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In this, our third Environmental and Social Values Report, we again provide information on the environmental and social values of State Forests. Each forest value is assessed by a set of performance indicators that measures various aspects of the current estate and management. Annual monitoring of these indicators provides opportunity to assess levels of achievement in ecologically sustainable forest management. We will continue to analyse the results to evaluate our progress towards ecologically sustainable forest management and the performance of environmental services.

Why these values and indicators?

The seven forest values assessed in this report were selected on the basis of:

- Values recognised in our Corporate Plan.
- Input from representative stakeholder groups.
- Reference to internationally recognised methods of measuring progress towards ecologically sustainable forest management.
- Consistency with national criteria and Regional Forest Agreements.

The 21 indicators presented in the Report were selected, based on information currently available, to portray our performance in managing the forest values. The indicators are also consistent with nationally agreed criteria for measuring forests and requirements of Regional Forest Agreements.

Environmental Performance Summary

Forest Value	Target	Indicator	Page
1 Biodiversity	Maintain the range of native species of flora and fauna	1. Extent of forest type – Native forests	7
		– Planted forests	8
		2. Extent of native forest structure	9
		3. Record of surveyed species	10
		4. Habitat level of representative species	12
2 Productivity	Achieve sustainable productivity	5. Forest available for timber production	15
		6. Growing stock in planted forest	18
		7. Removal of sawlogs compared to allowable volume	19
		8. Percent of planted forest effectively stocked	20
		9. Percent of native forest regenerated	21
3 Forest Health	Manage healthy forests	10. Expenditure on introduced predator, feral animal and weed control	23
		11. Percent of forest affected by agents that may change ecosystem health and vitality	25
4 Soil and Water Quality	Clean healthy streams and stable soils	12. Area and percent of forest harvested	28
		13. Area and percent of forest managed primarily for catchment protection	30
5 Forests as Carbon Sinks	Expanding contribution to reducing the greenhouse effect	14. Annual carbon sequestration in planted forest	32
6 Community Benefits	Provide wide range of community benefits	15. Volume of timber harvested	34
		16. Quantities of other forest products	36
		17. Number of recreational activities	38
		18. Expenditure on research & education	40
		19. Direct employment	42
		20. Regional opportunities for public participation	44
7 Cultural Heritage	Conserve and protect cultural heritage	21. Protection of recorded places, artefacts, sites and other structures	45

Results

Total forest estate managed by SFNSW of 3,026,000 hectares.

2,713,000 hectares of native forest estate identified by broad forest type.

313,000 hectares of gross planted forest estate.

8% Young Regrowth; 12% Regrowth; 30% Mature; 4% High Conservation Value Old Growth and 4% Rainforest (with 42% to be assessed)

51 targeted species identified from surveys prior to harvesting, with 3,106 sightings.

289,000 hectares of Koala habitat; 86,600 hectares of Greater Glider habitat & 13,200 hectares of Squirrel Glider habitat.

1,965,000 hectares available for timber production on State forests; 555,000 hectares in Reserves on State forests; and an additional 506,000 hectares of other areas protected from harvesting.

Current Annual Increment for softwood plantations of 18 m³/ha/yr.

Actual annual yield was 94% of allowable yield from native hardwood forests.

100% of hardwood and 98% of softwood plantation successfully established.

98% of harvested area successfully regenerated based on 28 surveys of 3,644 ha.

\$922,000 spent on feral animal and weed control.

0.04% (1,160 ha) of all State forests burnt by wildfire in 1999/2000; and 26% of new hardwood and 11% of softwood plantations with levels of insect infestation, fungal attack or nutrient deficiency that could cause deleterious effects.

2.4% of State forest harvested in 1999/2000.

In addition to areas managed primarily for Reserves a further 10.6% of State forest is specially managed for catchment protection.

2.88 million tonnes of carbon dioxide equivalent sequestered by planted forest in 1999/2000.

2.79 million cubic metres of logs and 1.22 million tonnes of pulpwood harvested in 1999/2000.

Various quantities, including grazing, beekeeping, seedling sales and firewood.

567 recreational facilities provided and 613 formal events conducted in 1999/2000.

\$7.1 million spent on research and \$2.8 million spent on education in 1999/2000.

8,109 people directly employed as a result of State Forests' activities.

2099 various regional community forums attended in 1999/2000 and additional community participation through the Regional Forest Assessment processes.

2213 sites of cultural significance to Aboriginal communities protected and 509 non-indigenous heritage sites protected in State forest.

The aim of this Report is to publicly record State Forests' state-wide performance against a number of values that reflect our environmental policy and the community's expectations of forest management during the 1999/2000 financial year.

Preparation of this Report is a requirement of corporate management and the various NSW Forest Agreements. In addition, the pool of data used to produce this Report will also be used to prepare similarly structured reports at a regional scale for the Department of Urban Affairs and Planning and be provided to the Parliament of NSW.

State Forests is committed to providing ecologically sustainable forest management and reflects this commitment in our Corporate Plan. The Plan contains a commitment to measure our performance in terms of those forest values considered important by our key stakeholders. These include biodiversity, productivity, soil and water conservation, and economic, social and cultural aspects. Additionally, the Plan also recognises the maintenance of forest health and levels of carbon sequestration as other important forest values.

This Report presents indicators that quantitatively portray our current performance against these forest values. The selected indicators have been refined from those used last financial year to better reflect nationally agreed criteria and the requirements of Regional Forest Agreements. Regional Forest Agreements are now determined for coastal forests in the south east and to the north of Sydney.

The completion in the last financial year of the Comprehensive Regional Assessment and identification of a Comprehensive Adequate and Representative reserve system for the south coast and southern tablelands has influenced the indicator results. Improved data and changes to land management means that changes in performance have occurred.

In addition to the performance indicators, the Report also presents a summary of regulatory compliance achieved by State Forests in the last financial year. Regulatory compliance is an important element to demonstrate management system performance. The summary reports the number of breaches identified and our monitoring effort during harvesting.

In the future State Forests will:

- Be adaptive and responsive in the ongoing development of management policy to address issues raised by this Report.
- Receive and consider feedback from interested readers of this Report.
- Continue development of our environmental management system (EMS) as the process by which we will deliver ecologically sustainable forest management. The system is based on recognising, protecting, managing and monitoring values in our operations consistent with the ISO 14001 standard. The native forest component of the EMS is due for operational use by April 2001.
- Introduce benchmarking and external review of the Environmental and Social Values Report.
- Progress development of Triple Bottom Line accounting.

This Report also provides some insight into future forest management strategies, recognising good environmental management can also provide good economic management and investment opportunities.

Consequently, State Forests have continued to pursue carbon trading, salinity and biodiversity credits as environmental management tools to encourage sustainable development. These market place mechanisms, being developed and refined by State Forests, encourage new investment, such as in new planted forests to help reduce greenhouse gases and to redress rising water tables and dry land salinity.

New business opportunities for State Forests are developing from the increased potential and expansion of planted forests. As well as its own planted forests and joint venture opportunities, State Forests is forging a role in servicing land rehabilitation and management requirements, such as mine site rehabilitation, where land owners will contract State Forests services to establish, maintain and/or harvest their planted forests.

Similarly, State Forests is now in a position to offer contractual services for ecological survey and assessment. The initial advertisements for this new service were issued during the year.



State Forests of NSW recognises that planted and native forests represent a wide range of values and uses to the people of New South Wales. It is a goal of SFNSW to conserve and protect forest values ranging from biodiversity and forest productivity to the ability of forests to act as carbon sinks and for the many recreational and cultural values they provide.

This environmental policy statement reflects international, national, and State commitments, policies and programs to ensure that State Forests operates its business and manages forests in a way that is environmentally sensitive, socially beneficial and economically viable. SFNSW is continuously seeking improvements in its environmental performance.

SFNSW is committed to ensuring ecologically sustainable forest management (ESFM) in NSW by:

- Managing forests to maintain and enhance the full suite of forest values for the benefit of current and future generations;
- working to ensure that our management is complementary to forest management on other tenures; and by
- working with others to ensure the development and operation of a sustainable forest industry.

To implement ESFM the organisation is committed to:

- Measuring and publicly reporting corporate performance concerning the:
 - conservation of biodiversity
 - protection of soil and water quality;
 - protection of cultural heritage; and
 - provision of social and economic benefits.
- Developing, implementing and continuously improving its Environmental Management Systems for both planted and native forests.

- Meeting or exceeding regulatory requirements and government policy.
- Implementing the outcomes of the NSW Forest Agreements by working with other land managers and stakeholders.
- Being open and transparent to the community in undertaking its operations and reporting on performance.
- Adapting forest management practices and systems in the light of auditing, monitoring and research information, changing expectations, regulatory requirements, and government policy;
- implementing world's best practice in forest management by SFNSW staff and contractors, including the provision of training, professional development, and accreditation processes.
- Adequately resourcing the organisation to achieve ESFM.
- Developing and implementing efficient energy use and waste management measures in all its activities.

State Forests will be actively seeking global business opportunities relating to environmental services and environmental enhancement.

Bob Smith Chief Executive State Forests
21/9/1999

Conservation of Biological Diversity

The NSW Biodiversity Strategy details actions to conserve the biodiversity of NSW. It commits all government agencies to working towards conserving biodiversity in NSW. The focus is on:

- Community consultation, involvement and ownership;
- conserving and protecting biodiversity;
- threats to biodiversity and their management;
- biodiversity conservation and natural resource management; and
- improving our knowledge.

What is biodiversity?

Biological diversity, or biodiversity, is the variety of all forms of life – the different plants, animals, micro-organisms, the genes they contain, and the ecosystems and ecological processes of which they form a part. Biodiversity is measured in terms of variations at genetic, species, and ecosystem levels. Ever-responding to natural forces and human activities, the biodiversity is in a constant state of change. These changes may be caused by human activities such as land management practices that result in habitat restoration or degradation, or natural agents such as fire that affect ecological process.

Why is biodiversity important?

Biodiversity is important because it plays a critical role in meeting human needs directly while maintaining the ecological processes upon which survival depends.

In this report, biodiversity is considered at two levels:

- Species diversity (the variety of species in the forests)
- Ecosystem diversity (the variety of habitats, biotic communities and ecological processes)

Maintaining forest biodiversity

The Forests of New South Wales contain considerable biodiversity – from rainforests in the north to the dry western Cypress Pine and flood plain River Red Gum Forests of the Murray Basin.

State Forests' is committed to the conservation of the biodiversity of these forests. This commitment has been demonstrated by the creation of 555,000 hectares of Reserve managed by State Forest, and new regulations that manage the number and variety of the plants and animals which make up the ecological communities in these forests.

State Forests' commitment to maintaining and enhancing biodiversity involves:

- Maintaining the extent and range of forest types, their distribution and abundance.
- Protecting high conservation value old growth forests, rainforest and unique ecosystems.
- Maintaining the diversity of flora and fauna in forests, with particular attention to threatened species.

This forest value provides four indicators to monitor biodiversity.

Indicator 1. Extent of forest type

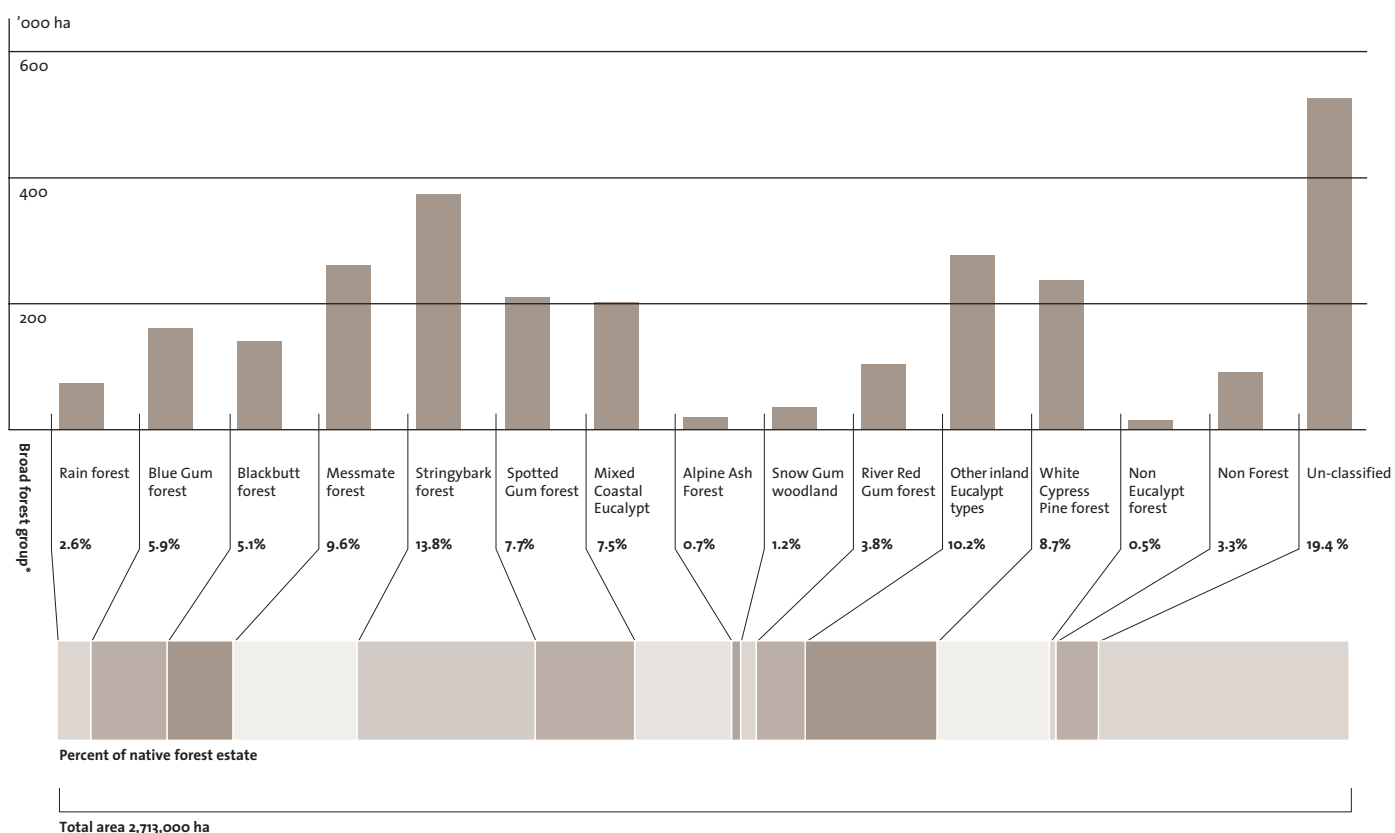
Each type of forest is unique. Forest ecosystems include both the physical environment and the combination of plant and animal species found living together. Monitoring changes in the extent of forest types over time and space will help State Forests ensure that forest management practices will maintain and enhance biodiversity. In the next financial year State Forests plan to introduce a system that will assist measuring and monitoring changes in the distribution of forest ecosystems across the landscape.

