Appendix S1

Current street tree communities reflect race-based housing policy and modern attempts to remedy environmental injustice

Karin T. Burghardt, Meghan L. Avolio, Dexter H. Locke, J. Morgan Grove, Nancy F. Sonti, and Christopher M. Swan

Journal: *Ecology*

Determining appropriate DBH size class ranges.

Size-class cut-offs were selected *a priori* using expert opinion and previously published research on size class distributions in cities (Morgenroth, Nowak, and Koeser 2020). Street trees in Baltimore are typically planted at 1-2 inches DBH. Including trees up to 5 inches thus captures a number of years of post-planting growth, while being small enough to exclude from this group old trees even from species that grow slowly or have small maximum sizes. An application of this threshold to our dataset across HOLC grades showed adequate sample coverage for even the HOLC grade of A with the smallest number of trees in this category (Fig 2A; Fig S1) The "large" (old) category was initially chosen to be DBH ≥ 25 inches to focus on the oldest cohort that may even have been alive during the redlining process. Unfortunately, when this cutoff was applied to the dataset only 250 trees in HOLC grade D fit the criteria (Fig. 2A) which is not a sufficient sample size for robust community analysis. We therefore lowered the threshold for large trees to DBH ≥ 20 inches. This increased the sample size to ~750 in grade D and showed saturation in the accumulation curve for Shannon's effective species number (Fig. S1) indicating we are adequately sampling the dominant community members for compositional analysis.

Comparing number of viable street tree planting locations across HOLC grade.

Opportunities to plant street trees across a city are not uniformly distributed. For example, neighborhoods with fewer streets likely have fewer viable planting locations. We assessed if HOLC grades differed in the number of viable tree planting locations. To do this, we used the full dataset that included all viable street tree locations including living trees, dead trees, stumps, and currently unoccupied locations found within each hex. Collectively, we refer to these sites as the total *viable* street tree locations. Neighborhoods with lower street density have a reduced capacity for street tree abundance in a given area compared to neighborhoods with a greater total length of streets. If total viable street tree locations systematically vary by HOLC grade level, then we cannot accurately compare living tree densities. To test this question, we used the lme4 package to construct a generalized linear mixed model (family=Poisson) to determine whether the number of viable street tree locations varied by HOLC grade. Hexes were the units of analysis in the model with HOLC grade as a fixed effect and HOLC-defined neighborhood as a random intercept to account for the non-independence of hexes in the same neighborhood. Drop1() was used to perform a likelihood ratio test (LRT) to determine if HOLC grade was a significant predictor of the number of total viable tree locations. We found that the total viable locations for street trees did differ by HOLC grade (Fig. S2; LRT=8.81 p=0.03), and so we proceeded with an occupancy-based analysis (see main text) to standardize for the uneven distribution of viable street tree locations across HOLC grades.

