order to increase the protection of the district's timber resources. In 1979 and 1983, previously leased Crown land surrounding Ruttley State Forest was added to Pilliga East State Forest. In 1986, the southern part of Yaminba State Forest was declared.

Following the war, nine large blocks of land in the assessment area were leased. These included several blocks to the south of Burma Road, and a few surrounding and to south of the Airlands property. Salisbury Waterhole on Borah Creek is named after one of the post-war lessees, whose lease extended into the present Pilliga Nature Reserve.

The values of the nominated area for fauna led to the proclamation of a 'Fauna Protection District' over part of Wittenbra State Forest in 1954 and the dedication of Pilliga Nature Reserve in 1968. Management of the area by NPWS commenced in 1972. The nature reserve was listed on the Register of the National Estate in 1978.

Part 4: Assessment of the Pilliga for Wilderness

As discussed in section 3.1, an overall assessment of the Pilliga Scrub against the criteria of the *Wilderness Act* was undertaken. These criteria are discussed in Part 2 of this report. Although this assessment was prompted by the proposal, such an assessment could have been undertaken under Section 5(1)(a) of the Act without a proposal and would have been undertaken in the near future. Sections 5(1)(b) and 7(4) of the *Wilderness Act* require the investigation of the proposed area for wilderness identification and declaration. This part of the report provides an assessment of the wilderness qualities of the assessment area, including the proposed area.

4.1 NATURALNESS

The proposal (Appendix 1) maintains that:

- the proposed area, together with its plant and animal communities, is in a state that has not been substantially modified by humans and their works; and
- the minor roads and the limited areas of logging and clearing within the area are capable of being restored to a substantially unmodified state.

The proposal requested that all developments cease until after completion of the assessment. In particular, it cites logging in state forests of the proposed area and work on the subdivision of the then privately owned freehold land.

The extent to which the assessment area (including the proposed area) has been modified by humans and their works, and the ability of the area to be restored to a substantially unmodified state has been assessed. In particular, the impacts of trails, forestry activities, bee-keeping, and introduced plants and animals were considered. Each of these is discussed below.

When assessing whether or not the area met the attribute of naturalness, the following were taken into account:

- the extent of substantially unmodified vegetation cover;
- the extent and location of modified areas;
- the degree of modification evident; and
- the possibility of restoration of modified areas.

Laut *et al.*'s (1977) naturalness indicator was used for this assessment. The assessment area and those lands immediately surrounding it were classified using information gathered from a variety of sources including:

- submissions on the proposal (see attached report);
- resource information already held by the Service (some of which is in a geographical information system (GIS));
- aerial photograph interpretation (airphotos taken 1980, 1988 and 1994);
- satellite imagery (1990 and 1995);
- data supplied by Service personnel and others familiar with the area; and
- on-ground assessment.

Appendix 4 provides a summary of the results of the assessment of naturalness.

4.1.1 Trails

Trails are the most obvious modification to the naturalness of the assessment area and have led to the description of the area as 'a roaded wilderness' (Mitchell *et al.* 1982). The presence

of the trails was equated in the National Wilderness Inventory with low levels of 'remoteness from access', significantly reducing the levels of wilderness quality for much of the area.

The nominated area is largely unroaded, with only about 70 km of internal trails. There are approximately 400 km of formed internal trails in the assessment area, with an almost equal length of unmapped rough bush tracks. Trails vary in width, standard of construction and purpose. Most have been constructed for fire management and timber getting. They also provide access to apiary sites. The network of trails is more dense in the state forests of the assessment area than in Pilliga Nature Reserve. There are no constructed or signposted walking trails in the area.

Major trails which pass through the assessment area include Burma Road, Yearinan Road, Beehive Road and Delwood Trail. The end part of Dandry Road is also in the assessment area. Of these, only Yearinan and Dandry Roads are dedicated Crown roads and the responsibility of Coonabarabran Shire Council. The others are maintained by SFNSW.

Minor trails which are regularly maintained include Sandstone Caves Road, Airlands Break, Kerringle Road, Galloway Road, Deldam Trail, Dudleys Road, Dipper Road, Mount Pleasant Road, South East Trail, Old No. 1 Break Road, Kings Road, Lanes Mill Road and Baradine Road. Other minor roads include Borah Creek Road, Punks Trail, Badham Trail, Banksia Trail, Baileys Road, Boronia Trail, Burke and Wills Trail, Oxley Trail, Dangar Road, Denobollie Trail, Als Trail, Crawl Trail, Duderay Trail, Beedel Trail, Tiber Trail and Kurrajong Trail. Many rough bush tracks also exist, especially in the state forests of the area.

Apart from the Number One Break Road and Sandstone Caves Road, no unauthorised use of the trails in Pilliga Nature Reserve is permitted. Trails in the state forests of the assessment area are open to the public but use of the trails is not recommended in wet weather. Despite plans to establish Bohena Forest Drive in the north east of the assessment area (FCNSW 1987), currently no tourist forest drives are present in the eastern half of the assessment area and use by the public is minimal. The only signposted forest drive road is Burma Road in the north-west of the assessment area. Other trails in the assessment area are only marked by small yellow metal name plates.

Impacts of trails include (Andrews 1990):

- Destruction of vegetation along the route of the trail. The 400 km of trails in the assessment area are equivalent to the destruction of more than 100 ha of natural vegetation.
- Erosion. Often there has been little planning in the location of trails. Erosion is a serious problem on the light sandy soils, especially near creek crossings, and trails are a major source of increased siltation of creek lines. For many trails, grading has been kept to a minimum to reduce erosion and several are revegetating.
- Extension of edge effects. The cleared corridors are fringed by microhabitats different from those of the rest of the forest due to the impacts of increased exposure. They tend to support different types and numbers of animals.
- Barriers to movement between natural areas. Small ground-dwelling mammals tend to avoid clearings and even disused trails can prevent their movement through the undergrowth. This has implications for a species' population dynamics, recolonisation of areas following disturbance and genetic diversity, and may lead to higher extinction probabilities.
- Road kills. These are greatest in areas where there are large numbers of vehicles travelling at high speed, such as along the Newell Highway, where the speed limit is currently 110 km/hr.

- Weed invasion. Because of the transport of seeds by vehicles and the presence of disturbed soil, trail edges are the sites with the highest densities of most weeds.
- Increased feral animal range. Trails provide easy travelling conditions for feral animals such as the fox (*Vulpes vulpes*), especially where the understorey is shrubby and dense.

The presence of trails, especially ungated trails, encourages vehicle-based recreation in the area. Litter can be found on the sides of trails, and vehicles produce unnatural levels of noise and chemical pollutants. Illegal use of the trails in Pilliga Nature Reserve has meant that increasing levels of maintenance of these trails are required so that they are trafficable during fire emergencies.

Although they remain obvious modifications of natural vegetation communities, the majority of the trails were developed to a relatively low standard and are therefore classified as Disturbed Natural. Trails unnecessary for strategic fire management of the area could be rehabilitated through natural processes with a minimum of human interference. Rehabilitation of trails will enhance and further protect the biological values of the area. In a declared wilderness area, the use of trails is significantly reduced as vehicles are permitted only for essential management purposes (such as fire, feral animal and weed control, and emergency rescue operations) and are not allowed for recreation.

The major through roads in the area (ie. the Newell Highway and Number One Break Road) lie outside the proposed wilderness. Sandstone Caves Road provides access to the Sandstone Caves, as well as to private property on Yaminbah Creek. It is excluded from the identified wilderness.

Burma Road, Pilliga East State Forest



4.1.2 Clearing and Development

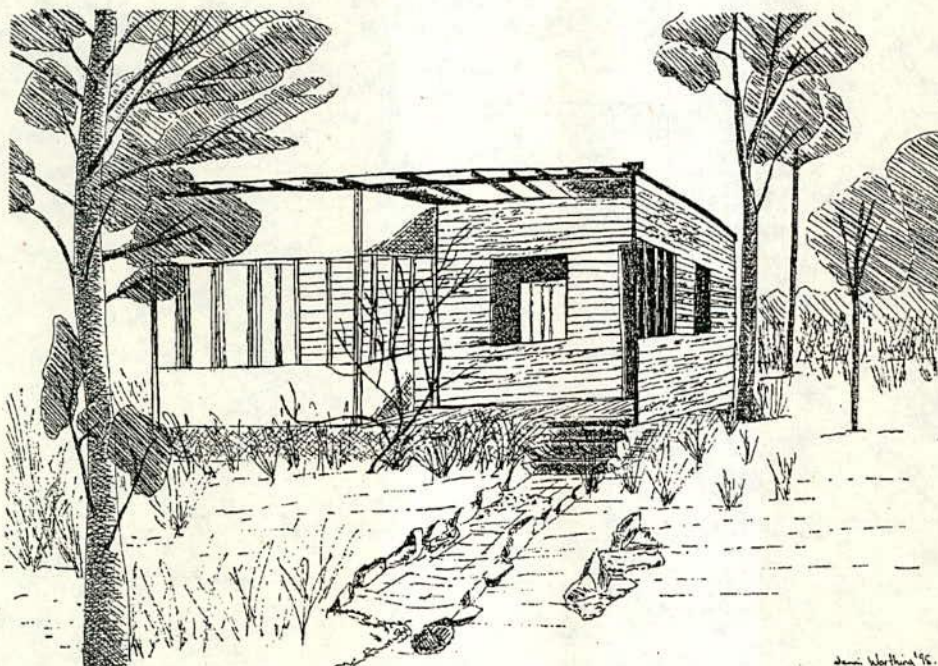
Within the assessment area, several developments and clearings exist. These include:

- clearings, pasture improvement, sheds and houses on private property on Dandry (Baradine) Creek, upstream of the proposed area, and on private property and occupational permits on Borah and Yaminbah Creeks, surrounding Ruttley State Forest;
- ruins of houses, tankstands and sheds;
- fence lines;
- dams;
- quarries; and
- trig stations.

Three areas in the assessment area are settled and cleared, and continue to be farmed. These are located in the Dandry (Baradine) Creek valley upstream of the proposed area, on private property and occupational permits on Borah and Yaminbah Creeks surrounding Ruttley State Forest (including the Airlands property), and on freehold land on Burma Road (the Arkell property). These areas are all classed as Cultural. Impacts from these clearings, especially those on Borah Creek, extend outside the properties, especially along creek lines.

Most other settlements in the area have long been deserted and have been restored by natural processes. Typically, little more remains than piers and a few fence posts within the forest. One area which was only relatively recently deserted is the Akehurst properties on Burma Road. Despite a large investment in supplying the necessary infrastructure of dams, clearings, fences and sheds (Rolls 1981), these properties never proved viable. They were deserted in the early 1970s, the Crown leases forfeited in 1983 and the clearings reclaimed by the scrub. All that remains are a couple of dams, fences, the ruins of two weatherboard cottages, the frameworks and slabs of a couple of sheds, and tankstands. A few wild oleanders and aloes surround the ruins. The area is now vacant Crown land. The previous clearings are classed Disturbed Natural. The immediate surroundings of the house ruins are classed as Degraded Natural. The southern portion of the property was never cleared and is classed Undisturbed Natural.

Ruins of one of the Akehurst houses



Old fence lines can be found in several parts of the assessment area including Pilliga Nature Reserve and provide evidence of previous settlement of the area. Some fencelines are short rows of fenceposts, with no holes drilled in the posts and no wire. This level of 'fencing' was the minimum standard of improvement required to secure occupation of land (Rolls 1981). In other areas, such as along Galloway Road in Pilliga Nature Reserve, decaying fence posts with rusting wire can be found. Within the Akehurst properties, six-strand wire fences and wire-mesh fences were constructed and still remain. These unmaintained fences are classed as Disturbed Natural and are gradually being restored by natural processes. Parts of the boundaries of the occupational permits surrounding Ruttley State Forest and the freehold land on Burma Road are well fenced with the fencelines maintained and cleared. All fence lines are classed as Disturbed Natural and are capable of restoration.

Several small dams have been constructed in the assessment area on lands outside Pilliga Nature Reserve. On leased and freehold property, dams provide water for stock; in state forests, dams provide water to re-fill tankers during fire fighting. The impacts of dam construction include localised changes in vegetation and faunal communities, such as increased abundance in bats, some birds and macropods (Smith 1982), and increased numbers of feral animals, especially pigs. Due to their impacts on the natural plant and animal communities, dams are classed as Degraded Natural. Restoration is possible.