Native Forests

The types of tree species and associations which make up native forest on State forest is well detailed in most instances. More than 200 individual forest types are recognised. For reporting purposes these forest types are aggregated into fourteen broad forest groups. Table 1 shows the area and percentage of forest in each of the fourteen broad forest groups, plus an area of forest not classified in detail. Large in area, this last forest group is mostly lower timber productivity forests west of the Great Dividing Range and non-timber production forests in eastern NSW. Progressively some of these un-classified forests will receive more precise assessment during the coming years, especially in light of our commitment to identify a comprehensive range of forest values.

The total native forest estate managed by SFNSW is 2,713,000 hectares. The native forest estate has remained unchanged during the year. Any variation of this figure from values advised for 1998/1999 is due to improvements in record and management systems.

Table 1. Area and percent of native forest in broad forest groups



*Classification into broad forest groups utilizes forest types and leagues identified in SFNSW Research Note 17.

Planted Forests

SFNSW manages a range of planted forest types, including native and exotic species. For management purposes State Forests label planted forests as either hardwood or softwood. This label reflects the wood density variation between major botanical families.

State Forests are committed to increasing the amount of native eucalypt tree species that we plant, as well as establishing exotic softwood plantations. Restoring tree cover to the landscape is a positive contribution to regional biodiversity.

In State Forests’ planted softwood forests, *Pinus radiata* is the dominant species (See Table 2.). Our planted softwood forests also include the spectacular native pines of *Araucaria cunninghamii* (Hoop Pine) and *Araucaria bidwillii* (Bunya Pine) in some northern locations.

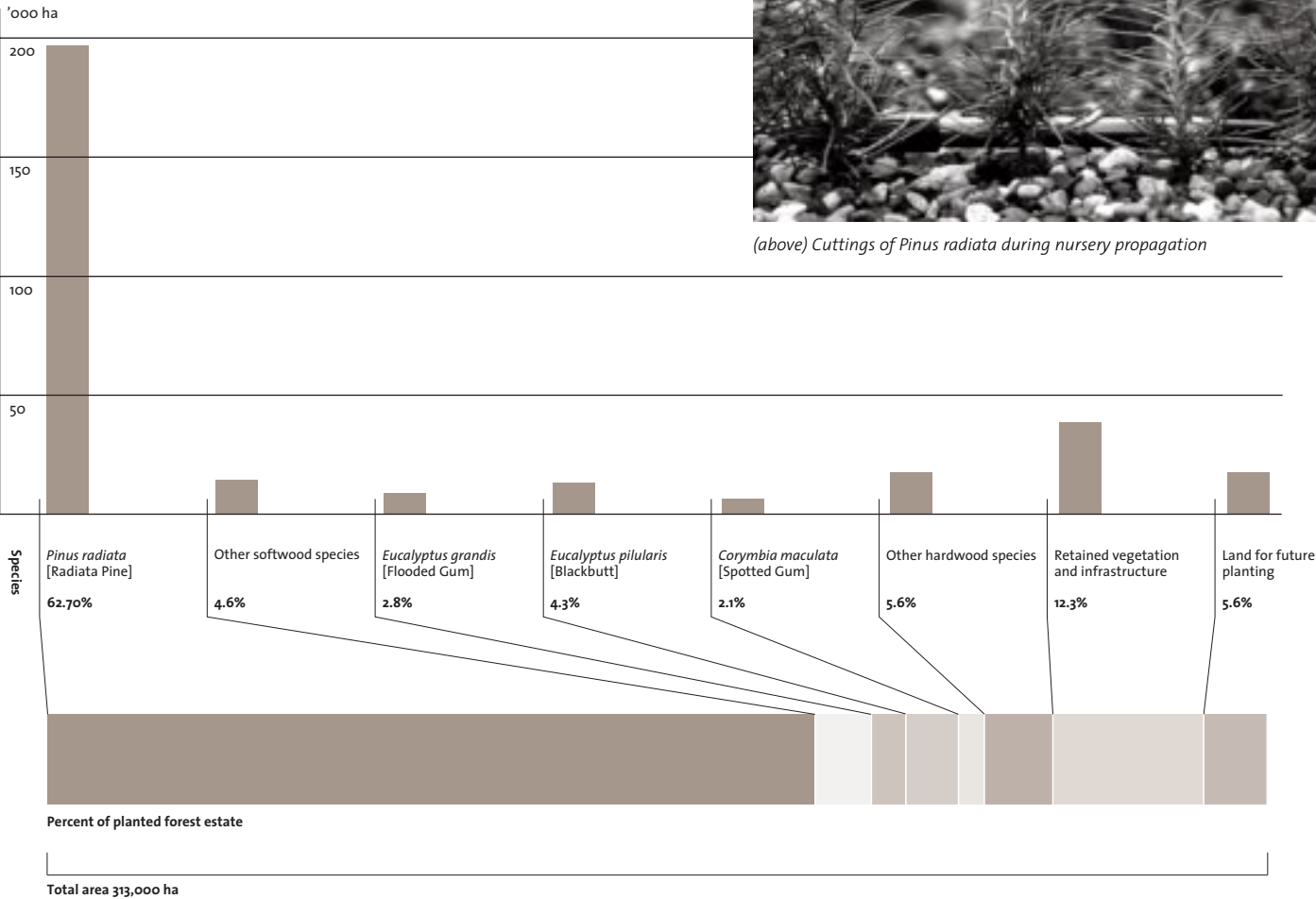
Whilst *Eucalyptus pilularis* (Blackbutt) is the predominant planted hardwood species, our planted hardwood forest program operating since 1995 utilises seven eucalypt species, selected for their commercial potential, growth rates and site suitability.

As recorded in Table 2, twelve percent of the planted forest estate is comprised of infrastructure and retained native vegetation including stream reserves and protected land.



(above) Cuttings of *Pinus radiata* during nursery propagation

Table 2. Area and percent of planted forest by species



Indicator 2. Extent of native forest structure

Native forests contain a mix of tree age and form which reflects the natural environment and management of the forest. State Forests refer to this condition of tree stands as forest structure. For comparative analysis and management purposes we characterise these various conditions in one of four forest structure classes. The forest structure classes are High Conservation Value Old Growth, Mature Forest, Regrowth Forest and Young Forest. Progressively through these categories the proportion of older trees diminishes. Within our forests, High Conservation Value Old Growth Forest is unavailable for harvesting, as the ecological value of these stands has been made paramount. Additionally, Rainforest is recorded as a type of forest structure for management purposes. Again, within State forests, Rainforest is reserved from harvesting and managed primarily for its very high biodiversity value.

Maintaining a range of forest structures in all forest types is critical for the survival of each forest ecosystem and the many native animal species that depend on them for habitat requirements in terms of food, shelter and breeding. Biodiversity is enhanced with a diversity of young, growing, mature and old vegetation.

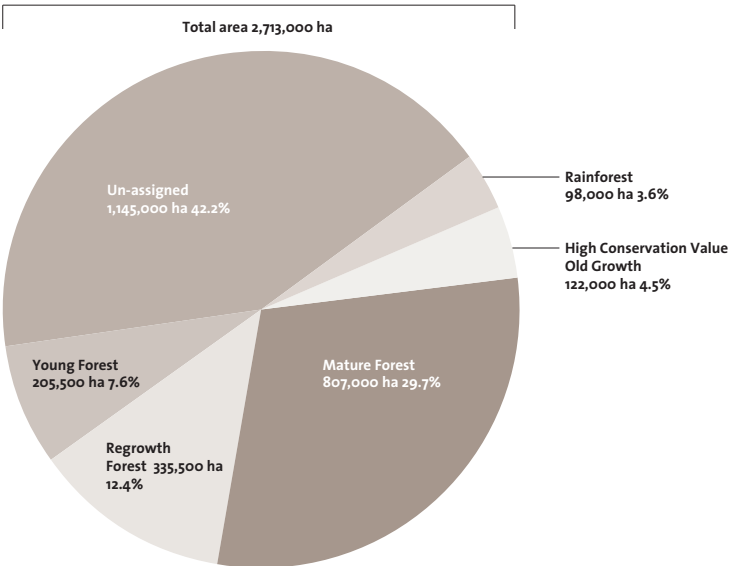
Following recent forest management zone identification and with resource monitoring upgrading it will be possible in the future to monitor forest structure and forest types in ‘reserved areas’ and ‘areas available for timber production’ and thereby periodically obtain updated information to manage biodiversity within the forest.

Classification of forest structure has occurred along the coastal and tableland forests in accordance with the Comprehensive Regional Assessment. Around 1.1 million hectares of native forest in the central and western districts of NSW remain un-assigned. Classification of some of these forests is currently underway as part of the western forest assessment.



(above) A Young Forest of coppice and seed regeneration adjacent to Mature Forest in Olney State forest.

Table 3. Area and percent of native forest in forest structure classes



Many native animals, including rare and endangered species, depend on and use forests for habitat.

An important role of forest management is to monitor the occurrence of these species.

This indicator uses target species which are those forest dwelling species identified under the NSW Threatened Species Conservation Act. Due to their low population size or limited geographic range extra care must be taken to maintain their habitat.

These species are subject to special protective conservation measures in the form of Licences. Protective conservation measures negotiated and agreed to between SFNSW and NPWS enable a consistent and uniform approach to be taken by SFNSW in meeting its licensing obligations under the Threatened Species Conservation Act 1995, National Parks and Wildlife Act 1974, Environmental Planning and Assessment Act 1979, and Forestry and National Parks Estate Act 1999.

In coastal and tableland native forests we survey flora and fauna on areas proposed for timber harvesting. Survey records of these species trigger a higher level of protection from the effects of harvesting. Over time we expect to see their numbers stable or increasing. In inland forests licence conditions for the protection of endangered species are also uniformly applied. Table 4 lists sightings and recordings of targeted species of fauna. During the last year a further 3106 observations of target species were recorded.

