

---

## **NOTES AND TOPICS**

---

### **Victoria's Mountain Ash Forests: A Case of Sustainable Management**

**Peter Attiwill**

**V**ICTORIA has extensive forests of high value for conservation, for timber, for water — indeed, of high value for *all* of the benefits that society seeks from its forests. These forests can yield hardwood timber of high quality and of large size, for which world demand is rapidly increasing. This demand will not be met, either physically or economically, by wood from eucalypt plantations. Australia, which has a substantial trade deficit in timber and wood-fibre products, is in the position to cultivate world demand for the high-quality timber and timber products that its native forests can yield.

Whether or not Australia wants to capitalise on this competitive advantage is a political issue that turns on differing conceptions of 'conservation'. John Passmore differentiated between 'conservation for', or conservation in the sense of the wise use of natural resources so that diversity and future supply are maintained, and 'conservation from', or preservation and protection of natural resources. While the traditional and the green conservationists have many common interests, 'they soon part company . . . and often with that special degree of hostility reserved for former allies' (Passmore, 1974:73). Central to the conservation movement and the emerging green parties is the policy of the Australian Conservation Foundation (ACF), which 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 . . . be protected to conserve biodiversity and all ecological processes'. The ACF therefore 'opposes the logging of native forest . . . believing that our society is currently incapable of harvesting wood . . . in a manner which respects and maintains ecosystem processes' (ACF, 1995:2).

#### **Fire and Eucalypt Forests**

Periodic disturbance is common to forests around the world (Attiwill, 1994a). Old views of plant ecology were very much concerned with theories of succession and with the notion that the natural progression of succession leads to a stable, harmonious and self-perpetuating end-state. But we are now well aware that there is no

such end-state. Forests are disturbed ecosystems. They are dynamic in time and space, and, as with other ecological systems, maximum diversity is reached at some level of random disturbance.

The most common disturbance in the forests of the world is fire (Spurr & Barnes, 1980), and nowhere is this more evident than in Australia. The ecologist R. W. Mutch (1970) argued that natural selection has led to fire-dependent species being highly flammable. At first sight this seems to be contradictory: why has evolution not selected fire-resistant species? But this would be impossible. Fire has been common throughout the northward drift of the Australian continent from its Gondwanan connections; today, Australia is widest at the Tropic of Capricorn, the driest part of the world. Given the right conditions — a long dry summer so that the fuels are tinder-dry, a hot day and strong northerly winds — and given an ignition source like lightning, bushfires can develop in our forests to an intensity where no fire-fighting capabilities of any nation could stop them.

The frequency of fire increased when Aborigines came to Australia more than 40,000 years ago, and increased again with the arrival of Europeans. Noble (1986: 230, 231) wrote of the profound effects of fire and of our role as managers of the land:

The Australian flora and fauna evolved with fire as an integral part of its environment . . . Not only are most species able to survive under the fire regimes they have experienced over the millennia, but some species require a specific fire regime for their continued existence. European settlement has changed the fire regime in most parts of Australia and as a result the balance between many species has altered.

Thus our decisions as to how we treat our forests — to suppress fires, to protect old-growth qualities, to harvest for timber and other products — are management decisions that will have their own consequences for forest development and species diversity.

### **Fire and the Mountain Ash Forests of Victoria's Central Highlands**

Forests cover only 5.5 per cent of the total land area of Australia, and are concentrated in eastern, south-eastern and south-western Australia. These forests contain an array of biological diversity (including 600 species of the genus *Eucalyptus*) and an array of management structures and procedures.

Mountain ash (*Eucalyptus regnais*, the ruler of the eucalypts), which grows in the Central Highlands of Victoria, is the world's tallest flowering plant and the epitome of the interdependence of forests and fire (Ashton & Attiwill, 1994). All of the characteristics supporting Mutch's (1970) hypothesis of high flammability are present in the mountain ash forest. In the mature mountain ash forest, no regeneration occurs after fire, which kills the trees and exposes the mineral soil on to which the seeds fall a few weeks later. The seeds germinate and competition for survival begins in earnest. By age three years, there may be 60,000 to 100,000 trees per hectare.

ture; competition reduces the number to about 2,500 trees per hectare at ten years and to about 20 at 250 years. Under these conditions, the forest remains even-aged, and thus there are extensive areas of even-aged mountain ash in Victoria. Sometimes there may be two or at the most three age-classes where subsequent fires have provided the right conditions for regeneration without killing the previously established trees.

### **Silvicultural Management of Mountain Ash Forests**

Ash forests (mountain ash and similar species including alpine ash and shining gum) cover some 480,000 hectares of public land in Victoria (about 10 per cent of the total forested public land). About one-third of the area of ash forest is within parks, catchment reserves and other reserves. The remaining 316,000 hectares has been declared, through the various land-use planning procedures, as State Forest, available for the sustained production of high-quality timber. Of this, 34,000 hectares is not suitable for timber production and 53,000 hectares is protected from harvesting under the Victorian government's Code of Forest Practices. Thus, management of the ash forests for timber production is currently based on a little less than one-half the area of ash forest, the remainder being managed for other benefits, among the most important of which is high-quality water for the city of Melbourne.

