THE AMERICAN LAWN: CULTURE, NATURE, DESIGN AND SUSTAINABILITY

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ABSTRACT

This was an exploratory study examining the processes and underlying concepts of design nature, and culture necessary to discussing sustainable design solutions for the American lawn. A review of the literature identifies historical perceptions of the lawn and contemporary research that links lawns to sustainability. Research data was collected by conducting personal interviews with green industry professionals and administering a survey instrument to administrators and residents of planned urban development communities. Recommended guidelines for the sustainable American lawn are identified and include native plant usage to increase habitat and biodiversity, permeable paving and ground cover as an alternative to lawn and hierarchical maintenance zones depending on levels of importance or use. These design recommendations form a foundation for further exploration of the sustainability of the American lawn.

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CHAPTER ONE

INTRODUCTION

"Our ability to perceive quality in nature begins, as in art, with the pretty. It expands through successive stages of the beautiful to values as yet uncaptured by language" (Leopold, 1949, p.). The American residential lawn is a beautiful, lush carpet that offers recreation and respite, as well a platform for important occasions. According to the U.S.D.A. if classified as a crop, lawns would rank as the fifth largest in the country (1992). Figure 1.0 shows how much physical space the lawn occupies in the United States. In "Lawn People", Paul Robbins, a professor of geography and regional development at the University of Arizona describes the lawn as shaping the American culture. Robbins (2007) suggests that lawn culture is a combination of cultural, political and economic drivers that work together and have evolved over time. Robbins suggests that the residential American lawn is one of the fastest growing landscapes in the United States, receiving more care, time and attention from individuals and households than any other natural space. Virginia Scott Jenkins writes about the lawn in her book, "The Lawn: A History of an American Obsession" (Jenkins, 2006) and notes that United States is the only country to have "National Lawn Care Month"; observed during the month of April. In her book Jenkins focuses on the environmental problems associated with the lawn and points out the relative recent cultural relationship Americans have formed with it.

Figure 1.0: Residential lawns in the U.S. equal the size of the state of Iowa (Robbins, 2007). Source: http://www.eprintablecalendars.com/images/maps/blank-map-of-the-united-states.jpg. Adapted by M. Ghys

Background

To begin a dialogue about the American residential lawn, it is important to understand the lawn's history and for that we must travel back to Europe. During the medieval period the lawn existed within walled courtyards of pleasure and physics gardens (Bormann, 2001). Pleasure gardens focused on social activities and physics gardens provided medicinal and herbal plants (Bormann, 2001). Figures 1.2 and 1.3 are photo-

Fig. 1.2: Medieval English Pleasure Garden. Source: http://remodelista.com/img/sub/uimg/10-2012/700_remodelista-arne-maynard-haddon-hall-01.jpg

Fig. 1.3: Medieval English Physics Garden. Source: http://www.historicscottishgardens.co.uk/wp-content/uploads/2011/04/inverewe2-940.jpg

Fig. 1.4: Versailles gardens designed by Andre le Notre. Source: http://blog.hometalk.com/wp-content/uploads/2012/07/Versailles-Gardens2.jpg

Fig. 1.5: Highclere Castle and Parkland designed by Capability Brown. Source: http://janeaustensworld.files.wordpress.com/2012/08/highclere-castle-and-parkland-designed-by-capability-brown.jpg

graphs of historical medieval garden still in existence. While hundreds of years have passed since these gardens' inceptions, they still are in existence which speaks to the effectiveness of the design. During the 1700's Bormann (2001) writes that the garden that the lawn existed within became an art form and represented man's control over nature. Figure 1.4 depicts Andre le Notre's design of the Versailles gardens and exemplifies the aesthetic of 1700's France (Bormann, 2001). Eventually the walls of the smaller courtyards came down and the lawn stretched beyond the boundaries it had formally known and offered uninterrupted views toward the horizon (Bormann, 2001).

The lawn's emergence as an icon in the "late eighteenth century British society" was initiated by Lancelot "Capability" Brown (Bormann, 2001, p. 16). But Bormann (2001) argues that Brown destroyed native vegetation, chopped down trees and even razed villages in order to realize his visions. Brown's vision of the English countryside dominated the landscape aesthetic and Bormann (2001) contends that this while lawn aesthetic remained ingrained in the memories of the new colonists as they moved to the new world, the inhospitable American climate would prove to challenge implementation. Figure 1.5 is a photograph of an existing estate designed by Brown.

Bormann (2001) states that as settlers moved to the New World they brought with them preconceived notions of what they

Fig. 1.6: Thomas Jefferson's Monticello, Ash Lawn, Virginia. Source: http://0.tqn.com/d/architecture/1/0/W/q/monticelloFlickr.jpg

thought lawns should look like but the only sectors of the population able to emulate the pristine English landscapes were government entities and the wealthy. The average American working class person lived in homes surrounded by dirt yards and grassy areas were used for livestock and community gatherings (Bormann 2001). More common than lawns, according to Bormann (2001, p. 19), were treeless, shrub-less, rather unkempt weedy properties whose front yards, especially in the South, were tidy patches of swept bare ground with occasional planting beds or shrubs. In contrast, Thomas Jefferson's Monticello pictured in figure 1.6, represents the ideal residential manor and influenced wealthy landowners across America (Bormann 2001). Robbins writes that prior to Andrew Jackson Downing the lawn American lawn aesthetic represented "state power and elite opulence" (2007, p. 25). Robbins (2007) contends that Andrew Jackson Downing in his "Treatise on the Theory and Practice of Landscape Gardening, Adapted to North America" espoused the lawn as idyllic living. Robbins also suggests that Downing's goals for the development of the landscape included promoting the middle class elite through visual harmony and strengthening the sense of community. Not only was the father of American landscape architecture, Frederick Law Olmsted an admirer and advocate of Downing's lawn culture and design philosophies, the two were colleagues until Downing's untimely death in 1852 (Tishler, 1989). Robbins points out that both Downing and Olmsted viewed the lawn as a proponent for American culture and social order and encouraged interaction, recreation and "moral sociability" (2007, p. 27). Robbins contends that as opposed to expressing American culture, both Downing and Olmsted created American culture by moralizing and naturalizing the lawn (2007). By the end of the nineteenth century there was a clear "unified vision" of public spaces, private residences and the accompanying moral associations that related directly to the lawn dominated aesthetic (Robbins, 2007, p. 29).

