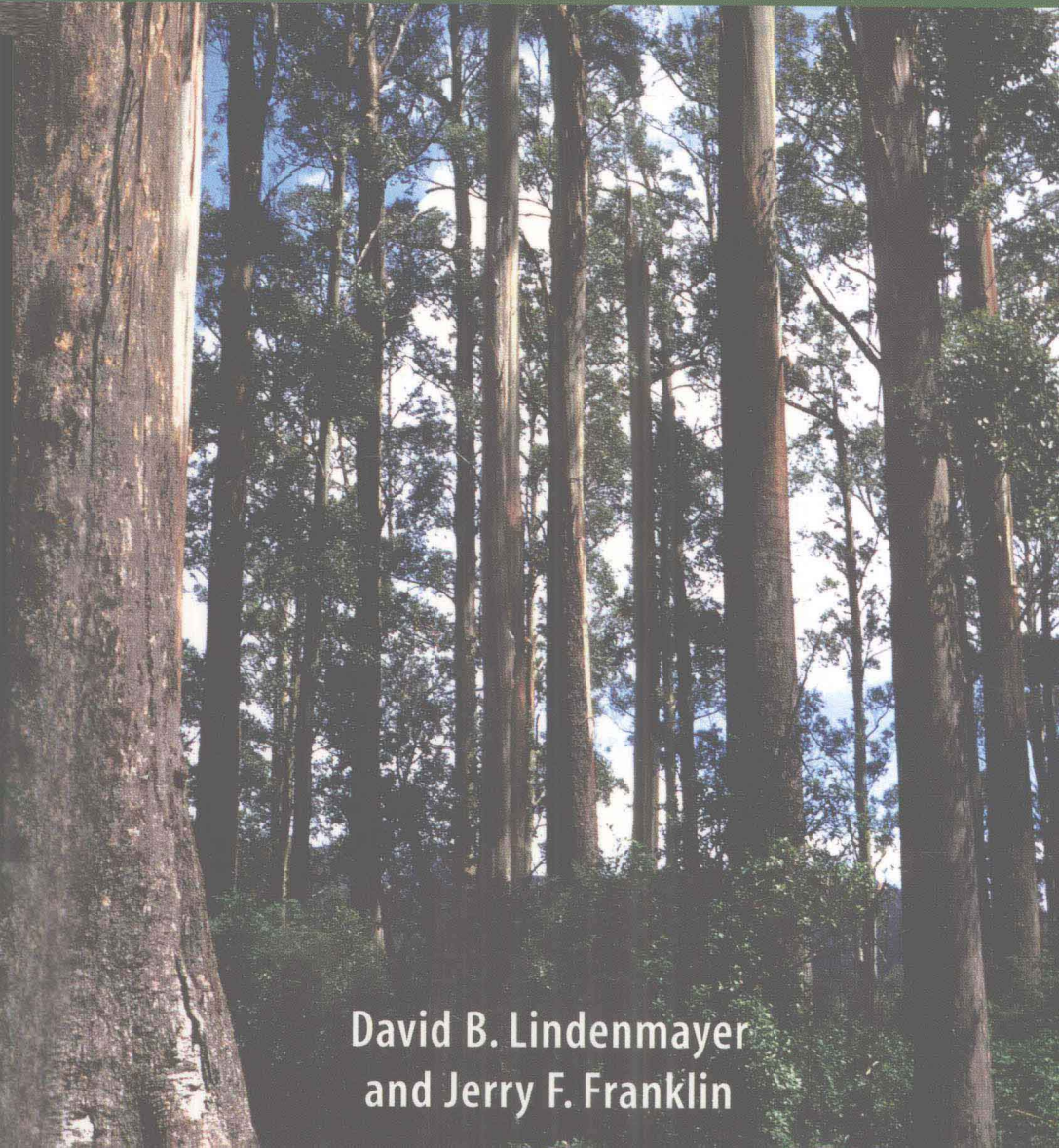


TOWARDS FOREST SUSTAINABILITY



David B. Lindenmayer
and Jerry F. Franklin

TOWARDS FOREST SUSTAINABILITY

Edited by
David B. Lindenmayer & Jerry F. Franklin

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Preface

Forests are a major natural resource used by human societies for a broad range of essential goods and services throughout the world. Forests provide the raw material for an immense array of products from the construction materials used in building homes to the paper that makes many types of modern communication, including this book, possible. High among the many and important services, forests protect the watersheds and regulate the hydrologic regimes of the water supplies on which the majority of human beings depend. And, of course, humans are not the only species that are strongly associated with and dependent upon forests since forests provide the habitat for approximately two-thirds of the world's plant and animal life.