Over the past 30 years or so, the ash forests available for timber production have been managed using the silvicultural system of clear-felling and burning. Most of the trees within a designated cutting area (or 'coupe') are felled. The commercially valuable parts of the trees are harvested, and all of the material remaining on the coupe after harvesting is burned to provide the right conditions for regeneration. Seed is then broadcast over the soil made bare by the fire. This system has been for the most part very successful; small areas of forest are scattered through the Central Highlands of Victoria, forming a mosaic of age classes. The creation of a planned series of age classes is fundamental to management of timber-production forest for sustained yield into the future.

The values of the forest are many and varied, including protection of native flora and fauna, water supply, wilderness qualities, aesthetic and artistic qualities, control of erosion and of salinity, recreation, timber and wood-fibre, eucalypt oils, honey and many others. Most of the forest estate in Victoria is publicly owned, and thus there are competing demands.

The use of public land in Victoria, including for commercial timber harvesting, is based on studies and recommendations of the Land Conservation Council. The initial, detailed study reports and all of the recommendations of the Council, region by region, are widely available, and public consultation is promoted over lengthy periods. Eventually, the Council presents its final reports to parliament and the use of public land within each region of the State becomes the subject of legislation. Forestry operations within the available timber-harvesting areas are then controlled through the Timber Industry Strategy, the Code of Forest Practices, and legislation such as the Native Fauna and Flora Conservation Guarantee and the Rainforest

**Policy.** The last of these excludes timber harvesting within all rainforests. For each management area, there is a Forest Management Plan and this too is open to extensive public participation. For each coupe within the management area, there is a detailed plan of how logging is to be controlled.

Of a total of 8.8m hectares of public land in Victoria, 4.7m hectares is forested. The area of forest available (following recommendations by the Land Conservation Council) and suitable for timber harvesting (under the Code of Forest Practices and various legislations) is 1.3m hectares (about 28 per cent of the forest area).

### **Forest Management and Species Diversity**

The natural forest is not at some pre-ordained equilibrium; it has evolved through a continuum of disturbances, both natural and human-generated (Taylor, 1990). Through our understanding of the processes of disturbance and recovery after disturbance, we should be able to accommodate planned management within the framework of natural disturbance.

The extensive literature on the effects of bushfire and of timber harvesting on floral and faunal diversity in mountain ash and similar forests has been recently reviewed (Attwill, 1994b). There is little evidence of marked change in the flora after clear-felling and burning over a range of higher-rainfall forests of Victoria and Tasmania. However, studies in East Gippsland (Mueck & Peacock, 1992; Ough & Ross, 1992) indicate a reduction in the number of tree-ferns and associated epiphytes, presumably caused during timber extraction. Coupe plans and logging techniques for these forests must therefore be modified to minimise damage within ecologically-acceptable limits.

The mountain ash forests support a rich mammal fauna, and all of the species found in one or more older forests have been found in one or more of the regrowth forests burned or logged in the past 50 years and which include larger trees that provide nesting hollows (Macfarlane, 1988). Similarly, Loyn's (1993) study in East Gippsland found that the numbers and diversity of birds in regrowth forests 25-40 years after logging were similar to those in mature forests, and emphasised the importance of retaining old trees as nesting sites. This is not to imply that all species of mammals and birds are found in all older forests and in all regrowth forests; a fundamental component of diversity is that each patch of bush is different from every other patch of bush.

In summary, timber harvesting has not resulted in the extinction of species nor in loss of diversity of species. Through planned disturbance of some portion of the forest estate by harvesting within the framework of natural disturbance, we create a mosaic of age classes so that diversity is maintained for the future. This diversity complements that produced by other management strategies in the rest of the forest estate. For example, buffer areas along streams are excluded from logging under the Code of Forest Practices. Gullies are relatively rich in both density and diversity of birds, possums and gliders. Furthermore, they are most likely to remain unburned by bushfire, and so they contribute to diversity — to the mosaic of forest — after fire.

## **Sustainable Management in Victoria**

Australia's present consumption of timber products for 1994/95 was 4.5 billion cubic metres of sawn-wood (more than one-third of this coming from native eucalypt forests), 1.4 billion cubic metres of other wood (including railway sleepers, plywood and particle board) and 3.4 billion tonnes of paper and paperboard. In the same year, Australia imported sawn-wood and round timber at a cost of \$539m, and other forest products at a cost of \$2,461m. Thus, total imports of forest products were \$3 billion, while exports were only \$1 billion, giving a trade deficit in timber products of \$2 billion for the year (ABARE, 1995).

