

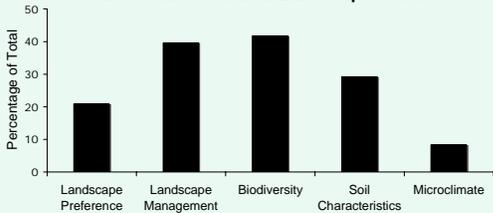
Objectives:

- Gain comprehensive understanding of residential landscapes in urban ecosystems.
- Highlight the social, ecological and integrated socio-ecological themes and current findings about residential landscapes.
- Identify gaps in current knowledge
- Integrate preliminary survey results from Phoenixians' landscaping preferences and practices into synthesis

Overview:

- Residential landscapes are a human construct adding to the heterogeneity of the urban matrix.
- Few studies focus specifically on residential yards. Rather, residential lawns are compared with other urban and non urban land cover and land uses. Additionally, studies rarely focus on variability within a yard or between yards.
- Among the 48 studies reviewed, 5 themes are identified.

Themes from Residential Landscape Studies



Themes determined by each studies' reported results and are not mutually exclusive.

- Socio-ecological studies focus ecologically on biodiversity and vegetation composition and socially on socioeconomic status and landscaping preferences.
- Little linkage thus far between homeowner practices and the biological functioning, especially biogeochemical cycling, of a yard.

Methods:

- Data mined using key word searches in Web of Science including "residential landscape; residential lawn; residential yard; residential" and searching bibliographies.
- 48 studies reviewed thus far, not including synthesis papers
- Studies were coded and grouped by variables (see table for partial list) reported within the methods and results sections.

Residential Landscape Survey Variables

Frequency of Variable Use (Percentage of Total Studies)

Property Characteristics	Soil Characteristics	Homeowner Characteristics	Biodiversity
Land Cover* 35 (73%)	Total Nitrogen (N) 7 (15%)	Income 13 (27%)	Vegetation 16 (33%)
Land Use* 15 (31%)	Inorganic Nitrogen (IN) 7 (15%)	Education 8 (17%)	Arthropod 2 (4%)
Housing Age 13 (27%)	Total Carbon (C) 6 (13%)	Cultural Norms* 4 (8%)	Earthworm 1 (2%)
Irrigation/Water Use 8 (17%)	Phosphorus (P) 6 (13%)	Environmental^ 4 (8%)	
Building Type* 6 (13%)	Soil Bulk Density 6 (13%)	Ethnicity 3 (6%)	
Lot size 4 (8%)	Soil Moisture 5 (10%)	Gender 2 (4%)	
Microclimate 4 (8%)	Soil Organic Matter 4 (8%)		
	Potassium (K) 2 (4%)		

* Land Cover includes trees, turfgrass, shrubs, impervious surfaces, etc

* Land Use includes residential, commercial, agriculture, etc

* Building Type includes single family homes, apartment complex, mixed use, etc

* Cultural and neighborhood norms are reported by homeowners to influence landscaping management decisions

^ Environmental variable accounts for homeowners reporting some educational background in environmental issues

Residential Landscape Literature

Landscaping Preferences & Management:

- Social surveys often examine homeowner landscaping preferences and management choices.
- Landscaping practices linked to cost & ease of maintenance, cultural norms, neighborhood codes and restrictions, and aesthetic, functional and lifestyle preferences.
- Income is often reported as a driver of highly managed landscapes.
- Awareness of environmental concerns correlated to higher pesticide and fertilizer use.

Residential Biodiversity:

- Common focus: vegetation diversity and composition.
- Plant diversity is correlated to homeowner socioeconomic status, housing age, and land use.
- Arthropod abundance higher in yards with greater plant species. Earthworm densities lower in properties which report frequent watering and fertilizer.

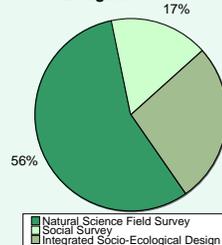
Soil Characteristics:

- Physical and chemical soil properties are related to land use, land cover and housing age.
- Younger properties: higher bulk density, fertilizer application and runoff; lower total N and C.
- N, P, and K losses from runoff lower in yards of monoculture than mixed grass species.
- Carbon pools and storage are dependent upon lot size and vegetation cover.

