

The Management of Australian Forests — A Personal View

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ABSTRACT

The management of Australian forests is discussed in relation to the biological and socio-economic factors affecting it. The demands placed on native forests and softwood plantations are examined together with the diverse management systems used to resolve the various conflicts.

INTRODUCTION

Forestry plays an important role in natural resource management in Australia despite the relatively small percentage of land area covered by forests. Forest lands are used for a wide range of activities. These include timber production, water catchment protection and, amenity. Timber production was the dominant use in the past. However, there is now a greater demand for other uses and consequently conflicts have developed. This is particularly true in the management of the native forests. The rise of public interest in their use coincided with the increased concern for the environment which was first highlighted in the 1960s. Softwood plantations, which are mainly dedicated to the establishment of a highly productive timber resource, are not subject to the same types of environmental pressure. The difficulties faced by foresters in the management of plantations are mainly of an economic and marketing nature, once the decision to devote the land to plantation use has been made. A controversial issue surrounds this land use decision because many of the plantations have replaced less productive native forest.

The extent to which the various demands on Australian forests are met depends on the management regime adopted which is shaped by various political, socio-economic, and biological factors. First, it is necessary to describe the forest resource.

DESCRIPTION OF THE FOREST RESOURCE

About 5% (41 million hectares) of the Australian continent supports vegetation which is classified as forest. Plantations make

up only 1.9% of this forested area, the balance is natural stands. The distribution and types of forests have been determined both by the physiographic and climatic conditions, and by the actions of man. Australia consists of a continuous, reasonably well watered, and comparatively fertile rim, representing a third of the continent, around a larger, dry and infertile core (Carron, 1979). The forests are largely restricted to this outer fertile zone of high and reliable rainfall. This occurs over most of Tasmania and extends from the Victorian-South Australian border, up the eastern Queensland coast, around parts of the northern coast, and in the south west coast of Western Australia. As the annual rainfall falls below 900mm the forests tend to be replaced by open woodland. In the vast and arid interior vegetation is mainly low scrub.

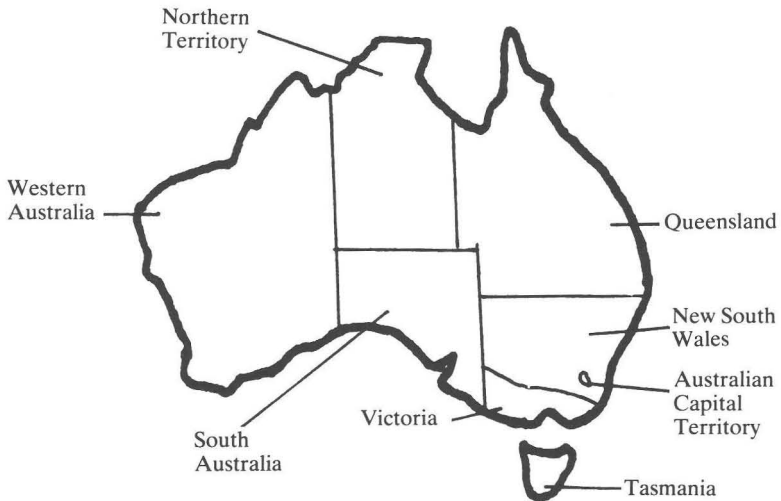


Fig 1. Map of Australia showing States and Territories.

Native Forests

The native forests are classified into two major categories: closed and open forests depending on the crown cover. The former, or rainforests, have a very limited distribution and are concentrated along the east coast of the continent, and in scattered isolated areas of Tasmania and northern Australia. The open forest formation is dominated by eucalypts of which there are over 500 species. It has a vegetation gradient from tall, high quality stands to low stands of poor quality. These types are often referred to as wet sclerophyll

and dry sclerophyll forest respectively and are now seen to be associated largely with a gradient in soil fertility status (Florence, 1983).