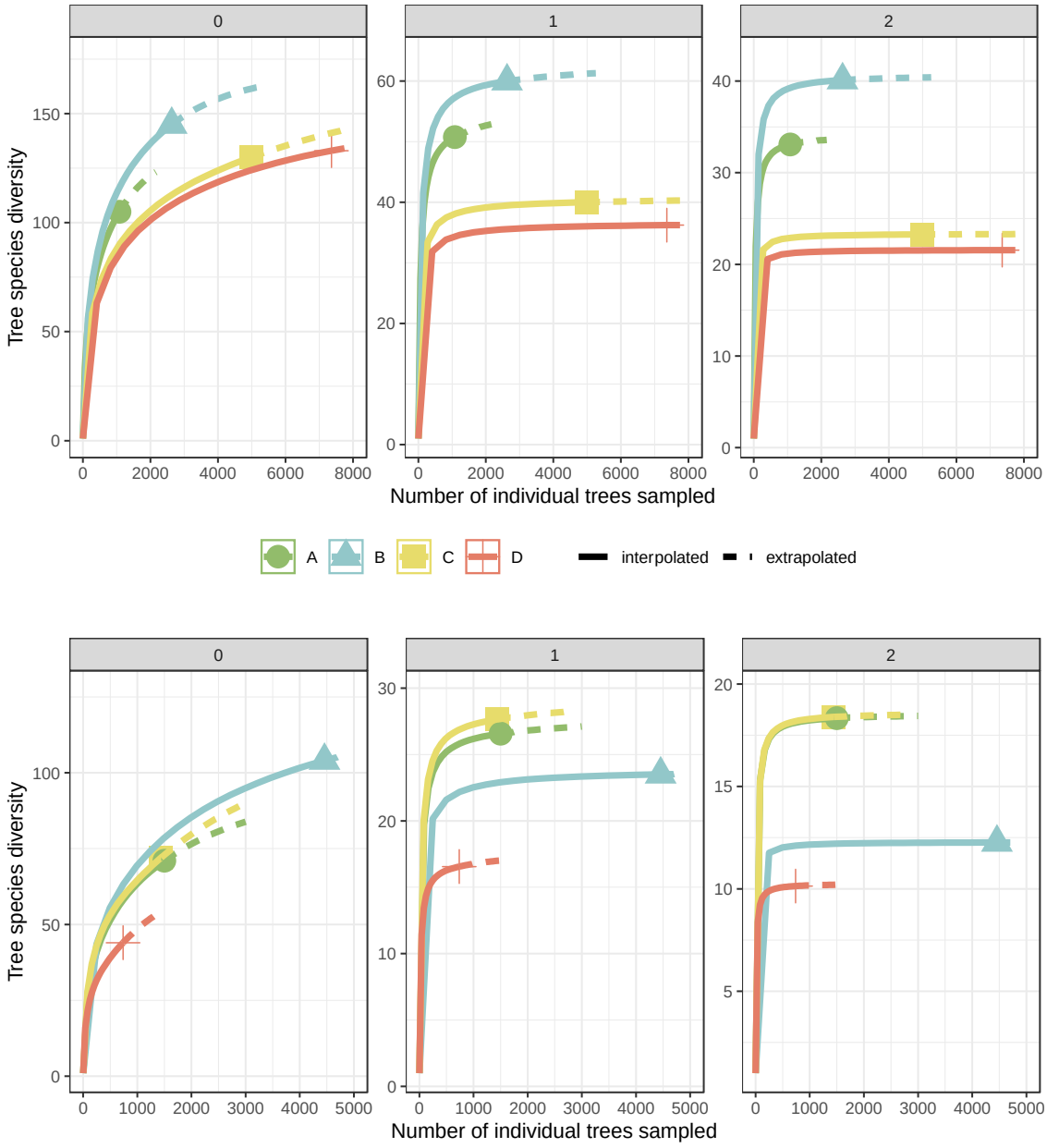

Figure S1. Individual-based accumulation curves by HOLC grade for the "small" tree size class (Top panel; DBH ≤ 5 inches (12.7 cm)) and "large" tree size class (Bottom panel; DBH ≥ 20 inches (50.8 cm) using three different diversity metrics that range in weighting the importance of species number versus relative abundance (0= richness; 1= Shannon's effective species number; 2= Simpson's effective species number).

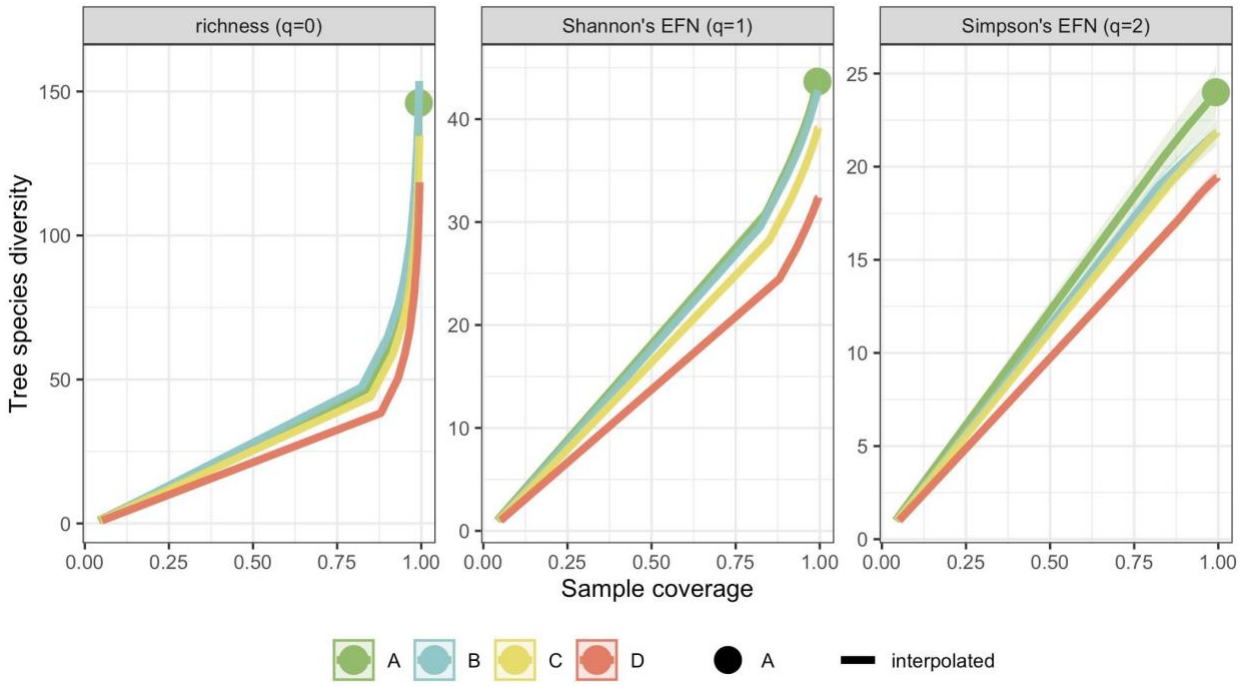

Figure S2: Sample coverage based accumulation curves for the data illustrated in Figure 1C. Coverage level is set by the A grade group. Qualitative interpretation is the same regardless of method.

