Landscape change and the adoption of water-conserving desert landscapes in Phoenix residential yards

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Background

In residential areas, over half of total water use is for outdoor purposes including irrigation, and in arid cities up to two thirds of residential water is used outdoors (Mayer et al. 1999). As residential areas expand and the climate changes, water conservation in residential areas is increasingly important. Irrigation may be reduced by replacing lawn-dominated landscapes with xeriscapes (Martin et al. 2001). However, residential yards are managed by many individuals who are influenced by a range of internal motivations such as personal preferences, in addition to external pressures such as regulations and financial costs. Thus, the adoption of water-conserving landscaping depends on these motivations and constraints (Larson et al. 2009; Kendal et al. 2012; Nassauer et al. 2009). While research has identified predictors of yard management practices, it is still unclear how residential yards are changing over time, what factors are driving those changes, and what those changes will mean for residential water use and other outcomes.

Research Questions

1. How has residential landscaping in the Phoenix metropolitan area changed over the past decade (specifically, 2006-17)?
2. How do these changes align with resident yard preferences?

Yard Typologies

Figure 1. Classifications of Phoenix yards based on turfgrass groundcover, and arranged according to expected water use.

Phoenix Area Social Survey (PASS)

- Residents from targeted neighborhoods in the Phoenix metropolitan area were surveyed in 2006, 2011, and 2017.
- The survey response rates ranged from 39-51% across years.
- Eight neighborhoods were surveyed in all years; only single-family homes are included in the following analyses.
- Surveys were implemented by phone, online, or in person in 2006 and 2011, and by mail in 2017.

Table 1. Demographic information for survey respondents in single-family homes in 8 repeatedly sampled neighborhoods.

	2006	2011	2017
% white	69%	66%	67%
% female	55%	55%	60%
% owner-occupied	92%	80%	85%
Median respondent age	48 years	46 years	55 years
Median household income range	$60,001-80,000	$60,001-80,000	$80,001-100,000

Surveyed Neighborhoods

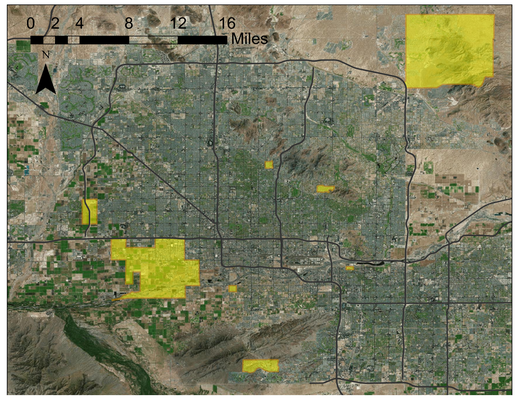

Figure 2. Map of 8 PASS neighborhoods (yellow)—defined by census tracts—sampled in 2006, 2011, and 2017.

Existing Yard Types

- **Mesic lawns—more common in back yards than front—have declined over time.**

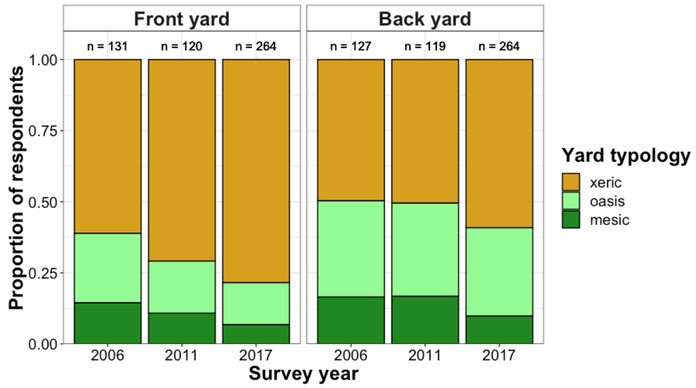

Figure 3. Residents' existing yard types by year.

Preferred Yard Types

- **While mesic lawns have declined over time, preferences for them have not. In fact, preferences for lawns have increased.**

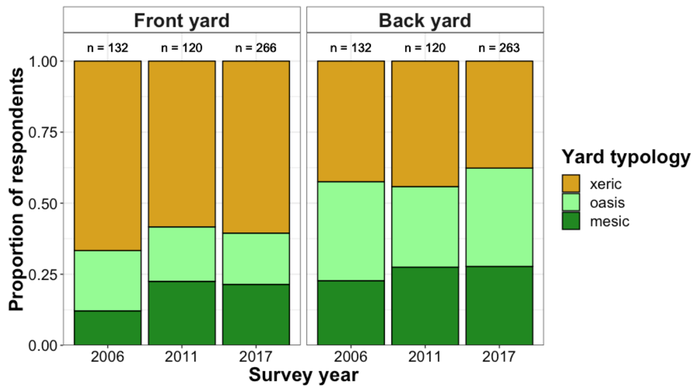

Figure 4. Residents' preferred yard type by year.

Changes to Yard Vegetation

- **More respondents planted than removed grass in 2011 and 2017** (these questions were not asked in 2006).

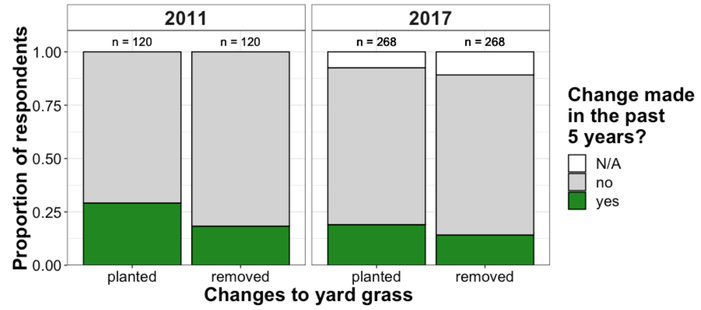

Figure 5. Residents' reports of planting or removing grass (mesic landscaping) in the past 5 years.

- **More respondents planted than removed trees in 2011 and 2017** (these questions were not asked in 2006).

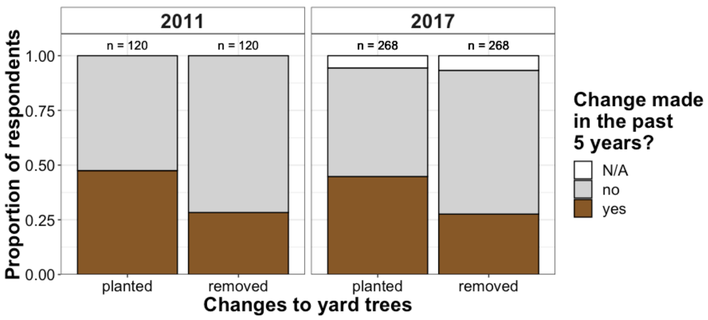

Figure 6. Residents' reports of planting or removing trees in the past 5 years.

Conclusions

- **Mesic yards appear to be decreasing in recent years, but not due to changing preferences.** Other drivers are more likely causing the observed decrease in grassy yards, and thus, may be better targets for future outdoor water conservation.
- **Residents are still adding grass** despite the overall trend of decreasing mesic yards.
- **The residential tree community is dynamic**. High rates of change are an opportunity for implementing conservation goals.

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