

Forest community composition in riparian and upland sites in the Northern Highlands Lake District, Wisconsin, USA

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Understanding the patterns and causes of spatial heterogeneity in terrestrial vegetation has long been of interest in ecology. Land-water mosaics offer an opportunity to understand the effects of a dispersed pattern of permanently open patches on the composition and structure of terrestrial vegetation. The Northern Highlands Lake District is a spatially complex landscape dominated by diverse forests and shrublands (81% of surface area) and lakes (> 8,000 lakes covering 13% of the surface area). To contrast the terrestrial vegetation adjacent to and distant from lakes, we measured forest community composition and stand structure in four pairs of 100-m² plots on each of 15 lakes during the summer of 2001-2002. One plot in each pair was immediately adjacent to the lake and the other was 70 m inland. We observed similar tree species richness in the riparian and upland plots (21 and 24 species, respectively), although species composition differed. Riparian sites were dominated by *Abies balsamea*, *Acer rubrum*, *Pinus strobus*, *Betula papyrifera*, and *Alnus rugosa*. Upland sites were dominated by *Acer saccharum*, *Acer rubrum*, *Abies balsamea*, *Populus grandidentata* and *Quercus rubra*. Stand density and basal area were similar on riparian (median density = 1092 stems ha⁻¹, median basal area = 27.2 m² ha⁻¹) and upland (median density = 883 stems ha⁻¹, median basal area = 26.7 m² ha⁻¹) sites, but riparian sites were more variable in both density (275 – 1767 stems ha⁻¹ vs. 720 – 1558 stems ha⁻¹) and basal area (11.0 – 40.0 m² ha⁻¹ vs. 19.2 – 39.4 m² ha⁻¹). Although stand structure is similar, species composition on upland sites is shifted toward late-successional hardwoods, which suggests that the vegetation of this lake-rich landscape is dependent on the spatial pattern of lakes. An explicit consideration of riparian edge may be important for studies of ecosystem processes in dissected landscapes such as the Northern Highlands Lake District.

Key words: Spatial pattern, scale, mixed-hardwood forest, plant community

Sections: Forest Ecology, Landscape Ecology