While cultural norms with the lawn were being formed through design (Robbins, 2007), according to Virginia Scott Jenkins (1994), advertisements in the late 19th century glorified the lawn as a symbol of healthy outdoor living thus establishing an economic driver for the lawn culture. Today care lawn has grown to a $40 billion a year lawn care industry (Jenkins, 2006). Figure 1.7 depicts a modern day

Fig. 1.7: Residential Lawn with automatic sprinkler system. Source: http://www.sprinklerdrainage.com/wp-content/uploads/2012/02/d3-_0554.jpg

example of an American middle class lawn. As the middle class emerged during the post WW II era, the suburban expansion offered the ideal setting for the crisp, neat lawn and blanketed American neighborhoods and offering average Americans an opportunity to realize the ideal landscape aesthetic (Robbins 2007). The advancement of lawn related products such as the lawn mower made maintenance achievable and inexpensive (Robbins 2007).

Problem Statement

There is ample evidence that the American lawn is not sustainable due to monoculture grass species plantings and the necessary inputs required for preferred aesthetics. Robbins states that U, S. homeowners spent 1.2 billion dollars on pesticides in 1999 (2007). That same year Robbins notes that consumers spent 9 billion dollars on lawn care (2007). According to Bormann, the E.P. A. estimated that in 1984 Americans applied more synthetic fertilizer to their lawns "than the entire country of India applied to their crops" (2001, p. 74). This study aims to identify and explore culture, nature and design as depicted on the following page in figure 1.8 and reveal the complex nature of their interactions as they relate to the American lawn. Equally important is discovering how these interwoven components that characterize the American lawn may be overlaid onto the sustainability triad. As shown in figure 1.9 on the following page, the overlapping of culture, nature, design as it relates to sustainability forms the theoretical framework for this study. Ex-

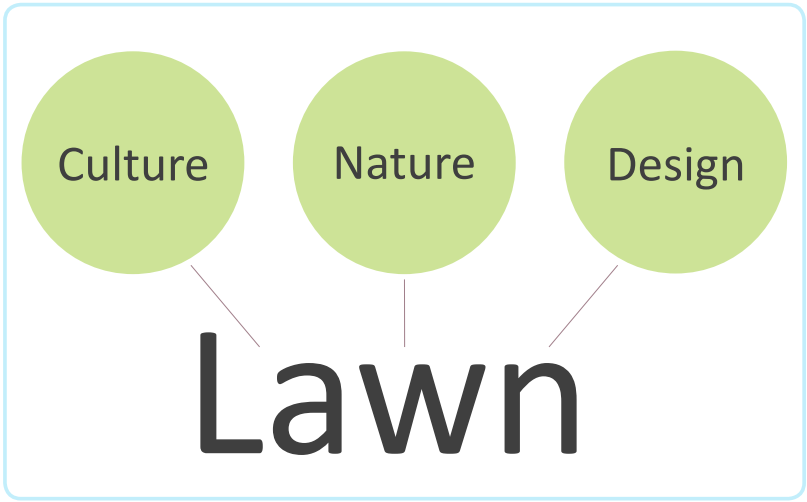


Figure 1.8: The three components that have been identified as underlying concepts for the American sustainable lawn

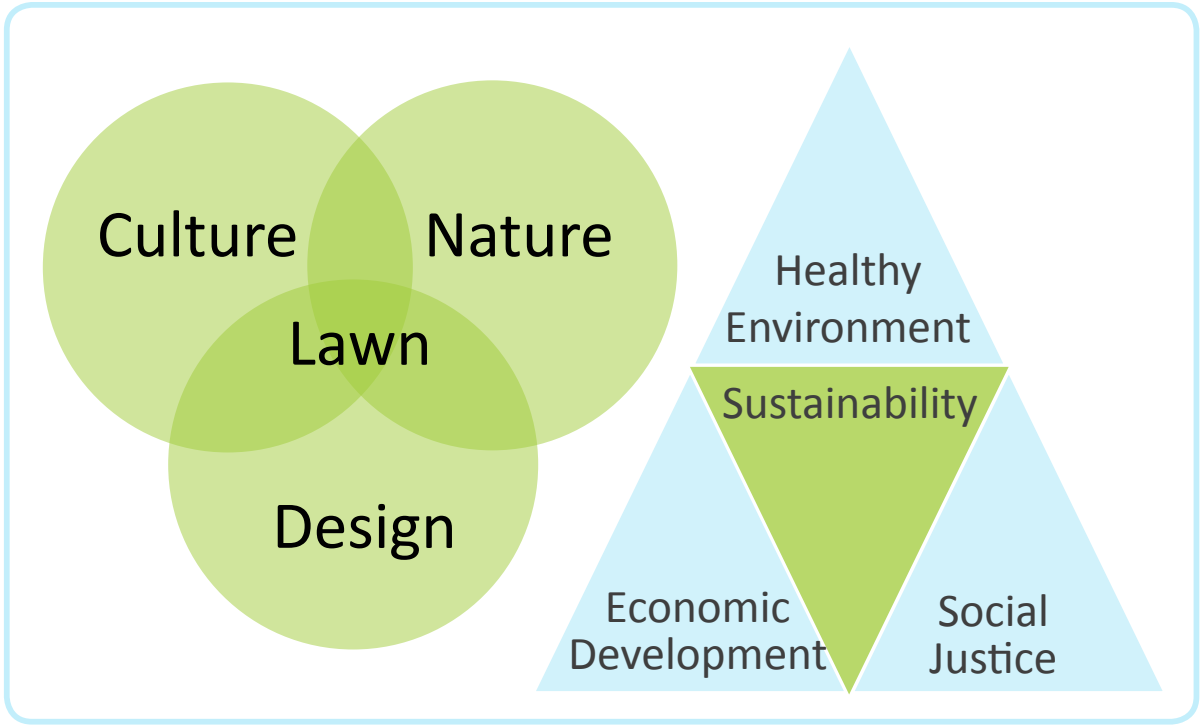


Figure 1.9: The weaving of integral underlying concepts and the definition of sustainability defined by the World Commission on Environment and Development (1987). Image of Triad: E. Vincent

ploring relevant questions pertaining to these concepts will provide drivers for eco-friendly alternatives to the current American lawn and these questions are presented in figure 1.10 on the following page. This study provides an understanding of the dimensions necessary to create sustainable alternatives that result in an eco-friendly lawn by uncovering the issues pertaining to design, build and maintenance while satisfying the aesthetic criterion of the American homeowner.

