

available at www.sciencedirect.comjournal homepage: www.elsevier.com/locate/biocon

Editorial

Forests in the balance: Linking tradition and technology in landscape mosaics

1. Introduction

The future of forests around the world is uncertain: forests are being cleared and the lands converted to other uses, while existing forests face many challenges from a variety of sources. The pressures on forests come from two usually opposing perspectives, timber production and wildlife conservation. This special issue volume attempts to bridge between these two disciplines and attempts to move towards an integrated approach for developing a forest conservation strategy. This volume is based on papers presented to two separate technical sessions of the XXII IUFRO World Congress, which was held in Brisbane, Australia on August 8–13, 2005 (IUFRO News, 2005). The themes of these technical sessions covered both the silviculture and management of rare, threatened and endangered tree species, and the management of forest landscape mosaics for production and conservation.

1.1. Silviculture and management of rare, threatened and endangered tree species

The survival and persistence of rare, threatened and endangered tree species is in doubt in many parts of the world. Although silvicultural information is readily available for many common tree species, there is a lack of information on the silviculture and management of rare species, and conservation of their genetic resources is necessary and important. Often information is lacking on natural stands, nursery practices, plantation establishment and management and utilization of these species. Data are needed on seed germination and seed storage of rare tree species, as well as on care of seedlings, genetic diversity, reproductive biology, seed dispersal, and insects and diseases. Modeling studies could help in assessing the potential for their survival. When forest restoration occurs, there is an opportunity to establish new colonies of threatened and endangered species, if enough information exists, and to increase biodiversity of the restored area.

The first paper on the silviculture of rare trees by Kristina Connor et al. reports on the importance of the fruit of pondberry (*Lindera melissifolia*), an endangered, dioecious, clonal shrub that grows in forested wetlands in the southeastern United States. With the emphasis placed on the clonal nature

of this species, little has been published about the early physical and biochemical characteristics of the fruit as they mature, but sexual reproduction and seed dispersal are clearly necessary for establishment of new colonies. This paper presents the first information about pondberry fruit development, fruit biochemistry, and seed maturation and storability. The authors conclude that fruit and seed production can play an important role in species survival.

The development of silvical guidelines for new blight-resistant hybrids of chestnut (~94% American chestnut) that should soon be available for reintroduction is discussed by Douglass Jacobs. American chestnut (*Castanea dentata*) once dominated the eastern deciduous forests of the USA, but nearly every tree throughout its range was killed by the introduced chestnut blight (*Cryphonectria parasitica*). Its ecological characteristics, including its ecological amplitude, its ability to survive for prolonged periods beneath forest canopies and to respond rapidly to disturbance, are discussed with reference to planting techniques and the potential for migration of regeneration into forests of the original American chestnut range. Furthermore, this paper helps establish preliminary guidelines for restoration plantings and discusses ecological issues and problems.

Antonio Todaro et al. then provide a compelling study that made use of tree ring-width patterns to indicate environmental changes and also to interpret the impact of anthropogenic activities (deduced from historical records) on *Pinus leucodermis*, a post-glacial relict species in the National Park of Pollino in Southern Italy. Grazing and logging had endangered the survival of *P. leucodermis*, especially during the 20th century. In 1993, a National Park was founded and anthropogenic activities were restricted. The authors suggest that recent socio-economic changes and protection strategies introduced by the National Park Institution are helping to preserve *P. leucodermis* high elevation stands. The recruitment and recovery of radial growth of the species indicate that the population is not as threatened today as it was in the past.

1.2. Managing forest landscape mosaics for production and conservation

The papers presented here aim to develop good practice where systems, trade-offs, tools and synergies promoting

production and biodiversity values could be shared among researchers and practitioners. Three themes emerge: Theme 1, the role that disturbance, at varying spatial and time scales, plays in determining biodiversity patterns through the landscape; Theme 2, the importance that maintaining production and conservation ethics in off-reserve tenures has in support of biodiversity objectives; and Theme 3, the strategies and decision-support tools that can be used to efficiently integrate conservation with production objectives.

The importance that variability in time and space of conifer and alder stands in Alaska contributes to biodiversity values is highlighted in Robert Deal's paper (Theme 1). Here, an approach is outlined for creating mixed conifer-hardwood mosaics, where conifers have previously dominated, and offers alternative silvicultural strategies to replace destructive clear-felling. These strategies have the potential to enhance the survival of threatened fauna in these forests.

The role that native eucalypt plantations play in supporting biodiversity in highly fragmented landscapes outside protected areas is emphasized by Richard Loyn et al. (Themes 2 and 3). The importance of on-site variables and landscape context is highlighted for bird species and groups of species. The paper provides better information for wildlife managers who wish to have information on the part different habitat components of a plantation play in determining the richness of species and functional guilds of birds.

One area that is of major concern for conserving forests is the identification of biodiversity hotspots. Ivar Gjerde et al. outline a tool for identifying such important biodiversity hotspots at forest stand level (Themes 2 and 3). While this paper analyses data from a large biodiversity project in Norway, it has produced a method that will be of more general international interest for identifying important biodiversity hotspots.

The final paper by Geoff Stoneman (Theme 3) discusses how the management of forest mosaics in Western Australia complies with the 'ecological forestry' concept proposed by Seymour and Hunter (1999). Here, forest management includes both silvicultural and forest management indicators in an ecological framework.

1.3. Overview

This volume synthesizes information on the silviculture and management of rare tree species and promotes integrated management approaches that allow both production and biodiversity to be conserved in forest landscape mosaics. We hope that they will be implemented, and help to ad-

vance forest production as well as enhance biodiversity values.

Acknowledgements

The authors thank the anonymous reviewers, who provided helpful suggestions for the manuscripts, the scientists from around the world who contributed to the discussion of production forestry and its integration with biodiversity objectives, and the members of Research Working Group 4 of the Standing Committee on Forestry for their support of the session on forest landscape management for production and biodiversity. The authors take this opportunity to extend an invitation to scientists whose organizations are members of IUFRO to join Research Group 1.07.00.

REFERENCES

- Forests in the balance: Linking tradition and technology, Highlights of the XXII IUFRO World Congress, Brisbane, Australia, 2005. IUFRO News 2005. International Union of Forest Research Organizations, Vienna, pp. 1–4.
- Seymour, R.S., Hunter, M.L., 1999. Principles of ecological forestry. In: Hunter, M.L. (Ed.), *Maintaining Biodiversity in Forest Ecosystems*. Cambridge University Press, Cambridge, UK, pp. 22–61.

Margaret S. Devall
Center for Bottomland Hardwoods Research,
P.O. Box 227, Stoneville,
Mississippi 38776, USA
Tel.: +1 662 686 3161
E-mail address: mdevall@fs.fed.us

Geoffrey C. Smith
Biodiversity Sciences Unit,
Queensland Environmental Protection Agency,
80 Meiers Road, Indooroopilly,
Queensland 4068,
Australia
Tel.: +61 7 389 69301
E-mail address: geoffrey.smith@epa.qld.gov.au

Available online 7 May 2007

0006-3207/\$ - see front matter
© 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.biocon.2007.03.009