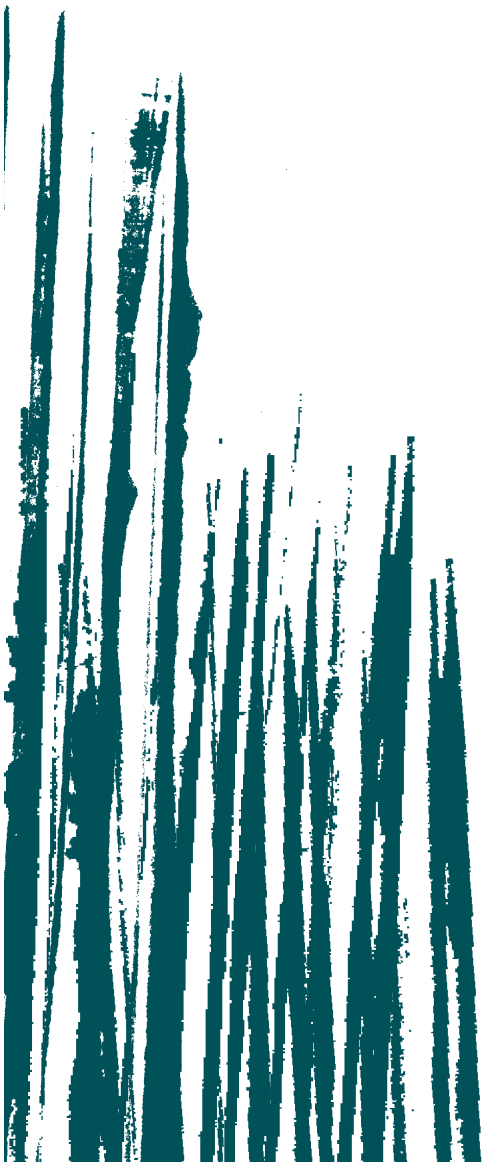
8 *The State of Knowledge*



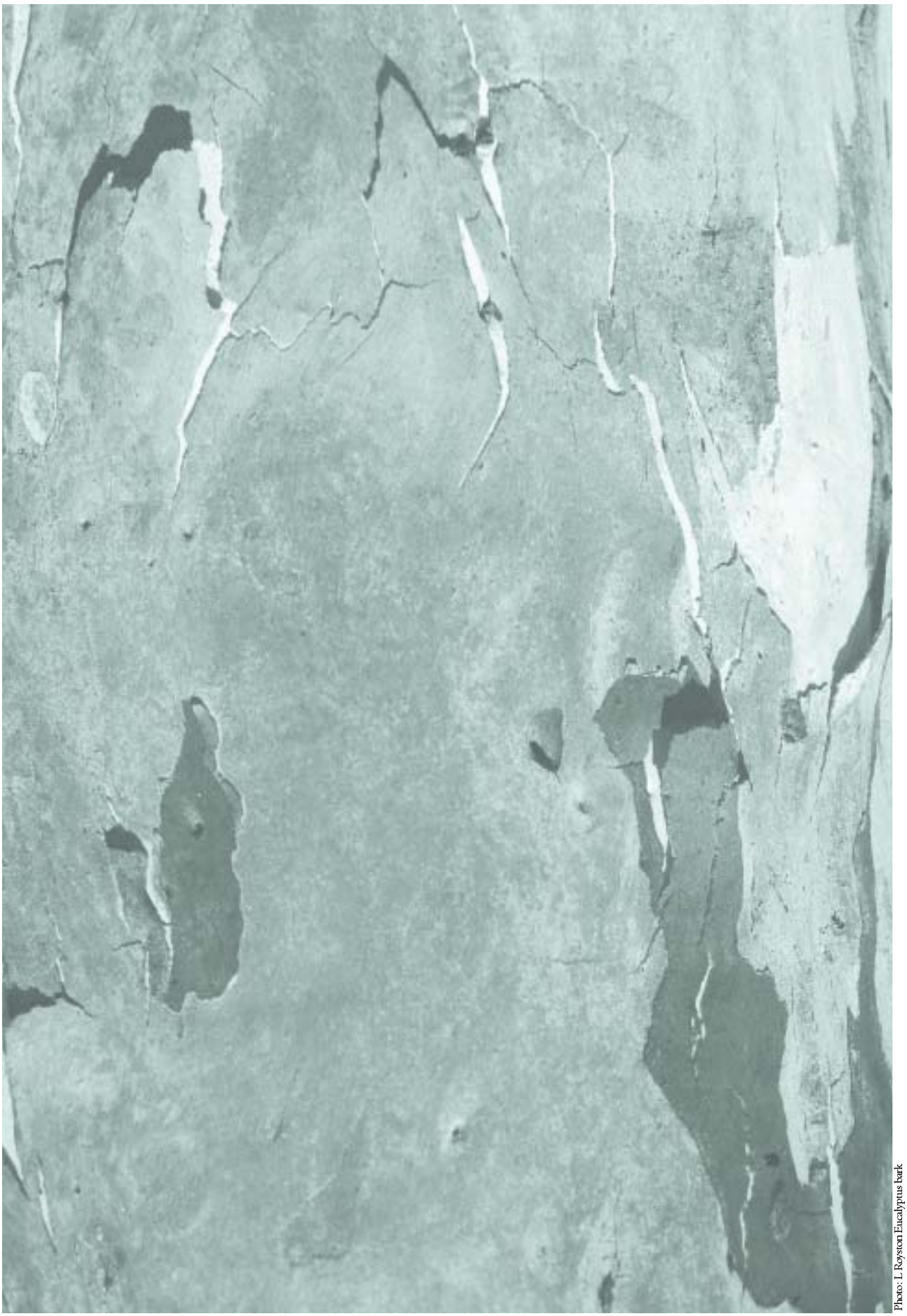


Photo: L Royston Eucalyptus bark

The State of Knowledge

Our understanding of the ecological, economic and social importance of forests has grown greatly in the last 25 years, although there remains considerable room to improve knowledge about how to manage forests sustainably. Much of our knowledge is centred on the publicly owned, timber producing forests, which constitute a relatively small proportion of the total national forest estate. Less is known about forests of lower commercial quality, forests in conservation reserves and forests on the private and leasehold estates.

In this chapter, the state of knowledge is discussed under the seven headings that form the basis of the Montreal Process criteria for sustainable forest management (see Box 14). In addition, issues of concern to the Australian community are listed: this is presented as a reference point for future reports about the issues considered nationally important in 1997.

The state of knowledge

Criterion 1: Conservation of biological diversity

The biological diversity of Australia has been documented and studied both extensively and intensively in the traditions of western science for well over 200 years. Indigenous peoples' knowledge of biodiversity has been acquired over very long periods of time and relatively recently has begun to be recorded. Only recently has attention turned to reporting on forest habitats as distinct from the whole biota. There are estimates of national biodiversity for forest-dwelling higher plants and animals, but not lower ones. There are lists of species occurrences for many specific sites, but these are not available for all forest types. There has been detailed research into the interactions of forest-dwelling species and how they live, but the number of species studied in this way is small compared to the total number. The levels of flexibility and adaptability of the biota to changing circumstances are not known for most species, but there appears to be a wide range of capacities among species.

Knowledge of forest ecology is increasing steadily and this information is used to modify management systems. The level of such information is known to be low enough that continued major research efforts are still required.

Information on forest cover extent is available for the entire country. The resolution and accuracy of information varies considerably. Several large projects under the National Forest Inventory are under way which will ensure that the forest estate will be mapped by forest type at the 1:100 000 scale or better within five years.

While the extent of forest in Australia is relatively well known, species-level mapping is not well covered. It is now possible to accurately produce predictions of potential distribution of species and forest types, based on available, but incomplete, information. Information is available at the genus level for most of the forested country. Australia is working towards a practical but appropriate classification of forest types that relates to biodiversity conservation. Analysis of existing site-based data suggests that there are at least 457 floristically defined forest types comprising several thousand species. Information on age-class and successional stages is currently poorly known, but for RFA areas will be significantly improved on completion of the assessments.