Fig. 1.10: Research Questions developed to inform sustainable design guidelines. Image adapted by M. Ghys

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter examines current literature focusing on environmental awareness and sustainability. The definitions of sustainability as defined in the report to the United Nations by the World Commission on Environment and Development (1987) and Sustainable Sites Initiative (2009) is being defined in my literature review as their definitions are essential to the new lens that may clarify the understanding of the underlying concepts of this study. Additionally, the American culture is addressed from the perspective of current research in the field. Lawn as a component of nature is evaluated and significant related research is reviewed. Finally the role of design is included and research is provided that indicates preferences for new alternatives to existing lawn typologies.

The World Commission on Environment and Development

The concept of sustainability is frequently misinterpreted and it is for this reason that the current definition as developed by the World Commission on Environment and Development. The Commission's definition of sustainability states that "Sustainable development meets the needs of the present without compromising the needs of future generations" (*Our Common Future*, 1987, p. 8). The definition of sustainability emerged in 1983 when the General Assembly of the United Nations requested that the World Commission on Environment and Development forge a campaign to be led by the and established by the prime minister of Norway, Gro Harlem Brundtland (*Our Common Future*, 1987). Known also as the Brundtland Report, this commission was charged to promote global environmental awareness and sustainability throughout the world community (*Our Common Future*, 1987). Additionally, for global development to be sustainable it requires those "who are more affluent" to adopt more ecologically friendly lifestyles (Brundtland, 1987, p. 9). Over the next four years Gro Harlem Brundtland worked toward the report that would be presented to the United Nations General Assembly (1987). The report titled, *Our Common Future*, heralds the possibility of a new era of growth economically with policies based on sustaining and

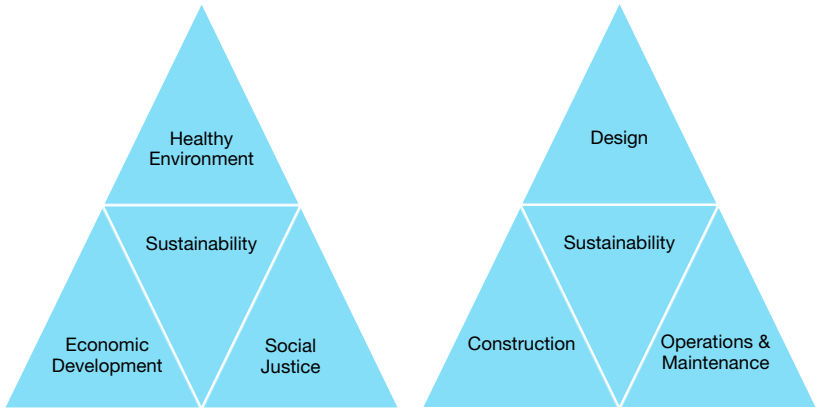


Figure 2.0: Diagram on left shows the original definition of sustainability as termed by the World Commission on Environment and Development and the diagram on the right depicts the new definition as stated by the Sustainable Sites Initiative (2009). Image: E. Vincent

expanding the resource base of the environment (1987).

Sustainable Sites Initiative

"The Sustainable Sites Initiative is a partnership of the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, and the United States Botanic Garden in conjunction with a diverse group of stakeholder organizations to establish and encourage sustainable practices in landscape design, construction, operations, and maintenance" (Sustainable Sites Initiative, 2009, p. 6). In the new definition "Sustainability is defined as design, construction, operations, and maintenance practices that meet the needs of the present without compromising the ability of future generations to meet their own needs" (2009, p. 7). This change is in response to a need to acknowledge additional stakeholders including design, construction, operations and maintenance and ecosystem services. By acknowledging the need to include a more comprehensive group, it identifies the multidimensional components of the sustainability pattern and the importance of ecosystem services. Figure 2.0 is a graphic representation of the old and new definitions of sustainability.

American Lawn Culture

Culture is defined as the ideas, customs and social behaviors of a particular people or society (Oxford, 2013). Current research by J. Nassauer acknowledges that the importance of middle class neighborhood cultural norms are stronger than broader cultural norms and can contribute significantly to improving ecosystem services (2009). Nassauer's research indicates that individual residential home-

Fig. 2.1: Residential landscape with eco-friendly design incorporating cues to care is emulated in neighboring yards.Source: http://www.sws-sssd.org/images/RainGa den.jpg

Fig. 2.2: Perceived care of the residential landscape. Source: http://boomtownphotos.s3.amazonaws.com/nassau_full/58568-1.jpg

owner stewardship may promote similar installations throughout the neighborhood. As represented in figure 2.1, the rain garden installation in one yard has been replicated in other yards throughout the neighborhood. Nassauer's research suggests that residents are more apt to mimic ecologically friendly landscape installations if they are seen in the context of their own neighborhoods (2011).

Another concept Nassauer promotes is perceived care which plays a considerable role in promoting sustainability because it relates to human perception and propensity to intervene (2008). Figure 2.2 depicts Nassauer's concept of perceived care and is an important component of changing landscapes (2008). This intervention is what Nassauer calls "cultural sustainability" and requires acceptance and care by humans (2011, p. 321). Nassauer defines cultural sustainability as the ability for individuals at a residential scale to become environmental stewards when confronted with aesthetically pleasing eco-friendly residential designs in their neighborhoods (2011). The correlations between the current research by Nassauer and pre-existing cultural norms of Downing and Olmsted both suggest that the perception of orderly landscapes reflects orderly lives and vice versa (Nassauer 2008).

