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Peatland Forestry

Ecology and Principles

With 87 Figures and 28 Tables



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Preface

Peatlands (or mires) cover at least 550 million ha globally, of which the greater part is situated between 50° and 70° N. Although the majority of peatlands are not used for human needs, there are large areas where agriculture, peat or wood production has been practiced. The suitability of peatlands for forestry differs from country to country depending on climatic conditions, raw wood demand, silvicultural management practice and tradition, as well as the infrastructure in the remote areas considered.

Peatland utilization for forestry may be divided into three efficiency categories: (1) **exploitation** (harvesting of trees with inadequate attention to regeneration) leading to reduction in the renewable resource; (2) **silvicultural management** (harvesting of trees with natural or artificial regeneration) aimed at maintaining the renewable resource in a sustainable way; and (3) **progressive forest management** (drainage, fertilization, afforestation, thinning, ditch maintenance, final harvest and regeneration) aimed at increasing the renewable resource. In North America, forestry utilization is changing from exploitation towards a kind of silvicultural management whereas progressive forest amelioration activities on forested peatlands and waterlogged mineral soils are part of the normal forestry practices in Fennoscandinavia, the Baltic countries and Russia. In the British Isles afforestation of open peatlands is associated with drainage.

This monograph is a review and synthesis of peatland forestry on northern peatland (mire) ecosystems. It covers peat soil properties, mire hydrology, carbon and nutrient cycling, and classification of mire sites. The emphasis, however, is on peatland forests as a renewable natural resource. The approach originated in northern Europe. This is because in Fennoscandia, especially Finland, operational scale forest drainage has a long tradition based on research aimed at maintaining and increasing the wood production of peatlands. Whenever relevant, a closer look is also given to other countries in northern Europe, Canada, the USA, and to the British Isles in the temperate zone.

Forest amelioration has been shown to be profitable when only directed towards appropriate sites. Possible environmental consequences have to be taken into consideration – in both the planning and realization of measures to minimize harmful effects on the site, locally downstream and even globally on the atmosphere. Despite steadily increasing scientific progress, there are still gaps in our knowledge. Both basic and applied research, based on international cooperation, are needed to achieve further levels of silvicultural and progressive forest man-

agement on peatlands. We hope that this review will promote research activities in the fields concerned. By introducing progressive forest management to relatively small areas, it is possible to preserve untouched mires and old forests for future scientific research, teaching and recreation.

Our work would not have been possible without a close cooperation with colleagues not only with our home research and teaching units, the Finnish Forest Research Institute and University of Helsinki, but also with scientists and practical managers in both Finland and abroad. Also, the knowledge obtained during our visits to all countries where peatland forestry has been practiced, at least on an experimental scale, was useful in the preparation of this review. The original drafts of Chapters 1, 2, 3.1, 3.2, 3.4, 3.5, 4 and 6 were prepared by Juhani Päivänen and Chapters 3.3, 5, 7 and 8 were prepared by Eero Paavilainen. However, both authors take the responsibility for the final version.

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EERO PAAVILAINEN JUHANI PÄIVÄNEN

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