

Human Socioeconomic Factors and Avian Diversity: A Cross-Site Comparison

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Introduction

A variety of measures have been advanced as predictors of ecological patterns in urban areas, such as human population density, building density, and canopy cover. These biophysical measures, however, either singly or in combination describe only a portion of the habitat structure that is important for wildlife. For example, neighborhoods with the same housing density can be landscaped with different kinds of plants. Thus, other tools are necessary to predict variation in the quality of habitat provided by urban patches. In our studies of small, neighborhood parks in Phoenix, AZ, we found that the socioeconomic status (SES) of the neighborhoods around the parks was one of the best predictors of bird community structure within them. Human behaviors, values, and resource consumption levels, which may vary by SES, can influence factors such as the habitat, food availability and predation rates for other organisms. An advantage of using SES's over direct measures of the factors influencing biotic communities is that information on SES is widely available. If this measure of human socioeconomic status can act as a surrogate for critical ecological conditions, then we can begin to predict species distributions in urban areas over broader geographic scales.

Hypothesis

We predicted that human socioeconomic status (SES) would show a similar correlation with avian species richness in both Phoenix and Baltimore.

Methods

We selected parks in both cities that were similar in size (<15ac) and facilities (open turf, playground equipment and/or sports facilities – see Fig. 1).

Using market cluster data from PRIZM, we selected parks in relatively homogeneous neighborhoods with respect to human socioeconomic and lifestyle characteristics (Fig. 2).



Fig. 1

Why Parks?

- A park is both a locus for daily interactions of people with nature and for social interactions among people.
- Small urban parks may reflect ecological conditions characteristic of a greater portion of the neighborhood

Why Birds?

- Birds respond to a complex suite of landscape features that might be intentionally or unintentionally manipulated by humans.

Preliminary Results

- Although bird species richness is correlated with income (a surrogate for SES) in both cities, income and SES explain much higher proportions of the variance in Phoenix.
- The two most significant factors predicting avian species richness at Baltimore sites are park area and human population density (Figs. 4-5).
- These two factors were relatively unimportant in predicting avian species richness in Phoenix (Figs. 4-5).

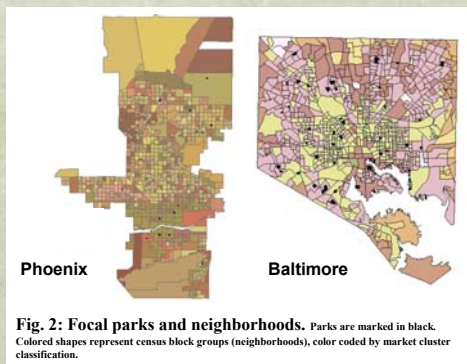


Fig. 2: Focal parks and neighborhoods. Parks are marked in black. Colored shapes represent census block groups (neighborhoods), color coded by market cluster classification.

— Phoenix (N=16)
— Baltimore (N=50)

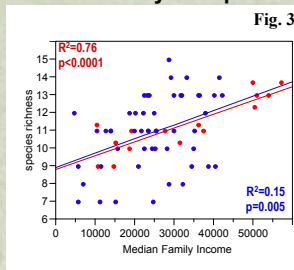


Fig. 3

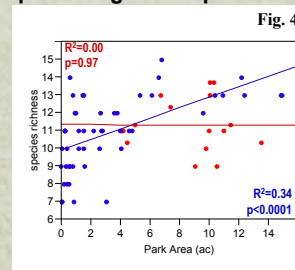


Fig. 4

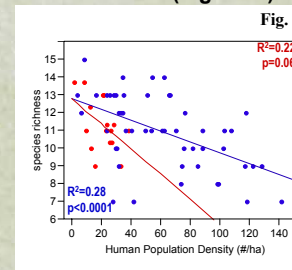


Fig. 5

NOTE: The absolute species richness numbers shown for Phoenix and Baltimore are not directly comparable, due to differences in avian census methods used.

We conducted point count censuses for birds:
Phoenix: 15 minute counts, 3 observers, 4 times per year.
In Baltimore: 5 minute counts, 1 observer, 3 times per season.

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Conclusions

Birds in Baltimore appear to be less sensitive to differences associated with human socioeconomic status and more sensitive to overall human density than birds in Phoenix. In addition, the ecological characteristics of parks in Baltimore appear to be more strongly area-dependent than those in Phoenix. We propose two possible reasons for these differences:

- The effects of socioeconomic difference on birds are mediated largely by the habitat found in yards. In cities like Baltimore with small or nonexistent yards (high human densities), these effects will be lost.
- There may be greater contrast between the habitat provided by parks in Baltimore and that found in the surrounding neighborhoods, making these sites more strongly area-dependent.