Fig. 2.3: Cues to care: colorful flowers. Source: http://4.bp.blogspot.com/-2G1a_it0U3c/UCk9ZlS-nfI/AAAAAAAAKq0/Fw6xmYMzuHc/s1600/oudolf%2Bnew%2Byork%2Bhigh%2Bline.jpg

Fig. 2.4: Cues to care: bird houses. Source: http://www.natureskills.com/wp-content/uploads/2009/07/iStock_000001800069Small-538x354.jpg

Fig. 2.5: Cues to care: fences. Source: http://1.bp.blogspot.com/_CvDCiEFbNy8/S_viuqmxzOI/AAAAAAAAR14/gvTMJJVq3rI/s1600/3pc12.jpg

Fig. 2.6: Cues to care: mown turf. Source: http://www.jardinages.com/wp-content/uploads/2011/04/oudolf-bonn1.jpg

Nassauer's research also identifies a need to place what she dubs "cues to care" in an eco-friendly landscape design (2011, p. 322). "Cues to care" are evidence that the eco-friendly landscape is intentionally designed and include but are not limited to: neatness, crisp edges, portions of mown turf and habitat functions (2011, p. 322). Figures 2.3 through 2.6 page depict images of what Nassauer would consider effective cues to care. It is important to understand that "cues to care vary with culture and landscape context" (2011, p. 322).

Currently the residential lawn has a new opportunity to unify neighborhoods and communities in a sustainable manner. This speaks to the current cultural and environmental concerns reinforced by research on lawn preferences by Nassauer that strongly indi-

cates that lawn preferences are shifting toward more eco-friendly design solutions. This is not suggesting a complete removal of the lawn but rather an integration of native plants into the landscape and functional landscape design that is aesthetically appealing to residents. Existing cultural norms are a strong foe to a pattern shift away from high maintenance residential lawn dominated aesthetics. This presents an opportunity for design to create solutions that organize nature and encourage diversity of native plants and grasses as well as other flora that encourages wildlife habitats. Figure 2.7 conceptualizes the old American lawn pattern in the early 20th century and the new lawn pattern formed by the philosophies of Olmsted and Downing (Robbins, 2007).

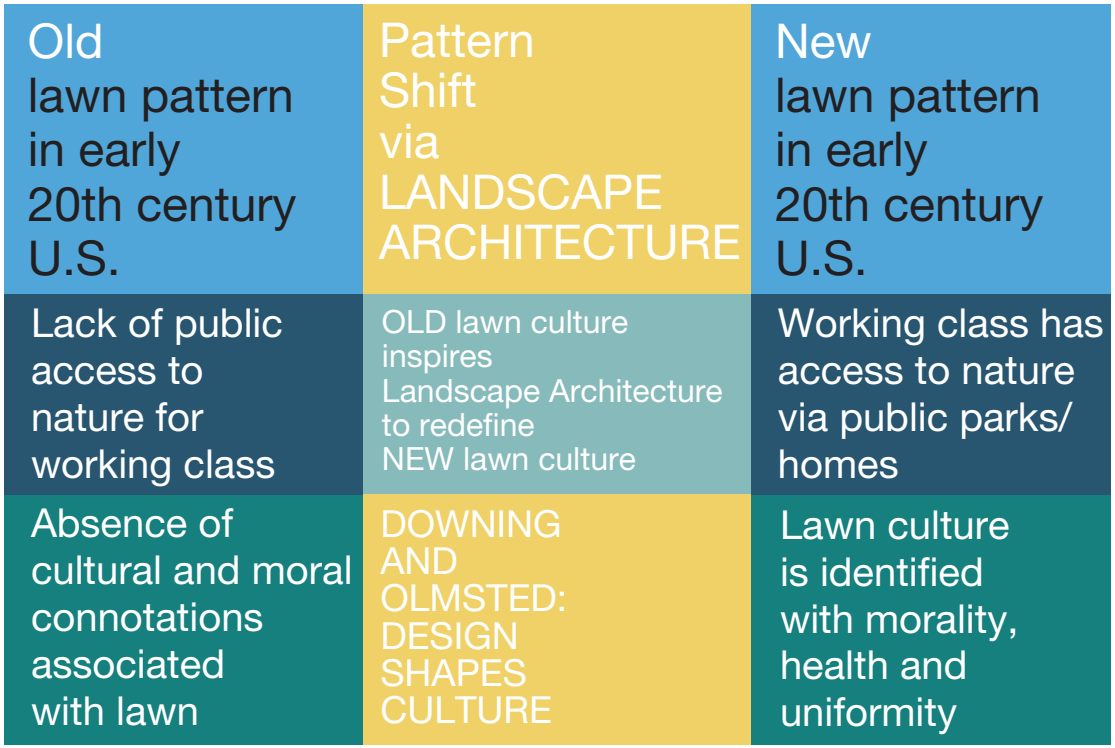


Figure 2.7: Concept of American lawn pattern in the early twentieth century. Source: Nassauer (1997), Robbins (2007) Image: M.Ghys

Nature and the Lawn

The Oxford online dictionary defines nature as a representation of the collective physical world, including plants, animals, and the landscape (2013). The accepted picturesque landscapes that were presented through Olmsted and Downing's landscape designs in the eighteenth century formed the American cultural perception of nature (Robbins, 2007). While lawn dominated open areas were prescriptions for cultural homogeny, elements such as rocky crags, twisted trees and rushing water were artfully crafted to represent the wilder more natural side of nature and formed the basis for cultural perception of how pristine nature should look (Nassauer, 1997). Nassauer points out that this picturesque scenic landscape aesthetic does not necessarily reflect a functional ecological system (1997). The charge for landscape architects is to integrate ecological function into the landscape while promoting cultural sustainability as defined by Nassauer (2011).

Ecological function in the context of ecosystem services has been a focus of the Sustainable Sites Initiative (S.S.I.) and is defined as goods and services provided by healthy ecosystems (2009). As depicted in figure 2.8, this lawn dominated residential aesthetic clearly requires high levels of maintenance and inputs and offers limited ecosystem services. Inputs in the context of this photograph include fertilizer, pesticides, and water. Major contributors to ecosystem services are native plants. The U.S.D.A. defines native plants as occurring naturally in a particular region, ecosystem or habitat without direct or indirect human intervention, (2013). Olmsted and Downing were proponents of native plant usage in their landscapes.

Fig. 2.8: Image of American residential lawn. Source: http://www.landscapedevelopmentinc.net/residential/privateres2/privateres2.1.JPG

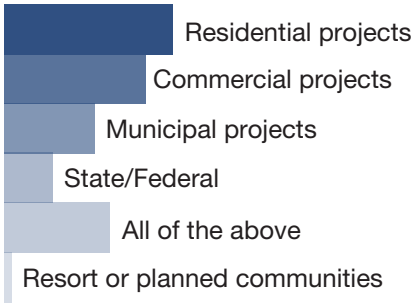
In the world of science, research confirms that native plants play a vital role in residential landscape ecology (Tallamay, 2010). Research of lepidopteran (butterfly and moth) communities concludes that there is a significant reduction in "abundance,

richness and host specialization" where nonnative plants were introduced. This is important because this group of insects is a hub in the food chain and as such contributes to a decline throughout the food chain.