Quarries are the only current form of mineral exploitation in the assessment area. All quarries are located close to major trails in the state forests (such as along Burma Road and the Number One Break Road) or within a few hundred metres of the Newell Highway. Quarries are classed as Degraded Natural. Restoration of quarries would require replacement of topsoil and vegetation rehabilitation.

Two trig stations are located in the assessment area on the following peaks: Baileys (Denison) and Bald Hill (Wanda). Their use is sporadic and is declining as satellite positioning (G.P.S.) is increasingly being used. The pole at Baileys has been attacked by termites and collapsed many years ago. It has not been repaired. The disturbance associated with the trig stations includes the localised disturbance of the point itself and access routes. They are classed as Disturbed Natural. Authorised access to trig stations could be maintained where necessary in a declared wilderness area.

The assessment area is influenced by upstream developments and clearings, especially in the Dandry (Baradine), Borah and Yaminbah Creek catchments. The streams in the east of the assessment area have become beds of sand through sedimentation and many rocky waterholes have disappeared (Date 1992a; Rolls 1981).

4.1.3 Forestry Activity

The Pilliga Forests are renowned for large stands of the termite resistant white cypress pine; logging for this valuable timber has been carried out in the district for more than a century and various silvicultural treatments have been trialled in the western Pilliga forests, including manual thinning and slashing of pine stands, and the cutting, ringbarking and poisoning of ironbarks (Cooney 1985). The nominated and assessment areas however do not contain large stands of white cypress pine. Generally the timber in the assessment area is of low commercial value and no silvicultural treatment has been undertaken (Rolls 1981; FCNSW 1987).

Commercial harvesting of ironbark species for the production of railway sleepers and electric fence posts has occurred in the state forests of the assessment area. Logging is still occurring in Timmallallie State Forests within the assessment area. Electric fence posts have been manufactured by Insultimber in Baradine since 1979. Because of short dropper lengths, they can utilise deformed trees (FCNSW 1987) which often have high habitat values. Sleeper cutting, on the other hand, has occurred in the area for most of this century and requires straighter, taller trees. Sleeper cutting has mainly targetted narrow-leaved ironbark

(*Eucalyptus crebra*) and broad-leaved ironbark (*E. fibrosa*). As well as these species, mugga ironbark (*E. sideroxylon*) has been harvested for fence posts by Insultimber and local farmers under licence. Other trees (such as dead ironbarks) are harvested under licence for firewood.

Whereas compartment histories of cypress pine harvesting and silvicultural treatments are generally well kept, ironbark logging has been poorly documented except in recent years. Sleeper cutting, for example, is usually undertaken by one operator, who chooses a site, cuts down the trees and produces the sleepers from the ironbark logs in the forest, leaving a residue of sleeper backs on the forest floor. Occasionally, ironbarks have been harvested in Pilliga Nature Reserve and tracks opened through the Reserve.

Broombush harvesting has had little impact on the assessment area, as most of the resource is to the north. The effects of broombush harvesting resemble those of severe frost. At low levels, this harvesting does not have a major impact on either fauna or flora (Woinarski 1989).

Disturbances associated with forestry operations include roading (section 4.1.1), artificial fire regimes (section 4.1.5) and the replacement of mature trees with regrowth. The impacts of timber harvesting depend on the level of the operation, the amount of timber removed, the degree to which surrounding trees are damaged, the resilience of the environment, and on the type and level of post-logging management. Due to the poor value of timber in much of the area, logging has generally been limited to small accessible areas. Timber harvesting can impact on faunal assemblages by enhancing the microhabitats available to reptiles, and reducing the availability of nesting hollows and food resources for arboreal marsupials and some birds (Smith 1982). Sleeper cutting has not reduced the number of hollow-bearing trees (ironbarks) in the same way as harvesting for electric fence posts.

4.1.4 Apiculture

The native forests of the Pilliga have been used for beekeeping since the late 1930s (Rolls 1981). Impacts associated with apiculture include:

- maintenance of clearings for hives;
- use and maintenance of access tracks (see section 4.1.1 (Trails)); and
- provision of water for hive sites.

In order to supply water for honeybees in areas away from dams, plastic lined trenches are made, filled with water and covered with wooden slats. These are relatively small, ranging from about 1 m³ to about 10 m³, and can be restored. Clearings range in size up to a few hectares and can be restored. Most clearings and trenches are located in the north-west and north-east parts of the assessment area.

Honeybees interact significantly with the Australian biota. They compete with native fauna (including native insects, flying foxes, possums and birds) for nectar and pollen. They also influence the production of seeds by various plants (Paton 1995). Their presence reduces seed production and/or rates of pollination for several predominantly bird-pollinated plants. Other plants tend to produce more seeds when honeybees are present and still others experience increased levels of hybridisation.

4.1.5 Fire

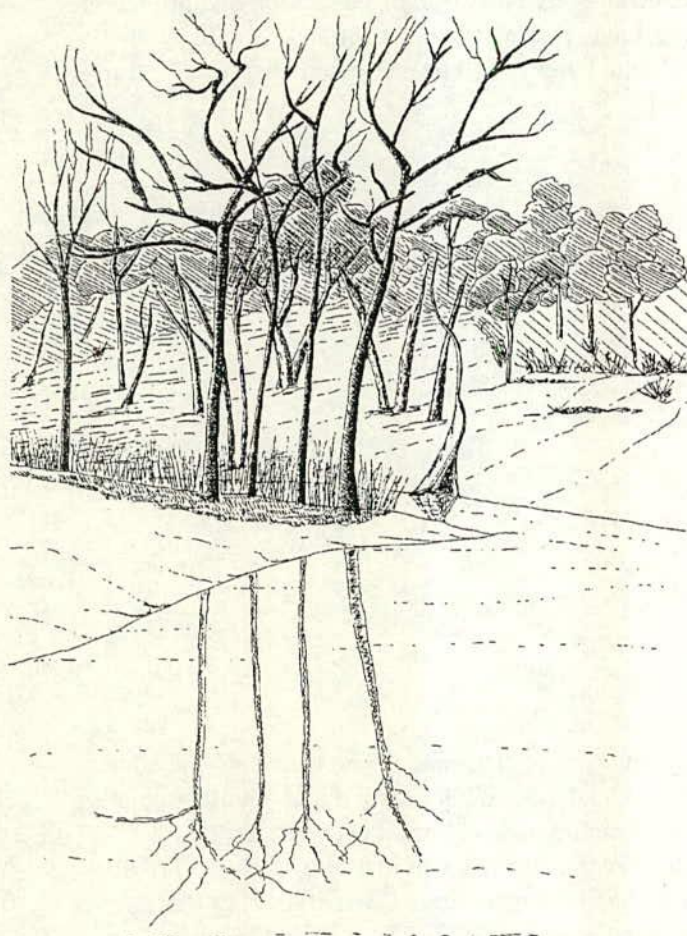
The extent and frequency of natural fires in the absence of human influence – including Aboriginal influence – is unknown. Dry lightening storms are common in early summer and can start fires when conditions are suitable.

The level of Aboriginal fire management of the assessment area before the mid-nineteenth century is similarly unknown. A regime of frequent fires, up to 'once or twice a year' has been claimed for the Pilliga, as well as much of non-arid Australia (Rolls 1981). Under such

management, many of the fire sensitive plants that can only regenerate from seeds, such as the wattles, casuarinas and cypress pines, would have disappeared. Fauna which prefer habitats that have not been recently burnt, including birds such as the malleefowl, spotted quail-thrush and chestnut-rumped hylacola (Date 1992a), and mammals such as the Pilliga mouse (Lim & Johnson 1991), would have been adversely affected and would not have survived to the present day.

It is certain that fire regimes have changed but the size and significance of the changes are unknown. It is likely that in some areas fuel reduction fires are less frequent, more intense and more destructive, and that wildfires are more common (Date & Paull 1993). In others, fuel reduction fires are more frequent. There has been 'an extraordinarily high fire frequency' in the Pilliga for several decades (Mitchell *et al.* 1982). In particular, between 1977 and 1982, a large proportion of Pilliga Nature Reserve was burnt, mainly as a result of escaped hazard reduction burns. It appears that the high frequency and intensity of hazard reduction burning has 'reduced the vigour of regenerating stands and killed many of the senescent trees' (Date 1992b).

Major fires in the area occurred in 1951, when all of the assessment area burnt, and in 1966/67, 1974 and 1982. The most recent major fire in the area spread from a car fire on the Newell Highway in late December 1994, and severely scorched an area of about 4000 ha. The areas impacted by recent fires are assessed as Disturbed Natural. Although recovery has been slow, there is no unequivocal evidence to suggest that permanent changes have occurred.



Jenni
Working 1985

Timmallallie Dam, Number One Break Road, constructed for fire-fighting purposes

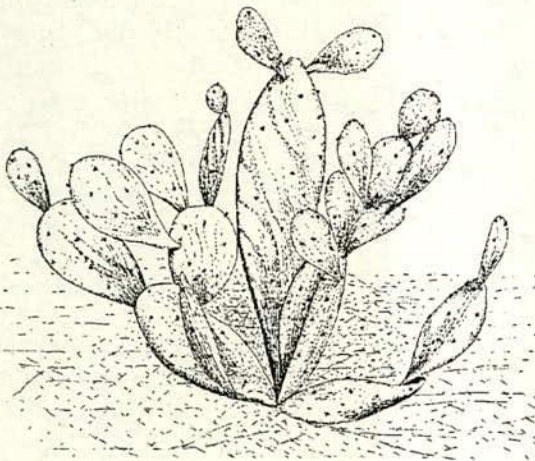
4.1.6 Weeds

There is a low level of introduced plant species present in the assessment area and few noxious weeds. Weeds are mostly found within sandy creek beds, such as Yaminbah and Borah Creeks, and are spread by flood flows along the creeks. The highest concentrations of weeds are found on the edges of the main tracks leading in from the Newell Highway, with transmission of seeds by vehicle tyres and by dirt carried by vehicles.

Declared noxious species known from the assessment area include prickly pear (*Opuntia stricta*), Noogoora burr (*Xanthium occidentale*) and spiny burrgrass (*Cenchrus incertus*). Of these, only prickly pear is not restricted to creek lines and roadsides, and is scattered in low numbers throughout the eastern section of the assessment area. Spiny burrgrass was introduced to the area in 1902 in drought fodder imported from Argentina (Rolls 1981). To this day, it is also known as Bohena Beauty. The major noxious weeds of the district, such as blue heliotrope (*Heliotropium amplexicaule*) and parthenium weed (*Parthenium hysterophorus*), have not been recorded in the assessment area.

Most weeds are symptoms of disturbance and their impacts are localised. They contribute to a classification of Disturbed Natural or Degraded Natural, but do not pose an obstacle to the recovery of these areas if they are controlled appropriately.

Over the years, a few small marijuana plantations have been located in the proposed area, most in the vicinity of Yearinan Road. They have since been removed and the area is regularly inspected. Impacts have included localised destruction of vegetation and provision of water for crops. Although Cultural under Laut *et al.*'s classification, their small-scale nature and short life-span means that the affected areas have been classed Disturbed Natural.



Prickly Pear

4.1.7 Introduced Animals

With the arrival of settlers in the Pilliga region, cattle, horses and sheep were introduced. As grazing ventures collapsed (see sections 3.4.2 and 4.1.2), stock escaped and a wild population of grazing animals became established. For a long time, wild horses and cattle in poor condition roamed in the forests, haphazardly mustered only when markets were good (Rolls 1981). No wild cattle or horses now occur in the assessment area. Current grazing leases (short-term Occupational Permits) only exist in the area of Pilliga East State Forest immediately surrounding Ruttley State Forest and the Airlands property, and grazing occurs on cleared private property in the south-western section of the assessment area. Grazing pressures also exist in some parts of the assessment area due to the presence of feral herbivores such as goats and rabbits.

The impacts on the naturalness of an area due to grazing by introduced herbivores can include (Beum 1990; Robertson *et al.* 1992; Westbrooke 1992):

- modification of the diversity, abundance and structure of plant communities by selective grazing of palatable herbage, especially near waterholes;
- physical damage by cattle of native vegetation, especially saplings and seedlings, by trampling and grazing;
- compaction of soil, especially near watering areas, soil erosion, decreased water quality and damage to waterways;
- movement along habitual pads, promoting invasion by weeds and access by feral animals; and
- clearings and fences (see section 4.1.2).

