

governance caught my eye. A key message here was the importance of separating the body charged with the provision of scientific advice from the body charged with policy development and implementation. Similar to the separation of church and state, or the judiciary and the executive arm of government, this separation is a key to improved management practices.

On a limited budget, which of these volumes is worth the personal investment? If you are looking for an entertaining, albeit a somewhat depressing and overlong read, Ellis's book takes the honors in my view. Pauly and MacLean do a good job and write in an engaging style, but in the final analysis, I can't help but conclude that the material presented would have been better placed in a review article and that the key elements will probably appear in this format in due course. To my surprise, I found

Responsible Fisheries in the Marine Ecosystem the most thought provoking of the three. However, this is probably one to put on the list for library purchase and to dip into occasionally. Notional ranking aside, what is striking about these three volumes is the consistency of the message – the exploitation of the world's oceans is out of hand and we'd better do something about it soon.

References

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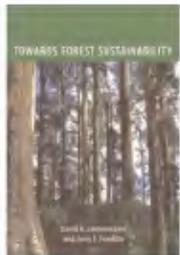
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Future shock for foresters

Towards Forest Sustainability by David Lindenmayer and Jerry Franklin. Island Press, 2003. £18.95 (212 pages) ISBN 1559633816

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For foresters in developed nations, life used to be relatively simple. For many, their *raison d'être* was to maximize the production of timber and wood fibre, which often involved large-scale clear-cutting of complex, old-growth forests (harvesting timbers that had taken centuries and even millennia to grow) and replacing them with monotonous, even-aged stands of commercially valuable species. Their mantra was simple: dense, old-growth forests were 'over-mature', prone to disease and fire. An open forest, dominated by young, fast-growing trees, was a healthy forest.

Fortunately, such dangerously simplistic views have now disappeared. Foresters today face a panoply of new demands, as described in *Towards Forest Sustainability*. Edited by two leading temperate-forest scientists, David Lindenmayer and Jerry Franklin, this book neatly summarizes many of the challenges now facing foresters and forest ecosystems.

Chief among these are growing social demands to manage native forests as crucial habitats for rare wildlife, to maintain natural hydrological regimes, to conserve soils and aquatic ecosystems, and to sequester and store carbon. Several chapters describe measures that are being devised to maintain sensitive wildlife in production forests. Among the most sophisticated are efforts led by Lindenmayer to ensure survival of Leadbeater's possum *Gymnobelideus leadbeateri*, the Australian equivalent of the northern spotted owl *Strix occidentalis*, an old-growth specialist

that has become a symbol of the conflict between pro-logging and pro-conservation forces. Because of intensive clearcutting and wildfires, the large, decaying trees that provide crucial den sites for the possums are now scarce. Fortunately, silvicultural systems that promote a multi-age stand structure, and the retention of unlogged patches, faunal corridors and hollow-bearing trees in production areas are helping to maintain some habitat for the possums. Comparable efforts are underway in Swedish forests, where the focus is on adapting logging practices to mimic the natural disturbance regime under which species in any particular environment have evolved.

Unfortunately, adapting forest management to mimic natural baseline conditions is difficult, given that the baseline is moving. Michael Soulé describes the waves of defaunation that have plagued North American forests, beginning with the extinctions of key species such as mastodons, ground sloths, and other megafauna by the recently arrived Amerindian hunters. This was followed by the near-extirpation of many furbearers by 17th century trappers, aggressive market hunting of bison *Bison bison* in the 19th century, and dramatic declines of wolves *Canis lupus*, grizzly bears *Ursus arctos horribilis* and other large predators by zealous ranchers in the early 20th century. Such dramatic changes in fauna have destabilized many forests; for example, because their natural predators have vanished, deer populations have exploded in the eastern USA, leading to a decline of herbs and seedlings and an increase in inedible ferns and coarse grasses in the forest understory.