Naturalist and philosopher, Aldo Leopold reinforces the individual's role as a necessary component of what he referred to as the "land ethic" (Wasowski, 2000, p. 128). Leopold's land ethic widened the scope of community to include natural elements such as soils, water, animals, plants; essentially, the land (aldoleopold.org, 2013). Concurrently Leopold believed that ethics motivated individuals to work in conjunction with one another and as such benefitting the collective (2013). This philosophy of connecting people with nature formed the basis for the modern conservation movement (Leopold, 2013). Again the correlations between cultural norms and nature are espoused and strengthen the argument that individual environmental stewardship is essential for greater ecological harmony (Nassauer 2011). To further connect the previous research, Nassauer's definition of cultural sustainability in conjunction with cues to care, is reinforced by the following Leopold quote: "We can be ethical only in relation to something we can see, feel, understand and love, or otherwise have faith in" (Leopold, 2013). Furthermore, Leopold acknowledges the inability to separate economic prosperity from ecological prosperity as is seen in the modern context of the Sustainable Sites Initiative (Leopold, 2013).

Design and the Lawn

Design shapes culture and because of that design has an opportunity to shape the new culture and that is the eco-friendly sustainable culture. Design is defined by Francis Ching as an iterative process that analyzes, synthesizes, and continues to achieve results based on repetitive attempts (1996). Design by definition is an attempt to solve a set of problems (Ching, 1996). Landscape architecture is charged with the task of conceptualizing aesthetically pleasing eco-friendly landscape designs that are successful in promoting environmental stewardship in homeowners. While many local and state ordinances require the use of native plants with the majority of regulation occurring in the western region of the United States, there is an increase in native plant selection by landscape architects in the southeastern region of the United States (Brzuszek, 2007). A study by Brzuszek et al in 2007 surveyed landscape architects in the southeast and results showed that native plant selection outnumbered exotics for landscape design projects. The main reason for this was site adaptability. Additionally residential projects ranked highest as the type of projects using native plants. What this suggests is



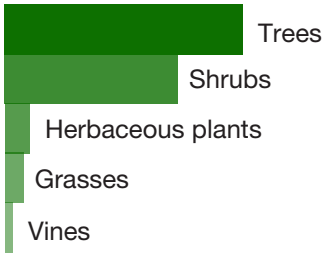


Fig. 2.9: Types of projects. Source: Barchart adapted from Brzuszek by M. Ghys, Image Source: http://www.farnsworthlandscaping.com/wp-content/uploads/2010/10/hillside-landscape-garden-steps.jpg

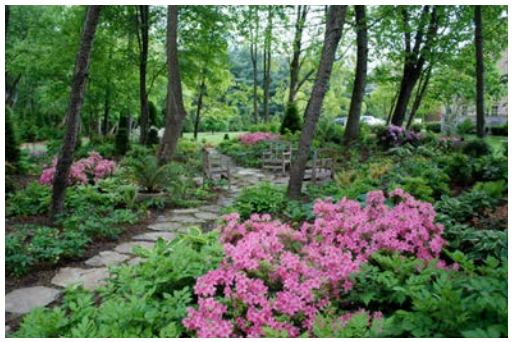


Fig. 2.10: Reason for native plant selection. Source: Barchart adapted from Brzuszek by M. Ghys, Image Source: http://i1.gardenscout.com/dynamic/photos-category/photos-section-530/dennysissonlandscapescom/507.shadegarden.jpg

Fig. 2.11: Types of native plants. Source: Barchart adapted from Brzuszek by M. Ghys, Image Source: http://currinsnurseryinc.com/Images/waxmyrtle15.jpg

that ecologically friendly landscape designs can promote functional, low maintenance and aesthetically appealing residential landscapes (2007). This also suggests that landscape architecture can promote awareness of native plant benefits by communication verbally with clients and allied professionals and visually through attractive eco-friendly design projects. Figures 2.9 through 2.11 show the results of Bruszek et al. findings (2007). There is empirical data that native plant installation can generate cost savings over time. Figure 2.12 on the