Table 4. Sightings and recordings of targeted fauna in native forests

Target Species	Number of Areas Surveyed 1999/2000	Number of Individual Records 1999/2000	Cumulative Number of Areas Surveyed since July 1997	Cumulative Number of Individual Records since July 1997
Arboreal Mammals				
Squirrel Glider	253	29	475	61
Yellow-Bellied Glider	273	477	611	1122
Brush-Tailed Phascogale	268	14	468	15
Koala	258	280	554	584
Ground Mammals				
Long-Nosed Potoroo	271	3	533	16
Southern Brown Bandicoot	41	0	93	0
Parma Wallaby	216	7	388	39
Red-Legged Pademelon	204	0	369	9
Rufous Bettong	216	4	399	47
Brush-Tailed Rock-Wallaby	256	0	430	8
Long-Footed Potoroo	37	0	116	0
Tiger Quoll	276	36	550	66
Broad-Toothed Rat	32	0	107	0
White-Footed Dunnart	28	0	48	1
Smoky Mouse	37	0	121	0
Hastings River Mouse	30	14	64	15

Table 4. (continued)

Target Species	Number of Areas Surveyed 1999/2000	Number of Individual Records 1999/2000	Cumulative Number of Areas Surveyed since July 1997	Cumulative Number of Individual Records since July 1997
Frogs				
Giant Burrowing Frog	50	9	100	13
Stuttering Frog	83	60	255	213
Green-Thighed Frog	55	4	124	13
Giant Barred Frog	175	10	288	59
Red-Crowned Toadlet	14	30	55	149
Corroboree Frog	20	240	43	441
Pouched Frog	0	0	17	20
Green and Golden Bell Frog	82	0	144	0
Sphagnum Frog	60	6	91	17
Bats				
Eastern False Pipistrelle	238	11	381	41
Golden-Tipped Bat	228	42	437	131
Large-Footed Myotis	228	21	458	61
Greater Broad-Nosed Bat	238	5	395	19
Little Bent-Winged Bat	211	167	367	248
Common Bent-Winged Bat	228	156	368	282
Eastern Cave Bat	210	20	301	20
Eastern Mastiff Bat	73	0	169	0
Yellow-Bellied Sheath-tail Bat	210	0	340	1
Raptors				
Powerful Owl	272	84	612	260
Masked Owl	265	34	570	126
Sooty Owl	265	95	568	256
Barking Owl	225	2	244	3
Square-Tailed Kite	260	7	489	12
Red Goshawk	229	0	401	0
Non Raptor Birds				
Glossy Black-Cockatoo	263	642	495	1135
Regent Honeyeater	98	0	262	0
Turquoise Parrot	222	0	337	0
Bush-Stone Curlew	214	1	310	3
Pink Robin	49	0	107	1
Olive Whistler	219	12	303	25
Wompoo Fruit Dove	13	4	84	51
Swift Parrot	235	0	366	0
Rufous Scrub-Bird	18	0	40	6
Superb Parrot	16	330	86	490
Regent Parrot	10	250	69	450

A Powerful Owl observed during a study on the breeding success of owl pairs in the southeast forests at Eden.
(Photo supplied courtesy of John Young and David Hollands)

An objective of forest management is to preserve habitat critical for the survival of native species in State forests, particularly for threatened species.

In this indicator we use three indicator species with a dependency on a developed forest structure. The selected species are *Phascolarctos cinereus* (Koala), *Petauroides volans* (Greater Glider) and *Petaurus norfolcensis* (Squirrel Glider). Although the Greater Glider is not threatened it is widely recognised as an important indicator species of forest biodiversity.

Habitat selection is based on a combination of preferred forest type and forest structure data. [NB: At this stage data is only available for 53% of State forests and therefore understates the total habitat available for these species.]

The data on forest type and growth stage changes by only small amounts each year, as areas are harvested and regenerated (or sometimes burnt by severe wildfire). Changes in this habitat indicator are not expected to be highlighted from year to year, but would show trends over a longer (say 10 years) period. The basis for the derivation of ‘habitat’ is reviewed periodically as new information becomes available.

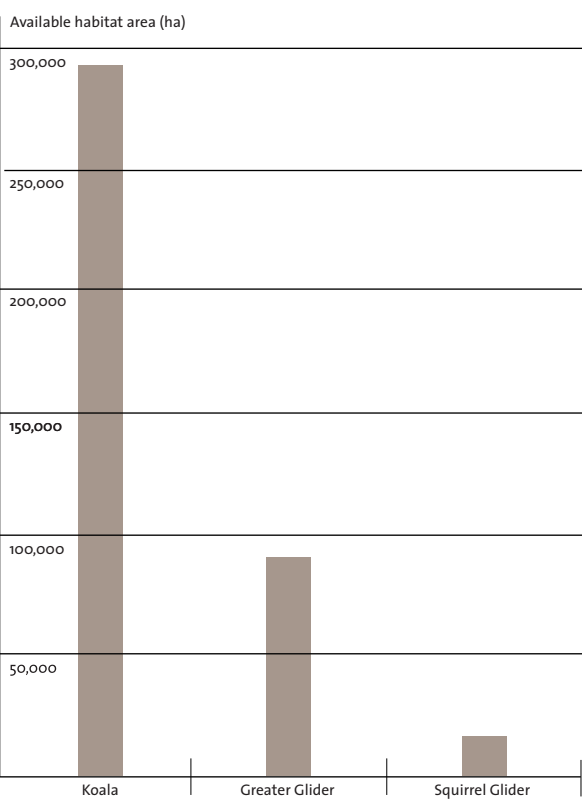
It is expected that following commencement of NSW Forest Agreements across all native forest Regions and initial monitoring that a review of the current methodology will occur.

Refinements in the analysis of forest typing and forest structure during the preceding twelve months has changed the availability of habitat compared to the last Report.



(above) Greater Glider

Table 5. Available habitat area in native forests for representative species



Pine Creek Koala Management Plan



(above) Koala

“Koalas and biodiversity will benefit in Pine Creek State forest, 20 km south of Coffs Harbour, following the release of a unique management plan”, says State Forests North East Strategic Planning Manager, John Fisher.

The cooperatively prepared Pine Creek Koala Management Plan has been four years in the making, cost \$500,000 and involved six independent scientific koala studies with input from conservation groups, the timber industry, State Forests and the National Parks and Wildlife Service.

The final management plan was presented to a community consultative group in Coffs Harbour in May, including representatives from Bellingen Shire and Coffs Harbour City councils which are also developing ways to better protect the region’s Koala population from threats such as road kills, dogs and urban development.

It is recognised that Koalas are widely distributed across the forest, but that population densities vary markedly.

The independent studies show there are approximately 400 Koalas living in this 5600 hectare forest. Furthermore, the studies identified that the maintenance of a viable Koala population in Pine Creek State forest requires the maintenance of species and structural diversity.

Important koala habitat will be left untouched while other areas will be regenerated with koala food tree species.

Maintenance of the Productive Capacity of Forests

State Forests' management objective is to ensure forest practices, including timber harvesting, are undertaken in a manner which provides for a perpetual supply of forest products in line with community expectations and to ensure all native forests are regenerated to their original forest ecosystem type.

Managing forests is a long-term process. The impact of decisions and actions in our management today may not be visible in the forest for many decades. New management practices can take decades to implement and/or to have effect on forests growth and production. Monitoring and maintaining the forests' productive capacity is critical to maintaining the forests' ability to provide, in perpetuity, their vast range of products and services.

Measuring the sustainable production capacity is not an easy task as the true productivity of a forest must be modelled over several centuries rather than in just a few short years. In this report we have used five indicators across the forest to monitor productivity. We concentrate on the timber productive capacity of the forest, as harvesting is the most important impact highlighted by our stakeholders.

Indicator 5. Forest available for timber production

Regional Forest Agreements are based on the National Forest Policy Statement, which is the national strategy for achieving ecologically sustainable forest management in NSW and Australia. Key national goals of this strategy include enhanced environmental management and conservation outcomes, wood production and industry development.

A prime objective of the enhanced environmental management is the creation of a Comprehensive Adequate and Representative (CAR) Reserve System. The CAR Reserve system includes Formal Reserves, Informal Reserves and values protected by prescription. Formal Reserves are Flora Reserves, on State forest plus National Parks, Nature Reserves and other nominated reserve types managed by the National Parks and Wildlife Service. Informal Reserves also occur on State forest. Informal Reserves are listed and protected by legislation. No harvesting occurs in Formal and Informal Reserves.

To identify land required for the CAR Reserve System a program of Comprehensive Regional Assessments (CRA's) was implemented across eastern NSW, which led to the Eden and North East Regional Forest Agreements signed in 1999/2000. Also in 1999/2000, the Southern CRA, which covered the south coast and southern tablelands, was completed.

An announcement on the outcome of the CAR Reserve System for Southern Region included the proposed transfer of approximately 217,000 ha of State forest for inclusion in National Parks as Formal Reserves and a further 69,000 ha of Reserve on State forest. This outcome will be implemented in 2000/2001, including negotiation on a Southern Regional Forest Agreement for NSW.

Table 6 records the current area of SFNSW managed land by forest management intent. This table includes both forest zoned using our new Forest Management Zoning in NSW State Forests and sections of forest in western NSW that is yet to change to the new system. Our forests include 555,000 hectares of Reserves.

Table 7 (Next page) illustrates the area available for timber production. Currently the level of land available for harvesting is 65% of the total forest estate.

Land available for harvesting includes planted forests, general management native forest, special prescription and land for further assessment. As shown in Table 7, within these management intent zones there are areas where harvesting is excluded to protect environmental values. These environmental values include threatened species habitat, protective buffers along creeks and drainage lines, high soil erosion hazard, wetlands, heaths, rocky outcrops and rare and non commercial forest types.

Table 6. Area and percent of land by forest management intent

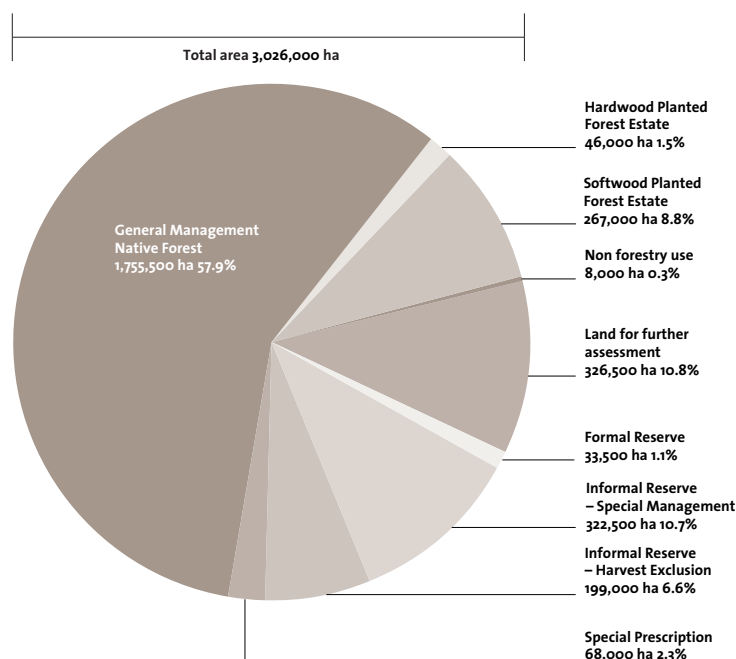


Table 7. Area of forest available for timber production

Forest Management Intent	Area (ha)	
	Non Harvest Land	Land available for Harvesting
Formal Reserve	33,500	0
Informal Reserve – Special Management	322,500	0
Informal Reserve – Harvest Exclusion	199,000	0
Special Prescription	54,500	13,500
General Management Native Forest	387,500	1,368,000
Hardwood Planted Forest Estate	0	46,000
Softwood Planted Forest Estate	56,000	211,000
Non Forestry Use	8,000	0
Land for Further Assessment	0	326,500
Total Forest Estate	1,061,000	1,965,000

The estimate of available timber production area is likely to decline as land is further assessed.

A substantial and continuing increase in Hardwood and Softwood Planted Forest is a critical instrument in meeting the NSW Government policy on the timber industry. Consequently the level of Planted Forest estate should show a steady increase over the next few years.



(above) eucalypt plantation near Casino in northern NSW

Recreation and conservation benefit from State Forest Reserves



*(above) mountain
biking in the forests
of NSW*

The importance of State forests for NSW conservation and recreation was recognised with the finalisation of new reserves, Forestry Minister, Kim Yeadon, announced earlier this year.

Areas of rainforest, rare forest types, old growth, recreation sites and other important values in the State forests of the North Coast and Eden have been mapped and set aside under a new zoning system.

'These new informal reserves officially protect values such as old growth for the future and exclude activities such as timber harvesting,' Mr Yeadon said.

'The areas are mapped under a new Forest Management Zoning System which was developed in close consultation with State Forests, RACD, and the National parks and Wildlife Service. The North East Forest Alliance has been closely involved with the process.

'The new zoning system not only identifies conservation areas but also outlines management intent for every area of the forest. It clearly shows everyone where certain activities such as horse riding, four wheel driving, bike riding, camping and timber harvesting are allowed and where they are not.

'In areas where timber harvesting continues on State forests, licence conditions will still apply to protect and manage habitat for endangered animals and plants and clean water,' Mr Yeadon said.

'This is a good result for conservation as it is a major contribution to the fabric of conservation across the landscape. It will also add important stability to the resource base for the regional timber industry.'

