

Public Abstract

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Evaluation of the private forestland ownership parcelization and its effects on the forest landscape in the southeastern Missouri Ozarks

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The recent increase in forestland ownership parcelization has stirred worries as management activities can result in fragmented harvest events, which may influence the composition, structure and spatial pattern of the forest landscape. Due to the complexity of the processes and the spatial and temporal scale involved, a tool such as forest landscape simulation models is required to investigate the ecological consequences. First, a computer model was developed to create forestland ownership patterns that are strongly characterized by the shape of the underlying Public Land Survey System (PLSS) structure, and the highly parcelized size distributions. Model performance is evaluated by comparing with the actual ownership pattern, and is applied for simulating ownership patterns of various parcelization levels. Second, a transition matrix model, based on the plat books of 1930 and 2000, is used to characterize the recent changes in forestland ownership parcelization. Results suggest a strong tendency towards further parcelization, characterized by parcel size classes smaller than 100 ha, and reveals the significant contribution from large purchases from the Pioneer Forest. Third, the harvest regimes characterized by a parcelized ownership landscape is spatially implemented for a forest landscape simulation model – LANDIS – to evaluate its short-, mid- and long-term effects on forest composition, age structure, and spatial pattern. A  $2 \times 2$  factorial design for ownership parcelization and harvest intensity is used. The results suggest that changes will be dominated by the successional process, with significant but limited effects from parcelization levels and harvest intensities. The implications and limits of the application are discussed.