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A Decision Support System for Sustainable Forest Management and Ecosystem Service Provisioning at the Enterprise Scale †

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Abstract: Forest management is becoming increasingly complex due to increasing demands in ecosystem service provisioning and future climate change impacts. For a sustainable forest management, scientifically well-founded decision support is therefore urgently required. Within the project SessFor, a decision support system for strategic planning at the forest enterprise level is being developed, based on the climate sensitive forest model SwissStandSim and initialized from forest inventory data. The system is currently applied to the forest enterprise Wagenrain (440 ha), located in the Swiss Plateau region. Indicators for biodiversity and ecosystem service provisioning (timber production, recreation value and carbon sequestration) are calculated for different management strategies and evaluated using a multi-criteria decision analysis. Preliminary results demonstrate the suitability of the system to evaluate ecosystem service provisioning under different management strategies and to identify the best management strategy, based on criteria defined by the forest manager. Furthermore, results show how the system can be used to assess developments for time-scales of 50-100 years under different climate change scenarios. In the ongoing project, the system will be applied to other case study regions, including mountain forests, which are of key importance in Switzerland and other alpine areas.

Keywords: sustainable forest management; decision support system; forest development; biodiversity conservation; ecosystem service provisioning; multi-criteria decision analysis; climate change