Table 8. Area of planted forest established annually since 1995

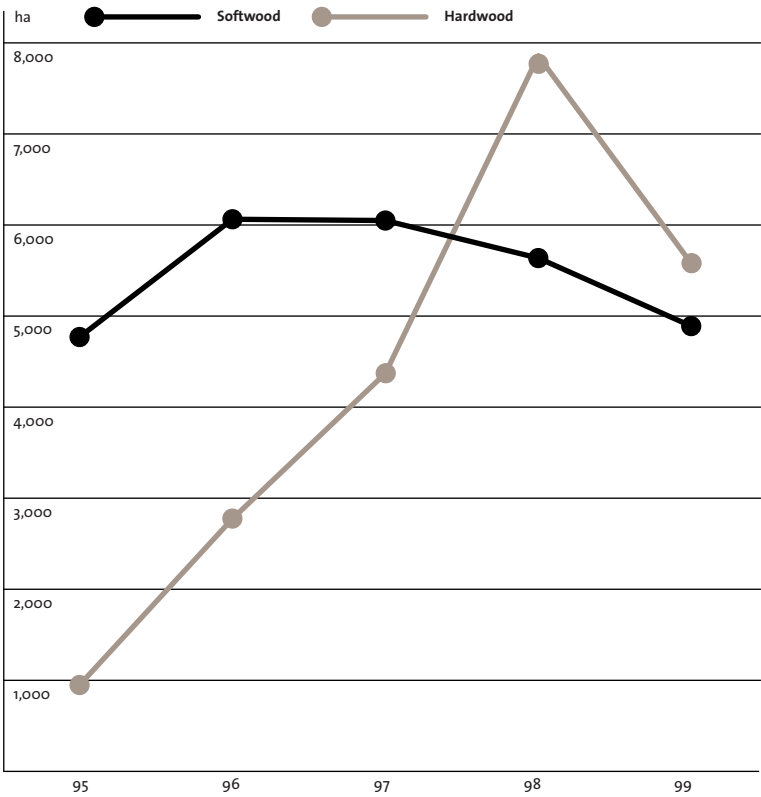


Table 9. Current growing stock in planted softwood forest

	Total
Standing Timber Volume* (m3) 30/6/2000	37,870,000
Area of Commercial Age Plantation** (ha)	135,000
Current Annual Increment*** (m3/ha)	18.1

* Standing timber is tree boles of merchantable quality.
** Commercial age is either thinned or 14 years and older.
*** Current annual increment is the average growth of merchantable timber on 1 hectare of commercial age plantation in 1999/2000.

Available statistics continue to show that NSW imports some of its timber and wood product needs from overseas. There are compelling economic and environmental reasons to reduce this significant trade deficit.

To help offset this import requirement it is important to expand the area of planted forest at economical, environmental and socially acceptable rates. State Forests are an active participant in the Plantations for Australia 2020 Vision, released in 1997, which aims to treble the plantation estate by the year 2020.

Table 8 records the area planted during the last five years. The area planted to hardwood species is mostly new planted forest. About half of the recently planted softwood trees are in new plantations, while the other half are planted as second and third rotation crops on existing plantation estate. New planted forests are established on former agricultural land that is either purchased by SFNSW or by contractual arrangement with the land owner.

A further mechanism for offsetting the timber trade deficit is to maintain high productivity (growth rates) in planted forests. By monitoring the annual growth of planted softwood forests, management is able to focus on maintaining and improving productivity through maintaining forest health, maintaining soil fertility, improving genetic stock and improving silvicultural practices. A key strategy of State Forests' plantation program is designed to produce high value logs.

Table 9 shows the current growing stock of commercially available planted softwood forest. This is planted forest that has already been logged by a thinning operation or is of an economical age (greater than 14 years old). The standing timber volume is the total volume of logs in these commercial age planted forests.

Table 9 also records that the current annual growth rate of timber in planted softwood forests. Timber growth averages 18.1 cubic metres per hectare per year.

Indicator 7. Removal of sawlogs compared to allowable volume

Measuring the actual quantity of logs harvested against the prescribed sustainable level is an important indicator of current performance and long term capacity. Trees take a long time to grow to a size suitable for harvesting. If more timber is taken than can be grown to replace it, eventually the supply of timber will not be able to meet the demand.

The volume of high quality sawlogs and veneer logs permitted to be cut from the forest is set at an agreed sustainable level of production. For native forests in eastern NSW this level of production has been established through the Comprehensive Regional Assessment process involving key stakeholders and other Government departments. Consequently the Forest Agreements prescribe the allowed volume of logs harvested in these native forests. Elsewhere, the sustainable level of production is established through State Forests' Resource, Planning and Operational Divisions.

In the longer term it is important that the level of actual harvest does not exceed the agreed sustainable level of production.

Table 10 shows the percentage of allowable volume actually harvested for high quality sawlogs and veneer logs. The variation from the allowable volume is within an acceptable range. The variation occurs because of weather patterns, customers' demands and harvest opportunity.

The quantity of native forest logs is undercut but close to the allowed rate.

Table 10. Percent of high quality logs harvested compared to allowed rate

Percent of High Quality Sawlogs and Veneer Logs harvested by volume against the sustainable level of production

Landcover type	1998/99	1999/2000
Native Hardwood Forest	88%	94%
Softwood Planted Forest	Not Previously Reported	95%
Native Cypress Forest	Not Previously Reported	97%

The establishment of new planted forest and re-establishment of existing planted forest after final harvesting is contributing to the development of a sustainable timber supply in NSW.

To enhance the productivity of a newly planted forest it is vital to achieve vigorous growth in the first few years. State Forests monitor the effective establishment of newly planted forest by undertaking surveys of seedling survival in the first year after planting. If survival rates are generally low or low in specific locations, the failed areas are replanted. Secondary survival counting is sometimes undertaken if plant health, disease or adverse weather conditions warrant further examination.

Table 11 shows that forest planted in 1999 attained an exemplary level of establishment. These levels reflect good choices in plantation location, species selection and establishment practices. They also reflect favourable weather conditions for seedling establishment and development in 1999.



(above) eucalypt plantation on former farmland in northern NSW

Table 11. Percent of newly planted forest effectively stocked

Landcover	Effective stocking of new planting	
	1998	1999
Hardwood Plantation	94%	100%
Softwood Plantation	97%	98%

Indicator 9. Percent of native forest regenerated



(above) Monitoring of regeneration in Olney State forest

This indicator monitors the maintenance of the productive capacity of native forests through regeneration.

Regeneration of native forests after harvesting is the source of future forests and the key to maintaining future timber supplies and forest ecosystems. The nature of eucalypt and cypress pine forests allows for the natural regeneration of seedlings following a logging operation.

Forest regeneration is most successful where there are appropriate seedbed (soil, light and water) conditions, adequate seed availability, good seed germination and good seedling growth. Where occasionally these conditions are not available, natural regeneration may need to be supplemented by planting.

Depending on the type of forest, forest structure and harvesting regime a suitable level of seedling regeneration is desired. Improvements in resource information processes and release of a Silviculture Manual in 2000/2001 should assist the introduction of a consistent methodology for establishing suitable levels of regeneration in all harvest areas.

In 1999/2000 State Forests conducted twenty eight regeneration surveys, covering 3644 hectares of logged native forest. These surveys are usually conducted from nine to twenty four months after logging is complete.

Table 12. Percent of recently harvested native forest effectively regenerated

Number of Regeneration Surveys Undertaken	28
Area Surveyed (ha)	3,644
Percent of Harvesting with Effective Regeneration	98%

Maintenance of Forest Health and Vitality

A healthy and vital forest promotes biodiversity and productivity and also provides a greater range of possible community uses, products and benefits. Controlling populations and effects of introduced predators, feral animals and weeds, conserving site fertility, controlling insect and fungal pests and managing the effect of wildfire are critical components of our forest management.

State forest management includes a significant effort to protect the health of our forests. For example:

- Our Forest Health Unit monitors all planted forests for disease, insect attack and nutrient deficiency.
- We systematically allow the healthy dominant trees room to thrive in planted forests.
- In native forests, we continually monitor for pests that act directly on the trees or indirectly on the forest ecosystems.
- Control of introduced predators and feral animals is undertaken in conjunction with adjacent managers and the local community.
- We are developing techniques to detect and accurately measure the extent of disease using satellite imagery and aerial photography.

We also develop co-operative bushfire risk and bushfire suppression management plans in conjunction with local communities and agencies, and implement extensive hazard reduction and fire suppression programs to protect forest from the effects of severe wildfire.

Thankfully, our job is made a bit easier by the fact that Australian forests are world renowned for their adaptation and resilience to low fertility, periodic drought and frequent wild fire.

Two indicators are included to monitor forest health and vitality.

Indicator 10. Expenditure on introduced predator, feral animal and weed control

Where weeds vigorously colonise an environment or feral animals and introduced predators affect populations, the stability of natural ecosystems can become unbalanced. Forest health and vitality can be significantly reduced in these circumstances.

Weeds tend to be classified as noxious or environmental in their affect. Traditionally, noxious weeds are associated with causing problems on agricultural land, and include many of the thistles, worts and grasses. However in recent years environmental weeds are also recognised, because of their potential influence on forest ecosystems. Willows for example are now commonly viewed as an environmental weed when growing on sensitive land such as forest streams.

Introduced predators, such as cats, dogs and foxes have a potentially devastating effect on native animal populations as the native fauna have not evolved to meet their particular behaviour and hunting style.

Feral animals, as well as a carrier of disease to domesticated stock, also have dramatic environmental impacts and potential to replace native animals in the landscape. Feral goats for example, can out-compete native animals such as Rock Wallabies and also adversely browse on some protected plants.

State Forests manage the threat of these pests based on legislation, economic criteria, environmental management standards and neighbour responsibilities. State forest management accepts that it is more practical to control (rather than try to eradicate) introduced predators, feral animals and weeds.

Many programs depend on co-operative management with adjacent land managers and communities. Such programs usually determine priorities on an annual basis particularly where climatic conditions may have a significant effect on pest population levels. We are producing Regional Plans to better understand and co-ordinate our control mechanisms.

Table 13 presents the expenditure on the control of introduced predators, feral animals and weeds. Expenditure in 1999/2000 was less than the previous year. The progressive reduction in expenditure is partly due to the mid 1990's release of Rabbit Calicivirus Disease affecting rabbit populations in planted forest and reduction in the area of native forest from 1997/98 to 1998/99.

Blackberry, foxes and wild dogs have remained the highest individual categories for control effort.

Table 13. Expenditure on introduced predator, feral animal and weed control

	1997/98 Annual expenditure (\$)	1998/99 Annual expenditure (\$)	1999/2000 Annual expenditure (\$)
Weeds	\$1,325,000	\$630,000	\$552,000
Introduced Predators	\$328,000*	\$409,000*	\$338,000
Feral Animals	—	—	\$31,500

**These values are the combined expenditure on Introduced predators and Feral animals.*

Sifting the Dogs from the Dingoes



photo by Dave Watts / Nature Focus

(above) A dingo

State Forests North East ecologist, Paul Meek, has a special place in his heart for a proud Aussie predator, the dingo.

Paul warned a conference at the Australian Museum in May, that Australians risk losing dingoes in our enthusiasm to destroy feral animals such as dogs, foxes and cats that pose a threat to native wildlife.

“We don’t want to throw the baby out with the bathwater,” Paul said. “Managing dogs and foxes is one thing but dingoes are a natural part of the ecosystem.

“Dingoes have been in Australia for 5000 years, probably brought here by Aborigines. They are often misunderstood because they are a top level predator and they are treated like pests or mistaken for feral dogs.

“Wild dogs are a pest species and a genetic threat to dingoes. It is a question of how you manage these pests without damaging the dingoes.”

Paul said that one of his first tasks on the North Coast would be to assess where the pure dingoes were living and where they had significantly interbred with feral dogs.

“We are working toward strategies that will balance all demands including reducing the impacts of feral predators on livestock. By having a better understanding and targeting our management of feral animals, we will do a more effective job, lessen the impact on native species and also reduce costs. If we find hotspots for dingoes of good genetic quality, we will leave them alone and let them continue their role as a natural predator in forest ecosystems.”



A Chrysomelid Leaf Beetle and eggs.

Nutrient and Biological Agents

The vitality of a forest refers to the essential components and processes that maintain the life of the forest.

Ecosystem health is reflected in the state of the processes and systems that maintain forest vitality. These processes are usually categorised into energy, nutrient, hydrological and biological processes.

In order to measure health and vitality in planted forest State Forests annually collect data on the occurrence of the main threatening biological agents and critical nutrient deficiencies. Collection is undertaken by SFNSW Research Division as part of our plantation management. The full assessments are available to SFNSW staff for information and development of responses to the advised threats.

Table 14 illustrates the percent of recently planted hardwood forest affected by selected agents that are severe enough to potentially cause a deleterious effect on plantation health and vitality. Insects, including herbivorous insects, continue to remain the major agent impacting hardwood plantations. Insects, particularly impacting this year were *Psyllids*, *Christmas Beetles*, *Monolepta Leaf Beetles* and *Chrysomelid Leaf Beetles*. As expected for endemic species, the percentage of trees suffering insect attack is high. However, the attributes of the selected native plants means that insect attack is usually not severe enough to kill trees but does reduce the optimal growth rate. Potential insect damage is countered by selecting species that are appropriate for each individual site by planting a mix of species on some sites and by promoting strong root establishment and early growth of the seedlings. Research is also continuing on treatment of these agents and genetic selection to improve tree vigour. No significant damage from soil pathogens was identified this year.

