

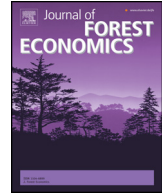


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Estimating the benefits of recreation-oriented management in state-owned commercial forests in Finland: A choice experiment



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ABSTRACT

As forestlands provide a variety of environmental services, the management of forest resources is a matter of public concern. In the present case of state-owned commercial forests in Finland, legislation requires specific management practices to enhance recreational benefits free of charge to the public. This choice experiment considers Finnish people's valuation of the recreation-oriented management of state-owned commercial forests to evaluate whether the recreational benefits produced justify the related loss of profits from timber sales. We focus on three management attributes: scenic buffer zones along lakes and rivers, habitats for game birds, and the quality of scenery as reflected by the frequency of clear-cut areas along hiking trails. Marginal willingness-to-pay (WTP) effects for the attributes are estimated with random parameters logit models specified in the WTP space, while preference-space models are used to estimate in physical terms the attribute levels that maximize the benefits to the public. Despite regional differences in preferences, people in all parts of Finland valued the current recreation-oriented management of state-owned commercial forests considerably. Nationwide, the aggregate benefits of recreation-enhancing management clearly exceeded the estimated opportunity costs. The most preferred

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levels of management attributes were slightly above the current levels, suggesting an increase in the provision of recreational services when not considering the associated costs.

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Introduction

Healthy forest ecosystems provide a wide variety of marketed as well as non-marketed goods and services, including timber and other material products, recreational opportunities, wildlife habitat, esthetically pleasing landscapes, and watershed protection. Accordingly, the management of forest resources is a matter of increasing public concern. A consequence is that forest managers and forest policy makers can greatly benefit from research results concerning the general public's or recreationists' preferences for management-related forest characteristics. During the last two decades, attribute-based stated choice methods such as choice experiments (CE) have been found to be particularly useful for resource management in considering the forest management regime as a set of attributes that have management or policy relevance (e.g., [Bennett and Adamowicz, 2001](#); [Holmes and Adamowicz 2003](#); [Holmes and Boyle, 2003](#)). By including a monetary attribute and varying several attributes in the choice tasks, a multidimensional valuation surface can be estimated and value trade-offs among the management attributes measured.

A number of CE studies of forest recreation and environmental benefits of forestlands have been conducted so far. Apart from a monetary attribute (cost of access, tax increase), these have focused on management attributes such as size and shape of harvesting gaps or evidence of forestry activity, especially clear-cuts ([Hanley et al., 1998](#); [Boxall and Macnab, 2000](#); [Holmes and Boyle, 2003](#); [Tyrväinen et al., 2014](#)), forest scenery related to management intensity ([Horne et al., 2005](#); [Christie et al., 2007](#)) or slash disposal ([Holmes and Boyle, 2003](#)), recreational access within the forest ([Adamowicz et al., 1998](#); [Boxall and Macnab, 2000](#)) or access to private forests ([Campbell et al., 2014](#)), as well as tree species and trees left after harvest ([Hanley et al., 1998](#); [Holmes and Boyle, 2003](#); [Campbell et al., 2014](#)). Management attributes considered also include opportunity to see, and populations of, wildlife species ([Adamowicz et al., 1997, 1998](#); [Boxall and Macnab, 2000](#)), hunting and fishing ([Schaberg et al., 1999](#)), area available for timber production or left aside ([Adamowicz et al., 1998](#); [Holmes and Boyle, 2003](#)), measures of biological diversity ([Garrod and Willis, 1997](#); [Adamowicz et al., 1998](#); [Horne et al., 2005](#); [Meyerhoff et al., 2009](#); [Thiene et al., 2012](#); [Tyrväinen et al., 2014](#)), recreational vs. ecological management ([Juutinen et al., 2011](#)), as well as riparian buffer zones and watershed protection ([Holmes and Boyle, 2003](#); [Schaberg et al., 1999](#); [Haefele and Loomis, 2001](#)).²

The present choice experiment study explores Finnish people's preferences for the recreation-oriented management of state-owned commercial forests (SOCFs) in Finland. Overall, state-owned forests cover about one third of Finland's forestry land and amount to 9.2 million hectares, a half of which is commercially managed forest ([Fig. 1](#)). The other half consists of wilderness areas, national parks, and other protected areas. These lands are managed by Metsähallitus, a state-run enterprise that remits the profits from forestry as well as other business operations to the government. In addition, Metsähallitus has public administration duties, such as the management of conservation areas.

Legislation poses specific requirements for the managers of SOCFs to provide environmental services along with timber ([Act on Metsähallitus, 2004](#)). Similar statutes exist, for example, in the USA ([National Forest Management Act, 1976](#)). Finland's SOCFs are estimated to host over 10 million close-to-home recreational visits annually ([Sievänen and Neuvonen, 2011](#)). To enhance recreation,

² [Lindhjem \(2007\)](#) provides a review of stated preference studies in Fennoscandia. For revealed preference data, [Thiene and Scarpa \(2009\)](#) consider site selection for alpine outdoor recreation, with attributes such as conifer vs. broadleaved forests. [Zandersen and Tol \(2009\)](#) provide a meta-analysis of European travel cost studies.

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