The majority of the semi-arid woodlands of south-eastern Australia are in a state of decline due to over-grazing (Westbrooke 1992).

Until the late 1970s, there were only a few small herds of goats in the assessment area (NPWS n.d.) with the main population being around the Willala Hills. The number of goats has increased in recent years, especially in the proposed area, fed by escaped animals from hobby farms. It is estimated that approximately 50 feral goats live in the nominated area (Date & Paull 1993). Control is possible. Goats compete with kangaroo and wallaby species for shelter and food. They have been implicated in the disappearance of brush-tailed rock wallabies from the Willala Hills (Mitchell *et al.* 1982) and elsewhere in eastern Australia through competition (Short & Milkovits 1990). The presence of goats can also change the composition of plant communities through over-grazing of the herbaceous layer and browsing on shrubs and trees.

Another introduced animal which can change the composition of plant communities through grazing is the rabbit (Myers 1983; Westbrooke 1992). It is the least selective when grazing, and can ring-bark shrubs and trees (Westbrooke 1992). This animal was first reported from the western Pilliga forests in 1900 (FCNSW 1987). Numbers were very high on the fringes of the Pilliga forests during the first half of this century, although they were considered 'very scarce' in the scrub (Jensen 1912 quoted in Cleland 1919). The main documented impact of their presence was the heavy grazing on white cypress regrowth which affected the sustainable yield of the western forests. There is little information on the effects of rabbits or their numbers in the assessment area during the plague. New growth in the 1930s in the assessment area suggests that their impact was low. A dramatic reduction in rabbit numbers followed the introduction of myxomatosis and populations are currently held in check by predation, myxomatosis and climatic variability (Myers 1983). In the assessment area, rabbits are uncommon except along short sections of Borah and Yaminba Creeks.

In the assessment area, the impacts from the historical grazing of cattle and sheep are limited and grazed areas are classed as Undisturbed Natural. More recent grazing by stock and feral animals in forested areas is classed as Disturbed Natural. The original composition and structure of the biota of these areas has been assessed as remaining basically intact, and the vegetation could recover within a relatively short period once grazing ceases.

Feral pigs are common in the Pilliga, especially in the north and eastern parts of the assessment area. Their range includes most of the Pilliga during wet times, but is limited to the immediate vicinity of dams and waterholes for most of the year. The direct effects of pigs include:

- damage to vegetation and soils from rooting around the margins of water courses for succulent roots and water; and
- increased predation on small native mammals, reptiles and invertebrates.

The presence of pigs has encouraged recreational hunters and sport shooters to the area. Hunting is illegal in Pilliga Nature Reserve but is permitted with authorisation in the state forests of the assessment area (L. Carey, SFNSW, pers. comm.). The population of feral pigs in the assessment can be controlled. Baiting programs have been used in Pilliga Nature Reserve.

Introduced predators in the assessment area include pigs, foxes and cats. Little is known about the feral cat population, but it is suspected to be relatively low in numbers. Foxes have been established in high numbers since 1910 (Rolls 1981) and are the major mammalian predators in the area, displacing quolls and dingos. They have been linked to the decline of many native animals in a 'critical weight range' (that is, weighing between 35 g and 5.5 kg), especially following the rapid reduction in rabbit numbers in the 1950s. Foxes are of major concern only in areas where dingos are absent or in low numbers. A successful control program for foxes using monitored bait stations has been introduced in Pilliga Nature Reserve with the assistance and cooperation of neighbours.

Introduced insects include the cactoblastis moth and European honey bees. *Cactoblastis cactorum* was introduced to Australia from Argentina to control the noxious weed, prickly pear (Lamp & Collet 1976). It was brought to the Pilliga in about 1927 (Rolls 1981). It has no other documented impacts.

Feral hives of honey bees have been established in tree hollows in the assessment area. The effects of feral bees include the reduction in pollination success of some native plant species and competition with native animals for food and shelter resources. For example, feral honeybees establish long-lived hives in tree hollows which would otherwise provide shelter for hollow-dependant native animals, including gliders, possums, bats, parrots and owls. However they only occupy a small proportion of the available hollows (often <1%) and interactions with hollow-nesting fauna may not be substantial (Paton 1995). Competition for food resources by feral honeybees is thought to be less severe than that by managed honeybees (Anderson 1989), though impacts may be significant for native bees (Pyke & Balzar 1985).

4.1.8 Natural Significance

As shown in Map 1, the Pilliga is the largest area of natural vegetation in the mostly cleared Central Division of New South Wales. Pilliga Nature Reserve is listed on the Register of the National Estate because of its importance as a significant natural faunal refuge in a region that has been highly modified (AHC 1978). It is one of the most significant biological refugia in New South Wales (Smith 1982). The native fauna of New South Wales has suffered more extinctions and range-reductions in the agricultural regions of the western slopes than elsewhere in the state (Marlow 1958 cited in Smith 1982). The area contains a significant number of both plant and animal species and vegetation communities which are not found elsewhere in the Central Division.

Despite its significance as a refugium, it must be remembered that the Pilliga forests are not representative of the vegetation which once covered the slopes and plains of inland New South Wales. The Pilliga exists because its forests grow on infertile soils which were unsuited to agriculture. With its poor soils and lack of available surface water, the area has not been subjected to the intensive alterations which, elsewhere in the Central Division, have been wrought by European land use practices. The plains grasslands, forests and woodlands which once occurred on the more fertile soils have now been mostly cleared, and that land converted to pasture or crops.

The importance of the Pilliga for fauna is due mainly to the existing forest structure. Extensive parts of the forests in the assessment area contain old-growth forest elements. Although numerous definitions of old-growth forests have been produced as a result of the current debate about their conservation (Woodgate *et al.* 1994), most definitions stress that

they are ecologically mature, with the overstorey in the late mature to overmature growth phases. They are characterised by their structural diversity, which depends on the presence of large live trees, large standing dead trees and large logs. This structure provides an abundance of foraging substrata which are crucial for forest dependent species (Scotts 1991). As a result, old-growth forests have significant nature conservation values (Milledge 1992).

The large area of mature box and ironbark woodland in the assessment area is of national significance (Date & Paull 1993). This ecosystem, comprised of several plant communities including mugga ironbark, white box and bimbale box, formerly covered most of the inland slopes and plains from western Victoria to southern Queensland. Most of this country has been cleared for wheat and sheep (Traill 1992; Date 1992a). Large remnants are significant, particularly those remnants which contain a high number of mature trees. Mature trees produce hollows in a range of sizes, and they also tend to produce more flowers and nectar than smaller trees (Gilmore 1992; Traill 1992). Mugga ironbark in particular has very high habitat value due to the number of hollows formed at a relatively early age and the profuse number of nectar-rich flowers.

The assessment area contains much of the rockier eastern and southern parts of the Pilliga Scrub and many sites of poor soils. These areas in particular contain stands which 'are in a general condition which resembles that prior to European settlement' (FCNSW 1987). The proposed area in particular is similar in both structure and composition to Oxley's description from 1818. Oxley ventured along Dandry (Baradine) Creek through the proposed area, which he described as an open grassy woodland with scrubby ridge lines. All components of his description of the area are still present. Elsewhere in the assessment area, the vegetation corresponds with early descriptions. 'Marvellously dense scrubs' existed along the eastern edge of the Pilliga during the 1870s (Carver 1878 quoted in Norris *et al.* 1991).

The generalisation that the Pilliga Scrub is a modern forest (eg. Rolls 1981; FCNSW 1987) does not hold for much of the assessment area, though it does apply to some of the more undulating areas. This modern forest grew when the original Aboriginal inhabitants of the area were displaced by European settlers. Its growth was prompted by over-grazing by introduced herbivores and an 'exceptional' sequence of events in the 1880s or 1890s and in the 1950s, involving a few wet years, fire and a decline in small grazing mammals (Rolls 1981). The regenerated forest 'possibly reflects a state existing before aboriginal times' (FCNSW 1987). This change reflects the absence of active Aboriginal land management in the form of a regular and frequent artificial fire regime rather than the imposition of European management. There is no evidence that the natural processes have changed substantially.

There has however been little change in the species composition of the area's vegetation. There is evidence that the Pilliga forests east of Baradine Creek have been stable since European settlement with little change in vegetation boundaries from the 1870s surveys (Norris *et al.* 1991; P. Mitchell, Macquarie University, pers. comm.). Clues regarding the original structure of the vegetation can be obtained from the fauna of the forests. The malleefowl, for example, is less likely to breed in areas which have been burnt in the past 15 years as it prefers to live in a dense understorey and would have been unable to survive in areas maintained as an open grassy woodland by frequent fires.

Most of the vegetation of the identified Pilliga wilderness is assessed to be in a natural state. The level of modification through human activities in the past century is low and therefore is classified as Undisturbed Natural. Recovery, albeit very slow, is taking place in most areas where selective forestry activities have taken place in the past.

The small areas previously described where the vegetation has been modified, but where the original composition and structure is basically intact, are classified as Disturbed Natural. The vegetation in these areas is likely to recover within a relatively short period of time.

Limited areas are classified as Degraded Natural and the vegetation is likely to take a relatively prolonged period to recover. These areas of previous relatively heavy disturbance are usually indicated by the presence of clearings and introduced plant species. Where these areas are surrounded by unmodified vegetation, are well within the identified wilderness area, or are necessary for the management and maintenance of wilderness for the greater area they are identified as part of the Pilliga wilderness.

4.2 SIZE

As well as meeting the criterion of naturalness, the identified Pilliga wilderness must be of sufficient size to make its maintenance in a substantially unmodified state feasible. See Part 2 for a detailed discussion of the size criterion for wilderness.

The central factor in determining whether the size of an identified wilderness is adequate is the continued biological integrity of the area. Although an area must be of high biological integrity, it is acknowledged that active management inputs may be needed to ensure its maintenance as wilderness.

As discussed in section 4.1.1 (Trails), the existing management trails impact on the movement of small ground-dwelling mammals, can prevent the recolonisation of disturbed areas and are readily used by feral predators. All these impacts reduce the ecological viability of a natural area (LCC 1990). The continued maintenance and use of each trail need to be reviewed in the Plan of Management for the area and its fire management plan.

The eastern and south-eastern boundaries of the assessment area abut freehold land, most of which is cleared and used for grazing and cropping. This boundary reduces the ecological viability of the assessment area. For example, high numbers of feral animals and kangaroos are found along this boundary, due to the combined benefits of the readily available food and water on the grazing land, and the shelter provided by the forests.

Along other boundaries, the assessment area is surrounded by forested land and these forests enhance the viability of the assessment area. Most of these forested lands are state forests which are not intensively managed, and thus serve as extra habitat for the range of fauna found in the assessment area.

The integrity and natural significance of the area is also enhanced by its location within a wide corridor of mostly natural vegetation. This corridor extends from the Warrumbungle Range (including Warrumbungle National Park) in the south to the Namoi River and almost to the Nandewar Range (including Mount Kaputar National Park) in the north. As well as the assessment area and other state forests, this corridor includes important areas of forested freehold land.

Size is also important when considering the use of an area for self-reliant and appropriate recreation (see section 4.3). Myles Dunphy in 1934 defined a wilderness area as being (Robertson *et al.* 1992):

an area of primitive wilderness, compact in shape and extensive, so that one may be able to travel on foot in any direction for at least a full day without meeting a road or highway.

Although some parts are narrow, much of the assessment area is more than one day's walk from any boundary. Thus it is considered to be of sufficient size for users to feel satisfied they have established contact with the wilderness.

The assessment area covers almost 200 000 hectares. It is composed of three sections, each of which exceed 30 000 ha and are contiguous with other forested land. Each section of the assessment area meets the size criteria and its maintenance in a natural state is feasible.

4.3 SOLITUDE AND APPROPRIATE SELF-RELIANT RECREATION

The identified Pilliga wilderness must be able to provide opportunities for solitude and appropriate self-reliant recreation.