Table 15 illustrates the percent of planted softwood forest affected by selected agents that are severe enough to potentially cause a deleterious effect on plantation health and vitality. Only reasonable low levels of potential harm were identified. However it is worth noting that *Dothistroma* (a type of fungus) is of concern in plantations in the north of the State. In addition the assessment identified *Sirex wood wasp* for the first time in plantations around Inverell. Although the infestation level is too low to register at a State-wide scale the occurrence is the most northerly record for *Sirex* in NSW.

Table 14. Percent of hardwood plantation that may be adversely affected by selected agents

% of new hardwood plantation (planted post 1995)

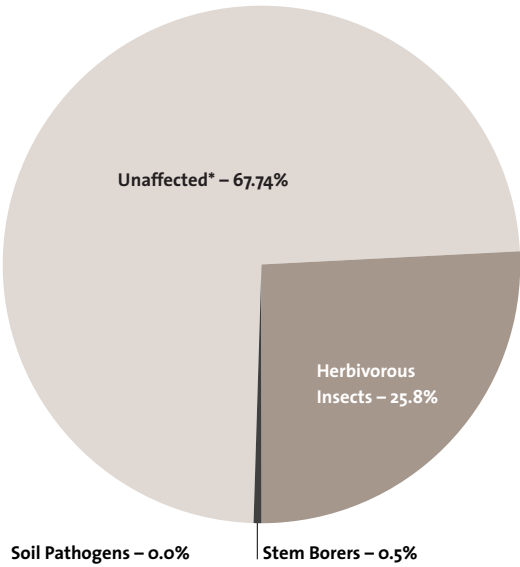
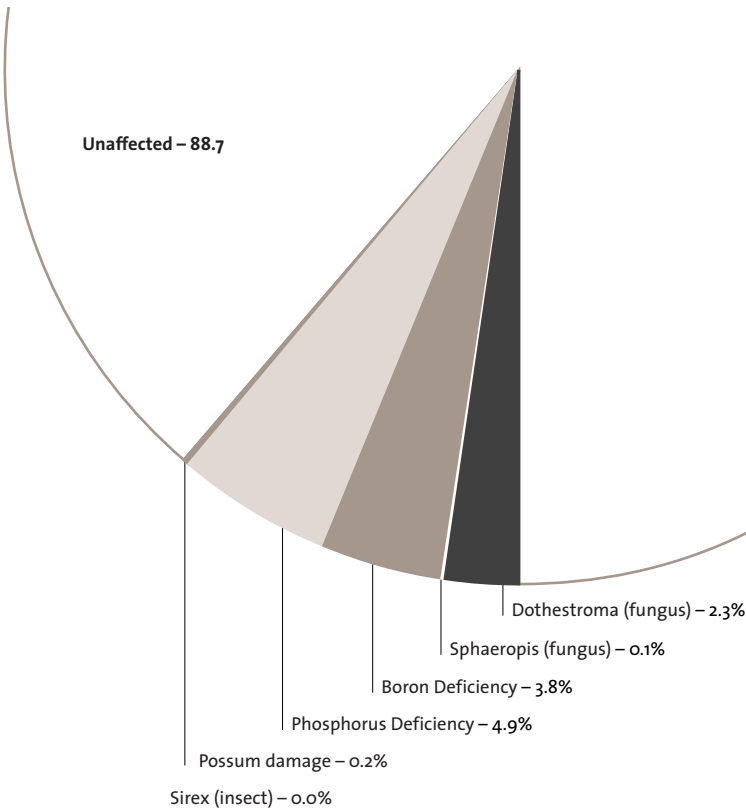


Table 15. Percent of softwood plantation that may be adversely affected by selected agents



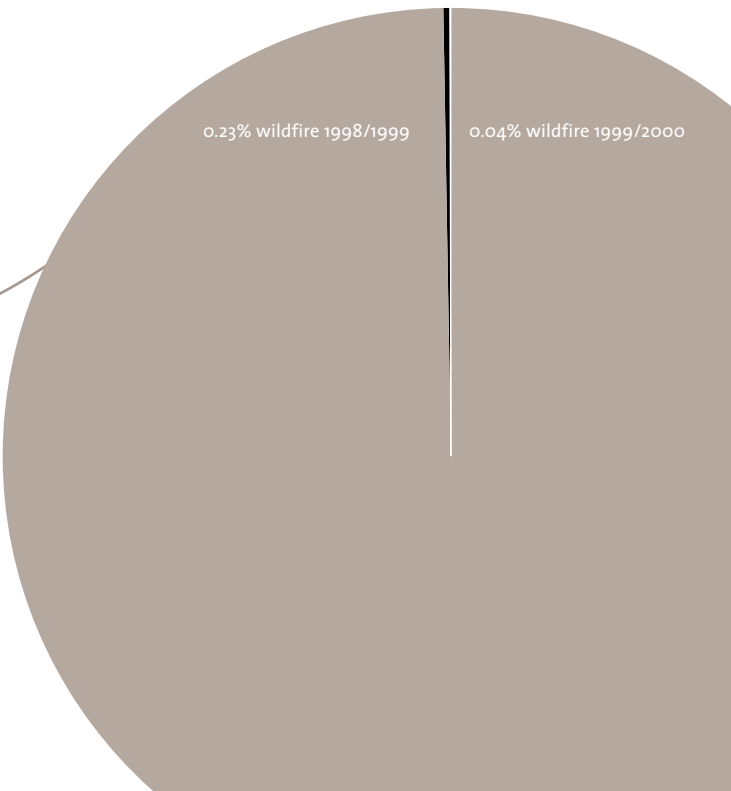
Wildfire

The impact of wildfire on forests is variable, being both threatening and beneficial to ecosystem health. Apart from planted forest and rainforest, wildfire is often a necessary component of native forest regeneration and ecosystem renewal. Wildfire also contributes to the mosaic of vegetation type and growth stages in native forest which are essential for maintaining the habitat required by forest dependent animals.

However, severe wildfire can also be catastrophic for the preservation of high conservation value old growth, rare forest communities, rainforest and threatened species and can be instrumental in triggering large-scale environmental degradation. Severe wildfires are classified as those where more than 70% of individual tree crowns in a forest are burnt. Fire management is focussed on minimising the occurrence and impact of these types of fires and maximising the control options and safety when they do occur.

State Forests therefore track the occurrence of wildfire each year. Table 16 illustrates that 1999/2000 was an extremely light year for wildfire in State forest. This continues the trend from the preceding financial year.

Table 16. Percent of Forests burnt by wildfires



Conservation and Maintenance of Soil and Water Resources

Forests are an important component in the protection of soil and water resources. Conservation of soil and water contributes to the catchment, health and biodiversity values of the landscape.

State forest management practices are committed to ensuring that our activities do not have an adverse effect on water quality, for example, causing increased erosion of soil and turbidity of creeks and streams. Forest management also focuses on maintaining the capacity of our soils to support the natural forest ecosystems.

State Forests are committed to using world's best practice to ensure that soil and water quality are not adversely impacted by our operations. The practices used are documented in Forest Practices Code for field operations which specifies amongst other things, the operational standards required to deliver clean water and meet current regulatory requirements.

Effective implementation of soil and water protection is further assisted through the regulatory conditions prescribed in Environment Protection Licences, issued by the Environmental Protection Authority (EPA). The EPA monitors the implementation of Licence conditions.

State Forests are also undertaking a program of water quality monitoring, part of which is prescribed in the Licences issued for harvesting.

For this report we are using two indicators, which articulate the level of harvesting and protective measures applied in State forest.

Indicator 12. Area and percent of forest harvested

This indicator compares the net area harvested each year with the total area of State forests. It shows us how much land has been impacted directly by harvesting.

It is our objective to manage the extent, intensity and spatial arrangement of harvesting in our forests to minimise the potential of impacts occurring.

Every harvesting operation must comply with State Forests’ Forest Practices Code and either an Environment Protection Licence issued by the Environment Protection Authority or Soil Erosion Mitigation Guideline issued by the Department of Land and Water Conservation. These documents include levels of planning, hazard analysis, provision

of stream side reserves, application of erosion mitigation standards, site specific conditions and managing road surfaces and stream crossings to reduce soil movement. Consequently the area of harvesting is a reasonable measure of the land systematically assessed for soil erosion hazard and for which water pollution measures are prescribed.

Table 17 shows that 2.4% of the total forest estate was harvested in 1999/2000. This value is consistent with expectations. Of note is that of the 56,900 hectares of native forest harvested, nearly 40% was conducted in western NSW where average yields per hectare are very low and consequently harvest plan areas are extensive.

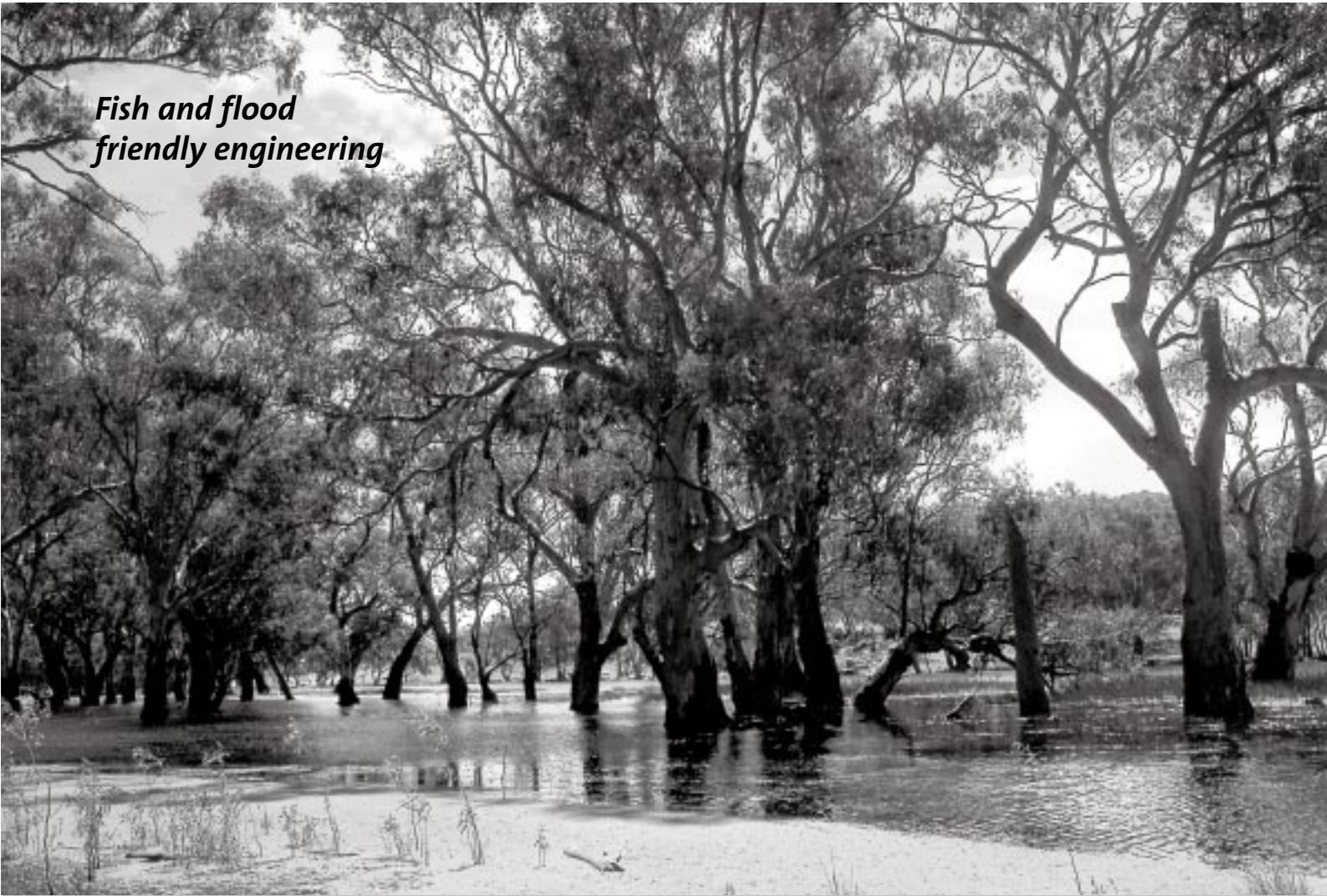
Table 17. Area and percent of forest harvested

Land Category	Percent of Forest Harvested			Area of Forest Harvested
	1997/98	1998/99	1999/2000	1999/2000 (ha)
Native Forest	Not Previously Reported			56,900
Planted Softwood Forest	Not Previously Reported			14,000
Planted Hardwood Forest	Not Previously Reported			2,100
Total Estate	2.1%	2.4%	2.4%	73,000



(above) mechanised harvesting of eucalypt trees

Fish and flood friendly engineering



(above) River Red Gum forest on the Murray River in Southern NSW

State Forests is involved in creative new methods to attract native fish back into the Murray River's Red Gum forests.

In Riverina Region, ecologist David Leslie is leading the way to return natural flooding and drying cycles to Red Gum forests that also allow native fish to move freely between the river and flooded forests.

Native fish once abounded in the Riverina but the introduced scourge of native fish populations, the European carp, now dominates all of the waterways.

