Plant species diversity and community composition of alternative yards in Phoenix, AZ

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Background

- Landscaping preferences in Phoenix are diverse, and residents choose landscapes for various reasons, including appearance, maintenance, environment, recreation, microclimate, familiarity, and health/safety (Larson et al. 2009). As a result, species composition varies across yards.
- Integration of native plants into urban landscapes has the potential to support multiple conservation goals, including preserving native biodiversity, maintaining ecosystem function, and conserving water, the latter of which is an increasing concern in the arid Southwest.
- However, it is not clear in what types of landscapes people are more likely to include native plants.

Research Question

What types of yards in Phoenix have the most native plants and greatest similarity to desert vegetation?

- H1: Residents who design their yard to support wildlife are more likely to also support native plants than are other residents.
  - P1: Wildlife yards will have a higher number of native plants than other yard types.
- H2: Xeric yards have more similar plant communities to deserts than do other yard types because they are typically designed with arid-adapted plants.
  - P2: Xeric yards will have more natives than other yard types.
  - P3: Xeric yards will have plant community compositions that are more similar to deserts than are other yard types.

Study Sites & Methods

- We compared plant species composition in Urban-Desert Interface and Desert with four types of residential yards: Low Intensity Lawn, High Intensity Lawn, Xeriscape, and Wildlife Certified.
- Botanists identified all plants in front, back and side yards. For desert sites, plants were identified along four 100x2 m transects. Species were classified as native or non-native to Arizona using the USDA PLANTS database (USDA NRCS 2017).
- Yards were mapped on the ground by landscaping type (i.e. impervious, lawn, xeric, shrubbery, etc.). Percent xeric landscaping for each yard was calculated in Google Earth from field maps.

Figure 1: Photos of sampled yards and desert sites.

Results

As expected, yards contained fewer native species than desert sites. However, the number and percent of species did not differ among yard types. All yard types had significantly fewer native plants than did desert sites, but all yard types except high intensity lawn yards supported as many native species as urban-desert interface sites.

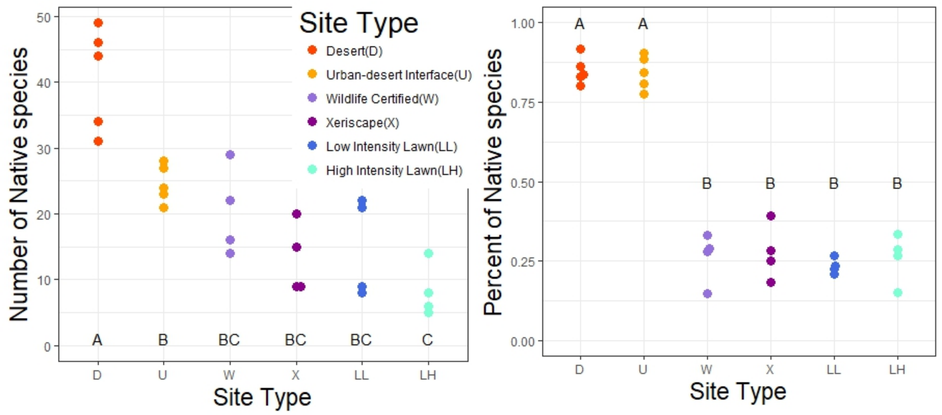

Figure 2. Number and percent native plant species present in yard and desert sites.

Contrary to expectations, “eco-friendly”, water-efficient xeriscape yards did not contain more native plant species than other yard types.