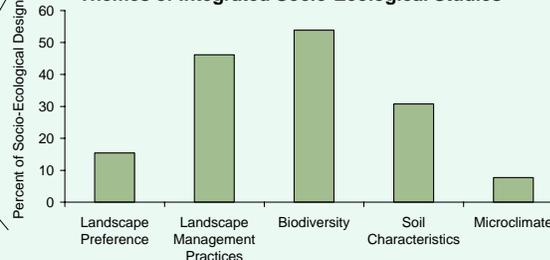
Microclimate:

- Most microclimate studies conducted in an arid ecosystem: Phoenix, Arizona.
- Microclimate linked to abundance, gas exchange, hydrologic processes and heat stress.

Study Sampling Designs:



Themes of Integrated Socio-Ecological Studies



Case Study of Landscape Preferences & Practices:

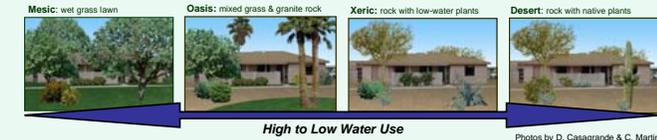
Phoenix residents, from 4 distinct neighborhoods ranging from high to low household income with mesic, xeric and oasis yards, were recently surveyed on homeowner landscaping preferences and management practices. Reported below are some preliminary findings on landscaping preferences and practices from 121 survey respondents.

This survey is the initial step in addressing the integrated socio-ecological research question: **What are the factors that drive residential landscape management decisions, and how do these practices affect ecological processes, specifically biogeochemistry?**

Survey Mode / Totals	Case Study Neighborhoods				N	Percent
	Hispanic Core	Historic Core	North Tracts Fringe	South Mountain Fringe		
Web	2	16	14	16	48	12.0%
Mail	5	26	21	21	73	18.3%
Total N	7	42	35	37	124	31%
Response Rates*	7%	43%	36%	37%	39%	3 rshds only

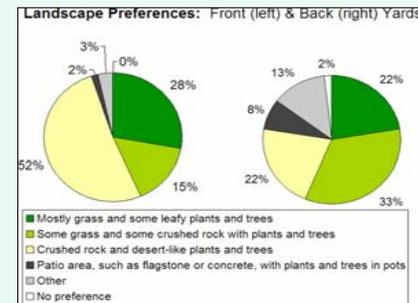
*The response rates are adjusted to account for refusals and undeliverable surveys that were not replaced.

A Landscape Gradient → Landscaping Treatments from Mesic to Desert Yard



Photos by D. Casagrande & C. Martin

High to Low Water Use



- Respondents reported more highly mixed preferences for their backyard landscaping than front yard landscaping.
- More than half of residents use fertilizers, about the same amount (56% & 58%) for grass & plants/shrubs/trees.
- More residents use chemical pesticides to control weeds in gravel groundcover (47%) compared to grass (26%).

Application of Yard Care Products		
Product	Frequency	Valid %
Fertilizers	88	73.9%
Pesticides	69	57.5%

Future Steps:

- Continue to build current literature database and synthesize the literature
- Link current natural and social science data to understand drivers of landscaping practices, decisions and biological functioning of residential yards.
- Field work to gather data on vegetation composition, biogeochemical cycling, and soil properties at the residences from above social survey.
- Follow up interviews from survey presented above to attain further insight into how landscape management is linked to neighborhood pressures and social identity.

Acknowledgements: This material is based upon work supported by the National Science Foundation under Grant No. DEB-0423704, Central Arizona-Phoenix Long-Term Ecological Research (CAP LTER) and Grant No. 0504249, IGERT in Urban Ecology. Any opinions, findings and conclusions or recommendation expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF). The social survey was funded and conducted by the ASU Institute for Social Science Research Catalyst Grant.