Managing landscape spatio-temporal heterogeneity for biodiversity conservation

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Abstract

Although the concept of biodiversity emerged 30 years ago, patterns and processes influencing ecological diversity have been studied for more than a century. Historically, ecological processes tended to be considered as occurring in local habitats, spatially homogeneous and temporally at equilibrium. However, the increasing recognition of environmental heterogeneity and its role for biodiversity resulted in the emergence of landscape ecology, whose major goal is to understand how spatial and temporal heterogeneity influence biodiversity. To achieve this goal, researchers came to realize that a fundamental issue revolves around how they choose to conceptualize and measure heterogeneity. Indeed, observed landscape patterns and their apparent relationship with biodiversity often depend on the scale of observation and the model used to describe the landscape. Due to the strong influence of island biogeography, landscape ecology has been focusing primarily on spatial heterogeneity and the role of patch structure, patch context and mosaic heterogeneity for biodiversity. More recently, the increasing recognition of the role of temporal scale has led to the development of new conceptual frameworks acknowledging that landscapes are not only heterogeneous but also dynamic and that species and ecosystems respond to environmental changes with time lags. The current challenges now remain to truly integrate both spatial and temporal dimensions in studies on biodiversity and to understand how complex interconnections between social and ecological processes shape socio-ecological landscapes, maintain biodiversity and ecosystem services.

Keywords: landscape ecology, landscape heterogeneity, biodiversity, conservation, socio, ecological landscapes

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