4.3.1 Solitude

As described in section 2.2.3, it is difficult to predict the requirements for solitude. It is clear, however that large tracts of natural land remote from vehicle access and settlement are more likely to satisfy expectations for solitude than smaller, more modified and less remote areas. The internal network of management trails in the assessment area, even if they are not used for vehicle-based recreation, will impact on people's perceptions of solitude and the wilderness experiences of bushwalkers in the area. However, the large blocks of natural forested land between each fire trail are considered to be of sufficient size to allow a feeling of solitude in walkers. Visual impacts of the trails are restricted to the immediate surroundings of the track; there are not considered to be any noise impacts associated with these management trails.

Noise from the Newell Highway on the other hand is considered to be an impact on the perceived solitude of the assessment area. Traffic noise travels a long distance in the more undulating country of the northern part of the assessment area. In the more rugged terrain of the nominated area, noise is blocked by ridgelines near the highway. The other major road between the sections of the assessment area (the Number One Break Road) and the major fire trails separating the area from other more modified lands (eg Top Crossing Road, Rocky Road and County Line Road in the west and Scratch Road in the east) have less traffic and are not travelled at speed. Thus their impact is much less than the Newell Highway.

4.3.2 Recreation

The area, because much of it is a nature reserve, has not been promoted for its recreational use. It is however regularly visited by local bushwalkers, with the short walk along Dandry Gorge from Top Crossing being particularly popular. The Willala Hills are also a popular destination for bushwalks, nature observation and picnics. When walkers venture into the area, they need to be self-reliant because drinking water is not available, and they need to be competent at navigation especially in the more undulating and featureless areas (FCNSW 1987).

The Pilliga has been the focus for birdwatchers for many years. The diversity of bird species in the area, their abundance and their concentration around water holes makes this a rewarding experience. Photography is another popular past-time in the assessment area, with the spectacular wildflower displays providing a riot of colours and textures for photographic study.

The identified Pilliga wilderness is capable of offering opportunities for appropriate self-reliant recreation. The nominated area and the ridgeline in the east of the assessment area, with their more rugged terrain, hidden gullies and broken sandstone cliffs is likely to provide some of the most attractive wilderness experiences in the region.

Part 5: Identification and Declaration of Wilderness

5.1 IDENTIFICATION OF WILDERNESS

As a result of this assessment, three discrete areas totalling approximately 123 000 hectares in size have been found to meet the criteria of wilderness and have been identified as wilderness. The identified areas are characterised by

- natural vegetation, including few introduced plant species;
- a lack of permanent human settlement and developments; and
- a lack of or only low levels of human utilisation including low levels of forestry activity and bee keeping in the state forests of the identified area.

The identified areas include the majority of the eastern half and the south-western sections of the assessment area. The following areas have been excluded from the identified wildernesses:

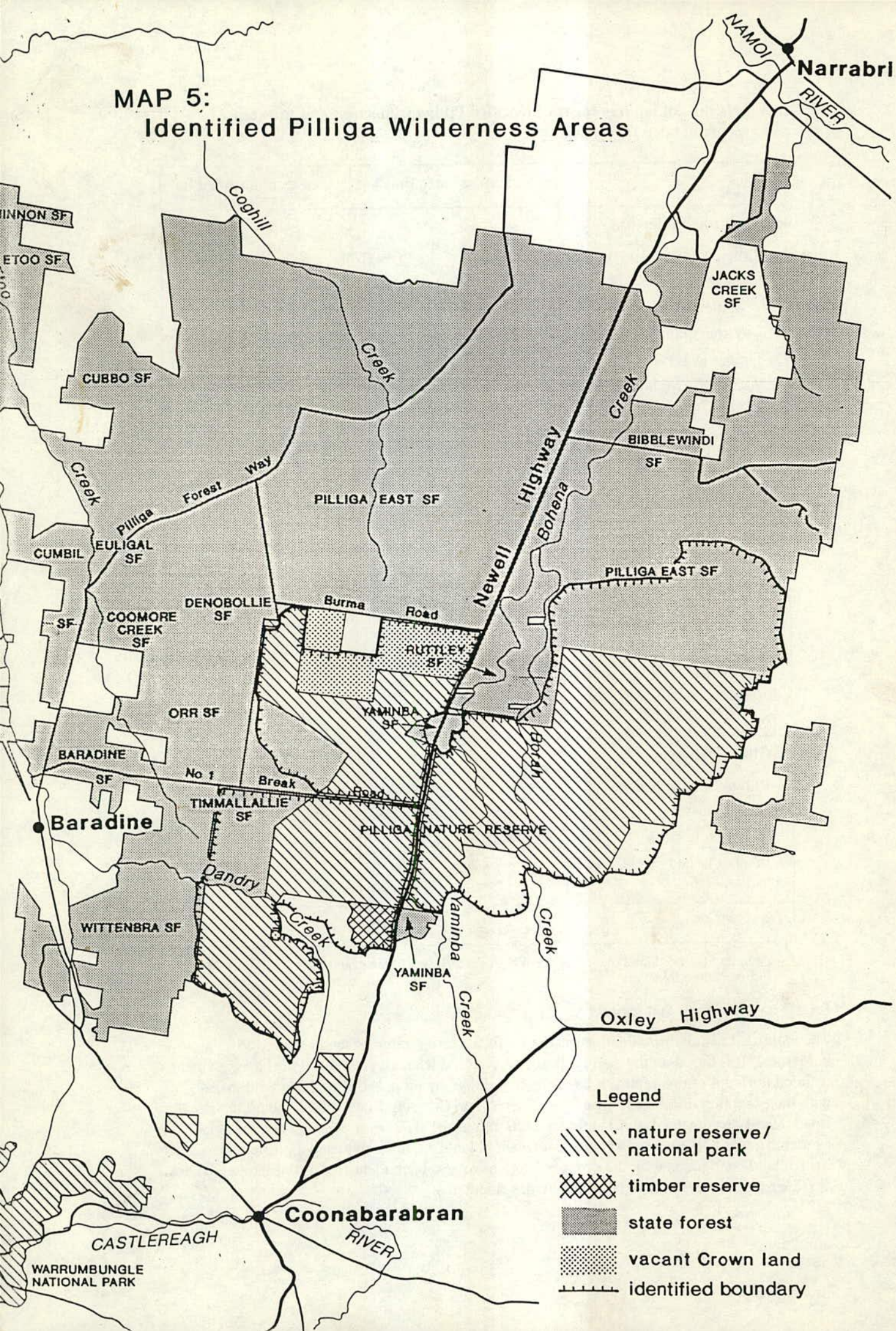
- 1) disturbed forest, clearings, houses and dams on private lands in the Dandry (Baradine) Creek area upstream of the proposed area;
- 2) areas that have been significantly modified on private lands and occupational permits near Airlands
- 3) Ruttle State Forest, which is surrounded by modified lands;
- 4) areas of state forest which have been more intensively managed, including most of Yaminbah State Forest, parts of Pilliga East State Forest and all of Bibblewindi State Forest;
- 5) the state forests north of Burma Road; and
- 6) that section of Pilliga Nature Reserve, south of Sandstone Caves Road.

Seven areas of private land, including four not originally in the assessment area, have been assessed to be contiguous with the identified wildernesses and to be in a state which is not substantially modified. These are:

- 1) in the Dandry valley, immediately upstream of the proposed area;
- 2) two timber reserves to the west of the Newell Highway;
- 3) the upper catchment of Cooper and Wittenbra Creeks;
- 4) part of the forested ridge line between Yaminba and Borah Creeks immediately adjacent to Pilliga Nature Reserve;
- 5) the headwaters of Sawpit Creek, to the east of Pilliga Nature Reserve;
- 6) part of the Kerringle Creek catchment south of Baileys Lookout, east of Pilliga Nature Reserve; and
- 7) an area between Scratch Road and Pilliga Nature Reserve to the north-east of Baileys Lookout.

The three Pilliga wildernesses have been labelled the Gamilaroi wilderness, the Timmallallie wilderness and the Willala wilderness. The identified Pilliga wildernesses are shown on Map 5. A detailed map of the identified wilderness (at a scale of 1:150,000) is provided in Appendix 5. The tenure of lands in the identified wilderness is given in Table 2.

MAP 5:
Identified Pilliga Wilderness Areas



Legend

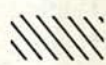
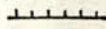
-  nature reserve/
national park
-  timber reserve
-  state forest
-  vacant Crown land
-  identified boundary

Table 2 Schedule of tenures for the identified Pilliga wilderness and the area recommended for declaration

Tenure	Identified area (ha)	Area recommended for declaration (ha)
Gamilaroi Wilderness		
Pilliga Nature Reserve *	20 990	20 990
State Forest	6 275	6 275
Wittenbra SF	330	330
Timmallallie SF	5 945	5 945
Timber Reserve	1 530	0
Vacant Crown land	135	135
Water Reserve	15	15
Reserved for future public requirements	120	120
Freehold	2 235	0
Total	31 165	27 400
Timmallallie Wilderness		
Pilliga Nature Reserve	14 010	14 010
State Forest	4 120	4 120
Timmallallie SF	3 810	3 810
Yaminba SF	270	270
Denobollie SF	40	40
Vacant Crown Land	6 930	6 930
Total	25 060	25 060
Willala Wilderness		
Pilliga Nature Reserve	42 110	42 110
State Forest	18 650	18 650
Pilliga East SF	18 650	18 650
Freehold / Leasehold	6130	0
Total	66 890	60 760
Total	123 115	113 220

* including freehold land owned by NPWS which will shortly be gazetted as an addition to Pilliga Nature Reserve

5.1.1 The Gamilaroi Wilderness

The identified Gamilaroi wilderness is the south-western section of the identified Pilliga wilderness. It is based on the area proposed by Richard Rickert. As a result of the assessment detailed in Part 4 of this report, it has been found that the proposed Kamilaroi wilderness, with the exception of the quarry on the corner of Top Crossing Road and Number One Break Road, readily meets the definition under Section 6 of the *Wilderness Act* and can reasonably be identified as wilderness. Two areas of freehold land, a Crown road and a portion of vacant Crown land contiguous with the proposed area have also been identified as wilderness. There are few roads in the area, no dams and no developments.

This area is part of the Bugaldie Unit, with a dissected landscape of broken sandstone cliff-lines and hidden valleys. It contains a number of important rock shelters and art sites that provide evidence of pre-contact Gamilaroi life in the area.

5.1.2 The Timmallallie Wilderness

The identified Timmallallie wilderness encompasses that area of Pilliga Nature Reserve, some vacant Crown land and some of the state forest between Number One Break Road and Burma Road. Those parts of the Akehurst properties which were once cleared are excluded from identification, as are the modified parts of the Arkell property. Recent intensive logging for fence posts has been excluded from identification.

5.1.3 The Willala Wilderness

The identified Willala wilderness is the eastern and larger section of the identified Pilliga wilderness. It extends north from Sandstone Caves Road in the south west to Kurrajong Trail in the north east. It excludes Bibblewindi State Forest, Ruttley State Forest and the eastern sections of Yaminba State Forest. The only development included is one dam, a few log dumps, hive sites and several trails.

Part of this area – which now supports a dense woodland – was much more open at the time of European settlement (E. Rolls, pers. comm.). Although the structure of the vegetation has changed, it has been assessed that the natural ecological processes in the area have not changed substantially, and that the vegetation is in a largely natural state.

