



## Harnessing forest ecological sciences in the service of stewardship and sustainability A perspective from ‘down-under’

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### ABSTRACT

Australia's native forests are predominantly Crown land, managed by the States. Regional Forest Agreements between four of the States and the Federal Government (1997–2001) resulted in a 36% increase in the area of conservation reserves and a 15% decrease in area of multiple-use (including timber harvesting) forests. The limited acceptance of timber harvesting in native forests, together with the rapid expansion of hardwood plantations, has diverted research focus away from native forests. Recent events including a prolonged drought and two forest fires totaling more than 3 million ha should have stimulated research in native forests on the effects of fire on ecosystem processes, on the management of fire and on management of water catchments; fires, far more than logging, are shaping our native forests in recent times. In particular, the use of prescribed fire to reduce fuels has decreased. We argue that Australian research effort in native eucalypt forests is lacking in two key areas – the effects of fire on carbon storage in forests and soils, and on the management of water yield from forested catchments. The results of forest research are variously published in the scientific journals, and increasingly in consultancy reports to governments or a to a range of organizations and industries. The question of who does the harnessing of knowledge coming from the science of forest ecology is compounded by constant changes in both political and management arrangements. If forest science is to assume a greater role in politics and forest management in Australia, scientists must enter the foray, using the fighting words of politics rather than maintaining the protective mantle of neutrality. With research in native forests being continually downgraded at both State and Federal levels, we take a somewhat less than optimistic view about how well ecological sciences will be harnessed in the service of forest stewardship and sustainability in Australia.

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### 1. Introduction—forest science within Australian society and politics

How well has the science of forest ecology served forestry, stewardship and sustainability, notions that apply to the management of all forests, for all of their products and services? There is a science to serve forestry, stewardship and sustainability; however, given the scales of both time and area, forest science is open to interpretation both within the ranks of forest scientists and within the ‘emotional psyche’ of people.

The forest debate has been very different in nature from debates over other social issues such as climate change, stem cells and GM

foods. The results of new and innovative scientific research in forest ecology did not initiate debate; rather, the environmental movement arising in the 1960s saw forest management as too exploitative. That, together with concerns over the past clearing of forested land for agriculture, prompted the call by the major environmental groups to stop timber harvesting in all of Australia's native forests, and that call continues: the [Australian Conservation Foundation \(2005\)](#) ‘advocates that all remaining native forest and woodland in Australia should be preserved’ and that ‘All native species and communities in native forest and woodland ecosystems must be protected to conserve biodiversity and all ecological processes’.

Native forests cover more than 160 million ha of Australia, most of it on the eastern seaboard, and plantations cover only about 1.8 million ha ([Commonwealth of Australia, 2007](#)). Yet for most of the last two decades, plantations have attracted nearly all of the forest research attention of Commonwealth Scientific and Indus-

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trial Research Organization (CSIRO), of state agencies, and of the two main university schools of forestry. We recently reviewed both the quantity and quality of research underpinning harvesting native forests in south-eastern Australia (Bennett and Adams, 2004a, b). We concluded that much of this research is statistically weak and site-specific, and there has been little or no coordination of research on any subject that could lead to a meta-analysis, with the possible exception of vertebrate abundance. As a consequence, there are no well-supported, general conclusions as to the sustainability of harvesting, and governments rely instead on the scientific opinions of experts of all persuasions. This situation persists despite the long-standing existence of bodies specifically charged with such coordination (e.g. the Research Priorities Coordination Committee is a permanent body, including representatives of every state and of CSIRO, that advises the Standing Committee on Forestry and Ministerial Councils).

Most of the forest that has been used for timber production in Australia is Crown land, with decisions on land-use and management vested in the various States. The Commonwealth has little control except where it must exercise its powers under international treaties (such as The Convention on Biodiversity) or through external affairs (such as the granting of export licences).

Thus matters such as forestry, stewardship and sustainability are fundamentally determined by State governments, not necessarily in response to, nor in line with, scientific initiatives but in response to all of the political forces. Science then becomes to some extent dictated by the funding that flows from a political decision. In that sense, we could well argue that the question 'how well has the science of forest ecology served forestry, stewardship and sustainability' can be answered positively; that is, the science of forest ecology has been a servant of the political process. On the other hand, there are many examples of good science that have not always been utilized in forestry, stewardship and sustainability; the science of forest ecology has generally been a servant, but not always a master. Here we discuss the subservient nature of forest ecology within the field of forest management in Australia, and we provide some examples.