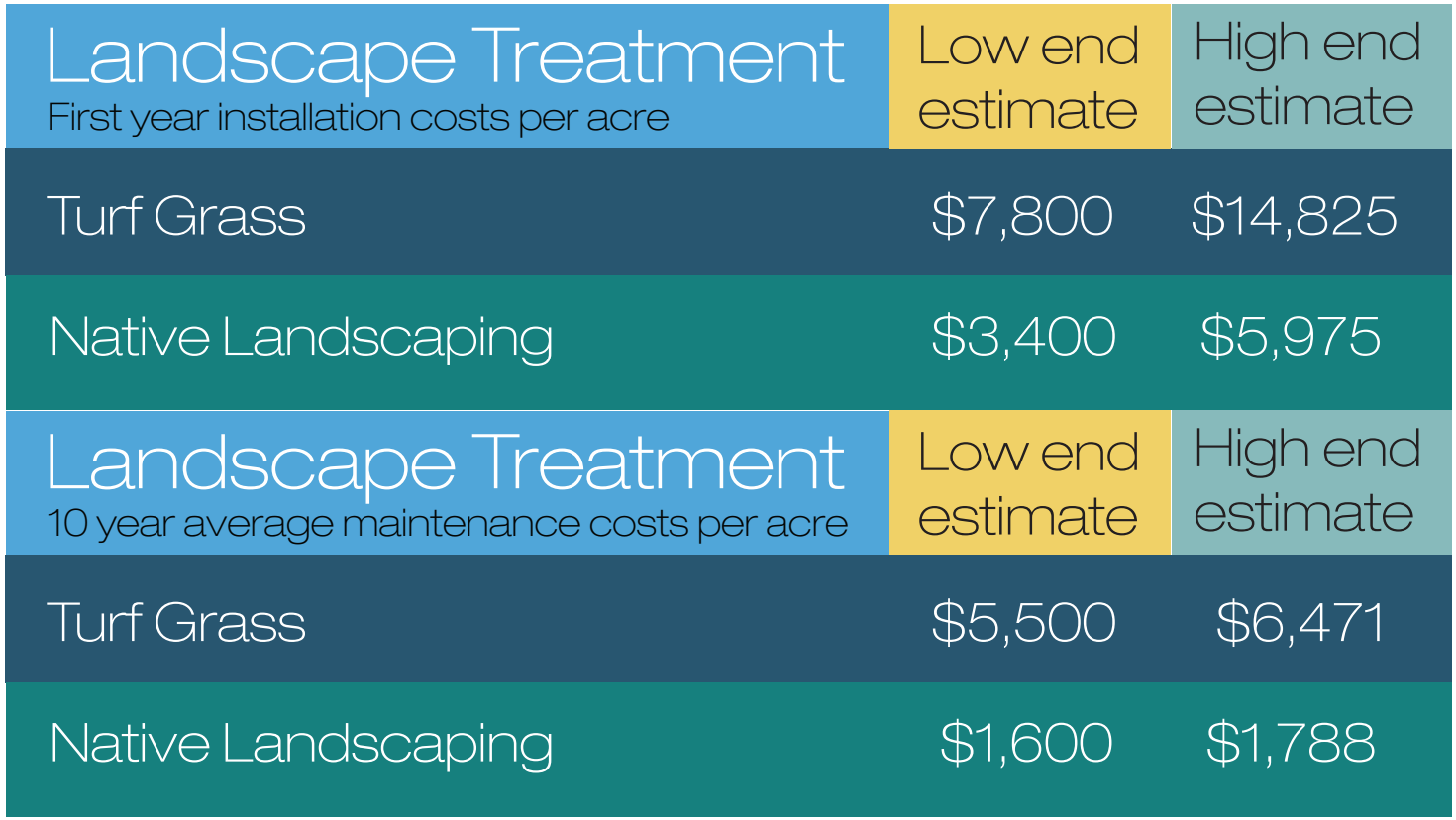


Figure 2.12: Data indicating cost savings of native plant installation. Source: Natural Landscaping for Public Officials: Northeastern Illinois Planning Commission, 2004. Imaged adapted by, M. Ghys 2013.

following page represents data from the Northeastern Planning Commission and breaks down the costs of turf grass installation compared with native landscaping per acre. The results indicate that over time, native plants may be a better investment.

Additionally, research by Nassauer shows residents willingness to pay for eco-friendly designs is not motivated by social implications or bureaucratic ordinances (2004). Rather residents found the eco-friendly installations aesthetically pleasing due to Nassauer's

Fig. 2.13: Eco-friendly design replacing former turf dominated yard. Source: http://blog.jpaulmoorephoto.com/wp-content/uploads/2011/02/Native_Garden_5703.jpg

Fig. 2.14: Native plantings require cues to care. Source: http://www.habitatdesign.com/wp-content/uploads/2012/04/ca-native-garden-tour.jpeg

incorporation of cues to care (2004). By including elements such as strips of mown turf and colorful flowers in the eco-friendly design, residents found them attractive and acceptable (2004). Results of Nassauer's research also indicate that homeowners are willing to pay more for these designs. Figures 2.13 and 2.14 are representations of the results of this research (2004).This data offers landscape architects tangible proof that eco-friendly designs including cues to care can be successfully received by residential homeowners. Changing residential landscapes by implementing eco-friendly designs creates an opportunity for landscape architecture to contribute to the promotion of ecosystem services and sustainability.

Summary

Culture, nature and design are interwoven and integral components of the American lawn. By examining these themes through the lens of sustainability, as defined by the Brundtland Report (1987) and the Sustainable Sites Initiative (2009) there is a greater potential to create sustainable alternatives that result in an eco-friendly lawn. Figure 2.15 on the follow page is a graphic image depicting weaving of the underlying components.

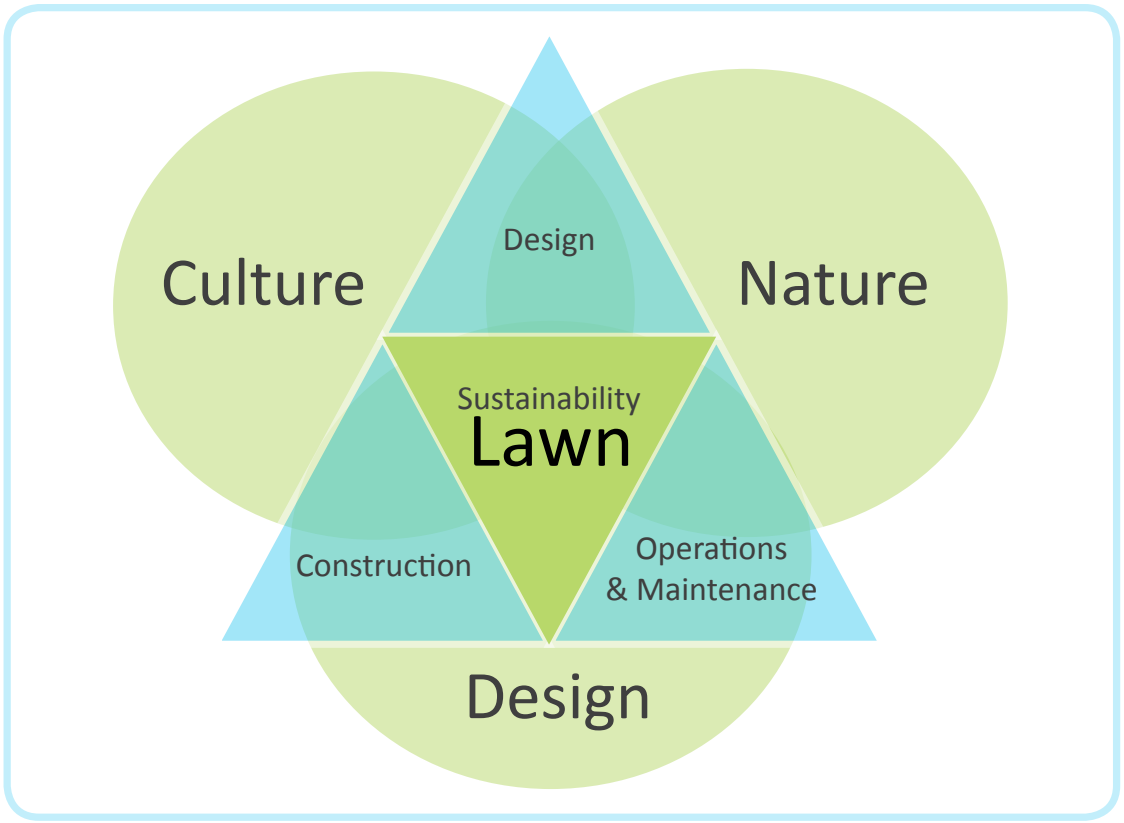


Figure 2.15 depicts the weaving together of culture, nature, space and design as it pertains to the Brundtland (1987) and Sustainable Sites Initiative (2009) definition of sustainability.

