



## Research Paper

# Homeowner preferences for wooded front yards and backyards: Implications for carbon storage



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## HIGHLIGHTS

- Homeowners have heterogeneous preferences for more or less wooded yard styles.
- Neatness, backyard privacy and fitting in with the neighborhood are preferred by all.
- Those who prefer more wooded yards more often prefer privacy in the front yard.
- Backyard neatness is less preferred by those who preferred more wooded yards.
- Those who prefer less wooded yards less often prefer shade and wildlife habitat.

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## ABSTRACT

This study contributes to understanding of social preferences, norms, and behaviors in residential landscapes that affect planning, design, and management of trees, which store carbon and contribute to mitigating climate change. We investigated southeast Michigan homeowner preferences for different styles of front yards and backyards that were more or less wooded, learning what landscape characteristics they preferred and how their preferences related to their own yard management behavior. We surveyed homeowners, who selected their most preferred front yard and backyard from a series of images and indicated what characteristics were important to their preferences. We developed a homeowner typology based on their stated preferences for more and less wooded front yards and backyards, distinguished each type by landscape characteristics that were most important to homeowners, and tested whether homeowners of each preference type managed their actual yards consistent with type. Our results show that homeowners are heterogeneous in their preferences, identifying different characteristics as important according to type, but that only mowing of their actual yard is consistent with type. We also found that both important characteristics and actual uses of homeowners' yards varied between front yards and backyards. Both homeowner types and front yard/backyard differences suggest opportunities for planning and maintaining larger urban woodlands on residential lots.

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## 1. Introduction

Residential land use continues to expand beyond urban boundaries in the United States, creating a suburban landscape of single-family homes set in their own expansive yard, a privately owned and tended property for personal use (Ekers, Hamel, & Keil, 2012; Nickerson, Ebel, Borchers, & Carriazo, 2011; Talen, 2003). These yards are dominated by mown, fertilized, and irrigated turf

(e.g., Dahmus & Nelson, 2014). If the American residential landscape was less dominated by turf and more wooded, it would store more carbon to mitigate climate change (Godwin, Chen, & Singh, 2015; Vaughn, Hostetler, Escobedo, & Jones, 2014). Our study examined suburban homeowners' preferences for more or less wooded yards in order to learn how land development processes might promote more wooded suburban landscapes.

Compared with other ecosystem types, forested ecosystems store large amounts of carbon in woody biomass (Rhemtulla, Mladenoff, & Clayton, 2009). While residential areas are not forested ecosystems, our colleagues have investigated whether patches of unmown, dense woody vegetation on exurban residential properties in southeast Michigan store almost as much carbon per area as mature hardwood forests of the region (Currie, Kiger,

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Fig. 1. Southeast Michigan study region.

Nassauer, Hutchins, Marshall, Brown, Riolo, Robinson, and Hart, *In Review*). Mature trees or trees in dense woodlands with leaf and needle litter particularly enhance carbon storage in ecosystems (Watson et al., 2000). In Leicester, UK, 97.3% of the above ground carbon pool was found to be in trees (Davies, Edmondson, Heinemeyer, Leak, and Gaston, 2011). In suburban areas, property size and the number of trees on a property have been found to be related to carbon storage (Fissore et al., 2012). In order to consider the implications for carbon storage, we investigated homeowner preferences and behaviors that affect the presence of trees and wooded areas in suburban yards.

We surveyed homeowners in suburban residential areas including exurban development in southeast Michigan (Fig. 1). Exurban development, known as peri-urban development in some parts of the world, occurs as a broad edge of very low-density development on the rural fringes of denser suburban areas. In the United States, the lower density of exurbia is typically a product of minimum lot sizes required by local governments to protect drinking water supplies from septic systems, to make agriculture viable, or to ensure rural character (Brown et al., 2008). The resulting large lots in southeast Michigan are typically larger than one acre (.405 ha) and range up to more than 20 acres (8.100 ha) and can include more extensive wooded areas (Robinson, 2012).

Our general research question was whether suburban homeowners preferred their yards to be wooded and why. We hypothesized that they would prefer wooded backyards more than wooded front yards. We looked for heterogeneity among homeowners in their preferences for wooded yards, asking: do homeowners with different preferences for having wooded yards prefer different characteristics of these yards? Do they use their own yards differently? Do they manage their own yards differently? Might their preferences be influenced by the appearance of their neighbors' yards? To address these questions, we examined homeowners' preferences for yard styles that combined different types of front yards and backyards that were more or less wooded (Table 1), and we compared their stated preferences for different yard styles with the way they actually used and managed their own yards.

