

BOOK OF ABSTRACTS

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

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Halle (Saale), Germany



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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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Pérez-Rodríguez, F., Sil, A., Honrado, J., Carvalho-Santos, C., Nunes, J. P., Azevedo, J. C.

Multi-objective forest landscape management based on expert opinion in Northeastern Portugal

Institution: CIMO, Instituto Politécnico de Bragança, Portugal

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Forest management planning is a complex process of defining and coordinating forest management activities according to particular goals and objectives. Spatial heterogeneity, either resulting from environmental variability and disturbance or from societal variables (ownership, governance, preferences), contributes to increase the complexity of management problems and the solutions that can be found for particular targets. The trend to address several ecosystem services simultaneously as management criteria and objectives accounting for the way these vary in space, make the process even more complex. Tools to integrate this diversity of conditions, criteria and objectives have received strong interest in recent years and several applications are now available in academic and professional environments in several parts of the world. In the region of Bragança, North-eastern Portugal, operational research tools recently developed with the goal of increasing management and wood mobilization in the local forest sector, allow ecosystem services to be addressed from heuristics, multi-criteria and multi-objective perspectives.

In this study we addressed the management of maritime pine stands in the region of Bragança to optimize the supply of timber, water and mushrooms. For that we used a modified version of the forest management decision support system tool AppTititude[®], based on a heuristic approach and combining forest growth and yield dynamic models, expert opinion and multi-criteria decision making methods on a spatially explicit basis. The tool considers supply, demand and supply-demand interactions for timber, water yield and mushrooms in forest stands. It considers also user-defined scenarios that are based on constraints and limits (minimum and maximum) to find the best solutions for the supply of the three ecosystem services addressed. Expert opinion was used in the valuation of maritime pine wood from the point of view of the industry demand, mushrooms production and water yield, based on questionnaires build with several criteria and sub-criteria selected for each of the services. Analytic Hierarchy Process (AHP) was used to calculate weights for each criterion in a decision tree and Multy-attribute utility theory (MAUT) to link weights with the weight utility model for each attribute in the spatial dataset of the Bragança region. The combination of these methods results in suitability maps for the three ecosystem services in the entire region. The interactions between supply and demand solutions were found through linear programming based on consensus among value, price and/or quantity according to the rules applied yearly in every unit of the Bragança region grid for a simulation horizon of 20 years. We present and evaluate the results of the simulations run in AppTititude[®] providing the best solution scenarios for the forest management problems in the Bragança region, balancing timber, mushrooms production and water yield. We discuss also the effects of multi-objective management approaches on wood supply in the region.