Rainforests form a very small percentage of the total native forest (Table 1). This is important from the conservation point of view. On the other hand the eucalypt forests, especially the stands of lower productivity, form the major part of the total.

Table 1 Native forest areas by forest type group in 1980 (000s hectares)

Forest type group	Total area	% area
Rainforest	1,884	4.6
*Eucalypt I	2,688	6.6
Eucalypt II	13,635	38.3
Eucalypt III	11,778	28.8
Tropical eucalypt and paperbark	6,528	16.00
Cypress pine	4,371	10.7

(Source: Anon, 1981)

*Eucalypt forests are grouped into productivity classes in descending order of productivity.

Most of the forest land is in public ownership and over 28% of it is permanently dedicated to timber production (Table 2). However, the area under National Parks has increased from 5% in 1971 to 9% in 1980. This reflects the changing public attitudes to the use of forest land and further changes in public land tenure are likely over the next few years. These changes will be carried out on the basis of comprehensive land use studies and surveys (Forwood, 1974).

Plantation Forests

Softwood plantations were first established in the late 1800s both to alleviate a natural hardwood/softwood imbalance and to provide a high yielding wood resource for industry within concentrated areas of management. In the 1960s there was a rapid expansion of the plantation programme which was aided by extra federal funds. The declared policy was to establish 1.2 million hectares of plantations by planting 29,000 hectares annually (Forwood, 1974). At present the plantations supply approximately 40% of the total wood production although they make up only 1.9% (over 766,000 hectares) of the forest area; almost half is aged 10 years or less.

Table 2 Native forest areas by ownership categories in 1980 (000s hectares)

Ownership category	Area	% area
State Forest (a)	11,405	27.9
Other Public (b)	16,940	41.4
National Park (c)	3,782	9.3
Private	8,757	21.4

- (a) Publicly-owned land, permanently reserved or dedicated primarily for timber production.
- (b) Publicly-owned land, vacant or occupied under lease, not specifically secured for permanent timber production but on which control of timber rests with the Government.
- (c) Publicly-owned land, permanently reserved for purposes other than timber production, such as water catchment, recreation, protection, reservation of unique flora communities.

(Source: Anon, 1981)

Coniferous plantations produce from 15-25m³ of wood per hectare per annum. This yield can be achieved by few native eucalypt stands — with averages of only 0.5m³ to 3.0m³ per hectare per annum. This low yield is the result of the inherent biological character of the native forest and historical influences (Florence, 1983).

Most of the plantations are concentrated into large blocks in a few regions where growing conditions are favourable. This is done so as to meet the needs of highly capitalised and integrated forest industries.

The main species used in the plantations is radiata pine (*Pinus radiata*) which covers almost 66% of the area planted (Table 3). Slash pine (*Pinus elliottii*) is the next most important species and it is planted mainly in the coastal fringe of Queensland where the climate does not suit radiata pine. Caribbean pine (*Pinus caribaea*) is tending to replace slash pine on the drier sites where it has more rapid growth. Hoop pine (*Araucaria cunninghamii*), a native species, is used in the more northerly areas of Queensland on the sites of the indigenous hoop pine rainforests. The only other species of any significance is pinaster pine (*Pinus pinaster*), and it was planted mainly on the infertile areas of Western Australia but is now not widely used.

Over 29% of the total plantation estate is privately owned, mainly by industrial and investment companies. Farm woodlots make up only a small percentage of the private plantations.