Australia's high-rainfall eucalypt forests produce timber in large sizes and of extraordinarily high quality. There is an increasing world demand for such a product; exports of sawn timber increased by 22 per cent in 1994/95, divided evenly between hardwood and softwood (ABARE, 1995). The assessment by D. A. Neilson and Associates (1995:iv) of the Australian native forest sector was that it 'is in a superb position to contribute to the future wood demands of an expanded Pacific Asian community on a long-term sustainable basis' and that our international benchmark standard in native forest management was excellent; the study concluded that 'it would be a great pity if the decision makers do not consider . . . the opportunities to maximise the value to all Australians of the internationally important Australian native forest resource'. Australia therefore has all the components of a competitive edge: an increasing world demand for its timbers, a timber industry which is constantly increasing the output of value-added products, and a forestry profession that can ensure that Australia's forests are by and large managed sustainably, and managed to the best standards commensurate with accumulating ecological knowledge.

The Commonwealth government has developed a system of Comprehensive, Adequate and Representative forest reserves, aiming at the broad benchmark of keeping 15 per cent of the pre-1788 distribution of each forest community in a dedication conservation reserve. A large amount of effort has gone into this planning as part of the Regional Forest Assessments under the National Forest Policy. At the end of the process, Australia should be in a sound position to provide both for a guaranteed forest industry and for preservation.

If the forest debate could be resolved, attention could turn to the environmental problems that are orders-of-magnitude greater in their impacts than those stemming from properly managed forestry for timber production. These problems include devastation of both land and native fauna caused by introduced and feral animals like rabbits, foxes, dogs and cats. In addition, problems have arisen from excessive clearing of forests in the past, such as soil erosion and dry-land salinity. In contrast to managed forestry for wood products, excessive clearing leads to biological extinctions and has major consequences for biodiversity. The economic consequences of decreased productivity of the land are enormous. Restoring the land should therefore have a very much higher priority for environmental action than the issues of logging and wood-chipping in our native forests.

## References

- Ashton, D. & P. Attiwill (1994), 'Tall open-forest', pp.157-96 in R. Groves (ed.), *Australian Vegetation* (2nd edition), Cambridge University Press, Cambridge.
- Attiwill, P. (1994a), 'The Disturbance of Forest Ecosystems: The Ecological Basis for Conservative Management', *Forest Ecology and Management* 63: 247-300.
- (1994b), 'Ecological Disturbance and the Conservative Management of Eucalypt Forests in Australia', *Forest Ecology and Management* 63: 301-46.
- Australian Bureau of Agricultural and Resource Economics (ABARE) (1995), *Quarterly Forest Products Statistics: June Quarter 1995*, Canberra.
- Australian Conservation Foundation (ACF) (1995), *Policy Statement No. 59: Forests Policy*, Sydney.
- Loyn, R. (1993), *Effects of Previous Logging on Bird Populations in East Gippsland: VSP Retrospective Study*, Wildlife Section, Department of Conservation and Natural Resources, Melbourne (VSP Technical Report No. 18).
- Macfarlane, M. (1988), 'Mammal Populations in Mountain Ash (*Eucalyptus Regnans*) Forests of Various Ages in the Central Highlands of Victoria', *Australian Forestry* 51: 14-27.
- Mueck, S. & R. Peacock (1992), *Impacts of Intensive Timber Harvesting on the Forests of East Gippsland, Victoria*, Flora and Fauna Branch, Department of Conservation and Natural Resources, Melbourne (VSP Technical Report No. 15).
- Mutch, R. (1970), 'Wildland Fires and Ecosystems: A Hypothesis', *Ecology* 51: 1046-51.
- Neilson, D. A. & Associates (1995), *The Future Management of Australian Native Forests. An International Perspective*, Rotorua, New Zealand.
- Noble, I. (1986), 'Fire', pp.224-32 in H. Wallace (ed.), *The Ecology of the Forests and Woodlands of South Australia*, Government Printer, South Australia.
- Ough, K. & J. Ross (1992), *Floristics, Fire and Clearfelling in Wet Forests of the Central Highlands, Victoria*, Flora and Fauna Division, Department of Conservation and Environment, Melbourne (VSP Technical Report No. 11).
- Passmore, J. (1974), *Man's Responsibility for Nature. Ecological Problems and Western Traditions*, Duckworth, London.
- Spurr, S. & B. Barnes (1980), *Forest Ecology* (3rd edition), John Wiley & Sons, New York.
- Taylor, S. (1990), 'Naturalness: the Concept and its Application to Australian Ecosystems', in D. Saunders, A. Hopkins & R. How (eds), *Australian Ecosystems: 200 Years of Utilization, Degradation and Reconstruction*, Surrey Beatty & Sons, Chipping Norton, New South Wales (*Proceedings of the Ecological Society of Australia* 16: 411-18).