"Large dams built in the headwaters of the Murray River have substantially changed the natural flooding and drying cycles of the forest," Mr Leslie said. "Higher sections of the forest are now flooded less frequently, while lower areas – the wetlands – have been permanently inundated."

"Water control structures called regulators have been built in the forest to address these problems. Until 1990, many of the smaller regulators were made of enclosed concrete. They had no light and encouraged high water flows – neither of which encouraged native fish to move between the river and the wetlands."

These old concrete regulators and associated road are gradually being replaced.

The new fish friendly structures include the use of bridges, low level causeways, large inlet ponds, spans crossing the natural width of the waterway and designs to ensure that there is no waterfall cascading from the structure.

These new structures are much more costly to build. For example a new fish friendly wooden bridge costs about \$12,000 to install, which is about twice the price of the traditional concrete culvert.

In addition, State Forests is working with NSW Fisheries to install fishways in three major weirs, which presently restrict fish movement into the forest.

"The combination of fish-friendly regulators and environmental flows will allow natural flooding and drying cycles to be emulated in the red gum forests," Mr Leslie said. "This should not only benefit native fish but waterbirds and the Red Gum trees as well."



(above) a creek protected by a filter strip in Mebbin State forest

This is the first year that this indicator has been reported. The adoption of this indicator is consistent with meeting nationally agreed criteria for forest reporting.

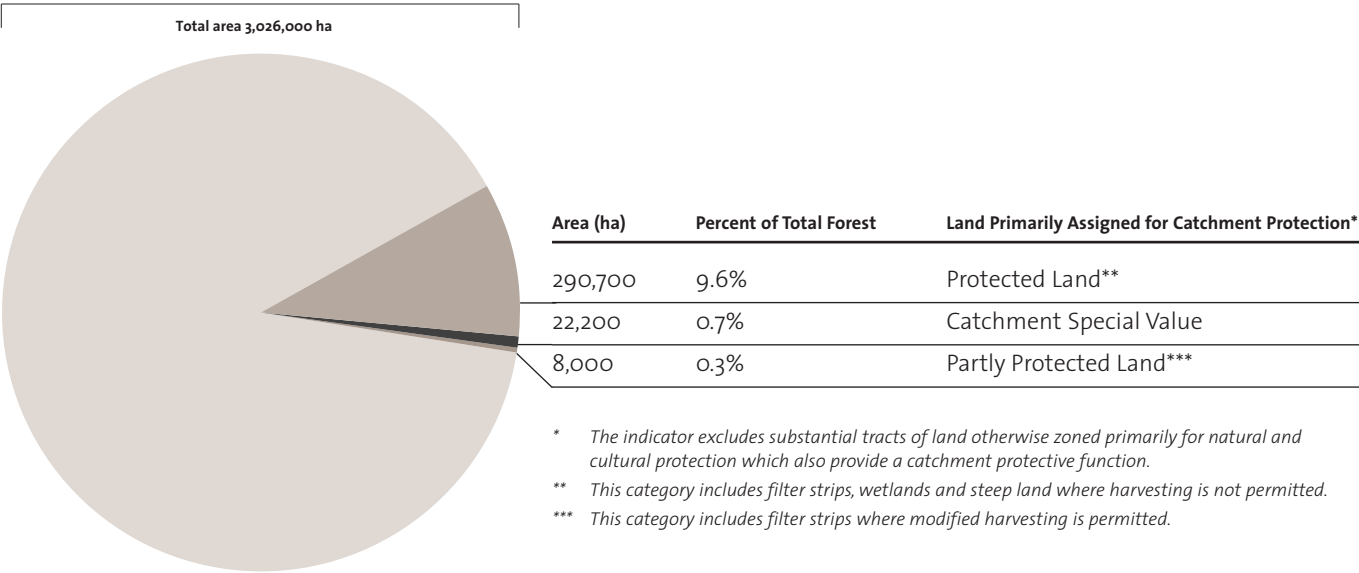
This indicator reports on the area and percent of land primarily assigned for catchment protection. Knowledge of the land assigned for catchment protection is a measure of the significance of this value against other, often competing forest values.

For State Forests this indicator includes land that is zoned catchment as the first special value key in our Forest Management Zoning. Secondly, the indicator reports on the current strategic estimate on the extent of stream side reserves and extreme soil erosion hazard land in general management native forest where harvesting is excluded. And thirdly, the indicator reports on the current strategic estimate on the extent of filter strips in planted forest where available.


Table 18 illustrates that 320,900 hectares representing 10.6% of the total forest estate is primarily managed for catchment protection.

The indicator does not record land that has been primarily zoned for other ecological purposes, but for which catchment protection is also an important objective. Consequently Reserves are not included in this indicator which account for a further 555,000 hectares.

Table 18. Area and percent of forest managed primarily for catchment protection



Forests as a Carbon Sink



For some time, forests have been recognised as an important carbon dioxide sink. State Forests has been playing a key role in the development of a strategy to address the impacts of greenhouse gas emissions and actions to offset them.

Trees take carbon dioxide from the air and store it, mainly as wood and roots. Because forests can store carbon dioxide in this way, they are sometimes referred to as 'carbon sinks'.

The value of forests as 'carbon sinks' has grown significantly since the Kyoto Protocol was negotiated in 1997. Recognition of this value has led to the concept of trading in carbon credits. The Kyoto Protocol made provision for carbon credits to be traded and to seek out the ways of reducing net industrial or transport emissions.

This is an important development as it is the first time that a market value has emerged for the environmental benefits provided by forests. The establishment of a carbon market will promote the planting of trees which in turn has a number of positive environmental outcomes including redressing dry land salinity, water quality and biodiversity enhancement.

Also within our management scope is the realisation of market opportunities for other environmental attributes from forest management, especially planted forests. These include salinity, waste water and mine site rehabilitation.

Indicator 14 reports on the status of our forests as carbon sinks.

State Forests has spent considerable effort in the last four years in developing a standard for carbon accounting in planted forests. An open, independently certifiable standard for the carbon accounting system is available. This system is available as a prospectus to potential customers for the establishment of new planted forests.

Carbon accounting is based on estimating the uptake (by photosynthesis), and release (by decomposition, burning, respiration etc.) of carbon dioxide by forests and forest management activities.

However this indicator expresses the total annual carbon sequestration potential of our existing planted forests. The calculations are affected by planted area and any fundamental shift in the mean

annual increment of timber. The indicator assumptions have not been altered to account for the current annual increment reported in Indicator 6. Current annual increments are expected to deviate from year to year and it is the mean established over many years that is used for monitoring over time.

Table 19 shows the estimated quantity of carbon dioxide absorbed into the trunks and boles of our existing planted forest in the last three reporting periods. Sequestration has consistently increased as the area of planting exceeds the area subjected to final harvesting each year.

Table 19. Annual carbon sequestration in planted forest

Planted Forest Type	1997/98		1998/99		1999/2000	
	Net Plantation Area (ha)	CO ₂ Fixed (Tonnes) *	Net Plantation Area (ha)	CO ₂ Fixed (Tonnes) *	Net Plantation Area (ha)	CO ₂ Fixed (Tonnes) *
Softwood	206,006	2,284,402	210,714	2,336,609	211,000	2,339,781
Hardwood	42,084	496,531	44,360	523,385	46,000	542,734

* Assumptions:

a) Mean annual merchantable increments of 16 and 13 m³/ha/ann

b) Basic density of 0.42 and 0.55 tonnes/m³

c) Carbon content of wood 0.45 tonnes of OD wood

d) 1 tonne carbon is equivalent to 3.667 tonnes of CO₂.



(above) measuring tree roots for studies on carbon accounting

Maintenance and Enhancement of Community Benefits

State forests are managed on behalf of the people of the NSW.

These forests are a major source of timber in NSW and they also provide a very important and broad range of non-timber uses and benefits to the people of NSW.

Anyone can visit our forests for recreation, relaxation and enjoyment. Our forests can be used for many types of commercial, sporting and cultural events, and permits can be obtained for the removal of a range of forest products.

In addition, timber production and harvesting creates jobs for contractors, saw millers and other wood processors, and the timber produced provides numerous essential products, such as house frames, trusses, fences, furniture and paper.

State forest management is seeking to be more inclusive, and opportunities for facilitating community involvement in forest management continue to increase.

As there exists a large range of community benefits we have selected six indicators that best monitor our performance in this critical value.

Timber and wood products contribute significantly to our economy. Timber harvesting is also a very important measure of State Forests' performance for many of our key stakeholders. Readily available data makes the volume of logs harvested an ideal indicator of social benefit.

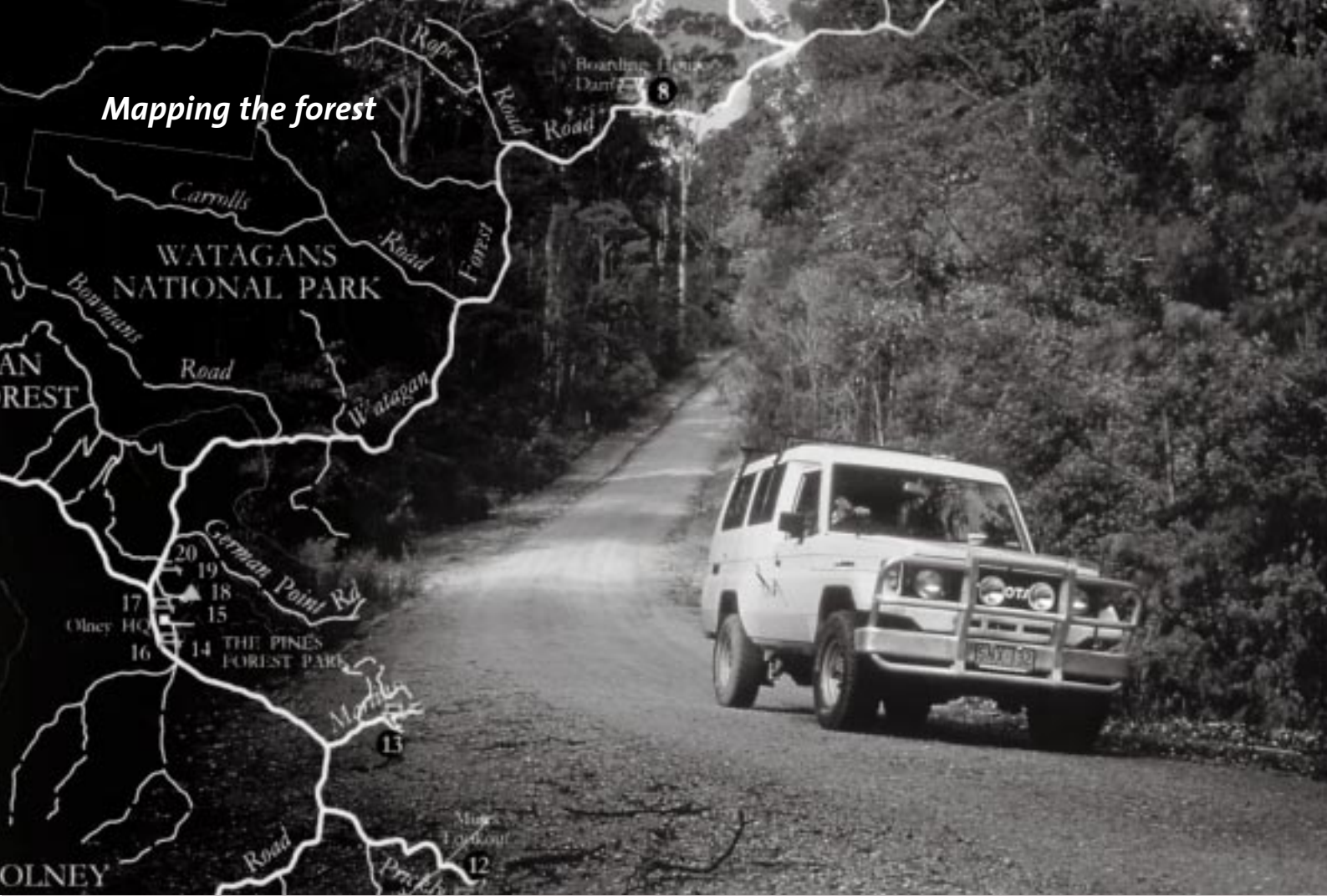
Table 20 shows the volumes of timber sold during the last five years. Total sales of logs have increased during the last five years. Significant trends include the consistent sale of cypress pine sawlogs and the increase in softwood plantation sawlogs and veneer logs.

The increase sale in softwood logs is the forecast realisation of the maturing plantation estate. High log volume is becoming available from the significant forest area planted in the 1970's.