5.2 DECLARATION OF WILDERNESS

Various options exist for the protection of the wilderness values of the Pilliga forests. These are detailed in the attached Options Report. The recommended option is option 1, which involves:

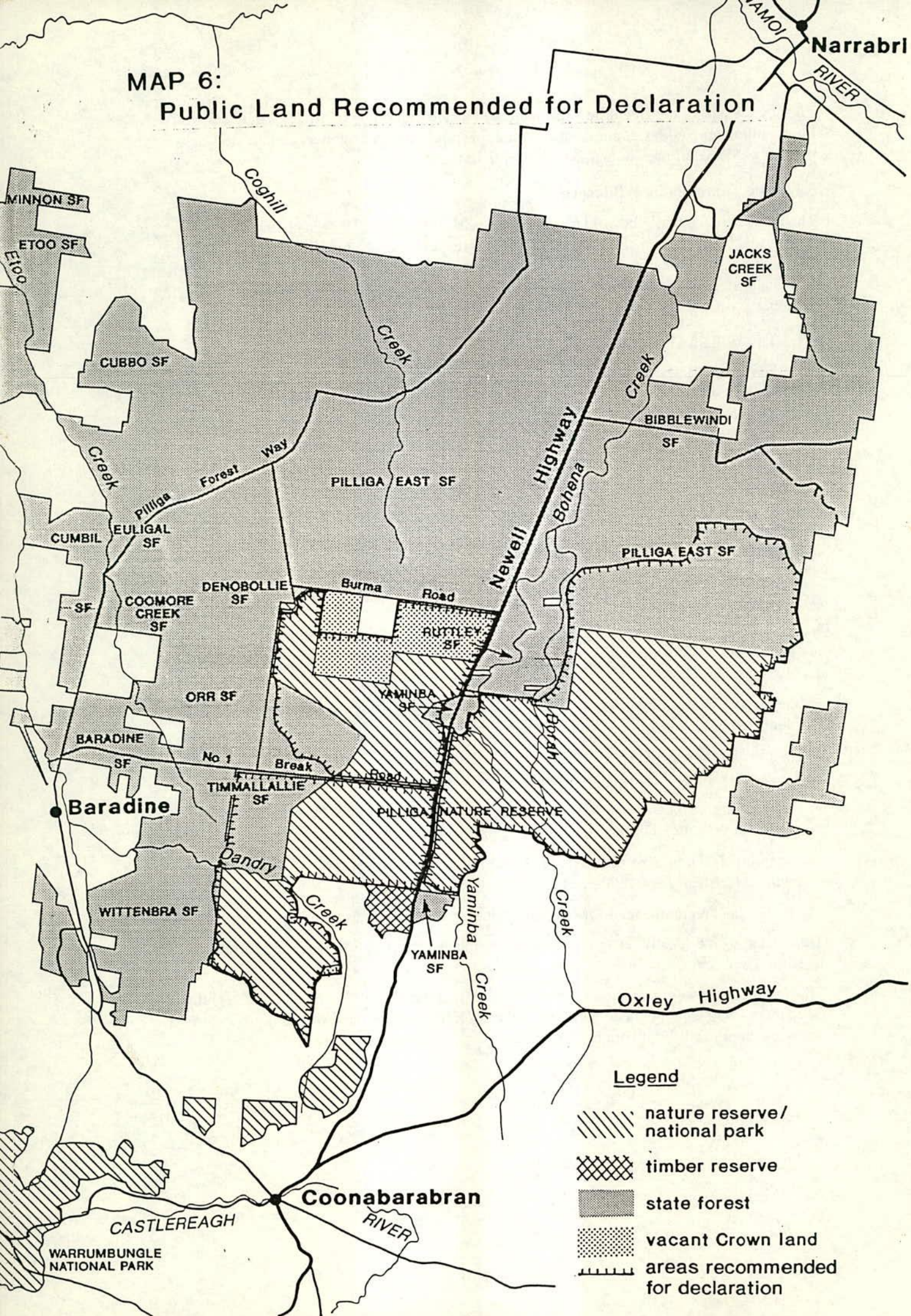
- the reservation under *National Parks and Wildlife Act 1974* of all public lands within the identified wilderness;
- their declaration as the Pilliga Wilderness under the provisions of Section 8A of the *Wilderness Act* and Section 59 of the *National Parks and Wildlife Act*;
- approaching land owners and lessees of all private lands that have been identified regarding voluntary conservation agreements; and
- the future declaration of private land covered by voluntary conservation agreements as additions to the Pilliga Wilderness.

The public land recommended for immediate declaration as wilderness is shown on Map 6.

This option would legally recognise the existing management of Pilliga Nature Reserve for its natural and remote values.

This option also recommends that, despite the fact that the Newell Highway and the Number One Break Road have not been included in the wilderness areas, they should not become utility corridors and should not be upgraded.

Public Land Recommended for Declaration



Part 6: Conclusion

The Pilliga forests contain three large areas which meet the definition under Section 6 of the *Wilderness Act* and can reasonably be identified as wilderness.

These are:

1. the Gamilaroi wilderness (31 165 ha);
2. the Timmallallie wilderness (25 060 ha); and
3. the Willala wilderness (66 890 ha).

The extent of the identified Pilliga wildernesses is shown in Map 5. The public lands within this area recommended for declaration as wilderness are shown in Map 6. It is recommended that the owners and lessees of private lands which have been identified as wilderness will be approached regarding voluntary conservation agreements to protect the wilderness values of their lands without a change of land tenure.

Further advice will be provided to the Minister for the Environment following the public exhibition of this report.

Regent Honeyeater



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APPENDIX 2 RARE OR THREATENED PLANT SPECIES EXPECTED TO BE PRESENT IN THE ASSESSMENT AREA

Known from the assessment area:

Common name	scientific name	ROTAP code*	Notes on known locations
slender Darling pea geebung	<i>Rulingia procumbens</i>	3V	in sandy sites in the Pilliga
	<i>Swainsonia murrayana</i>	3VCi	on heavier soils, especially in depressions
	<i>Persoonia cuspidifera</i>	3K	Warrumbungle National Park and the southern Pilliga Scrub
	<i>Eriostemon ericifolius</i>	3RC-	in dry sclerophyll forest and heaths on damp sandy flats

Expected to occur in the Pilliga:

spiny peppercress donkey orchid	<i>Goodenia macbarronii</i>	3VC-	damp sandy soil in Warrumbungle National Park
	<i>Lepidium aschersonii</i>	3VCa	from Brigalow Park Nature Reserve
	<i>Diuris tricolor</i>	3K	in sclerophyll forest among grass, often with cypress pines
bush pea	<i>Isotropis foliosa</i>	3KC-	in sclerophyll forests on skeletal soils on the north west slopes
	<i>Derwentia arenaria</i>	3RC-	on rocky slopes and river flats on sandy soil in eucalypt woodland; from Warrumbungle National Park
hairy anchor plant	<i>Discaria pubescens</i>	3RCa	often in rocky situations in woodland and forest
spike rush	<i>Eleocharis blakeana</i>	3RC-	found in gilgais near Wee Waa
long-tailed greenhood	<i>Pterostylis woollsii</i>	3RCi	found among rocks on ridges and slopes, and among grass in sclerophyll forest
	<i>Zieria odorifera</i>	3RCi	in tall heath, on rocky ridges in shallow sandy soils amongst rock outcrops in Warrumbungle and Nandewar Ranges

* ROTAP codes are from Briggs and Leigh (in press).

Distribution category: 2 very restricted with a geographic range < 100 km
3 range over 100 km

Conservation status: E Endangered - in serious risk of disappearing from the wild within 10 or 20 years
V Vulnerable - at risk of disappearing from the wild over a longer period (20-50 yrs)
R Rare - scarce or extremely restricted, but not considered at threat of extinction
K Poorly known - suspected to be rare or threatened but current information is inadequate

Reservation status: C known from a conservation reserve
a adequately reserved (>1000 plants occurring in reserves)
i inadequately reserved
- population size in reserves is unknown

**APPENDIX 3 ENDANGERED ANIMAL SPECIES EXPECTED TO OCCUR IN
THE ASSESSMENT AREA**

Common name	scientific name	Status*			Source**
		NPW Act	ESP Act	local status	
Birds					
Australasian bittern	<i>Botaurus poiciloptilus</i>	V&R	-		A B C E
black-necked stork	<i>Xenorhynchus asiaticus</i>	V&R	-	rare visitor	A C
magpie goose	<i>Anseranas semipalmata</i>	V&R	-		A B
freckled duck	<i>Stictonetta naevosa</i>	V&R	-		B
brolga	<i>Grus rubicunous</i>	V&R	-	occasional visitor	A B C
chestnut quail-thrush	<i>Cinclosoma castonatum</i>	V&R	-		B E
bush stone-curlew	<i>Burhinus magnirostris</i>	T	-	not seen recently	A B C D E
square-tailed kite	<i>Lophoictinia isura</i>	V&R	-		A B D E
black-breasted buzzard	<i>Hamirostra melanosternon</i>	V&R	-		A B C
red goshawk	<i>Erythroriorchis radiatus</i>	T	V		B
grey falcon	<i>Falco hypoleucos</i>	V&R	-		A B C
malleefowl	<i>Leipoa ocellata</i>	T	E	not seen recently in assesment area; last seen in Pilliga in 1990 (F)	A B C D E
squatter pigeon	<i>Geophaps scripta</i>	T	-		B D E
red-tailed black-cockatoo	<i>Calyptorhynchus magnificus samueli</i>	V&R	-		A B C D E
glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	V&R	-		A B C D E
Major Mitchel cockatoo	<i>Cacatua leadbeateri</i>	V&R	-	no recent sightings (C)	B C E
superb parrot	<i>Polyteus swainsonii</i>	V&R	-		A B C D E
swift parrot	<i>Lathamus discolor</i>	V&R	V	migrates to area during winter	A B C D E
turquoise parrot	<i>Neophema pulchella</i>	V&R	-		A B C D E
eastern grass owl	<i>Tyto longimembris</i>	V&R	-	locally extinct ?	B E
masked owl	<i>Tyto novaehollandiae</i>	V&R	-		B C D E
powerful owl	<i>Ninox strenua</i>	V&R	-		B C E
Gilbert's whistler	<i>Pachycephala inornata</i>	V&R	-		B E
shy hylacola	<i>Sericornis cautus</i>	V&R	-		B
regent honeyeater	<i>Xanthomyza phrygia</i>	T	E		A B C D E
painted honeyeater	<i>Grantiella picta</i>	V&R	-		A B D E

Common name	scientific name	Status*			Source**
		NPW Act	ESP Act	local status	
Mammals					
spotted-tail quoll	<i>Dasyurus maculatus</i>	V&R	-		B E
stripe-faced dunnart	<i>Smithopsis macroura</i>	V&R	-		A
brush-tailed phascogale	<i>Phascogale tapoatafta</i>	V&R	-	not recently seen	B D E
koala	<i>Phascolarctos cinereus</i>	V&R	-		A B D E
squirrel glider	<i>Petaurus norfolcensis</i>	V&R	-		A B D E
black-striped wallaby	<i>Macropus dorsalis</i>	T	-		A B D E
brush-tailed rock wallaby	<i>Petrogale penicillata</i>	V&R	V	locally extinct, but populations nearby with chance of being re-established	A B D E
rufous bettong	<i>Aepyprymnus rufescens</i>	V&R	-		D E
yellow-bellied sheath-tailed bat	<i>Saccolaimus flaviventris</i>	V&R	-		B E
little pied bat	<i>Chalinolobus picatus</i>	V&R	-		A B D
large pied bat	<i>Chalinolobus dwyeri</i>	V&R	-		D E
greater long-eared bat	<i>Nyctophilus timoriensis</i>	V&R	-		A B D E
common bent-winged bat	<i>Miniopterus schreibersii</i>	V&R	-		E
Pilliga mouse	<i>Pseudomys pilligaensis</i>	V&R	V		A B D
Reptiles					
pale headed snake	<i>Hoplocephalus bitoratus</i>	V&R	-		A B E
five-clawed worm-skink	<i>Anomalopus mackayi</i>	T	-	locally extinct ?	B

* Status:

NPW Act status according to Schedule 12 of the New South Wales *National Parks and Wildlife Act 1974* (as amended in December 1992)

T Part 1, Threatened

V&R Part 2, Vulnerable and Rare

ESP Act status according to Schedule 1 of the Commonwealth *Endangered Species Protection Act 1992* (as amended in July 1994)

E Part 1, Endangered

V Part 2, Vulnerable

**Sources of information:

A FCNSW (1987) and recent harvesting plans

B Forest Conservation Unit, NPWS and Wildlife Atlas (NPWS 1995)

C Rolls (1981)

D Date & Paull (1983)

E Paull (1994)

F Date (1992a)



NSW
NATIONAL
PARKS AND
WILDLIFE
SERVICE

Mr David Page
Lot 15, Lower Bobo Rd
ULONG NSW 2450

A/12862:SA

Dear Mr Page,

**Re: Request for information on logging in State Forests of the Pilliga
Management Area**

Thank you for your enquiry dated 15 August 1996. As you are probably aware, variations to existing s.120 licences are permissible under the *Threatened Species Conservation Act, 1995*. All of the licence applications for forestry operations in the Western Zone up to this point have been made on this basis.

Prescriptions for species listed on Schedules 1 and 2 of the *Threatened Species Conservation Act, 1995* are applied to licences for timber harvesting operations if a given species occurs within a 5km radius of the proposed area. Fauna records are obtained by searching the NPWS Wildlife Atlas.

