

## *A landscape approach to sustainable forest management and habitat quality modelling*

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### ABSTRACT

This work provides views and examples on how the holistic approach of landscape ecology can be considered towards the interplay between biodiversity value and the needs of forestry activities. Focusing on biodiversity conservation as a proxy for ecological dimensions of sustainable forest management the work proposes a series of requirements for the conservation of habitat networks and ecological processes to be met by forest landscape managers. This is particular challenging nowadays because of the increasing pressures to intensify wood production and timber exploitation. Nevertheless, there are also demands for improving the actions in favour of safeguarding biodiversity, and in a more general way improving forest ecosystems functioning. This twofold requirement of an optimized forest production and an environmental quality improvement represents a true challenge for the years to come. A fast reorganization of the system is needed in order to find the right balance between management within a forest ecosystem services approach at different scales. In particular, we need to consider a valorisation of wood resources and production, thorough knowledge of their vulnerability within an intensification management scenario.

Vis-a-vis of such stakes, which concepts, methodologies and tools can be validated on strong scientific grounds that can be proposed to the actors charged to implement policies and actions on the ground? Landscape ecology, proposes a comprehensive and integrative approach from the plot level to the landscape level, considering adaptive management and an analysis of ecological thresholds. Spatial conservation prioritization methods are applied to a national-scale conservation planning task.

Results from Boreal and temperate forests in Europe demonstrate the importance of forest habitat quality models and the development of a spatial framework to integrate information of protected and private forest land. The present analysis provides a large ecological scale approach, where certain natural disturbances can be considered. Forest management operations, can be targeted for the maintenance of the quality of the protected areas. The work opens questions regarding the needs for a comprehensive adaptive forest management. Adaptive management seems to be the only options that will contribute to balance multiple objectives under changing environmental conditions to improve forest management in a wide range of territories.