Equally profound ecologically was the widespread extirpation of fire-using indigenous populations in North America, Australia and elsewhere, which sharply reduced

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fire frequency. In concert with decades of fire suppression by foresters, natural fire regimes have been dramatically altered, with concomitant changes in forest composition. Soulé argues that, because we often have no viable concept of natural baseline conditions or normal variability in forest ecosystems, the only viable strategy is to maintain all forest species and natural ecological processes, such as fire. He further asserts that large carnivores should be re-introduced to forests wherever possible, to help maintain natural abundances of their prey species.

In addition to such biological challenges, foresters are being forced to adapt to fundamental changes in the forest industry. One of the most profound changes is that, in some temperate areas, logging of native forests is being phased out altogether, in favor of wood from tree plantations. In particular, cutting of old-growth forests is declining because of intense pressures applied by conservation organizations that have initiated successful boycotts of companies that produce and use products from ancient forests. Even the famously recalcitrant Boise Cascade Corporation, labeled the 'dinosaur of the timber industry' by the Rainforest Action Network, which once floated a giant dinosaur balloon over the company's headquarters in Idaho, recently announced that it would phase out old-growth logging.

Finally, modern forestry is being rocked by the forces of globalization, as centers of production shift to where items can be produced most cheaply. In the case of rapidly

expanding tree plantations, where wood fibre is produced by fast-growing exotic species, this means a dramatic rise in production from the southern hemisphere. New Zealand has already shifted completely from logging its native forests to exotic-pine plantations, and several developing countries, such as Chile, Argentina and South Africa, are also becoming major tree-farming centers. This has serious ramifications for regions such as British Columbia, where well paid forest workers formerly generated a third of the global softwood production by cutting old-growth forests. Today, demand for British Columbian timber is collapsing under an influx of cheaper, environmentally more-benign wood from southern-hemisphere plantations.

If there is one constant for modern foresters, it is that nothing is constant. Shifting markets and production centers, changing environmental demands, the looming prospect of global climatic change, and a myriad of other challenges mean that the goalposts are constantly shifting for forest managers. For those interested in the conservation and management of temperate forests, *Towards Forest Sustainability* is important reading, for the profound changes it describes will have far-reaching implications for forest ecosystems and wildlife.

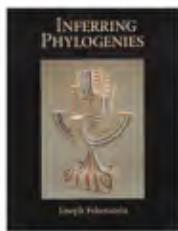
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Inferring phylogenies: an epic worth the wait

Inferring Phylogenies by Joseph Felsenstein. Sinauer Press, 2004. US\$59.95 (664 pages) ISBN 0 87893 177-5

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Few books in molecular systematics have been awaited with such anticipation. Rumors had been circulating for many months, even years, that Joe Felsenstein's long-promised *Inferring Phylogenies* was about to be published. Now that it has finally appeared, has it been worth the wait?

The author certainly sets out with an ambitious goal: to survey, in one book, the field of phylogenetics since computational methods entered the arena 40 years ago, and he amply delivers on this promise. The reader is taken on an engaging and varied tour of topics ranging from traditional and more recent methods for inferring, comparing and analyzing phylogenetic trees, to applications involving coalescent, alignment, biogeography and genomic data. There are chapters about the technicalities of drawing trees, and about applications of phylogenies to areas such as paleontology. Written from the author's distinctive statistical viewpoint, it is dense with refer-

ences, details, examples, figures, photographs, discussion and an occasional sprinkling of humor and anecdote (such as the footnote about the only contemporary systematist to be mentioned in a Hollywood film).

Just as *Inferring Phylogenies* succeeds in providing a comprehensive overview of the field, it also highlights Felsenstein's own interests and contributions. The author is well known for pioneering applications of model-based and statistical techniques to phylogenetics. He has championed this view in research papers and sometimes in vigorous debates, particularly with his long-time intellectual rival Steve Farris and with the philosopher Elliott Sober. Two of Felsenstein's contributions in particular have had a profound effect on the field: his early insights into the possible inconsistency of maximum parsimony [1] (in a region of parameter space now dubbed the 'Felsenstein Zone') and his development of maximum likelihood methodology for phylogenetics [2]. Sections of the book also focus on more esoteric topics, such as Brownian motion models for analyzing gene frequencies, and phylogenetic invariants.

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