CHAPTER THREE

METHODOLOGY

Research Process

This exploratory study utilized multiple stages of data collection as seen in figure 3.0. Each of the stages informed and influenced the next stage. The first stage was the literature review which resulted in the underlying questions that aligned concepts of design, nature and culture as seen in figure 2.15. The second stage of data collection involved conducting personal interviews of green industry profes-

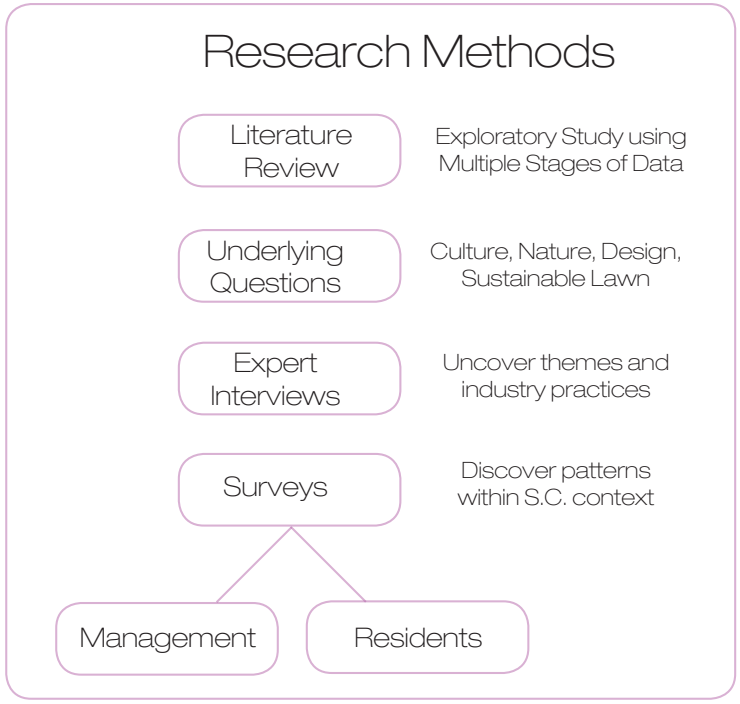


Figure 3.0: Research Methods

sionals to investigate the design, nature, and cultural implications of the American lawn within the context of sustainability. Six professionals were selected from a variety of disciplines in order to arrive at a broad and comprehensive perspective. Figure 3.1 - 3.6 depicts the experts' published works and identifiers. Piet Oudolf is a plantsman, landscape architect, and author of Landscapes in Landscapes (2010). He is native to The Netherlands yet practices internationally and is the designer associated with the renowned High Line installation in New York City. Thomas Cook is Associate Professor Emeritus at Oregon State University; a state turfgrass extension specialist; and author of Sustainable Landscape Management (2011). Cook has worked with the commercial turfgrass industry and been involved in numerous research studies. Karen Hall is an ethnobotanist with a specialty in native plants at Clemson University. Dr. Hall works with consumer and commercial audiences as she is the director of the South Carolina master gardener and master naturalist programs. Jenks Farmer is a South Carolina plantsman, designer and author. Mr. Farmer has designed gardens in the US and Caribbean. Additionally, Mr. Farmer established the vision and managed the installation of only two major botanical gardens built in South Carolina in last century. Ted Whitwell is Associate Dean of the College of Agriculture, Forestry, and Life Sciences at Clemson University who teaches Weeds in the Landscape class to undergraduate students. Dr. Whitwell is also an accomplished researcher in the field of weed science. Bert McCarty is a turfgrass physiologist at Clemson University who teaches turfgrass physiology, weed science, and pest management. Dr. McCarty has strong ties to the golf course community and is co-author of Weeds of Southern Turfgrasses (2004) and Southern Lawns (2003).

Each professional was interviewed on the telephone (Oudolf, Cook, and Farmer), or in person (Hall, Whitwell, and McCarty). Interview questions were developed to identify perceptions of design, nature (eco-system), and culture issues of the American lawn and its relationship to sustainability. The word 'eco-friendly' was chosen to replace the word 'sustainable' in most of the survey questions in order to minimize misinterpretation See Appendix A for example of interview questionnaire. Each interview was audio recorded and then transcribed into text. The resulting text was printed as a poster and scanned to detect correlations among respondents. Responses reflected the underlying concepts of culture, nature and design as they pertained to sustainable lawns.

Interview repeated responses indicate a strong need to understand a site's natural components as a means to properly integrate

Fig. 3.1: Book by Sustainability-turf grass expert Thomas Cook. Source: http://2.bp.blogspot.com/-_By-Td00qs4/UJ1tiF-2sI/AAAACII/Uy_wQ7QlxGI/s1600/Sustainable+Landscape+Management.jpeg

Fig. 3.2: Image from Plantsman-plant promoterJenks Farmer. Source: http://sphotos-a.xx.fbcdn.net/hphotos-ash4/422022_365872576766189_1953064296_n.jpg

Fig. 3.3: Book by Plantsman-horticulturalist Piet Oudolf. Source: http://4.bp.blogspot.com/-PqGyLrW7IRk/T8PTD1r1ryI/AAAAXU/krv3T8sfV8w/