The large and diverse array of values that humans place on forest ecosystems, including critical ecological services and wildlife habitat, make the intense and prolonged conflicts over forest management and conservation almost inevitable. Debates over policies on the conservation and use of temperate native forests are occurring in many regions of the world. Examples include New Zealand, Australia, Scandinavia, and North America, including both the United States and Canada.

Significant changes in native forest policy have occurred in all these places, although the specifics vary reflecting differences in their societal and natural settings. New Zealand, for example, has moved completely from harvesting in native forests to a forest industry that is based entirely on plantations of exotic species, whereas forest industries in British Columbia continue to depend on harvesting of native forests, including areas of primary or old-growth forest. Shifting the industry base to plantations is not possible without massive economic and other social impacts in the

short term. Nevertheless, major changes in native forest management are occurring in British Columbia, the United States, Scandinavia and Australia to better conserve key ecological values. There are important common factors in the changes that are occurring, despite the specific differences among temperate forest nations. Globalisation of the world economy has created an overarching—and rapidly changing—context since these countries are all heavily involved in trade in wood and wood products. As well, there are many commonalities among native temperate forests in their natural history and in historical treatments of these forests.

These commonalities led us to believe that sharing ideas and experiences of transitions in native forest policy and management would be useful. Hence, a roundtable meeting on forest management and conservation was convened in August 2002 at Marysville, in Victoria. The meeting was hosted by the Centre for Resource and Environmental Studies (The Australian National University) with funding provided by The Myer Foundation and the Poola Foundation. Attendance included experts in forest economics and policy, water management, and timber production as well as ecologists and conservation professionals.

General issues associated with management and conservation of native temperate forests—and specific issues associated with the montane ash (*Eucalyptus* spp.) forests of southeastern Australia—were discussed at the Forestry Roundtable Meeting. The Victorian montane ash forests represent one of the most productive and economically valuable forest areas in Australia, but they are also forest ecosystems that have extraordinary values for conservation of biodiversity and as source of domestic water supplies; hence, substantial conflicts have arisen among forest stakeholders. Representatives from Victorian state government agencies responsible for forest conservation and water management, as well as key forest industry and conservation groups, were participants in what proved to be stimulating and productive discussions.

Some of the participants in the roundtable meeting were invited to write essays on the topic of transitions to sustainability in forest conservation and management, and these essays form the chapters of this book. Collectively, the essays span the full range of spatial scales from regional and state through national to global perspectives on ecologically sustainable forest management.

Underlying these discussions is the reality that sustainability is not a set endpoint but, rather, an overall direction in conservation and forest management that reflects an evolution in societal perspectives and scientific knowledge. We hope that this book, which incorporates the considerable experience of the contributors, will help to propel forest management on its 'sustainability pathway' into the future.

David Lindenmayer and Jerry Franklin (Editors)

Participants at the Forestry Roundtable Meeting

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|--|--|
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| Professor Per Angelstam | Swedish University of Agricultural Sciences |
| Melissa Boyd | OfforSharp |
| Dr Mick Brown | Forestry Tasmania |
| Professor Fred Bunnell | University of British Columbia |
| Dr Rob Campbell | Department of Sustainability & Environment |
| Dr Judy Clark | Centre for Resource & Environmental Studies, Australian National University |
| Associate-Professor Stephen Dovers | Centre for Resource & Environmental Studies, Australian National University |
| Tim Fischer | Australian Conservation Foundation |
| Professor Jerry Franklin | University of Washington |
| Kertsen Gentle | Timber Communities Australia |
| Graeme Gooding | Victorian Association of Forest Industries |
| Lindsey Hesketh | Australian Conservation Foundation |
| Dr John Hickey | Forestry Tasmania |
| Professor Aila Keto | University of Queensland |
| Doctor Laurie Kremsater | University of British Columbia |
| Dr Charles Lane | The Myer Foundation |
| Frank Lawless | Melbourne Water |
| Associate-Professor David Lindenmayer | Centre for Resource & Environmental Studies, Australian National University |
| Ian Miles | Department of Sustainability & Environment |
| Professor Jari Niemela | University of Helsinki |
| Associate-Professor David Norton | University of Canterbury |
| Tim Offor | OfforSharp (roundtable facilitator) |
| Professor David Perry | University of Oregon |
| Professor Michael Soule | University of California |
| Lady Southey AM | The Myer Foundation |
| Malcolm Tonkin | Hancock Victoria Plantations |
| Dr Sally Troy | Parks Victoria |
| Brian Walters SC | Flagstaff Chambers |
| Marcus Ward | National Forest Summit |
| Professor Bob Wasson | Centre for Resource & Environmental Studies, Australian National University |
| Mark Wootton | The Poola Foundation |
| Virginia Young | The Wilderness Society |
| Dr Lu Zhang | CSIRO |