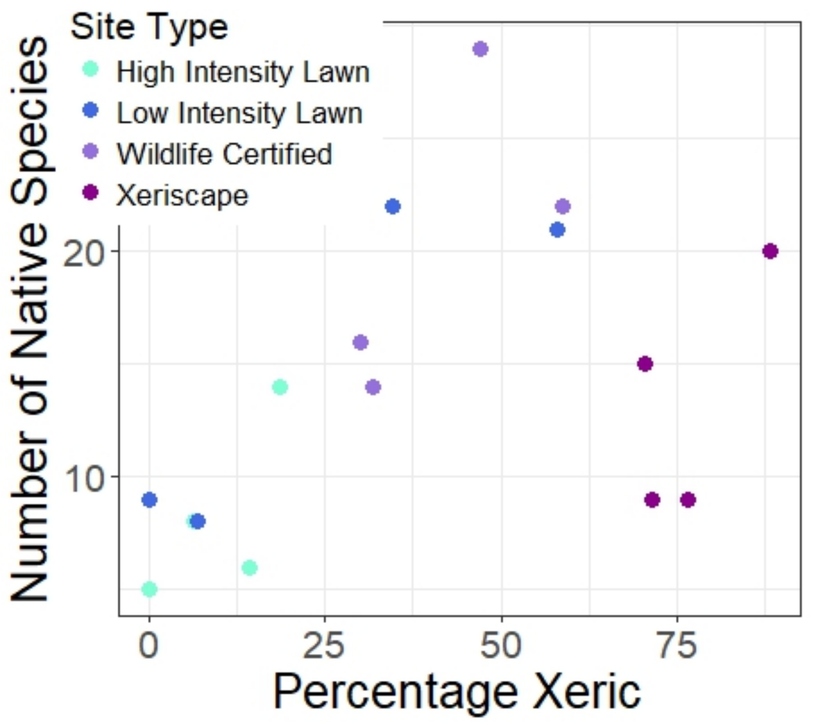

Figure 3: Total number of native species compared to the percentage of yard pervious area with xeric landscaping.

Different yard types have more similar plant communities to one another than to desert plant communities. Additionally, yards of the same type tend to have more similar plant communities.

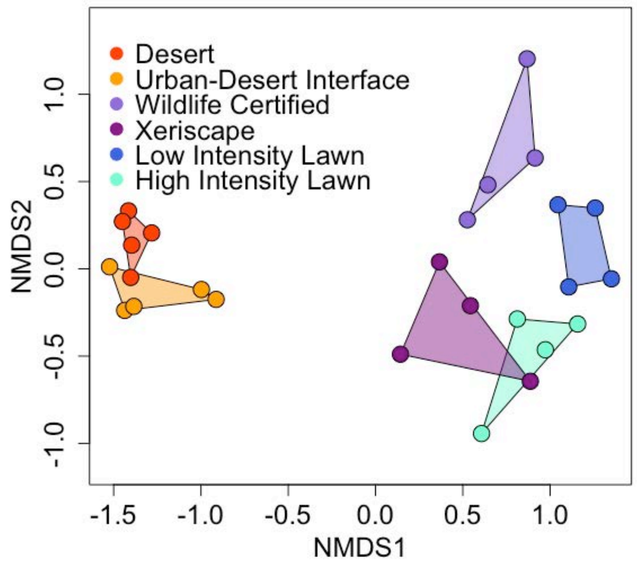

Figure 4. Non-metric multi-dimensional scaling of plant species presence/absence.

Conclusions

- Yard plant composition and number of native species differed from desert communities, but many yards are able to support as many native plant species as found in similar areas of urban-desert interface.
- Yard conservation practices such as creating wildlife habitats may be a better predictor of yard native plant diversity than prevalence of xeric-type landscaping.
- Alternative yard landscaping practices may be a useful tool to conserve native diversity, but a better understanding of how and why people choose to incorporate native plants into their landscaping is needed to evaluate its broad potential for increasing native diversity in urban areas.

References

- Larson, K. L., Casagrande, D., Harlan, S. L., & Yabiku, S. T. (2009). Residents’ Yard Choices and Rationales in a Desert City: Social Priorities, Ecological Impacts, and Decision Tradeoffs. *Environmental Management, 44*(5), 921-937. doi:10.1007/s00267-009-9353-1
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