

# Suburban development with wildlife in mind: An investigation of Home Owners' Associations in Phoenix, AZ



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## INTRODUCTION

Residential landscapes represent a significant part of urban areas and if managed collectively, can provide habitat for native wildlife. Increasingly, these landscapes are designed by private developers and managed by private entities called Homeowners' Associations (HOAs) through the authority of official Covenants, Codes and Restrictions (CCRs).

Residential landscape form and management is the product of decisions made by multiple stakeholders and not exclusively controlled by individual homeowners. CCRs control elements of landscape structure such as plant materials and ground coverings (e.g. turf or gravel) and, by extension, HOAs may influence the structure of urban bird communities (Figure 1).

## METHODS and RESEARCH QUESTIONS

- We calculate native bird species diversity at 39 PASS bird monitoring locations in Phoenix, AZ.
- Neighborhoods with HOAs: 19 of the 39 bird monitoring sites
  - Do neighborhoods with HOAs have higher bird diversity than neighborhoods without HOAs?
- Neighborhoods with HOAs:
  - Analyze landscape form and management practices based on CCRs. Variables include Vegetation and Pest Management, Species Composition, Water Management, Biophysical Structures, and Nuisances (Figure 3).

## RESULTS

Neighborhoods with HOAs had significantly higher bird diversity compared with neighborhoods without HOAs ( $r^2=0.13$ ,  $F=6.8030$ ,  $p=0.0132$ , Figure 2).

## FUTURE STUDIES

Examine the specific landscaping restrictions and test if neighborhoods with similar restrictions have similar bird communities (after accounting for neighborhood location, age and other confounding variables).

**Plant Species Required:** If require drought-tolerant trees, beneficial for desert birds

**Pruning Required:** Plant unable to flower or seed. Limiting for ground nesting birds

**Maximum Height Required:** Short trees are limiting for high nesting species

**Weed Removal Required:** Limiting for ground nesters and foragers

**Perching Structures Prohibited:** Limiting for raptors and flycatchers

**Disease Control:** Dead and dying wood and cacti beneficial for cavity nesting birds

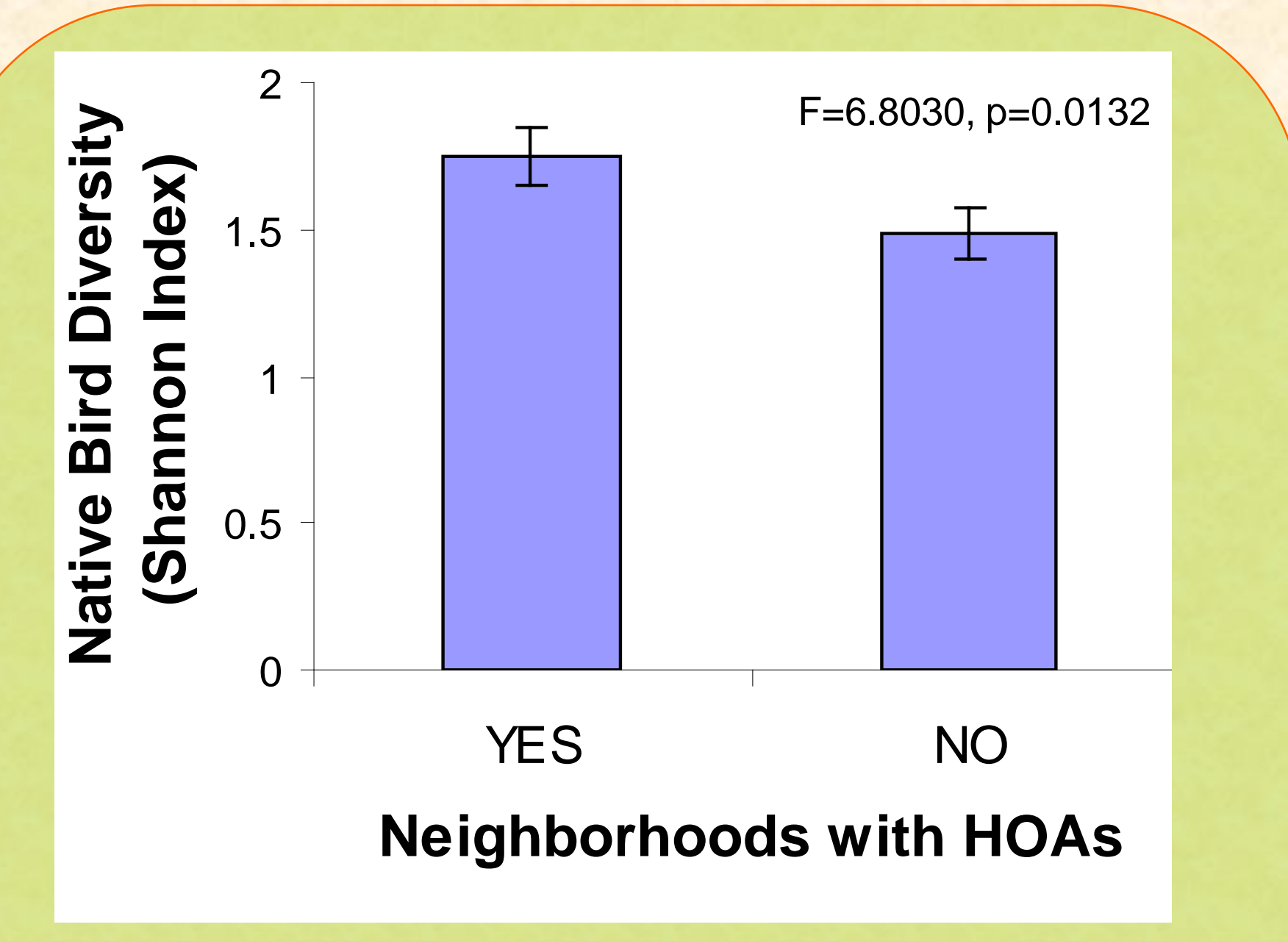
**Trash Removal:** Limiting for commensal species