Yard management behaviors like tree planting and retention have been shown to be influenced by broad cultural norms, including concern over what future buyers may want, as well as more localized neighborhood norms for particular yard styles (Blaine, Clayton, Robbins, & Grewal, 2012; Goddard, Dougill & Benton, 2013; Nassauer, Wang, & Dayrell, 2009; Schindler, 2012). Neatness is a broad cultural norm for residential landscapes because it communicates care and neighborliness (Blaine et al., 2012; Nassauer, 1993, 2011). Cues to care that indicate human presence in the landscape can include mowing, crisp, distinct edges, trimmed shrubs, and flowery plants (Nassauer, 1995, 2011). While canopy trees in a mown lawn are seen as cues to care, unmown wooded

areas as well as some tree species may be perceived as “messy”, and homeowners may not want them on their own properties (Crow, Brown, & De Young, 2006; Kirkpatrick, Davison, & Daniels, 2012; Nassauer, 1993; Nassauer et al., 2014).

Compared with backyards, front yard cultural norms for mown turf may be more influential because the front publicly exhibits residents' management choices. In the desert biome of Phoenix, Arizona, US, Larsen and Harlan (2006) found that yard styles featuring more socially correct desert plants were most preferred in the front yard, but not the backyard where residents' choices were less affected by social norms. Another study of Phoenix found that there were significant differences in preferences for backyards and front yards, where alignment with cultural norms was particularly important (Larson, Casagrande, Harlan, & Yabiku, 2009). In temperate biomes where turf may be more preferred in the front yard, homeowners may retain or plant more trees and shrubs in backyards to achieve greater privacy (Nassauer et al., 2014; Sperling & Lortie, 2010). Such planting screens the backyard from public view, which may allow residents to choose less tidy wooded yard styles.

Actual uses of front yards also may differ from backyards and affect the presence of trees and wooded areas. In New Urbanist-style developments in Toronto, Hess (2008) found that more respondents used their backyards than their front yards for activities such as socializing, relaxing, and gardening despite the neighborhoods having been designed to encourage front yard use for these activities. Hess links this result to residents' desire for privacy.

Wooded neighborhoods are in part a legacy of past decisions by developers and previous homeowners (An & Brown, 2008; Boone, Cadenasso, Grove, Schwarz, & Buckley, 2010; Lowry, Baker, & Ramsey, 2012). Many studies suggest that homeowners generally appreciate having trees in a neighborhood (Conway & Bang, 2014; Flowers & Gerhold, 2000; Stamps, 1997; Sullivan, 1994; Vining, Daniel, & Schroeder, 1984; Wang, Nassauer, Marans, & Brown, 2012). Neighborhoods that are characterized by wooded areas may convey yard style norms that override broader cultural norms for turf-dominated yards (Crow et al., 2006; Goddard et al., 2013; Visscher, Nassauer, Brown, Currie, & Parker, 2014). Furthermore, residents of wooded neighborhoods may have distinct preferences for wooded yards, having “sorted” themselves in choosing neighborhoods that fulfill their preferences for trees (Hannon, 1994).

## 2. Methods

In the summer and fall of 2011, we conducted a web-survey of suburban homeowners. Our sample included all respondents to our 2005 homeowner web survey (Visscher et al., 2014), all of whom had agreed to participate in on-line surveys, and lived in the 10-county Detroit, Ann Arbor, and Flint Metropolitan Statistical Area (MSA) of southeast Michigan (Fig. 1). We sampled residents of the 207 ZIP codes in the 10-county area that include municipalities that did not provide sewer or water services and used large-lot residential zoning. In 2011, we also sampled two additional households on each street sampled in 2005, selected at random (using [www.yellowpages.com/whitepages](http://www.yellowpages.com/whitepages)). Our survey complied with standards of our Institutional Review Board.

Invitations to participate in the web survey were sent by post to 1301 addresses in June 2011; 122 (9.4% of the initial 1301 cards) were returned as undeliverable. In October, reminder postcards were mailed. 126 (10.7% of the remaining 1179 deliverable mail sample) usable web surveys were returned. Our survey method, combining an initial postal contact with a requested web survey response, may have contributed to a low response rate. For this

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