DEVELOPING A STAND DENSITY MODULE IN LANDIS

TO IMPROVE SIMULATION REALISM OF STAND DYNAMICS

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ABSTRACT

Long-term landscape modeling is dependent on various forest dynamics including large-scale disturbances, environmental effects, land management and stand-scale succession. The stand density module was designed for LANDIS to link stand-level processes with large-scale landscape phenomena. The stand density module design is built based on the simple models of ecosystem processes which are suitable for large-scale landscape modeling. The stand density module is invented as a module that requires minimal parameterization and can be calibrated with empirical stand data. The stand density module predicted the basal area very accurately based on comparisons with the field data in spite of the simple model framework. The stand density module can interact with other modules in LANDIS reciprocally, thus the combined results allowed us to analyze the effects of various management regimes, inter- and intra-specific competition and interactions between disturbances on stand-level ecological processes. Finally, the stand density module in LANDIS provides valuable feedbacks between stand dynamics and large-scale ecological processes.