Information on the status of some forest-dependent species exists nationally for endangered, vulnerable and presumed extinct vertebrates and for rare, endangered, vulnerable and presumed extinct vascular plants. Species recovery plans are associated with many species on these lists. Some information is available on genetic and species diversity for limited regions through survey and expert knowledge. Part of the RFA process

is devoted to increasing the understanding of biodiversity in Australia through the provision for additional surveys and monitoring through time.

In order to progress our knowledge of forest-dwelling species it will be necessary to add habitat labels to the names of species currently held in databases. At present it is generally not possible to identify those species that are either known to occur in forests or are known to occur only in forests. This knowledge is often available in unpublished research papers and in the collective knowledge of experts, but has not been consolidated for easy access.

The responses of many plants and animals (including most species listed as threatened or endangered) to particular fire regimes are incompletely known. Research is needed to determine the responses of species with different life histories to particular fire regimes. Since deliberate burning for forest management and biodiversity conservation is needed, the development of techniques of adaptive management in relation to fire is a key priority.

Criterion 2: Maintenance of productive capacity of forest ecosystems

We have a sound understanding of the productive capacity of most forests with multiple-use tenure. Information about productive capacity on other public tenures or private lands in the wood production zones is very limited. All public forestry agencies are developing, or have developed, sustainable yield strategies based on field assessment of forest growth and modelling. Such information is generally unavailable for private forests in most regions. The growth models and spatial data used to calculate sustainable yield on public land will be (or have been) reviewed as part of RFAs. The impacts of timber harvesting, grazing and other forest uses on forest biodiversity and other values will also be (or have been) reviewed. The productive capacity of forests not covered by RFAs, including most forests in which the primary land use is grazing, is less well known than that of the wood production forests.

Criterion 3: Maintenance of forest ecosystem health and vitality

Defining and understanding what is meant by ecosystem health and vitality is in its early days. It is posing a significant challenge to forest managers in most countries of the world. Information relating to this criterion is currently very limited at the national level, although the biology and ecology of many forest pests and diseases are often well understood. Several research projects are currently under way specifically to examine this topic. A forest health committee has recently been established under the Standing Committee on Forestry to, among other things, review pests and diseases affecting Australian forests and forest products and to advise relevant bodies on the actions that may be required for the control of specific pests and diseases.

Criterion 4: Conservation and maintenance of soil and water resources

Catchment hydrology research in forested catchments is undertaken by organisations such as the Cooperative Research Centre for Catchment Hydrology, several divisions of CSIRO, and other State and Commonwealth bodies. Major research is being undertaken into the dynamics of soil erosion in both natural and disturbed forests and into the refinement of stream protection measures. Detailed research is being undertaken into the water relations of natural and plantation forests. Research programs are examining the role of trees on land irrigated with sewage treatment plant effluent, in terms of managing salinity on irrigated and dry lands. As the area of land dedicated to tree plantations increases in coming years, the streamflow reduction effects of converting a pasture cover to a tree cover is an issue that potentially has major implications for the regional allocation of water resources.

Work is being done by governments at all levels to develop and implement codes of practice from available information and to develop cost-effective approaches to the

monitoring and interpretation of forest management effects. Activities undertaken as part of the RFA process include the development of long-term monitoring programs for various factors related to the conservation and maintenance of soil and water resources.

Criterion 5: Maintenance of forest contribution to global carbon cycles

Australia has been able to report internationally on the contribution of its forests to global carbon sinks and sources. Present estimates show the forest sector as a net sink for carbon. Significant research is still to be done to bring the accuracy of the estimates within narrower bounds. Detailed information on forest biomass is generally only available for commercial public forests, with little known about spatial variation. Projects are currently under way to develop rigorous models of potential growth and carbon accumulation, both above and below ground, for a wide range of forest types, including those used for timber harvesting and pastoral grazing. International efforts to manage greenhouse gas emissions are providing a major stimulus to accelerate research in this area.

Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Information on this criterion is readily available in relation to major commercial forest uses at the State and national level. Information with regard to non-wood uses such as recreation or apiary is not easily summarised for the forest-only component. This criterion is currently being addressed through the RFA process. Significant work is still to be done to adequately bring the cultural values of Indigenous and non-Indigenous forest users more fully into forest management practices on appropriate tenures.

Criterion 7: Legal, institutional and economic framework for forest conservation and sustainable management

Australia has addressed most aspects of this criterion at the national level through its reports to the Montreal Process. At the State level, it is being addressed to a large extent by evaluating the processes which underpin ecologically sustainable management of forests through the RFA process. This approach includes a formalised process of monitoring and reviewing forest management practices; legal, institutional and economic frameworks; and social, economic and conservation planning at the regional level.

Issues

A survey of a range of people working in forest-related areas of government and universities produced a list of issues considered to be important to forests at the national level in the mid-1990s. This list was then circulated to representatives of all State and Territory conservation and forestry agencies for comment. The resulting list, presented in Table 73, is organised according to the Montreal Process criteria for sustainable forest management. It focuses on national-level issues and does not include issues that may be locally or regionally important.

The list is primarily intended as a reference point against which future reports can assess whether or how the issues have been resolved. Without such snapshot records, it can be very difficult to know what people in the past considered issues at the time. The list does not attempt to present arguments for or against the issues, only to note their existence.

Table 73: Issues for Australian forests in relation to the Montreal Process criteria for sustainable forest management

Criterion 1: Conservation of biological diversity

- Deforestation of major forest types: rainforest, woodland, mallee, mangroves
- Biodiversity, endangered species habitat
- Conservation of forest species
- Effects of forest use/management on forests
- Sustainable use of ecosystems
- Value forests for their own sake
- Urban expansion

Criterion 2: Maintenance of productive capacity of forest ecosystems

- Sustainability: definition, implementation, monitoring

Criterion 3: Maintenance of forest ecosystem health and vitality

- Landscape management
- Ecosystem processes: defining and maintaining them
- Managing for climate change
- Control of introduced species
- Regional planning of fire management for both protection and maintenance of biodiversity

Criterion 4: Conservation and maintenance of soil and water

- Catchment protection
- Soil: maintenance and protection
- Water quality and quantity

Criterion 5: Maintenance of forest contribution to global carbon cycles

- Carbon budget: how much is being accumulated and how much returned to the atmosphere? How much can extending forest area increase storage of carbon?

Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

- Recreation: its development and impacts
- Grazing: its effect on forest ecosystems, its value to industry
- To log or not to log native forests
- Woodchip exports versus local processing
- Balance of payments in forest products: how to improve Australia's position
- Adding value to forest products: what areas, and how to encourage
- Substitution for forest products
- Afforestation: softwood and hardwood plantations; farm forestry; extending the plantation estate; removing impediments; managing sustainably
- Multiple use of production areas and reserves: what range of uses to be allowed; what systems to achieve it and how to integrate with non-forest lands
- Recreation and tourism: how to encourage sustainable development
- Competition, markets
- Implementation of user pays principle
- Resource security
- Heritage and wilderness values: identification and protection
- Indigenous perspective: identification and recognition of traditional knowledge, uses, and significant cultural sites
- Viability of rural communities: facing changing conditions, employment levels, especially for young people

Criterion 7: Legal, institutional and economic framework for forest conservation and sustainable management

- Adequate stakeholder consultation in negotiating agreements about forest use and public involvement in planning
- International obligations arising from treaties
- Environmental education: how to develop and maintain balance
- Certification and labelling: when and how to develop and apply
- Codes of practice: development, continuing research, monitoring and compliance systems
- Regional planning
- Criteria and indicators for sustainable management of forests
- Long-term monitoring of effects of use
- Funding of management
- Corporatisation: its effect on productivity and sustainable management
- Research: capacity and funding
- Reliability of data: harmonisation of data collected in different places
- Public access to information
- Cost of providing information
- Monitoring implementation of plans and agreements
- System of reserves; conservation off reserves

Source: National Forest Inventory (1997).