Please find enclosed the developed species prescriptions for the Western Zone, which includes the entire Pilliga Management Area and all of the State Forests you described. The Square-tailed Kite prescription was developed for the most recent licence issued and has been used only once. For threatened species which do not have a current NPWS prescription, the ameliorative measures described by State Forests in their harvesting plan for the given compartment/s would be implemented. This situation may change in the near future, as the Service has recently developed baseline prescriptions for most forest-dependent threatened species, which may then be negotiated with State Forests on a compartment by compartment basis.

The recent licences issued have all been for White Cypress Pine operations and do not contain a prescription for habitat tree retention, since the species does not form substantial hollows and dependence by threatened species has not been established. In Cypress logging operations, eucalypt and casuarina species with a diameter greater than 10cm are not to be removed or intentionally damaged.

Head Office
43 Bridge Street
Hurstville NSW
Australia
PO Box 1967
Hurstville 2220
Fax: (02) 585 6555
Tel: (02) 585 6444

I hope this information is helpful to you. If you require further assistance, please do not hesitate to contact Sue Atkinson on (02) 585 6658.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'J Muldoon', with a stylized flourish at the end.

JOANNA MULDOON
A/Operations Manager
Forest Conservation Unit
Date:

Koala Prescription

A pre-logging survey for identification of significant Koala habitat is to be conducted by a person who is suitably qualified and approved by the Service. This will be done as part of the tree marking process for the harvesting operation and will, of necessity, cover all of the proposed logging area. The results of this survey are to be provided to the Service in an approved format.

Search for Koalas and Koala scats to determine high use areas

The area under the canopy of cypress pine and eucalypt trees will be searched for Koala scats and trees will be searched for Koalas in the process of tree marking.

Where a Koala is found in a tree within the harvesting area, or where scats are identified under a tree, the ground under the canopy of that tree and the ten closest trees with a diameter greater than 20 centimetres will be intensively searched for the presence of scats.

In Cypress Pine operations where scats occur under four or more of the trees (including the original tree with scats), the area will be designated a high use area and all harvesting operations will be excluded from a 30 metre zone around the perimeter of this high use area. Modified harvesting will be undertaken within a further 70 metre zone around the exclusion zone in such a way that felling does not damage eucalypts.

In Ironbark operations where scats occur under four or more of the trees (including the original tree with scats), the area will be designated a high use area and all harvesting operations will be excluded from a 100 metre zone around the perimeter of this high use area.

Low use areas

Outside high use areas which have been determined as above, any tree proposed to be felled with more than 50 scats underneath ("high scat tree") is to be retained. All logging debris is to be removed at least 10 metres away from the base of a high scat tree.

If the area around the tree with a Koala is not designated as a high use area, a temporary exclusion zone of 30 metres will be implemented. No harvesting operations will be permitted within this zone until the Koala has vacated the area.

Throughout the rest of the compartment, eucalypts with a diameter greater than 15 centimetres are to be protected from damage to the fullest extent practicable.

FAXED
1005-96

Justification:

Records of Koalas exist both within the compartment and in surrounding vegetated areas. This prescription includes a modification of the "spot assessment technique" developed by the Australian Koala Foundation (AKF) for determining the significance of habitat utilisation by Koalas. It has been modified for use in state forests in Western Region and in forest types (eg. mixed eucalypt/cypress pine) where there is a high density of trees less than 20 centimetres in diameter.

This prescription is to be regarded as a trial only and may be modified pending further information. It is considered appropriate at present for protecting Koalas and their habitat from the impacts of logging in these forests.

The definition of a high scat tree is based on the observation that 50 or more scats under a tree equates to a Koala spending two or more nights in the tree. This is based on observations by AKF that Koalas deposit 75-120 scats in a 24 hour period under trees in north east NSW. The lower end of this range has been adopted due to the lower productivity of Koala feed trees in this management area, and it is assumed that the tree is utilised by a Koala for an average of eight hours per 24 hour period. High scat trees are assumed to be significant for individual Koalas and should be retained.

22.2.86
TAXED

Prescription 2: Glossy Black Cockatoo

All practical attempts shall be made to minimise disturbance to seeding Forest Oaks throughout the logging area. All identified nest sites are to be protected by a 100 metre radius logging exclusion zone.

Justification: *Allocasuarina* and *Casuarina* are the primary food source for the Glossy Black Cockatoo in the Pilliga region. Although these species are not being harvested this prescription ensures that these trees are not unnecessarily damaged during the course of operations. Therefore it is important to retain Forest Oaks over the harvesting area so that a food source is maintained throughout the year. Much of the species *Allocasuarina luehmannii* within the Pilliga Management Area is regrowth and this prescription aims to ensure sufficient seeding Forest Oak is retained.

The exclusion requirement for nesting sites is included here as provided within the harvesting plan to provide a clear, coherent and comprehensive prescription for inclusion within the harvesting plan. It is not understood what factors determine nesting tree selection or reproductive success for this species. Retaining individual trees surrounded by an appropriate buffers may facilitate continued reproductive success in logged forest. Buffer width is likely to be dependent on the intensity of the operation and local site factors including the availability of local feed trees.

This compartment contains habitat required for nesting and feeding for this species within the Pilliga Management Area. This prescription will assist in the recovery of this species. This prescription replaces that prescription within the harvesting plan.

Prescription 3: Masked Owl

During pre-logging inspections and mark up care will be taken to identify possible Masked Owl nesting and roosting sites, particularly in mature hollow Ironbarks and River Red Gum.

No logging shall occur within 100 metres and 200 metres radius of a Masked Owl roost site and nest site respectively.

These exclusion zones are to be applied to all records of Masked Owl within compartment 865, and to those records outside the compartment where the exclusion zone affects the net harvesting area.

Potential habitat along prescribed streams will be protected by a corridor, 100 metres either side of the stream centre, where no felling of eucalypts will occur.

Justification:

Masked Owls in the western region of NSW utilise more open mixed forests. Where there has been extensive clearing of native forests owls will feed primarily in the adjoining cleared land on ground-dwelling fauna. The birds utilise mature hollow eucalypts for roosting and nesting.

This prescription seeks to protect the breeding habitat as well as maintaining the integrity of the eucalypt lined creeks which link this habitat to the adjoining cleared land.

This species has been recorded from within 100 metres of the western boundary of the compartment (AGM 776800 6661500) and within the compartment (AGM 777500 6661400).

This prescription is an interim replacement for the 1km exclusion zone previously applied in this management area. It has been formulated specifically for compartments where only cypress pines are being harvested.

This prescription is considered appropriate for this management area until a more comprehensive prescription based on the Masked Owl's ecology is developed for this species in western New South Wales.

Square-tailed Kite Prescription

Forestry operations (including roading and grazing) must be excluded from a zone of 100 m radius around known nest sites.

Justification

Ongoing clearing of forests and woodlands has reduced overall habitat availability for the Square-tailed Kite. The main threat to the species is further destruction of habitat, particularly as the recruitment rate for the species is low. These birds usually nest in mature trees with massive limbs in open-dry forests, making them particularly vulnerable to the effects of logging. Disturbance during logging is likely to directly affect breeding birds, as well as the availability of prey.

Malleefowl Prescription

Protection zones of at least 50 metres radius around Malleefowl mounds are to be established around mounds sighted before or during operations. No harvesting is to occur within and no machinery is to enter the protection zone.

Justification

The Harvesting Plan does not provide a specific prescription for the Malleefowl. This species is known from within 5 km of the compartment. The 50 m buffer approximates the bird's centre of activity surrounding the nest mound and will provide a 1 ha bufferzone encircling any mound. Forestry operations conducted near the mounds are likely to deprive the breeding adults and emerging chicks of adequate cover, thus increasing the risk of predation, and may cause the Malleefowl to abandon the mound.

Mallee dominated woodlands, broombrush, *Eucalyptus sideroxylon* forests, *Callitris* woodlands and *Acacia aneura* are suitable habitats for Malleefowl. The removal of trees, broombush and mallee will expose the mounds, and the birds on them, to predators (raptors and foxes). The importance of cover for chick survival has been shown experimentally in NSW. Burning will add to such exposure as well as depleting the amount of leaf litter available for mound construction. The bird is most common in areas that have not been recently burnt, the most suitable habitat for nesting being mallee woodland that has not been burnt for more than 40 years. The creation of roads and tracks will increase the access of predators to mounds and Malleefowl. Grazing by stock will deplete the shrub community thereby lessening the food supply and the amount of cover available to Malleefowl. There is evidence to suggest that goats and rabbits graze the food plants of the Malleefowl.

Contacts for Pilliga

NPWS

local district office at Coonabarabranph 068 421311
fax 068 422124

zone office at Dubbo.....ph 068 832252
fax 068 832261
located above State Bank,
48-52 Wingewarra St, Dubbo (between Brisbane and
Macquarie Streets)

Mike Fleming.....Natural Heritage Coordinator (he blocked the breach
investigations; has a reputation for being pro-forestry)

Jonathan Sanders.....Zone Manager (totally disorganised, pro-conservation;
interested in issues other than forestry - eg, irrigators)

Jo Smith.....Acting Threatened Species Coordinator (was in charge
of the western biodiversity survey, but a bit of a wimp)

Another NPWS person who might be able to provide information: Bill Johnson (02) 9585 6692
(used to be ranger at Coonabarabran, and lived at
Baradine; now in Sydney)

SFNSW

local district office at Baradine.....ph 068 431607/ 431907
fax 068 431639
located opposite bank, one block to west of main road.
(It's worth seeing: a large, really beautiful building, made
by people who loved wood, but now only occupied by 4
people).

Larry Careydistrict forester (used to be at Kendall)
home address: 28 Warrigal St, Baradine (on road to
Coonamble, shortly after intersection)
home phone number: 068 431858

OTHER CONTACTS

Liz Datefauna consultant; part of team to do FIS for NW
Cypress Pine MA
065 451283 (this may be out of date)

David Paullfauna consultant; part of team to do FIS for NW
Cypress Pine MA
067 752444
PO Box 817, Armidale 2357

Peter MitchellSchool of Earth Sciences, Macquarie Uni
02 9850 8421
he's good value: calls the Pilliga a 'roaded' wilderness.
He was Liz Norris' supervisor for her Masters. The
conclusion of her research was that the vegetation is
determined by climatic patterns rather than failed land
use practices;
[BTW: Norris left the Botanic Gardens in Nov. 92]

Eric Rollsph 065 596888
fax 065 596900

- Richard Rickert.....'Pilliga Potter'; proposed the Kamilaroi Wilderness in the dissected sandstone country around Dandry Gorge.
P.O. Box 197, Coonabarabran NSW 2357
- Baradine Naturalist Club.....maybe NPWS in Coonabarabran can give you a contact for this?
- Baradine Bushwalkers Clubpart of Confederation of Bushwalkers - they'll have an up-to-date address
most of their walks are in the Warrumbungles, but they do go into the Pilliga occasionally (eg, around Willala Hills and Dandry Gorge)
- Local Aboriginal Community.....contact Brad Sulter at Coonabarabran NPWS (home number 068 422624). He is a ranger there, employed under an Aboriginal employment scheme. He is very interested in regaining the Koori knowledge of the area. This was mostly lost when the entire community was incarcerated in missions. There are some very interesting cultural sites which have been recently discovered (eg, rock art of maps showing waterholes) but these are all in Pilliga Nature Reserve, I think.

THREATENED FAUNA

Mallee Fowl - may be locally extinct, but could still exist in dense scrub.

Bush Stone Curlew - may be locally extinct

Regent Honeyeater

Black-striped Wallaby

Australasian bittern

Square-tailed kite (canopy dependent)

Glossy Black-cockatoo (hollow dependent)

Turquoise parrot (hollow dependent)

Masked owl (hollow dependent)

Spotted-tailed quoll

Pilliga mouse

Squirrel glider (hollow dependent - living trees)

Little pied bat (hollow dependent)

Koala

Pale headed snake (hollow dependent - living trees)

Rufous bettong

definite records in SF.

STATE FORESTS GOOD FOR FAUNA:

Quegobola SF: black-striped wallaby, tiger quoll

Pilliga East SF: Broombush/forest ecotone, especially near Gilgai FR (rufous bettongs, Pilliga mouse, hopping mice, black-striped wallaby, squirrel glider)

OLD GROWTH FOREST

unlogged forest is scarce, but there is still some remaining. What is important for fauna are the old forest elements: eg. certain microhabitats, fallen trees and **hollow mature trees**. The last of these are being targeted by Insultimber.

