



FIA–FSP Forest Science Corner

FORCEE helps to manage mixedwoods

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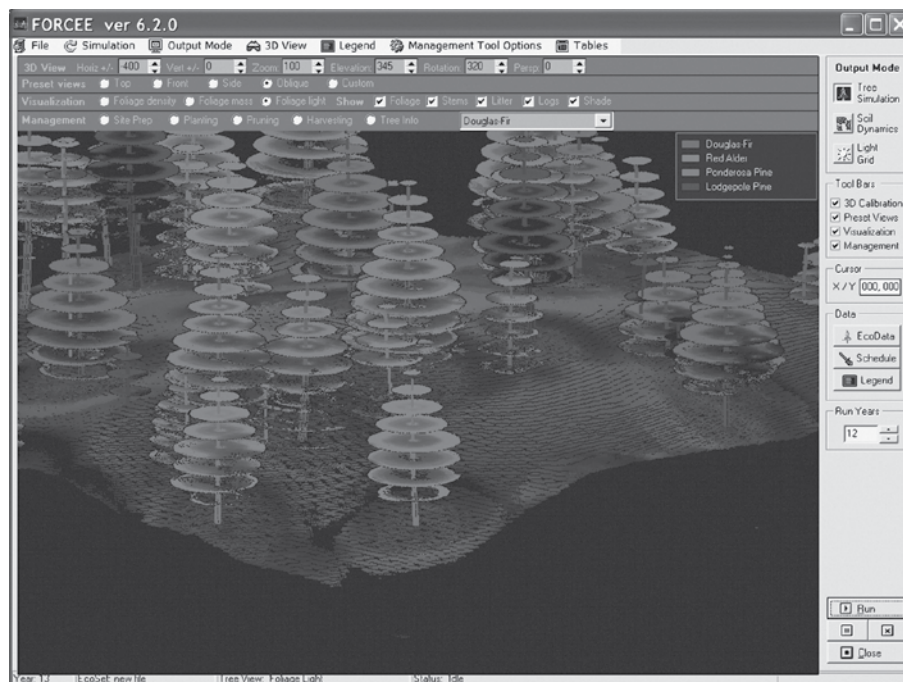
Mixedwood forests have distinctly different biological and ecological characteristics as compared to monoculture forests. These differences have implications for wildlife habitat, regeneration, biodiversity, operability, and timber quality. The structure and dynamic nature of mixedwood forests presents a number of management challenges, one of which is how best to project their growth, development, and timber yields. Traditional, empirically based models are best suited to even-aged monoculture plantations. Mixedwood forests require ecosystem-level models to capture the complexity of the interactions within and between tree species, between the overstorey and understorey, and with abiotic conditions.

Through funding from the BC Forest Investment Account–Forest Science Program (FIA–FSP), a spatially explicit, individual-tree, complex stand simulator, FORCEE, is being developed at the University of British Columbia (and computer coded by Life Science Programming Ltd.). FORCEE simulates ecosystem development using a pixel-based approach with 10 x 10 cm resolution. Work so far has linked together subroutines for nutrient cycling, nutritional regulation of vegetation growth, and the competitive effect of minor vegetation on

tree growth. Also simulated have been light competition and light regimes created around each individual tree. Although more work is needed to link all the ecological processes together, foliage and stem growth and soil layers have also been represented in the model. Another development is a basic interface that allows users to edit calibration data and to explore results (see figure).

In this final year of development, empirical data on the performance of boreal and sub-boreal mixedwood stands under alternative stand management strategies will be used for preliminary model calibration and partial validation. When completed, the validated model will be useful for exploring mixedwood and complex stand policy and management options, and for communicating the possible long-term consequences of alternative mixedwood management practices. A key question to be addressed with FORCEE is: At what spatial scale of mixing are the various biological, ecological, economic, and management costs and benefits of mixedwoods achieved? In the future, the model will be able to address the possible consequences of climate change on mixedwood dynamics. 🌲

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FORCEE interface.