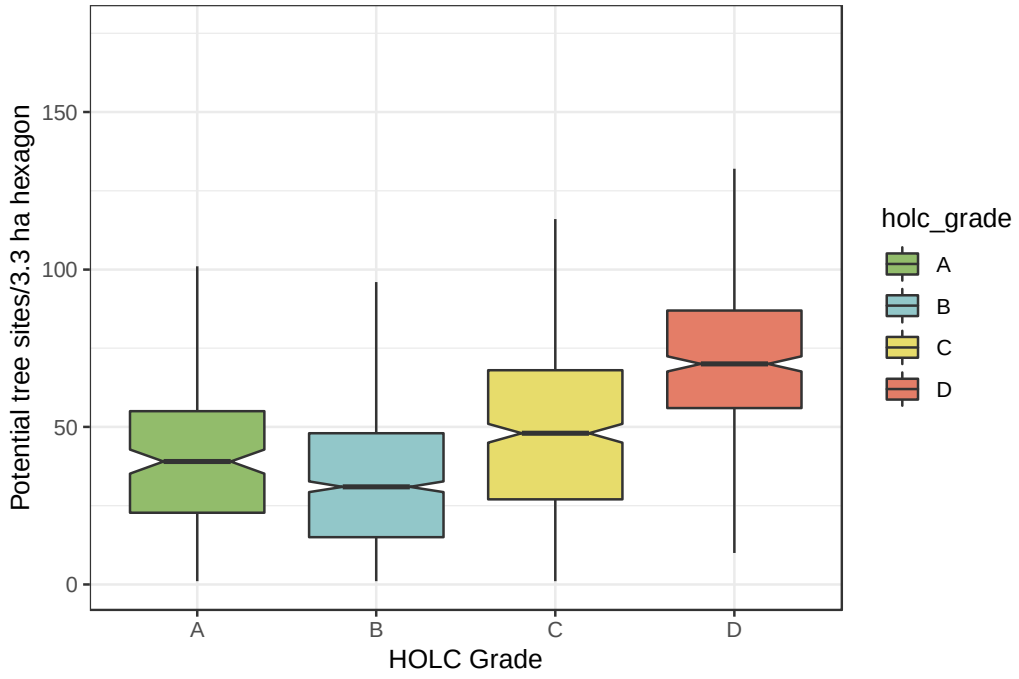

Figure S3: For equal area subsamples of viable locations in each neighborhood, there are differential opportunities for street trees to be present across HOLC grades. This is likely related to lower street densities and larger lot sizes in A and B neighborhoods.

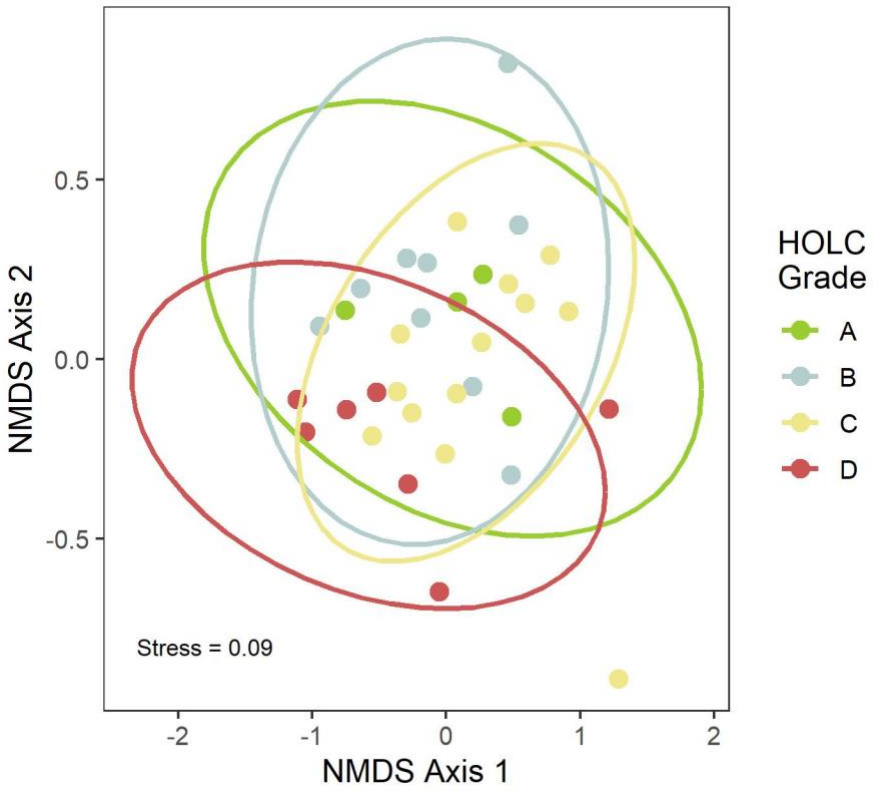

Figure S4. Non-metric multidimensional scaling (NMDS) of overall street tree communities. Ellipses denotes the 95% confidence interval for that distribution of points.

Appendix references

Morgenroth, Justin, David J. Nowak, and Andrew K. Koeser. 2020. "DBH Distributions in America's Urban Forests—An Overview of Structural Diversity." *Forests* 11 (2): 135.