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Letter to the Editor

Plants of a feather: Spatial autocorrelation of gardening practices in suburban neighborhoods

Dear Editor

Daniels and Kirkpatrick (2006) provide an important perspective on bird conservation in human dominated landscapes. They investigate effects of the composition and structure of individual gardens on the presence of bird species in urban residential areas. Focusing on this small scale has clear conservation potential and promotes tools for local land stewardship. In addition, they carefully account for some potentially confounding effects of larger scale landscape and environmental variables. We argue, however, Daniels and Kirkpatrick have neglected some key processes occurring at the intermediate scale of neighborhoods, a spatial scale corresponding more closely to that appropriate for bird studies. We suggest that a three-pronged approach, addressing both individual gardens and those of their surrounding neighbors along with broader scale landscape variables, will provide the strongest insights into opportunities for enhancing urban biodiversity.

Since a large proportion of urban green space exists as private gardens, their management has a significant impact on urban biodiversity conservation. Few previous studies have addressed habitat in individual gardens. Thus, Daniels and Kirkpatrick ask a highly practical question; can gardening practices of landowners influence urban bird community composition? Their answer, for their study area in the vicinity of Hobart, Australia, is largely affirmative. In comparing effects of broader landscape variables versus small scale garden variables, both are significant, but local scale variables have stronger effects. The presence of native plants, for example, has stronger effects on native bird abundance, than landscape variables indicative of intensity of urbanization or environmental gradients.

Birds are highly mobile animals and most species require areas larger than the 50–1600 m^2 gardens included in the study. As Daniels and Kirkpatrick acknowledge, it is unlikely an individual garden can provide the required resources to sustain viable bird populations. Thus, a potential criticism of any study focusing on such small scales is that the actions of a single landowner are unlikely to affect bird populations. But landowners are not strictly independent of one another. Neighbors influence one another's gardening practices, residents may select housing based partly on conditions of gardens on surrounding lots, and civic organizations regularly modify vegetation throughout a neighborhood.

Two sociological processes have been hypothesized to generate patterns of relative homogeneity of features across gardens within a neighborhood (Fig. 1a): social stratification and the "ecology of prestige" (Grove et al., 2006). Social stratification, a venerable term in urban sociology, refers to the unequal distribution of resources in different portions of a city, partly due to differential access to power by residents of higher socioeconomic status. The ecology of prestige is a newer concept, reflecting the dual influences of lifestyle (e.g. retired residents versus those with young children) and prestige ("keeping up with the Joneses") on residents' management regimes. Such processes might be harnessed to generate a neighborhood level conservation ethos through friendly competition for wildlife habitat amongst neighbors.

Daniels and Kirkpatrick do not explicitly consider the aggregate effects of managing many small gardens in a similar fashion. Thus, we can only speculate on how birds use surrounding gardens in their study. The key issue is whether the focal gardens in each study are surrounded by similar gardens (Fig. 1a) or are relatively unusual within their neighborhoods (Fig. 1b). Under the scenario in Fig. 1a, the correlations Daniels and Kirkpatrick find between vegetation structure of focal gardens and presence of birds species might more accurately be due to spatial autocorrelations in patterns of vegetation structure, attracting bird species both to the focal garden and to nearby gardens.

Inherent in the question of gardening practices addressed by Daniels and Kirkpatrick is the challenge of a scale mismatch: the scale at which conservation initiatives can be implemented versus the scale at which the organisms respond to conservation initiatives. Previous studies of urban birds have focused more on the latter and less on the former. Daniels and Kirkpatrick are to be applauded for addressing the impacts of practices of individual urban property owners. However, we argue that conservation initiatives in urban areas should be implemented at *three* spatial scales: the

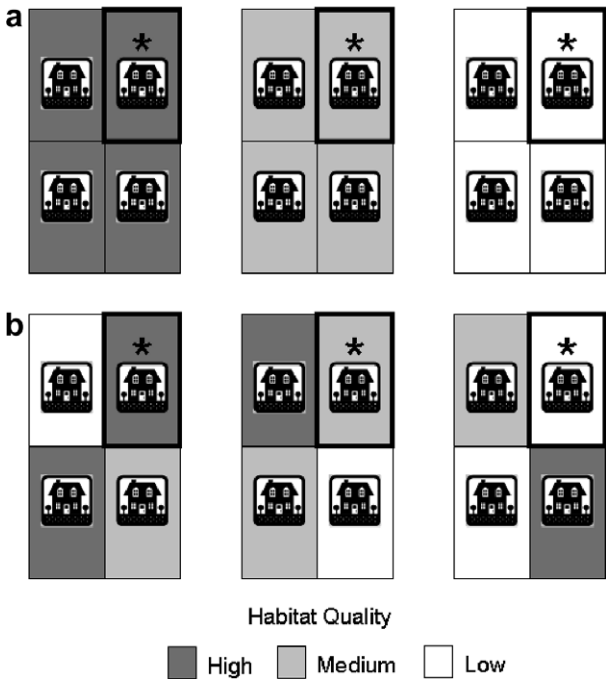

Fig. 1 – Habitat characteristics of focal private gardens (*) may be either correlated (a) or uncorrelated (b) to that in surrounding gardens, shown here as simple aggregations of just four properties. Daniels and Kirkpatrick (2006) do not distinguish between scenarios a and b. Several sociological processes have been hypothesized to lead to the kind of spatial autocorrelation illustrated in series a.

individual garden, the neighborhood and the city or metropolitan region. All three have value and should be addressed in studies of urban biodiversity.

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REFERENCES

Daniels, G.D., Kirkpatrick, J.B., 2006. Does variation in garden characteristics influence the conservation of birds in suburbia? Biological Conservation 133, 326–335.

Grove, J.M., Troy, A.R., O'Neil-Dunne, J.P.M., Burch, W.R., Cadenasso, M.L., Pickett, S.T.A., 2006. Characterization of households and its implications for the vegetation of urban ecosystems. Ecosystems 9, 578–597.

Paige S. Warren
Department of Natural Resources Conservation,
Holdsworth Hall,
UMass-Amherst,
Amherst, MA 01003,
United States
Tel.: +1 413 545 0061; fax: +1 413 545 4358.
E-mail address: pswarren@nrc.umass.edu

Susannah B. Lerman
Noah D. Charney
Graduate Program in Organismic & Evolutionary Biology,
319 Morrill S,
UMass-Amherst,
Amherst, MA 01003,
United States

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