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# Trade offs Between Sustainable Forest Management in Conservation Areas and Carbon Balance in Wood Products

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## Abstract

Sustainable forest management is a strategy for dynamically adapting to changing conditions, such as climate change. This comprehensive strategy seeks to balance social, environmental, and economic interests, which can sometimes be conflicting. Emphasizing management activities that target specific ecosystem services can directly influence forests' capacity to perform their functions effectively and equitably. Wood production is considered as the main benefit of the forests and is directed towards the production of harvested wood products. The carbon storage in wood products and their substitution for fossil-based materials and fuels enhances the overall forest sector's contribution to the carbon balance. The ongoing transformation of conservation areas in Slovakia, defined by the Envirostrategy 2030, has introduced changes in forest management of protected areas by establishing territories without human intervention. These areas should reach 50% by 2025 of the total area of each national park. The aforementioned change in the care for forest ecosystems will affect, among other things, the production of wood. The objective of the study is to analyze trade offs between forest management changes in conservation areas and the volume of carbon stored in wood products due to the availability of wood raw materials. Projected volume data for three scenarios considering 20% (baseline), 50% and 75% non-intervention management regimes are redistributed into the roundwood quality categories and used for estimates of wood product outputs. Finally, Standard IPPC procedures are applied to calculate volume and changes in carbon stored in wood products by 2040 under each scenario. The key findings of the study confirmed that in the most extreme scenario, the volume of harvested timber from these areas is expected to decrease by over 70% till 2050. As a result, the forest-based sector will face shrinking timber supplies with the softwood sawmilling sector as the most affected and carbon pool in wood products will tend to decrease and the future carbon emissions will overcome captures. As a part of ongoing research, the overall assessment is considering the whole forestry and forest-based industry contributions to carbon balance as well as other social, economic and environmental aspects.

**Keywords**: *Sustainable forest management, Conservation areas, Carbon balance, Wood products*