

# BOOK OF ABSTRACTS

## IUFRO 8.01.02 Landscape Ecology Conference 2017 The Green-Blue Nexus: Forests, Landscapes and Services

24 - 29 September 2017  
Halle (Saale), Germany



MARTIN-LUTHER-UNIVERSITÄT  
HALLE-WITTENBERG



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**The Green-Blue Nexus:  
Forests, Landscapes and Services**

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# **Book of abstracts**

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Landscape between Lednice and Valtice, South Moravia, Czech Republic. Author: Marcin Spyra

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***Solving multi-objective problems for multi-functional management in maritime pine forest landscapes***

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**Keywords:** FlorNExT Pro<sup>®</sup>, Portugal, forest mobilization, technology transfer, decision support systems

Forest management has followed many different concepts and philosophies over the last decades, the most recent of which favor the integration of multiple criteria and objectives in the management of forest ecosystems, ranging from the multiple use concept of the 1960's to the current multifunctionality and ecosystem services paradigms. These concepts require reliable and user friendly tools to be put into practice, in particular in regions where models and other decision support systems are not available. In this study we used FlorNExT Pro<sup>®</sup>, an operational research tool developed to facilitate management in socially and environmentally complex forest landscapes in the Northeastern region of Portugal, to solve multi-criteria problems. The tool was conceived to be easy to operate and to be able to produce management plans for groups of forest stands within this region according to varying objectives and restrictions. FlorNExT Pro<sup>®</sup> integrates forest growth, yield and management models with spatial data concerning management units within a certain management area, including the limits of all the forest stands, and alphanumeric information on current forest stand attributes. The tool requires that all possible management options (thinning and final cut) for each stand are established which is done through the definition of the number and duration of management periods by the user. Considering also general restrictions (minimum and maximum thinning and minimum final cut), limits (maximum final cut area, maximum thinning area, minimum and maximum volume per period), and management objectives (Net Present Value (NPV), volume, carbon sequestration, fire hazard) the tool solves the complex optimization problem through linear programming methods. We applied FlorNExT Pro<sup>®</sup> in the Lomba ZIF area (Vinhais municipality, Northeastern Portugal) to find optimal management solutions for particular objectives addressed individually (maximum biomass production, maximum large size timber production, minimum forest fire hazard, maximum carbon sequestration) and for combinations of objectives (e.g., balanced production of biomass, timber, and low fire hazard). Individual and multiple-objective solutions were compared based on indicators such as net present value (NPV), net carbon captured, and probability of fire occurrence, among others. Results show that the process of optimizing forest management at the landscape level is easily handled in FlorNExT Pro<sup>®</sup>. The tool proven to be a reliable and flexible tool to integrate multiple criteria and objectives into solving spatially explicit complex management problems which makes it particularly suitable for the preparation of forest management plans at the landscape level to address multifunctionality and to overcome technical planning problems in multi-owned or communal land. FlorNExT Pro<sup>®</sup> facilitates technology transfer to promote forest management in areas lacking decision support tools.