Table 20. Volume of logs harvested

	1995/96	1996/97	1997/98	1998/99	1999/2000
Sawlogs and Veneer Logs (m³)					
Native Forest Hardwood Sawlogs	980,149	844,349	744,583	662,336	786,774
Hardwood Plantation Sawlogs	—	—	—	34,445	55,466
Cypress Pine Sawlogs	95,105	98,278	99,127	100,879	101,881
Plantation Softwood Sawlogs	978,621	1,050,554	1,337,540	1,351,798	1,648,790
Plantation Softwood Veneer Logs	40,413	53,092	60,412	74,765	70,919
Native Forest Hardwood Veneer Logs	17,513	17,121	16,882	12,074	10,600
Hardwood Plantation Veneer Logs	—	—	—	4,068	2,819
Total	2,111,801	2,063,394	2,258,544	2,240,365	2,677,249
Poles, Piles and Girders (m³)					
Native Forest Hardwood	49,752	27,226	26,448	15,804	28,432
Plantation Hardwood	—	—	—	3,290	5,479
Total	49,752	27,226	26,448	19,094	33,911
Round Timber (m³)					
Preservation Plantation Softwood	49,752	47,240	63,274	71,314	56,422
Preservation Native Forest Hardwood	—	—	—	2,201	11,169
Mining Timber Hardwood	6,955	3,794	1,834	1,805	—
Total	56,707	51,034	65,108	75,320	67,591
Pulpwood (Tonnes)					
Native Forest Hardwood Pulpwood	768,191	605,254	614,623	472,970	503,546
Plantation Hardwood Pulpwood	—	—	—	81,751	82,660
Plantation Softwood Pulpwood	500,427	502,258	541,824	573,907	636,058
Total	1,268,618	1,107,512	1,156,447	1,128,628	1,222,264
Other					
Fencing/Landscape/Sleepers (m ³)	81,676	10,379	6,218	8,485	7,575
Total	81,676	10,379	6,218	8,485	7,575

Mapping the forest



This financial year State Forests undertook the challenging task of updating its extensive project map series. These maps were originally created just for State Forests' use but over the years forest recreationalists have taken them up with gusto and, despite their age, their popularity has not waned.

Two maps in the series have been updated so far. They are the Central Coast Forest Map (covering the Watagan Mountains) and the Lower North Coast Forest Map (covering the Barrington Tops). The maps include up-to-date geographical forest information: drives, camping spots, lookouts and picnic areas. The pictures and recreation information on the back of the maps entice readers to come and see the forests for themselves. The new maps cover all land tenures including State forests, National parks, Crown land and State parks.

"The new maps have been very popular," reports Publications Manager Katie Davis-Hall-Watson. "In the last financial year almost 3500 copies of the Central Coast Forest Map were sold. The Lower North Coast Forest Map is also selling well, with more than 2000 copies sold between its release in April 2000 and the end of the financial year."

In the next financial year we plan to publish two more forest maps. Work is currently underway on a new map covering the central west of NSW (Lithgow, Oberon, Orange and Bathurst areas).

State Forests provide many products and services other than logs, including grazing, apiculture, reference sites for research, easements for communication cables, gas pipe lines to enable efficient distribution of energy to the community, collection of firewood for personal and commercial use, collection of timber for woodcraft and supply of gravel to local governments and industries. Additionally our SFNSW nurseries, which operate on a commercial basis, sell seedling and advanced plants to the general public, rural land owners and other plantation developers.

This indicator summarises the range and quantity of these products and services provided over the last three years, including minor timber products.

Our objective is to ensure our forests continue to provide a diversity of products and benefits to the community.

A noteworthy figure is the significant increase in the sale of craft timber. This figure represents an important emerging contribution of alternative forest based industries from the forests of western NSW.

Apparent discrepancies from previous years include the sale of miscellaneous plant pieces, wood blocks and issue of research permits. The increase in miscellaneous native plant pieces is both real but also substantially a one off event due to a change in our accounting system from mostly sales by bunches to more precise tallying of individual plant pieces.

The increase in wood blocks sales represents a change in data presentation. In previous years the sale of wood blocks was mostly reported as firewood. However, the important role played by SFNSW supplied wood blocks in axe cutting championships, such as the Sydney Royal Easter Show, prompted us to report this category separately.

The research category previously included contracts for pre-harvest survey, road impact assessment, soil hazard assessment and collection of information for the Comprehensive Regional Assessments. Although many of these assignments contribute to our knowledge of the forest they are not necessarily an activity requiring a Research Permit. Consequently this year we have only tallied the actual number of Research Permits issued. This value more precisely reflects the actual number of research projects actively pursued by external scientists on State forests.



(above) State Forests nursery at Coffs Harbour in northern NSW

Table 21. Quantities of other forest products

Forest Product	Unit	1997/98	1998/99	1999/2000
Grazing	ha's	768,946	727,206	764,377
Apiculture	Sites	3,843	4,249	3,011
Leaf/Oil	kg's	8,013	5,465	6,874
Seed	kg's	969	214	688
Bark	Tonnes	1,109	18	1,035
Firewood	Tonnes	75,615	66,970	77,628
Broombush	Tonnes	1,977	2,303	2,442
Charcoal	Tonnes	119	1,333	1,805
Craft Timber	Cubic metres	33	38	4,127
Misc Native Plants Pieces	Number	1,219	8,179	178,449
Burls	Tonnes	44	16	13
Wood Blocks	Number	0	435	7,045
Film/Documentary	Permits	3	5	6
Communication Sites	Permits	126	141	135
Other Structures	Permits	227	203	486
Powerlines/Cables/Pipelines	km's	2,886	853	1,461
Gravel/Sand/Rock	Tonnes	69,495	99,448	103,275
Research	Research Permits	215	260	100
Nursery Seedlings to Public	Number	1,148,000	1,032,151	1,279,000
Maps Sold to Public	Items	5,491	5,152	19,945
Publications Distributed to Public	Items	Not Reported	Not Reported	318,900

(below) Apiculture, or bee keeping, being conducted near Morisset on the NSW central coast



State forests are important recreational destinations, attracting both casual visitors who enjoy the facilities provided- such as camping areas and walking trails, and organised activities for which a permit is required.

As these facilities and maintenance of a suitable forest environment require an ongoing devotion of resources, this indicator is a good monitor of our commitment to the provision of recreation in State forests. In addition, this year for the first time, we are reporting the area of land zoned primarily for recreation.

Table 22 shows the number of recreational facilities and permits issued for organised recreation activities during the last three years. A reduction in facilities and activities was evident in the previous year as a result of the transition of substantial areas of high value land to National Park.

An important difference since last year includes the reduction in maintained Lookouts. This reflects local strategies of targeting the most popular Lookouts for better maintenance and provision of new facilities

An increase in eco-tourism and four-wheel drive permits is a welcome result and represents an important focus by State Forests on ecotourism.

However, the most dramatic increase for organised activities is for Education. This figure is mostly due to the establishment of regular outdoor education schools conducted by SFNSW in Cumberland State forest in Sydney and in the forests of our Hunter Region.

Table 22. Recreational facilities provided and organised events

Recreational Facilities Provided	1997/98	1998/99	1999/2000
	Number of Facilities	Number of Facilities	Number of Facilities
Roadside Rest Areas/Picnic Areas	160	123	119
Forest Drives (Marked)	30	34	31
Forest Walks (Marked)	90	61	61
Lookouts	84	71	49
Camping Areas	308	225	266
Camps/Huts/Cottages	17	15	25
Other	2	3	16
Total facilities	691	532	567
Permits for Organised Recreation Activities	1997/98	1998/99	1999/2000
	Number of Permits	Number of Permits	Number of Permits
Eco Tourism/4x4 Tours	54	42	87
Horse, Trail and Endurance Rides	32	32	32
Car Rallies/Go carts	38	36	36
Motor Bike Rallies	6	8	6
Mountain Bike Rallies	30	6	5
Orienteering/Mountain Runs/Triathlon	37	37	34
Bushwalking	23	9	8
Bowhunting/Archery	60	5	20
Other.	22	13	29
Education/Outdoor Education Schools	27	45	272
Training/Exercises	152	77	84
Total activities	481	310	613
Area Zoned Primarily for Recreation (ha)	Not Reported	Not Reported	4,754

Visitors to Cumberland State forest



(above) Excursions in Cumberland State forest are an educational experience for many Sydney school children.

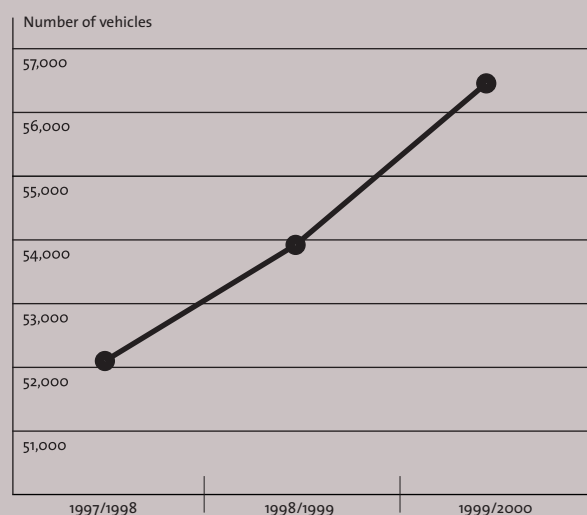
Cumberland State forest in Sydney's northwest is special in that it is the only metropolitan State forest in Australia. It is 40 hectares of picturesque native forest in the heart of Castle Hill suburbia. Cumberland State forest contains an information centre; forest shop, native plant nursery; forest studies centre, walking trails and picnic areas.

The challenge for Cumberland State forest this year was to increase its visitation from Sydney-siders and tourists alike to provide a fun yet educational forest experience.

Visitation has increased from 52,109 vehicles per year in 1997/98 to 56,437 vehicles per year in 1999/2000. This visitor increase has been achieved through improvements to facilities such as an additional carpark and revitalised recreational open spaces areas as well as an extension in programs and activities offered to visitors including a quarterly community activity program and new birthday party program. Visitors are also provided with a more personal and rewarding forest experience as part of our Cumberland Volunteer Ranger Program.

If you would like further information on Cumberland State forest visit State Forests website at www.forest.nsw.gov.au/cumberland, email cumberland@sf.nsw.gov.au or phone (02) 9871 3377 or 1300 655687.

Table 23. Visitor numbers to Cumberland State forest by vehicle count



(right) Radio tracking of a large forest owl.



This is the first year that this value has been reported as a distinct social indicator. The adoption of this indicator is consistent with meeting nationally agreed criteria for forest reporting.

Monitoring of this indicator provides advice on our direct commitment to public education and forest research.

The public education budget is mostly expended on the operation of Cumberland State forest in Sydney, which is principally designated for education purposes, our outdoor education schools, forest education manuals for Schools and other education publications.

The annual expenditure reported for research only reflects the SFNSW Research & Development Division expenditure and does not include additional research undertaken by other SFNSW Divisions. This expenditure allows us to continue a long history of active research into native and planted forests in NSW.

Table 24. Annual expenditure on research and education

	Research (\$M)	Education (\$M)
1998/99	7.2	*
1999/2000	7.1	2.8

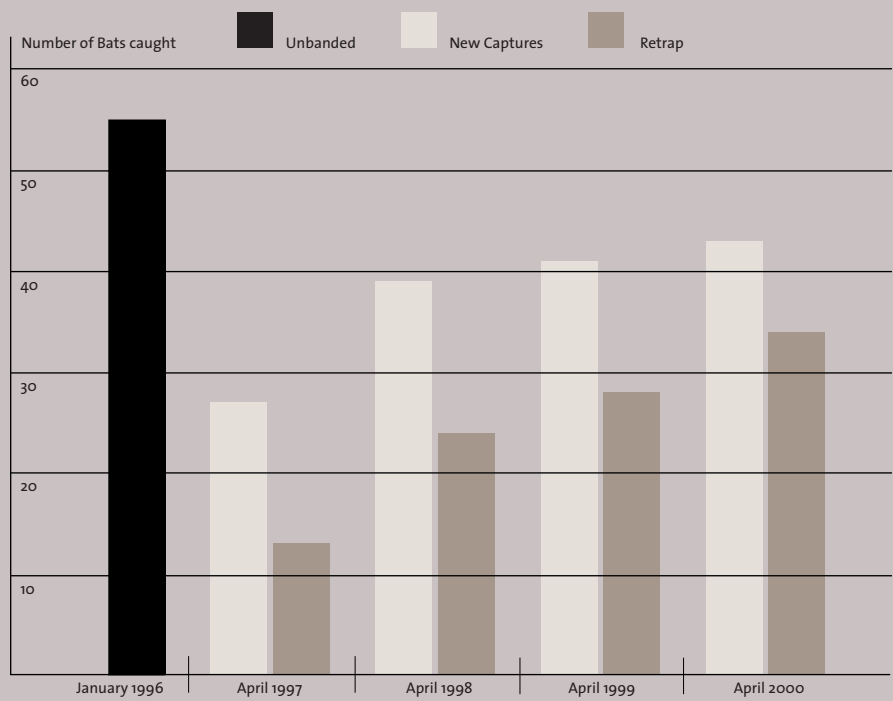
* not previously reported



(above) An education school conducted at Cumberland State forest.