Table 3 Total plantation area by species and ownership in 1980 (hectares)

Species	Public ownership	Private ownership	Total	(%) area
<i>Coniferous</i>				
<i>Pinus radiata</i>	344,009	161,284	505,294	66.0
<i>Pinus elliotii</i>	66,829	35,882	102,711	13.4
<i>Pinus pinaster</i>	29,685	1,188	30,882	4.1
<i>Pinus caribaea</i>	16,272	2,068	18,340	2.4
<i>Araucaria spp.</i>	42,354	724	43,078	5.6
Other conifers	15,485	2,461	17,943	2.3
<i>Broadleaved</i>				
Eucalypts spp.	27,734	16,836	44,570	5.8
Poplar spp.	15	2,626	2,641	0.3
Other	535	91	626	0.1
	542,928 (70.9%)	223,161 (29.1%)	766,089	

(Source: Anon, 1981)

Little emphasis is placed on broadleaved plantations. The policy of most State Forest Services is to concentrate investment on the establishment of softwood plantations and maintain hardwood forests by natural regeneration. In addition, growth stresses in young fast grown eucalypt trees have hampered attempts to saw small logs and thus have restricted the potential of eucalypt as a sawlog plantation tree. However, recent technological developments should see this problem diminish to a significant extent (Forwood, 1974). A few paper companies, such as Associated Pulp and Paper Mills Ltd. in Tasmania, have established eucalypt plantations with a rotation of about 16 years. The short fibres of the eucalypts' wood is mixed with the long fibres of the radiata pine in the pulping process. A small area of poplar plantations has also been established, mainly by private landowners for matchwood and veneers and in agroforestry schemes.

MANAGEMENT OF AUSTRALIAN FORESTS

It is difficult to generalise about the management of Australian forests, not only because of the two different types of forestry systems, i.e. native forests and softwood plantations, but also because of the various economic, social, technical and environmental issues affecting them. Because the native forests and plantations are so different in biological and policy terms, their management and the issues affecting them are discussed separately.

Native forest management

In recent decades the management of native forests has become increasingly complex. The various demands placed on this resource have inevitably led to conflict. One of the ways to lessen this conflict has been to divide the native forest estate into State Forests and National Parks. The State Forests are predominantly utilised for wood production. A wide variety of silvicultural systems are used for their management, ranging from single tree selection to clearfelling with development of fully stocked even-aged stands. The most intensive form of eucalypt forest management, involving clearfelling followed by natural or artificial seeding, is applied to only a small proportion of the native forest (Forwood, 1974).

Environmental considerations can play a major role in determining the type of management system adopted in the State Forests and in some cases take precedence. For example, an area high in wildlife value will often be managed for such as a priority, to the detriment or exclusion of wood production. The principle of multiple use has become prevalent in forest management thinking to meet the new 'environmental awareness'. This concept of multiple use calls for a balance among the different activities.

However, in trying to reconcile the different uses in State Forests and placing priorities, the forest managers face many difficulties and pressures. A number of issues such as the integrated sawlog/woodchip programmes and the logging of rainforests have focussed on these difficulties and on the controversial nature of native forest management.

The creation of an export market for woodchips to Japan in 1967 allowed the establishment of integrated sawlog/woodchip programmes which foresters feel will improve the productivity of degraded native stands. These integrated programmes involve the clearcutting of forest areas in large coupes with subsequent natural regeneration. Some environmentalists argue that this practice causes damage to the ecosystem through nutrient losses, increase in soil pathogens, a decrease in water catchment protection, and loss of unique vegetation and wildlife. As a result of public pressure,

foresters have attempted to minimise environmental effects in their management of forests for the woodchip programmes by adopting smaller coupe sizes, retaining buffer strips along streams, leaving uncut wildlife corridors and minimising landscape disturbance. A range of silvicultural regimes are used to suit different conditions. Selection logging is carried out where applicable, such as in the more open drier forests where regeneration is not a major problem.

The logging of rainforests is another issue which has aroused considerable public concern. Among the arguments put forward against it are the belief that it irreversibly damages fragile ecosystems and a valuable gene pool, that it reduces aesthetic and recreation values, and, that very important ecosystems for scientific study are not maintained. Foresters have argued that, with stringent standards, it is possible to maintain the ecosystem in perpetuity and still supply valuable timber. In a recent study the Queensland Forest Service found that careful management of harvesting such as directional felling, low ground pressure extraction, strict diameter limits, and rainy season logging bans, will ensure that selective felling does not exceed the rate and degree of a forest's natural disturbance (Caufield, 1983). In other States rainforests are not managed to the same standard as in Queensland. The New South Wales Government abandoned all logging in rainforests because of the huge public concern for the conservation of these areas.