## 2. Australia's forests, patterns of use, governance and policy

### 2.1. Areas and industries

Australia's native forests total 162.7 million ha, almost 70% of which is woodland (crown cover 20–50%). Multiple-use forest –

defined as 'public forest where timber production is permitted' – covers some 11.3 million ha, most (7.3 million ha) of it within open-forest (crown cover 50–80%) in areas of annual rainfall greater than 500 mm in the south-west, south-east, east and north of Australia; open-forest covers 5.9% of the continent.

Australia also has 1.82 million ha of plantations (data for 2006), with 'The 2020 Vision' aiming to expand to 3 million ha by 2020 (Plantations 2020, 2007). Australia's forest trees are predominantly hardwoods; pine plantations were therefore established beginning in the late 1800s and increasing from 1960 to 1980 to about 1 million ha. Since 1990, the area of hardwood plantations (predominantly Tasmanian blue gum, *Eucalyptus globulus*) has expanded rapidly (Fig. 1). Almost all (90%) of new hardwood plantations are aimed at the production of pulpwood, with rotations as short as 10 years. It is estimated that 97% of total removals from hardwood plantations will be pulpwood by the year 2039.

A widely held view is that eucalypt plantations will take the pressure off native forest. As Kile (2005) noted:

'plantations have long been touted as the alternative to native forest logging, and quite considerable effort has been devoted to the science of hardwood plantations since the mid-1980s. Actual investment, though, has been strongly skewed to short-rotation fibre plantations in response to taxation arrangements. Around the country, hardwood plantations are now accepted politically as the alternative (not a supplement or a complement) to native forests for solid wood supply'.

In 1999–2000, sawn timber and other timber products (plywood, veneers, particle board, etc.) from native forest accounted for 32% of production (Table 1), the rest coming from softwood plantations. The production of sawn timber and other timber products from softwood plantations is not expected to increase markedly over the next 40 years. Following the major increases in reserves, trends for sawlog production from native forests predict a serious decline (Fig. 2); unless the balance between multiple-use and nature conservation is reversed, imports must and will increase to meet demand of an increasing population. Australia's trade deficit in timber and timber products is approximately AUS\$2 billion per year. The largest export is wood-chips (data for 2005–2006, AUS\$840 million, mainly to Japan) and the largest import is paper and paper products (AUS\$2.8 billion). The import/export balance reflects both the unattractiveness of investment in

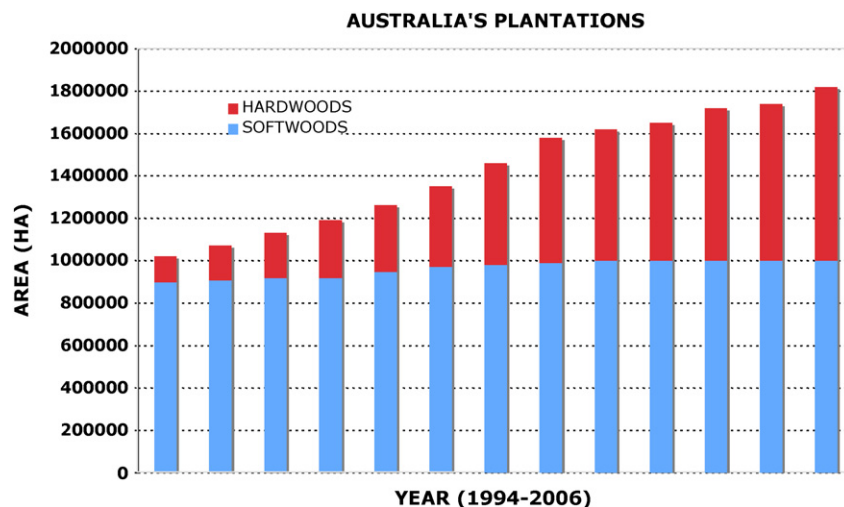


Fig. 1. The growth of Australia's plantation estate, 1994–2006 (Bureau of Rural Sciences, 2007).

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