NOTES FROM FCNSW 1987: *MANAGEMENT PLAN FOR PILLIGA MA*

[the name of the MA has been changed. It is a much larger area now, called the North West Cypress Management Area. This is the MA for which the draft FIS has been produced.]

- Pilliga is one of the largest remaining forested areas in NSW west of the Great Divide
- extensive tract of relatively featureless bush, 'product of failed grazing settlement'
- undulating country - sediments of Jurassic origin (quartz sandstones) subject to uplift during Cretaceous period. Very old soils. Cf. Warrumbungle and Nandewar (Mt Kaputar) Ranges which were formed during Tertiary volcanic activity.
- Pilliga sandstone beds dip 5-10° to north-west and form aquifer beds which feed into the Surat section of the Great Artesian Basin
- soils range from poor skeletal soils on ridge tops and upper slopes to moderately deep solodic soils and earthy sands on the lower slopes, to deep siliceous sands and grey clays on creek flats and drainage lines.
- rainfall typically about 600mm/yr, but highly variable from year to year (extended droughts common, as are periods of total saturation). Summer maximum. Electrical storms common between September and March.
- vegetation: complex pattern determined by nature of soils and occurrence of fire. 15 spp of eucalypt (including some mallees), also white cypress pine, black cypress pine, belah, bull oak, angophora, acacias, broombush. 4 spp of ironbark (*E. crebra*, *E. fibrosa* (timber spp.), *E. melanophloia* and *E. sideroxylon* (non-timber)).
- history: forest ranger appointed in 1877 to prevent overcutting of white cypress pine; most state forests in white cypress pine country dedicated in 1917; 1930s saw depression labour constructing roads into forests and more dedication of forests to the east of Baradine, plus creation of national forests; Lindsay conducted veg. management survey during 1945-1951 (didn't include forests near to and to the east of Newell Hwy: these weren't dedicated until 1949); first management plan prepared in 1968.
- in early times: no definite management strategy for hardwood resource - unregulated sleeper cutting (p.18) from early 1900s.
- increased utilisation of ironbarks since 1979, regulated by harvesting plans. Tree marking too expensive. Retention of vigorous ironbarks where feasible - **not feasible in eastern Pilliga**.
- 'except in the steeper eastern parts of the Area, and on some sites with poor soils, few stands are in a general condition which resembles that prior to European settlement. The dramatic overall change has been one of increase proportions and occurrences of all tree and shrub species, particularly that of white cypress pine. In the absence of fire and grazing there has been a general continued invasions of understorey species in previously open stands, particularly since 1950.' (p. 31-32) [note: this probably holds for the Pilliga West forests, but not for the forests to the east of Baradine - see paper by Norris et al.].
- nature conservation value: important on regional, national and international levels. Largest single tract of inland plains forest in Australia; last bastion of forest land in largely cleared region.
- overall low intensity of forest operations. [but that's not the case any more, with Insultimber trying to take out all the iron bark of any value]
- recreation: 'Water is not readily available and the featurelessness and expanse of the terrain can make unplanned excursions hazardous, especially in hot weather. Visitors need to be warned of the danger of losing their way. Similarly in periods of wet weather, there are access problems, especially for conventional vehicles' (p. 61)

PILLIGA FORESTS

USEFUL CONTACT Names / Nos.

Janet Kavanagh 669 170 h Whiponie
420 594 p w (NEWS)
619 f j

David Page 066 545 350

Even if all of the Wilderness and all the forests identified in the CCO are protected this still only represents in the order of ^{less than} ~~not one~~ territory of Red Goshawk, 36 territories of Square-tailed Kite, 70 territories of Powerful Owl, 162 territories of Barking Owl, 242 territories of Sooty Owl, 245 territories of Masked Owl, and 386 territories of Tiger Quolls. These population numbers are very far below what is required for their long-term survival. The fate of these higher-order predators should be of major concern as they are essential to maintaining the ecological balance of our forests. see 6.3
change of 'to' to 'for'

It is apparent that many of our fauna are in serious trouble even if all habitat included in the CCO and the EMMA is reserved. Their survival will depend upon maximising their representation in the reserve system and management of their habitat across all land tenures, but even then it is apparent that some species and many sub-populations which are effectively isolated by dispersal barriers may not be viable in the long-term. eye icon

6.2 A detailed review of 'old growth' forest targets

The Resource Assessment Commission (1992a) gave two options for the management of identified old growth forest:

1. require a rapid cessation of all logging operations within old-growth forests;
2. identify and rank old-growth forests in terms of their full range of values, then after adequately protecting viable examples of old-growth forest some may be available for logging if there are no feasible alternative sources of timber.

Once the old growth stages of all ^{plant} floristic communities have been identified it is necessary to identify their conservation values in order to ensure they are adequately protected. Some of the values of old-growth forest can be broadly delineated as:

- (i) reservoirs of biodiversity within which to retain genetic diversity, natural processes and evolutionary potential;
- (ii) provision of a variety of homesites (hollows, large trees, large logs, permanent seepages, etc.), abundant food sources (nectar, invertebrates, fruit, etc.), diverse foraging areas (uneven canopy, canopy gaps, deep litter, logs, large tree trunks, etc) and other attributes upon which a large diversity of fauna depend and which are either unavailable or significantly less abundant in regrowth forests;
- (iii) provision of habitat and niches for a variety of flora (eg lichens, mistletoe, epiphytes) and fungi which are either unavailable or less available in a regenerating forest;
- (iv) provision of more water, more regularly and of higher quality than regrowth forests;
- (v) retention of intact ecosystem processes (eg nutrient cycling, soil and hydrological processes, food chains, energy balances) which are altered by logging;
- (vi) importance as research sites, type localities and benchmark sites;
- (vii) retention of currently hard to detect archaeological material which is grossly disturbed by the earthworks associated with logging;
- (viii) provision of significant intangible values, especially values related to aesthetics and pristine attributes; and,
- (ix) retention of natural integrity, and thus less vulnerability to climate change and invasion by exotic species.

PEOPLE (really) INTERESTED IN GOING ON A FIELD TRIP
to **PILLIGA FORESTS**
Sept Fri. 27 → Fri 4 Oct

Name of person	ph/no.	4WD or 2WD or other	needs lift.	Gear available / address and general
Corkill.	224737	2WD	-	
Johnno	222765		✓	radios etc
Zac	224737		✓	
Georgia	333183	2WD		ute can carry motor bikes
Struan	448140	4WD		
Mick Moriarty	" or 431863		✓	2 mountain bikes
Audrey	448140			after Bello carnivale
Tim T	550027		✓	after Bello carnivale

it also seems to me that many submissions have one very simplistic theme, which is basically that the government bans private enterprise, so there is a lot of emotive language about threats of continued government monopoly. Would you like to comment on the narrowness of your company's submission.

Mr VINCENT: Our organisation is market-driven. We will respond to the needs of the community. The comments you allude to generally refer to the past. In the past two decades in this city putrescible waste has been controlled by government instrumentalities entirely, and we have this vague situation where companies that are licensed to accept non-putrescible material either accept it at their peril outside of the framework of their permits, or they cannot accept general commercial waste, which means they are only licensed to accept inert material.

Ms BURNSWOODS: We have had several days of hearings, and the majority of people who have appeared before us have been in the business to make profits. Nevertheless, most of them have been quite happy to make comments critical of the Green Paper or quite happy to accept the need for regulation in one area or another, or to stress the whole area of minimization. Your submission seems so totally self-absorbed that I am wondering about your company's sense of responsibility to the community.

Mr VINCENT: I cannot accept that. The opening comments are supportive of the Green Paper.

Ms BURNSWOODS: It seems strange that you are so out of step.

Mr VINCENT: We are not here to conform, we are here to act in the manner we see appropriate.

Ms MACHIN: My question is about cost. In your verbal submission you mentioned increases or a cost for disposing of waste. Do you have an optimum figure of dollars per tonne that you think would reflect the true cost of disposing of waste in landfills in the Sydney region? Have you done any calculations?

Mr VINCENT: That is a very intricate question. It has to depend on the site and the level of engineering required to render that site environmentally

North East Forest Alliance

C/- Big Scrub Environment Centre Inc, 149 Keen St Lismore. 2480.

Hotline 066 224 737 Fax/Ph; or Fax 066 222 676

Attention: Environment Centres and forest action groups

Please pass this on to relevant people or display discreetly; i.e. not in a public place.

To: All NEFA crew, forest defenders, green grannies & green extremists, etc.

FOREST ACTION UP-DATE - Thursday 12 September '96

<< GREEN ALERT >>

NEFA has received advice that State Forests has accelerated its plans to log (yes! here we go again!!) the mature forest in the north east of the PILLIGA SF which contain important forest types: ironbarks, box, and cypress pine (+ shrublands) & habitat for numerous endangered species.

No EIS has been done! These forests were omitted from the Interim Forest Assessment and weren't considered for a moratorium of the CAR reserve system. NPWS licensing and SFNSW supervision & planning are 'pre-Chaelundi' !

Proposal:

That NEFA conduct a 7 day fact-finding mission to the north-east PILLIGA FORESTS from

Friday 27 September -> Friday 4 October 1996,

(starting full moon night, for the week of the 3rd quarter)

to consider extending NEFA's western boundary to the Castlereagh River west of Coonabarabran and north of Sydney and Dubbo.

The field trip to include 'Green Policing' of logging operations, video & still photo documentation, visits to SFNSW and NPWS offices & (obviously) dialogue with workers!! Following the field trip a Green Police Report to be compiled and forwarded to the usual recipients: Ministers, MLC's, NPWS, media etc

A Wilderness nomination made for the Pilliga area has been assessed by NPWS but the report has not been released yet for reasons we're yet to discover.

This Alert is to:

- seek expressions of support,
- request promises to join the NEFA field trip (need info on vehicles, seats & gear available!)
- solicit copies of any relevant information on the Pilliga and its natural values, and
- ask for names & contacts no.s of 'local' people interested in protecting the Pilliga.

Please contact John Corkill at NEFA Lismore Branch on 066 224 737 or mail information to NEFA @ The Big Scrub Environment Centre, 149 Keen Street, Lismore 2480.

Further discussion of more detailed plans will be held at the North Coast Environment Council Inc AG meeting at Grafton Public School on Sat 21 September and at a NEFA meeting at Minnie Waters the next day Sunday 22nd September.

Om Gaia, dudes!

Some facts on the Pilliga Scrub

IV. 8
2-10-96

I WAS highly incensed and somewhat amused, if that is possible at the same time, concerning the article on 'Pilliga Scrub threatened: No EIS in sight'.

I point out that I was in charge of what possibly was the major timber assessment gang working in the Pilliga under the direction of Mr W Hindmarsh and his immediate boss Mr D Lindsay, who I maintain was a man 50 years before his time.

For three years, I walked strips 20 chain apart assessing timber volumes, mapping types, soils and grasses. Admittedly, emphasis was on cypress pine, however other species were not ignored.

To volumate a tree it was essential to arrive at a correct diameter, checked with calipers to keep the eye in and estimate log length by eye, thus it was essential for both estimators in the gang to constantly look at the tree tops.

Only on one occasion during this period did we sight a bear and that was in Pilliga East SE.

A further two years was spent in the Pilliga. I saw no koalas during this period, nor were any brought to my attention. Since retirement I have been an infrequent camper in the Pilliga. About 1977 I did see a koala up a river red gum in the dry creek close to the Aloes Windmill and well in the creek bed. I am not saying

that there are not koalas in the country that I did not walk closer to the Warrumbungle Ranges.

With regard to the regent honeyeater I cannot really comment. If I did see it it was just another bird to me as I was not particularly interested in individual species.

It is incorrect to say that timber was mainly used for fence posts. When I was there in the post-war years, the Pilliga supplied most of the cypress pine for housing and there was a quota of 76 sleeper cutters in the Baradine Sub-district alone.

The assessment revealed what was expected, that there was a death of the larger sized diameter classes in cypress pine and the the growth yield was being overcut.

To the credit of the Forestry Commission, moves were instigated to reduce grazing to ensure germinating species were not eaten out, mill quotas were cut despite strong objections and the sale of thinnings encouraged by price margins in an attempt to increase the percentage of larger diameter classes.