Surveys on Fishing Bat populations

Table 25. Myotis captures during April



The Large-footed Myotis or Fishing Bat (*Myotis macropus*) has been the subject of ongoing ecological research by the Forest Research and Development Division. The bats are known as Fishing Bats because they forage over streams and sometimes catch small fish. State Forests undertakes pre-logging surveys for this bat and if recorded special protective measures are put in place, such as increasing the width of buffers on streams. Targeted research on the species is used to guide management and to determine the effectiveness of protective measures.

A bat captured in 1996 in Kerewong State Forest on the mid-north coast of New South Wales was radio-tracked and a new breeding population was found. The bats roost in a log bridge over a permanent 10 m wide stream. Since 1997 the bats have been marked using bands from the Australian Bird and Bat Banding Scheme. Each year in autumn the population is censused and any unmarked bats are banded. The data show a trend for a slight increase in numbers over time, with 77 bats being recorded in the latest census in March 2000. Part of the bat's foraging catchment

was logged in 1999, yet no decline in numbers was measured. Annual banding will continue to track population changes and fluctuations will be related to rainfall patterns (a likely cause of population fluctuations) in each year and time since logging. Additional research on this species has focused on identifying the diet of this forest-based population, and with a Masters student from the Australian National University, identifying the kinds of streams that the bat's prefer to use for foraging.

This is an important social indicator on the performance of SFNSW especially to the rural sector of NSW.

Examination of Table 26 shows that forest industries managed by SFNSW contributed to direct employment of 8,109 people.

An increase in the growing and managing of forests was due to an increase in staff and contractors involved in plantation establishment but also partly due to the inclusion of our nursery and mechanical

staff who were not listed last year. Most of these staff are located in regional NSW and provide a valuable source of employment for several towns.

The reduction in harvesting and haulage staff is attributed to the accounting methodology this year. Workers involved in miscellaneous timbers, such as firewood, charcoal, broom bush and craftwood have this year been included in the category labelled 'Other' to better separate these secondary timber operations from the log harvesting operation. Whilst log harvesting and haulage tend to become more labour efficient, the secondary timber operations remain very labour intensive. Consequently they are better grouped with other forest product workers which have a similar high ratio of workers compared to the quantity of product extracted. The table demonstrates that forest products and miscellaneous timber operation are an important source of employment for rural communities.

Apiary, grazing and ecotourism on State forest include much seasonal or part time work.

Consequently, the variation in employment for apiary, grazing and ecotourism is partly due to the difficulty in precisely determining full time equivalents.



(right)
hand planting of
Eucalyptus pilularis
on former pasture

Table 26. Direct employment from State Forests by major categories

Forest Sector	1997/98	1998/99	1999/2000
Growing/Managing*	1,383	1,073	1,404
Harvesting/Haulage	1,132	1,306	1,027
Primary Processing**	4,328	4,775	4,577
Apiary	302	280	356
Grazing	165	154	123
Ecotourism	88	112	55
Other***	136	134	567
Total	7,533	7,833	8,109

* Includes administration, maintenance activities, consultants and contractors.

** Processing undertaken at a site where the input is raw material supplied by SFNSW.

*** Includes gravel extraction, forest product removal and miscellaneous timber harvesting.
Employment numbers are recorded as annual full time equivalents.

Central Coast forest revitalised and protected



(above) Banksia Picnic Area in Strickland State forest

A committed community group is planning the revitalisation and protection of their local forest, Strickland State Forest, which is situated on the northern outskirts of Gosford. The community consultative panel, 'The Friends of Strickland', will work with State Forests' Hunter Region on bush regeneration and develop interpretive programs for visitors to the forest.

Strickland State forest contains a number of scenic walking trails and barbecue and picnic facilities. The community was concerned about anti-social behaviour in the forest and wanted to be personally involved in the solution.

State Member for Peats, Marie Andrews, said that she was pleased to be associated with a group that is taking pride in their community forest resources. "The care of our public forests is something we should all be concerned about if we are to keep these areas as places we love to visit and enjoy into the future. In this case, the community has even decided to improve Strickland State forest to make it an even more enjoyable place to spend time," she said.

(right) State Forests officers preparing for a community consultation meeting in Bulahdelah State forest.



State Forests' Environmental Policy emphasises a commitment to ensuring ecologically sustainable forest management in NSW by working with others to support the development and operation of a sustainable forest industry.

This indicator monitors the extent of formal community contact and the range of different communities and processes affecting forest management. State Forests are committed to involving the public, particularly key stakeholders, to better form our management decisions for the public forests of NSW.

During the year staff attend meetings and community forums where land and forest management issues are discussed. A variable level of participation in management decisions and scale of consultation operate depending on the type of meeting. Documents and reports are placed on display to seek community feedback on forest management proposals and activities that may affect forest management.

Table 27 summarises the range and number of community forums at the regional level. The attendance level indicates our commitment to public involvement in decision making. The increase in the number of forums attended during the year reflects our efforts to seek out new opportunities for community involvement and public input through direct liaison with interested stakeholders.

Table 27. Number of regional community forums attended

Community Forum Categories	1997/98 Number of Meetings	1998/99 Number of Meetings	1999/00 Number of Meetings
Community Bushfire Management	252	470	363
Catchment Management	213	153	126
Local Emergency Management	14	23	14
Community/School/Education	63	255	752
Local Government	46	55	72
Flora and Fauna Management	47	52	30
Cultural Management	116	285	214
Feral Animals/Noxious Weed Control	44	99	72
Industry/Stakeholders	67	155	110
Recreation/Tourism	17	53	64
Regional Planning/RFA	79	83	94
Conservation/Environmental	40	105	104
Forestry/Forest Practices	29	79	47
Other	n/c	73	37
Total	1,027	1,954	2,099

Source: Records from minutes, files, personal diaries

Protection of Cultural Heritage

(above) Remnants of tramlines previously used to transport logs to sawmills

Cultural heritage encompasses the qualities and attributes of places that have aesthetic, historic, scientific or social value for past, present or future generations. These values may be seen in a place's physical features, but importantly can also be intangible qualities such as people's association with, or feelings for a place.

Aboriginal cultural places retain special values for recognition in land management. These places may hold additional significance that is defined by the Aboriginal communities themselves.

State Forests appreciate the important role management activities have on the conservation of cultural heritage, both indigenous and non indigenous.

We are especially improving our recognition, management and conservation of Aboriginal cultural heritage values in our forests. Two officers are employed in our head office to develop and implement cultural heritage policy including Aboriginal cultural heritage. Aboriginal cultural heritage officers are also employed regionally to assist in identification and protection of Aboriginal sites in the forests and to liaise with the local Aboriginal community.

Cultural heritage is managed in State forests by identifying and protecting specific sites from adverse disturbance, and in the case of Aboriginal sites as also advised by the local Aboriginal community. In addition, we are implementing processes for the management of forests or parts of forests where local Aboriginal communities can share forest management responsibilities. As an example, in Eden, the Aboriginal community and SFNSW have jointly drafted a Memorandum of Understanding containing agreed arrangements for consultation to:

- Conserve Aboriginal culture, heritage and resources.
- Facilitate the achievement of Aboriginal cultural, social and economic aspirations.
- Protect Aboriginal cultural rights and intellectual property.
- Manage State forests for the benefit of people of NSW.



(above) An Aboriginal cultural site protected in Hunter Region

Forest and land has great significance to local Aboriginal communities. The forest also contains many sites of important cultural, spiritual and heritage value. Heritage sites also hold a special value to the wider community.

The types of sites are variable, ranging from artefacts, to artwork, ceremonial sites, historic places, natural features and spiritual places. In addition, Flora Reserves within State forest are listed on the State's Heritage Register. We value all these sites and undertake to protect them.

The number of sites identified and protected is monitored as a performance indicator. In addition we now report on the number of indigenous sites for which an application to destroy has been approved by the NPWS. Where the application is permitted following consultation with local Aboriginal Land Councils the artefacts are either recovered and relocated or stored according to the wishes of the local Aboriginal community.

Table 28 shows a steady increase in the identification and protection of indigenous sites. For the first time we are also reporting the number of non-indigenous heritage sites protected on State forest.

Table 28. Number and type of heritage or cultural sites protected on State forest

Sites of Cultural, Spiritual or Heritage Value	Total Number of Sites	Number of Sites Found/ Registered in 1999/2000
Indigenous Site		
Natural Features	84	2
Sites of Historic Importance	1	1
Art and Ceremonial Sites	69	5
Sites associated with Tools, Artefacts and Hunting.	693	84
Sites associated with Traditional Aboriginal Life.	1,340	27
Not Classified	26	0
Sites Destroyed *	0	NA
Total Indigenous Site	2,213	119
Non-Indigenous Site	509	NA

* The destruction of sites requires licence approval from the NPWS and consultation with the relevant Local Aboriginal Land Council.

Source: NPWS Database, Heritage Register and SFNSW Regional Records

Preservation of historic sawmill site in Cascade



(above) Part of the machinery that once drove a steam powered sawmill near Cascade on the Dorrigo escarpment

A joint project involving State Forests, the University of New England (UNE) and the Cascade Field Studies Centre is helping to unlock the daily lives of NSW pioneer timber communities. A team of State Forests and UNE archaeologists and students has been working in the village of Cascade, near Dorrigo, uncovering a steam-driven sawmill abandoned and enveloped by regrowing forest 50 years ago.

"The archaeological and historical importance of this area has long been recognised because many of the old tram tracks, homes and other relics that can easily be seen through the forest," said State Forests' archaeologist Ray Fife.

"By recording the way these steam mills were built and the artefacts left in the surrounding areas, we can add to what we already know about this important period in forestry history from photographs and anecdotal evidence.

"Steam was once the main source of power for the forest industry, just as trams were once the main form of transport. As we see today, forestry is evolving, so it's important to retain some early history for generations to come," Ray said.

"This archaeological work is particularly important in northern NSW because forestry was a pioneer industry that helped shape the region as we know it today."

UNE's Dr Wendy Beck said a group of about six students and archaeologists would record the site and features in detail, using archaeological surveying equipment. *"The data we collect will be used to prepare a conservation plan for the area, detailing which parts or relics should be preserved for their archaeological and historical values," Dr Beck said.*

"We will use time-lapse photography to keep a record of the entire exercise. Eventually, people will be able to come to Cascade and see the sites for themselves and, hopefully, have a much better understanding about life in these early forest communities."

Record of regulatory compliance

All harvesting operations conducted by SFNSW require adoption of a regulatory regime. In the native forests of eastern NSW, considered by NSW Forest Agreements, the regulatory regime is set out in the Integrated Forestry Operations Approvals. Elsewhere we are obligated to follow the regulatory requirements applicable to any other person or organisation in NSW conducting a similar level of impact.

Consequently, with the exception of western NSW, native forest and planted forest harvesting operates with an Environment Protection Licence issued by the Environment Protection Authority (EPA). In western NSW our harvesting is undertaken according to Guidelines issued by the Department of Land and Water Conservation. The Licences and Guidelines set conditions relating to the protection of soil and water quality.

Native forest harvesting is subject to the requirements of licences issued by the National Parks and Wildlife Service (NPWS) for the management of endangered and protected species.

Native forest harvesting in eastern NSW is also subject to licences issued by NSW Fisheries for the protection of fish habitat and fish passage in streams.

Integrated Forestry Operations Approvals have been granted jointly by the Ministers administering the Environment Planning and Assessment Act 1979, Forestry Act 1916, National Parks and Wildlife Act 1974, Protection of the Environment Administration Act 1991 and Fisheries Management Act 1994. The Approvals establish clear, consistent and strong environmental regulation of forestry operations.

Table 29 lists the number of non-compliance incidents recorded by State Forests' supervision and the actions taken by regulators during 1999/2000. The three fines issued by the EPA incurred penalties of either \$500 and \$1,500. The fines related to two breaches of harvesting in native forest and a pollution event during the establishment of planted softwood forest.

A prosecution case conducted by the NPWS is in process. The case relates to an alleged failure to exclude harvesting within 8 hectares of a Squirrel Glider record in early 1999.

Table 29 also lists the number of supervision work sheets completed by Regional staff. Tier 1 supervision is conducted by a SFNSW officer who is regularly in attendance at harvesting operations to ensure that contractors are performing as required. Tier 2 supervision is conducted by the regular officer's supervisor to ensure that standards and the application of conditions are being maintained.

Table 29. Summary of regulatory compliance during harvesting in 1999/2000

Compliance Items	SFNSW Total
Number of Compliance Check Sheets Conducted	
1st Tier Supervision	5,428
2nd Tier Supervision	420
Total	5,848
Number of Non-Compliance Incidents recorded by SFNSW Supervision	
Related to Soil Erosion & Water Quality	1,255
Related to Flora and Fauna	469
Related to Fish Habitat & Passage	1
Other Issues (eg Safety)	314
Total	2,039
Number of Fines Issued to SFNSW	
National Parks & Wildlife Service	0
Environment Protection Authority	3
NSW Fisheries	0
Total	3
Number of Prosecutions Conducted against SFNSW	
National Parks & Wildlife Service*	1
Environment Protection Authority	0
NSW Fisheries	0
Total	1

* One case currently before the court.

Acknowledgment

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