**Pest Control Required:** Limiting for insectivores

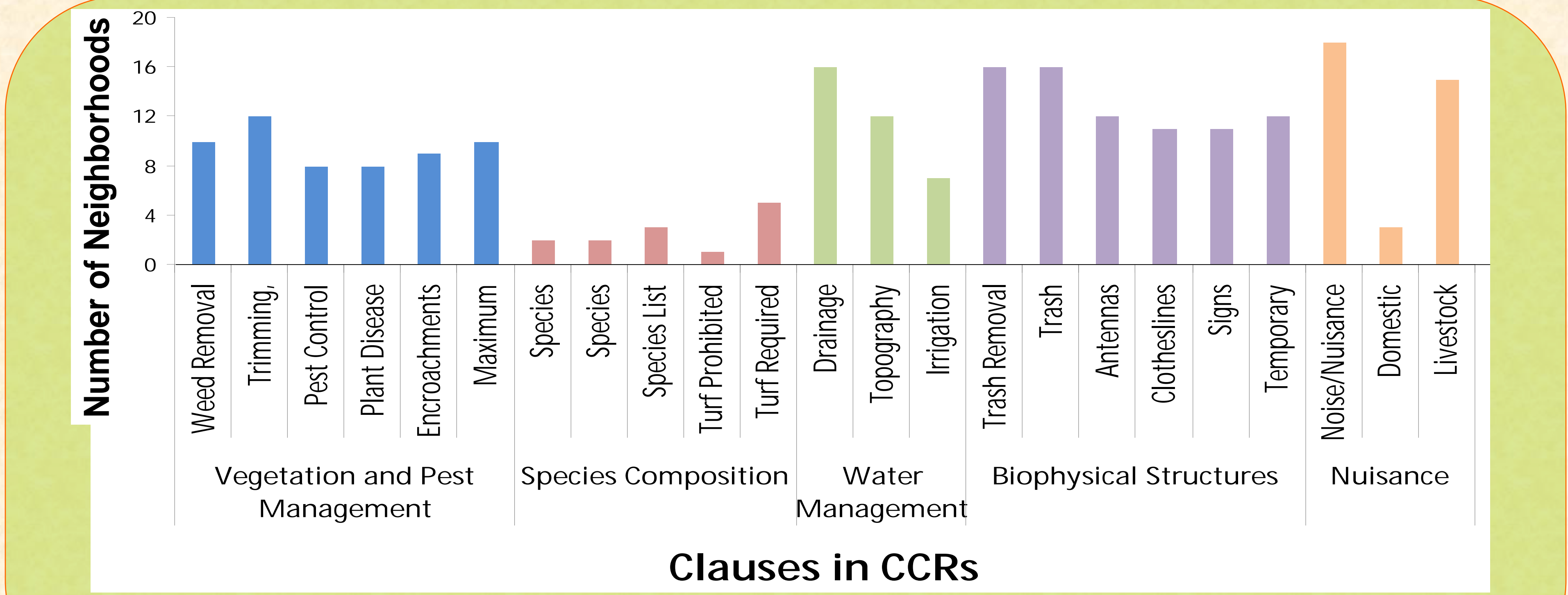
**Turf Required:** Attracts generalist species, limiting for desert specialists

**Regulate Drainage:** Removes standing water, limiting for species unable to adapt to arid environments

**Figure 1.** Examples of different landscape designs, the landscape restrictions, and implications for the bird community. Species shown (from top, going clockwise): Peregrine Falcon, American Kestrel, Curve-billed Thrasher, Gila Woodpecker, and Say's Phoebe.



**Figure 2.** Neighborhoods with HOAs have greater native bird diversity than neighborhoods without HOAs. Standard error bars shown.



**Figure 3.** Coding results of common landscaping clauses appearing in CCRs for each neighborhood with an HOA. Results indicate the particular management practice exists.

## IMPLICATIONS

Landscaping restrictions influences urban bird communities. Therefore identifying landscape practices that benefit native bird communities could serve as a model for current and future HOAs.

Integrating concepts from conservation biology with institutional analysis helps identify important stakeholders and evaluate their role in landscape planning and management. This research potentially identifies barriers to creating urban landscapes with high levels of biodiversity that are also desirable for people. This may alleviate some of the negative impacts of urbanization.

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