It is inconceivable to me that any consideration would be given by the Forestry Commission or government to clearing the forest. I think it is just not on when you consider much of the area is failed farming or grazing country.

Undercuts are as bad as overcuts, as generally it is the only economic way to thin when it is known and shown on TV that the number of trees occupying stands in the Pilliga are on the increase.

In 1927 Priestman described thickets of regrowth with die-back tops about two and a half metres high and about five or six centimetres in diameter. They were precisely the same when I encountered them in the late forties. No doubt over a period, possibly hundreds of years they would sort themselves.

This drive to close all forests to me is insanity, after all there is such thing as multiple use. The third statement under 'What You Can Do' I ask, what is environmentally responsible? Changing uses and ideas have a habit of altering the status quo.

I fail to see why members of the silent majority should concern themselves with writing to the Premier. Until they acquaint themselves with the facts it is like buying a pig in a poke; the next thing someone will be asking me to accept their hypothesis that the world is flat.

ALLAN GRAHAM,
Goonellabah

The Kamilaroi Wilderness

The Pilliga Scrub flanks the Newell Highway for some 100 km between Coonabarabran and Narrabri. Much of it consists of abandoned grazing properties and its cyprus pine and ironbark has been extensively logged. 20 km north of Coonabarabran is the Pilliga Nature Reserve which remains little affected by grazing or logging. The southern section of this reserve is fragmented by the 4,500 ha property of Schmidt and Partners. In 1990

the Coonabarabran Shire Council approved a subdivision within the property of 60 hobby farms of approximately 40 ha each. In 1992 the Council required a fauna impact statement as a condition for the extension of the subdivision approval, but this condition was not upheld by the Land and Environment Court when the developers appealed.

When roading and clearing commenced early this year Mr Richard Rickert, a member of the Colong Foundation

who owns a property adjacent to the nature reserve, sought the advice of the Foundation on a wilderness nomination.

After an inspection of the area the Foundation formed the opinion that the nature reserve, together with the Schmidt property, was well qualified for wilderness nomination and had ecological features little represented elsewhere.

This view was confirmed by the research of Dr. Elizabeth Date and David Paull of New England University.

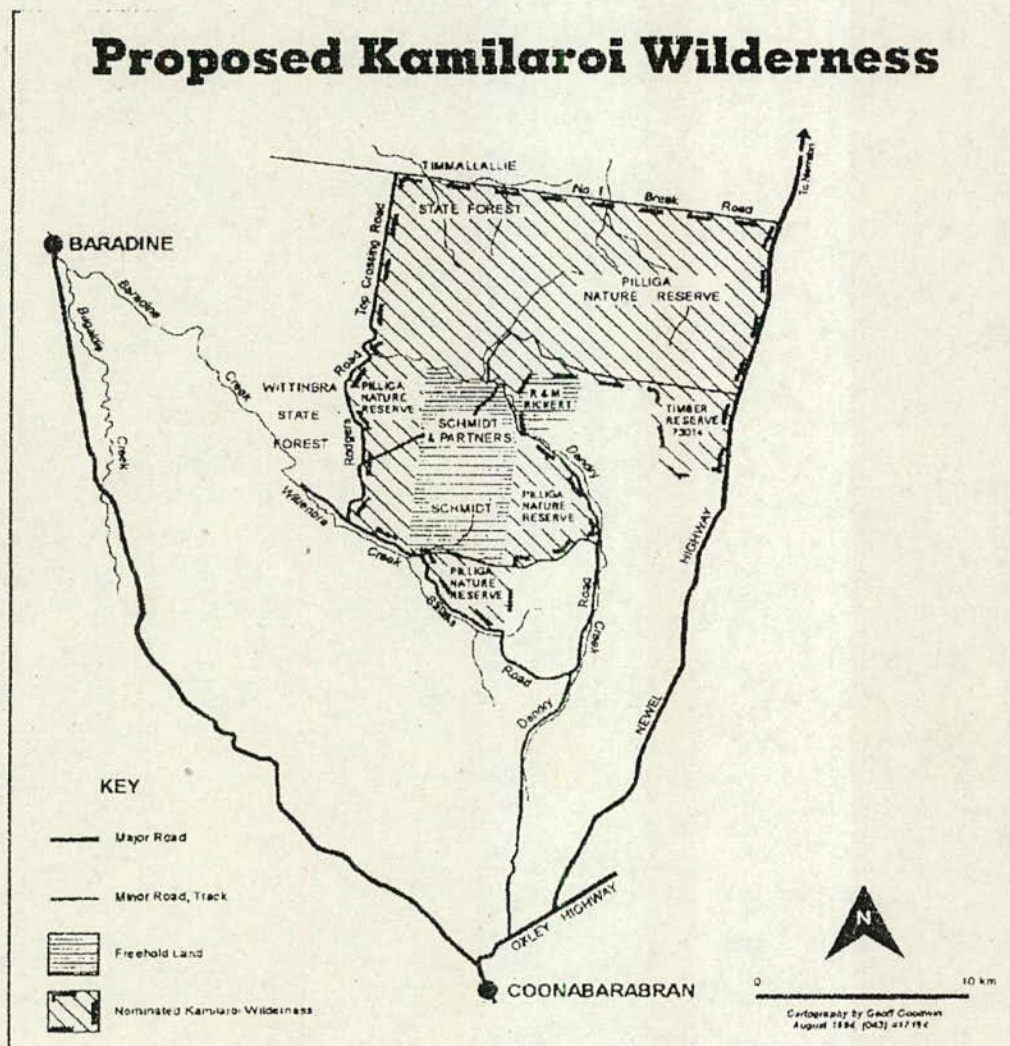
They reported that "the land appears similar to Oxley's description of the area as it was in 1818. In fact Oxley may have passed directly across the area." They were of the opinion that the areas that had been disturbed were already regenerating and had the capacity to return to mature woodland. It contained the largest continuous mature stand of semi-arid woodland on the western slopes of NSW. Sightings of many rare and endangered species had been made and many others, known to exist in the locality, were likely to be present.

Mr Rickert nominated the nature reserve, together with the Schmidt property, on June 6th. The nomination was supported by the research papers of Dr Elizabeth Date and David Paull. The Endangered Species Network, the Total Environment Centre, the North East Forest Alliance, the Wilderness Society and other organisations enthusiastically supported the nomination.

We are pleased to report that NPWS negotiations for the purchase of the Schmidt property have been successful, albeit at a price enhanced by subdivision approval.

The Kamilaroi Wilderness (so named after the tribe that once inhabited it) is unique. It is the most extensive and best preserved wilderness on the lowlands west of the Great Divide. It probably contains species, such as the Bettong, the brush tailed wallaby, the Koala and the Squatter Pigeon, now wiped out or extremely rare in the grazed and cleared western lands.

Proposed Kamilaroi Wilderness



BYO wilderness

I WAS recently invited to comment on a nomination as wilderness of country that I know intimately, the Pilliga Nature Reserve and Pilliga forests in north-west NSW.



ERIC ROLLS

The Wilderness Act of 1987, which is administered by the National Parks and Wildlife Service (NPWS), makes it compulsory to investigate any area nominated as wilderness by "any person, body or organisation".

This Act has antagonised many who want continued access to the areas - trail bike riders, horse riders, four-wheel drive enthusiasts and some farmers.

But it is an excellent idea, as it secures significant tracts of land from exploitation.

NPWS project officer Janet Cavanaugh spent months preparing the assessment of the Pilliga land. She did a superb job in an area particularly difficult to understand. In much of it, what looks new is old, and what looks old is new.

No judgment can be made by sight. A knowledge of the history of the area is vital.

The definition of wilderness in the Act is "a large natural area of land that, together with its native plant and animal communities, is essentially unchanged by human activity". That rules out the whole of Australia at the time of European settlement.

There was no land that the Aborigines - an observant, intelligent and imaginative people did not manage to suit themselves.

The Big Scrub to the north of the Richmond River on the north coast of NSW, often described as an impenetrable tangle, had hunting and trading tracks running through it and numbers of areas kept free of trees and shrubs by fire.

In answering the question "Why do we have wilderness?" an Information sheet put out by NPWS shows a misunderstanding of Aboriginal management.

"The landscape of wilderness areas," it explains, "can help us to understand how Aboriginal people lived in harmony with the land for thousands of years before European settlement. Such areas are valuable reminders of the way we can live with minimal impact on the environment."

Aborigines had a maximum impact on the land. They maintained huge areas as beautiful open parkland, a wildflower garden, and they opened tracks for hunting and gathering into those timbered areas, especially the rainforests and vine scrubs of northern Australia, that they wished to maintain for their fruit and medicines.

If they had let up on

their management, the rampant bush would have overrun them, as happened to the first European settlers in many districts.

That is what happened in the Pilliga forest. In the late 1830s squatters sent stockmen with cattle to establish a series of runs on the rich black and chocolate soils along the Namoi River and the headwaters of the Castlereagh.

So the sandy soil that is now a forest was ringed by men and their livestock on the north, east and south. The remarkable blacksoil plains between Baradine and Coonamble formed the western boundary. No-one occupied them for years because they were waterless.

More and more squatters came over the Liverpool Range exploring for runs and driving the sheep and cattle to stock them.

CLOVEN hooves soon trampled out the good grasses. A long drought in the 1870s bared the ground and reduced the number of rat kangaroos and possums that ate tree seedlings. The heavy rains of 1879 started a wild growth of pine and scrub. It grew unchecked and soon drove out men and livestock.

The nomination of the Pilliga wilderness came from Richard Rickert, a potter who lives on the edge of the nature reserve. His object was to stop a senseless subdivision for houses in unsuitable, heavily forested country.

Because it seemed inevitable that there would be future nominations of both forest and nature reserve, NPWS asked Janet Cavanaugh to investigate the entire area.

She decided on three blocks, the one nominated and two others, one of 64,000 hectares adjoining the first on the west of the Newell Highway, the other of 85,000 hectares on the east.

The two western blocks are much as they were when the squatters moved in.

They were always scrubby and stocked mostly by batlers and cattle that had run wild. They fit all categories of wilderness.

The whole 85,000 hectares of the block on the east of the highway cannot be classed as wilderness. Two big areas of it are unchanged, but 30,000 hectares in the centre of the block are greatly changed.

This area comprised runs known as Arrarownie and Bora, fascinating because of the men associated with them.

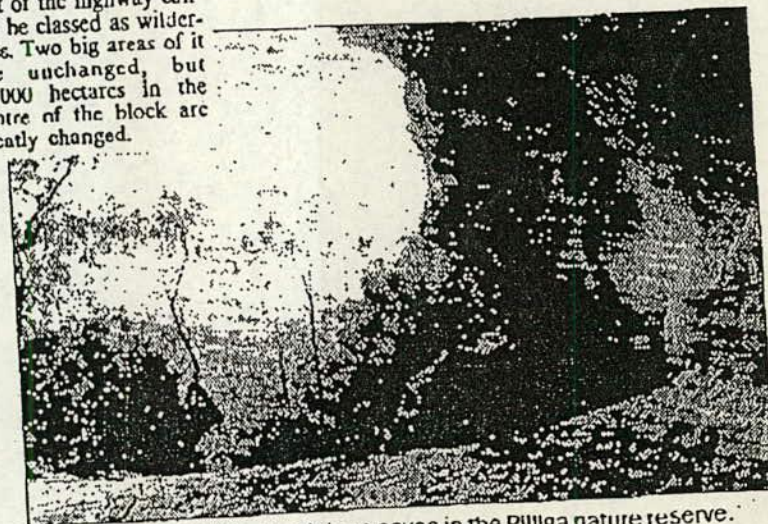
John Robertson, later premier, came to Arrarownie with cattle as a 19 year old and took it up as open grassland. Ebenezer Orr ran sheep on Bora and dressed his Aboriginal shepherdesses in long red flannel.

Frederick York Wol-

seley later bought Arrarownie as sheep country and began development of his shearing machine there. He ran 28km of fence and the men who put it up did not have to clear the line.

What was ancient scrub there and what was open country is now indistinguishable. The land has produced areas seemingly thousands of years old in little more than 100 years.

Jacqui!
Wilderness



ANCIENT LANDS: Sandstone caves in the Pilliga nature reserve.