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The Forestry Roundtable Meeting held in August 2002 at Marysville, Victoria, Australia, from which this book flowed, was made possible only because of the generous support of The Myer Foundation and the Poola Foundation. In particular, Charles Lane and Mark Wootton helped to keep the process on the rails. Bob Wasson, Director, Centre for Resource and Environmental Studies, provided considerable guidance in the nuances of successful roundtable discussions based on his extensive experience in the Australian water and cotton industry sectors. Ian Miles from the Victorian Department of Sustainability and Environment made a major contribution to the smooth running of the field day associated with the Roundtable Meeting.

The many participants at the Forestry Roundtable Meeting contributed extensively to very informative and useful discussions, and their ideas helped stimulate many of the authors in writing their essays to reshape the material in the chapters contained in this book.

Finally, we are most grateful to Nick Alexander from CSIRO Publishing for his assistance in making this book a reality.

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essay I share my perspectives on some of the important circumstances and issues regarding forest resources that national and global societies must address in the 21st century. The focus is primarily on temperate regions and the developed world. Because of the variety of social and economic factors, the challenges of tropical forest policies are currently and likely to continue to be very different from those affecting temperate and boreal regions.

Globalisation of the wood products industry

Globalisation of the wood products industry is, I believe, the most significant factor influencing the developing context for forest stewardship. Technology and globalisation of the world marketplaces are creating a new model for production of the bulk fibre needed to provide for the mass markets in wood products, such as paper and common wood construction materials.

The global marketplace, with its emphasis on moving activities to areas where lowest per unit cost of production can be achieved, fits perfectly with basic corporate goals. Consolidation also appears to fit the global paradigm so we can expect that a few very large, international, publicly traded corporations will increasingly dominate global markets in wood products. The goal of these corporations is to maximise their return on investment; hence, the net present value model will continue to dictate corporate forestry practices just as it has for at least 50 years. Net present value is the discounted values of the revenues and costs from the use of forest resources over time and allows investors to compare returns from different forest resource investments as well as with returns from alternative investments. Maximising net present value is, consequently, taken as the overall goal for forest management under this model.

Technological developments in forestry—as well as the fortuitous discovery of some unusual biological potentials—fit very well with the goals of global corporate forestry. First, there has been the recognition of the extraordinary production potential of some exotic tree species—initially, some pines and later (with development of appropriate pulping processes) eucalyptus species—on temperate, subtropical, and some tropical sites, primarily in the southern hemisphere. Second, there has been the increasing potential for enhanced production using bio-engineered trees—

initially by traditional breeding methods and more recently by direct manipulation of genes.

As a result of these developments, corporate forestry is moving to an agronomic model of wood fibre production and away from traditional forestry models. In effect, the move is towards the development of fibre farms in which intensively managed 'fields' of engineered poplars, exotic pines, and eucalypts are grown on short rotations of two or three decades—perhaps eventually in only a single decade. Adoption of the agronomic model has many advantages from the corporate perspective including much shorter investment cycles, high efficiency in per unit production costs, and reduced environmental constraints, since societies often have fewer expectations of farms—including fibre farms—than they have of areas that are clearly forests.