Plantation forest management

There is great diversity in approach to the management of forest plantations in the State Forest Services because of the different market situations, forest policies, and biological conditions that exist in each State. Most of the plantation management systems have intensive establishment and early tending regimes which include cultivation, and the application of fertiliser and herbicide. The latter is important because, in an arid country like Australia, competition for the limited water and nutrients must be reduced to a negligible level. A major proportion of the current planting is with improved genetic planting stock.

A decline in productivity in second rotation crops in the south east region of South Australia reported in the 1960s has emphasised the need for improved establishment techniques. This decline prompted an intensive review of establishment practices in South Australia and Victoria. The loss of organic matter and nutrients through burning of litter and logging residue appears to be the major cause of the decline in yield between successive crops planted on sandy soils. The devastating wild fires of February 1983 that swept through many Australian States resulted in the loss of

18,700ha of plantation in South Australia. The Wood and Forests Department sowed subterranean clover over large areas of burnt forests within three months of the fire in an attempt to replace some of the lost nutrients and organic matter.

Other factors affecting the biological productivity of forests include wind and insect (e.g. *Sirex* sp.) damage. Their occurrence is often related to thinning practices and have assumed increasing importance in plantation forest management.

The type of silvicultural management with regard to thinning, spacing and pruning, varies considerably between the States. South Australia follows a conventional system similar to Ireland. Their silvicultural management objectives were outlined by Lewis et al., (1976) as follows:

- (1) every thinning is to produce a commercial yield.
- (2) the site is to be used to full production capacity.
- (3) the forest stands must remain stable.
- (4) on average, final crop trees of 50-60cm dbh are expected to be produced in a rotation of 50 years.

The fire of February 1983 has forced the Department to re-assess its strategies, in order to maintain these objectives, resulting in some upset to established silvicultural management. Most of the timber burnt was in the older age classes. In order to keep the sawmills in production the crop rotation may have to be reduced. Nearly a million tonnes of timber was salvaged and is being stored in a fresh water lake or under sprinklers to prevent the development of blue stain. It is hoped to use this material to supplement the annual timber input into the mills over the next 4 years.

The South Australian approach to silvicultural management was prevalent until the early 1970s. Foresters in other States are now finding that this approach of frequent light thinnings is not always suitable to their situation. Tasmania and Western Australia have diverged sharply from this more conventional system (Kerruish et al., 1981) and now have systems which are quite similar to the radical silvicultural regimes in New Zealand. They have adopted wider spacing and pre-commercial thinning as a solution to their limited smallwood market. Silvicultural policies in the other States have tended to be more opportunistic in that silvicultural management has been modified periodically to meet the exigencies of the times (Kerruish et al., 1981). For example, the Queensland Forest Service is now adopting silvicultural options to suit local conditions. Departures from the conventional system are often necessary because of the lack of pulpwood markets and/or because

of the distance from available markets. However, they are reluctant to change completely from a conventional system to a more radical approach because it would hinder the ability to attract a major forest pulp industry to the area. Regions are zoned into either integrated sawlog-pulpwood areas or sawlog-only areas depending on the smallwood market. In the sawlog-only areas the stands are pre-commercially thinned and the final crop trees pruned. The integrated sawlog-pulpwood zones are treated silviculturally in the conventional way by light thinnings.

IN CONCLUSION

It is impossible to do full justice to as wide a subject as the management of Australian forests because of the diversity of the biological and socio-economic factors affecting it. The different approaches by the States to these factors further complicates the discussion. However, it can be said that foresters have moved towards more flexible planning and innovative management techniques so as to meet the various demands on the forests in a co-ordinated and rational manner.

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