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**MODELING FOREST SUCCESSION IN BALSAM FIR-RED SPRUCE-
YELLOW BIRCH
MIXEDWOOD ECOSYSTEMS USING THE ZELIG MODEL**

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The mechanisms of succession are still poorly understood for most forest ecosystems. Gap models are very useful for better understanding the mechanisms of change and predicting the patterns of succession in forest ecosystems. Considerable research has been devoted in recent years to the development and calibration of various gap models. However, as there are few historical data for forest ecosystems, the validation of gap models has been more problematic. The objective of the present study was to calibrate and validate the ZELIG model for balsam fir-red spruce-yellow birch mixedwood ecosystems in southern Quebec. Historical data obtained from an experimental design of permanent sample plots established in 1936 were used to compare the results of the simulations with reality. Several reasons justified the selection of ZELIG for the present study. ZELIG integrates in simple terms the main ecophysiological mechanisms of tree growth and stand development. Also, it remains relatively general for application for different forest types and is adapted for complex stand structures, such as uneven-aged mixed stands. The validation of ZELIG was performed using data from undisturbed and disturbed sites that were subject to two levels of partial cuttings.