Temperate and subtropical regions of the southern hemisphere are primary sites for the development of corporate forestry's fibre farms for many reasons.¹ Locations include Australia, New Zealand, Chile, Argentina, Uruguay, southeastern Brazil, and South Africa. Productivity of exotic species is extraordinary on many southern hemisphere sites, often at the very upper limits of known wood production. Many of the sites have been previously used for agriculture or grazing so costs of preparing sites or mitigating environmental impacts is often low. The ability to use efficient equipment for tending and harvesting the plantations substantially reduces labour costs. Furthermore, labour and other production costs, including those related to environmental concerns, are typically lower in many countries at lower and southern latitudes than in North America and Europe.

The implications of these new opportunities for corporate investment in fibre production are inevitable. Few, if any, forest sites in the northern hemisphere can compete directly with fibre farms in the southern hemisphere even in terms of biological productivity, let alone total cost of production. Only the very best of the forest sites in the northern hemisphere can approach the productivity levels of exotic plantations in the southern hemisphere. When you add in the costs of labour, taxes, and environmental mediation in North America and Europe the advantages of

1 See Marchak, 1995

investing in agronomic wood fibre production in the southern hemisphere are very large. Indeed, the only advantage of north temperate forests appears to be in their proximity to large markets; unfortunately, transportation costs for finished products are typically not a high proportion of the total cost.

Hence, following trends in global production and marketing of the last several decades we can expect that corporate wood production is going to continue to move (1) to the agronomic model and (2) primarily to southern latitudes. It is inevitable based on the imperative of maximising return on investment. Please note that this shift is not about exporting North American or world demand for wood fibre to 'third world countries' that 'do not know how to manage their forests and have no environmental laws or regulations' as suggested by some observers. Also, generally we are not talking about cutting down native forests in order to provide space for exotic plantations, although this has occurred in the past. The majority of these plantations are on abandoned agricultural or grazing lands. Furthermore, these developments are not likely to significantly affect the fate of tropical forests. Over 85 per cent of the tropical tree harvest used for wood products is used in-country and does not enter world trade; the only significant global market for such wood is in environmental rogue states, such as Japan, China, Taiwan, and South Korea. These shifts in the locale and techniques for the wood products industry *are* the consequence of corporate decision-making based on standard business models and practices. These current developments have made a major contribution to the current glut of wood fibre in the global marketplace. They are likely to continue to provide excessive amounts of wood, at least until the consequences of the shift to fibre farming are fully recognised and appropriate adjustments are made. We can expect that there will be a significant competitive 'sorting out' among countries and regions that are heavily invested in fibre farming; factors affecting the outcome will include relative productive capabilities and total costs of production. Substantial improvements in productive capacity and reductions in costs of production can be expected in subsequent generations of fibre farming as a result of genetic modifications (traditional and genetically engineered) of the farmed species and technological developments in harvesting and processing.

Significant competitive ‘sorting’ among fibre farming countries and regions is likely to occur with these and other developments. In any case, the new-age fibre farms will certainly have the capacity to meet and grossly exceed global needs for bulk wood fibre for the next century, even in face of the rising global population. They can do so, efficiently and almost certainly without any need to use native forests, except as a source for particular specialised and valued wood products that cannot be mass produced under a short rotation agronomic regime.

Consequences of globalisation for stewardship of native forests

So, isn’t it a good thing that we can provide for the wood fibre needs of the world without having to manage any of our native forests? Certainly many participants in global and national forest policy debates think so. Substituting fibre farms for cutting in native forests has been a primary goal of environmentalists in Australia for well over a decade. New Zealand took its native forests ‘off the table’ as a matter of national policy over a decade ago to the joy of most environmentalists.

There are many stakeholders—institutional and individual—that favour ‘solving’ all our global forest policy debates by substituting exotic plantations for wood production from forests of native species, whether of primary or secondary status. These stakeholders span the spectrum from the wood products industry to hardcore environmentalists and are united in their desire to disengage from the intense conflicts over native forests that characterised the 20th century.

However, a major shift in the global wood products industry from forests and plantations of native species to fibre farming using exotic and bio-engineered species in southern latitudes creates an incredible array of new challenges for society. These include issues of:

- land ownership and use in an environment with decreased potential for economic return from those lands

- stewardship of public forest lands, including provision of the financial resources needed to monitor, protect, and appropriately manage these lands
- the health of the rural communities that are located within forested regions.

