

Relative importance of habitat quantity, structure, and spatial pattern to birds in urbanizing environments

Roarke Donnelly · John M. Marzluff

Published online: 28 April 2006
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Abstract Urbanization reduces the quantity of native vegetation and alters its local structure and regional spatial pattern. These changes cause local extirpations of bird species associated with native vegetation and increases in the abundance and number of bird species associated with human activity. We used 54–1 km² landscapes in the Seattle, Washington, USA metropolitan area to determine (1) the relative importance of habitat quantity, structure, and pattern to bird diversity and abundance and (2) whether housing developments can be managed to mitigate the negative impacts of urbanization on forest bird diversity. In general, bird species richness was high and many native forest species were retained where urban landcover comprised less than 52% of the landscape, tree density (especially that of evergreens) remained at least 9.8 trees/ha in developments, and forest was at least 64% aggregated across the landscape. These results suggest that the quantity, structure, and pattern of forested habitat affected breeding bird diversity in urbanizing landscapes. However, habitat pattern appeared less influential than other habitat attributes when results from all community- and population-level analyses were considered. Conservation of native birds in reserves can be supplemented by managing the amount, composition, structural complexity, and—to a lesser extent—arrangement of vegetation in neighborhoods.

Keywords Bird · Conservation · Fragmentation · Landscape · Pattern · Urban · Vegetation

Introduction

As Earth's human population grows, it becomes more concentrated in and around urban centers (Berry, 1990; Vitousek et al., 1997; United Nations, 1999). Even developed nations with

R. Donnelly (✉) · Present address:
Biology Department, Oglethorpe University, 4484 Peachtree Rd. NE, Atlanta, GA 30319, USA
e-mail: rdonnelly@oglethorpe.edu

R. Donnelly · J. M. Marzluff
Box 352100, Environmental Science and Resource Management, College of Forest Resources,
University of Washington, Seattle, WA 98195-2100, USA