For example, in a region like northwestern North America, what will happen to private forest lands, especially the large corporate holdings, when forestry is no longer a profitable enterprise on these lands? Who will acquire them and for what purposes? How will those purposes fit with primary societal needs, such as maintenance of high-quality, well-regulated streamflows or secondary needs, such as open space for recreation and wildlife habitat?

On public lands, where are we going to get the financial resources needed to carry out essential stewardship and how are we going to maintain the skilled woods work forces that will be needed to do this work? How can we retain a capacity to process wood removed from these lands—a capacity that I believe will be important to achieving stewardship objectives on both private and public forest lands. What about the local communities whose fate is strongly linked to that of the forest? And trusts that depend on income from forest lands?

Most temperate forest regions are already struggling with the impacts of massive change, including globalisation, whether or not the ultimate dimensions of the change have been recognised. Some regions, such as the northeastern United States, have already had to cope with the departure of corporate forestry and the disposition of the large tracts of forest that they owned. Societal efforts in such regions to retain forest landscapes and values in the face of such changes provide valuable examples of both the challenges and potential solutions.

The complexities of all of these issues, including some of the potential solutions, are beyond the scope of this essay. However, one issue that I would like to address a little more thoroughly is the need for active management of native forests to maintain native forest function, biodiversity, and health, especially on public lands. As noted above, many stakeholders appear to believe that

‘preserving’ all native forests resolves our major forestry conflicts and allows us to return their management to ‘nature’. I do not agree.

A ‘solution’ to forestry issues that divides the world’s forests into fibre farms and native forests—the former to supply all of our wood products and the latter categorically ‘preserved’ from active management—I view as potentially dangerous for the temperate native forests of the world. In my view human society will need to be continuously engaged in active management of many native temperate forests even when they are no longer used as a source of wood products. I believe that the proffered ‘solution’—fibre farms and preserves—will often lead to undesirable outcomes for native forest function, biodiversity, and health and, consequently, the failure of these forests to fulfill the expectations and needs of human society.

The need for active management of forests

So, why do we need to be concerned about our commitment and capacity to carry out active management of native temperate forests? One very important set of reasons is that we have so altered the physical and biological context from those in which the native forests evolved. A second category of important reasons relates to the societal goals that we are setting for our native forest landscapes—for example protection of watersheds and maintenance of native biodiversity—that are clearly not likely to be met with *laissez faire* management.

Alterations in the physical and biological context for temperate forests are immense and numerous including:

- altered fire and other disturbance regimes
- altered regional and global environmental regimes, including climatic and chemical changes, such as those associated with acid rain
- introductions of exotic organisms, including virulent insect and disease pests, and other fauna and flora that damage, destroy, and compete with native biota
- fragmented landscapes in which both the amount and spatial pattern of specific forest conditions have been drastically altered.

There are *no* areas of our native temperate forests that are not significantly influenced by these altered physical and biological conditions. And the impacts of altered physical and biological conditions will intensify throughout the 21st century!

Altered fire and disturbance regimes

The issue of disrupted fire regimes provides an outstanding example of the need for human beings to be continuously involved in stewardship of extensive areas of temperate forest. Pre-modern human societies were very effective at modifying natural fire regimes by increasing the number, locales, and timing of ignitions. Modern human societies have been very effective at altering fire regimes in many forest regions by suppressing natural wildfire.

Forest landscapes in western North America provide an example of where natural fire regimes have been dramatically modified during the 20th century. This has been accomplished through a variety of activities including suppression of natural fires, logging of mature and old trees, and active management to create dense ('fully stocked') stands of young trees.

The effects of such activities have been particularly profound in the pine and mixed-conifer forests that evolved under a regime of frequent, low to moderate intensity wildfires.²

In these forests, fire suppression has been very effective over the short and mid term. Suppression has resulted in increased stand densities, increased fuel loadings, and greater continuity in fuels (ground-to-crown and crown-to-crown). In many forests, shade-tolerant tree species have largely replaced the shade-tolerant pioneer tree species that are important ecologically and have greater fire resistance. The potential for uncharacteristic stand replacement fires is now very high in many of these forests, putting native forest biodiversity and functions (such as watershed protection) at risk.

Active management of these forests is required to restore and maintain these ecosystems if they are to provide the conditions and services expected by local and global human societies. The negative consequences of allowing wildfire to return to these

2 See, for example, Agee, 1993, Sierra Nevada Ecosystem Project, 1996, and Quigley, 1996.