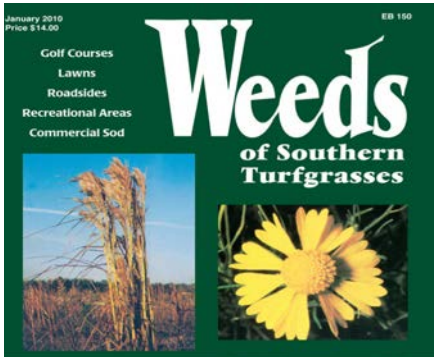


Fig. 3.4: Book by Turf-grass expert Dr. Bert McCarty. Source: http://sphotos-a.xx.fbcdn.net/hphotos-ash4/422022_365872576766189_1953064296_n.jpg

Fig. 3.5: Image of lawn and weeds. Weeds-herbicide Expert Dr. Ted Whitwell. Source: http://sphotos-a.xx.fbcdn.net/hphotos-ash4/422022_365872576766189_1953064296_n.jpg

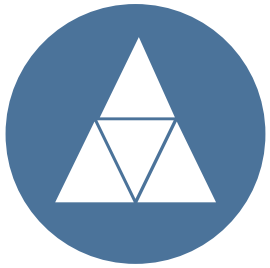
Fig. 3.6: Images representing SC Native plant expert Dr. Karen Hall. Source: http://www.octech.edu/sites/www/Uploads/images/Master%20Gardener%20logo.jpg, http://www.grandiflora.pro/_scripts/show_image.php?size=1200&file=/Flowering+Vines/Gelsemium+sempervirens.jpg

a plant palette or appropriate turf grass species. Homeowner's unrealistic expectations of what lawns should look like are based on previous experience and close ties with maintenance and lawn care companies. Eco-friendly recommendations suggest that lawns mixed with other plants should be considered as an ecological alternative to the pesticides and fertilizer needed to support a monoculture of one grass species. Native plants should be a part of every landscape installation. The lawn is a place for recreation and respite and is indeed a reflection of the function needs of the family or resident. Interviewee responses echo the importance of Nassauer's "cues to care" or the desire for neat and orderly appearance in the lawn and landscape (2010). On the following pages, figures 3.7 and 3.8 are quotes from the experts and represented a common theme throughout the interview process.

The third stage of data collection consisted of email surveys to residents and administrators of three residential planned unit development (PUD) communities. Communities' Web pages were also examined and the three selected communities all featured environmentally focused living. They also shared similar geographic locations (coastal low-country of SC), socioeconomic status (typically upper middle class incomes) and types of home owners (families with young children, professionals without children, and retirees)

Survey questions were developed for residents of the three communities. Twelve respondents were selected to represent three types of homeowners: young married couples with children (n=2), professional couples with no children (n=4), and retirees (n=6). Eleven preference questions were developed to explore the concepts of design, nature, and culture. See Appendix B for example of questionnaire. Eco-friendly (sustainable) implications were also sought. Response agreements found a range of preferences for lawns range ranging from 'none' to 'highly attached to lawn.' These cultural preferences were aligned with memories of the lawn and prior living locations. Nature themed responses included residents' connections to surrounding wildlife and preference for wildlife habitat within their yards. Design related responses revealed a desire to include site function and site maintenance in a manageable eco-friendly manner.

These responses agree with Nassauer's (2011) research, that lawn preferences widely differ based on memories and previous cultural norms. The lawn typologies selected by residents included a lawn dominant, lawn mixed with plantings and trees, and lawn minimally applied with a focus on pine straw and native plantings. Additionally Nassauer's research affirming the importance of the middle class homeowner as a steward for the environment and her concept of "cultural sustainability" (2009) is reflected in the sentiments of



"If you choose the right plants then it is sustainable. You don't have to take action concerning water. It's a matter of knowing your plants. Balance habitats, and how plants like to be with each other. That's the big thing with this kind of gardening. It has to do with ecology but also aesthetics and design. Has to be sustainable but it's not to say that you do not have to work." Piet Oudolf

I think the mowing side if you can figure that out whether it is electric mowers or rechargeable solar mowers. That's probably the worst part of it. Of course you are always going to have people to abuse fertilizer and pesticide but everybody mows. In the mind-set, they have to have it manicured. They have to have it mowed so that's the constant on both sides of the equation. Dr. Ted Whitwell

"When I purchased my landscape I waited a year before I did anything because I wanted to make sure that I knew what was in my lawn and then I worked toward planting but I worked toward planting with an idea of understanding nature in the long picture in the long term. Listen and look at nature." Dr. *Karen Hall*

"There a lot of people in Holland and Europe that love their lawns as well. People who love nature. I have no opinion about it- Do what you like. Gardening is about what you like. Some people like to control more than others. I like plants. I like to give them some freedom in the garden. I choose my plants for how they perform." *Piet Oudolf*

Lawn Sustainability

Wildlife Habitat

Plant Selection

Fig. 3.7: Analysis of interview responses conducted with experts on: sustainability, habitat, plant selection. Image: M. Ghys

"A lot of us grew up with lawns that were basically grasses with things in them that were mixed in and some of those things were good! We need to look to the days before expectations got so high. A lot of people have developed an artificially high expectation of what the lawn should be." *Jenks Farmer*

"People have a love-hate relationship with the lawn" *Dr. Bert McCarty*

"For many people, lawns are simply part of their everyday existence." *Dr. Thomas Cook*

I like to vary the intensity of maintenance to achieve my goals for appearance but also save water and fertilizer. Thoughtful design can hide brown grass areas from pretty lawns. Dr.*Thomas Cook*

"Lawn size should be only as big as can be mowed in a reasonable amount of time." Dr. *Thomas Cook*

"To be eco-friendly it's not necessarily the scale of the lawn but how it is managed. *Jenks Farmer*

The size of the lawn depends on the needs. " *Jenks Farmer*

"A great deal of thought is needed to place lawns appropriately in relation to the overall design and with respect to environmental conditions that will allow the lawns to thrive without excessive inputs. "Don't put lawns where they don't belong." Dr. *Thomas Cook*

"Proper selection, proper placement, and up front discussion that expectations of perfect golf course mono cultures – I think it's important that a designer says you can't afford them and we can't afford them. So that client from the beginning is on board and understands that their having a less than perfect lawn is a helpful thing to society." *Jenks Farmer*

Lawn Perception

Lawn Maintenance

Lawn Design

Fig. 3.8: Analysis of interview responses conducted with experts on: sustainability, habitat, plant selection. Image: M. Ghys

the respondents. Both Brzuszek (2007) and Nassauer's (2005) research indicating both designers and upper-middle class homeowners' preferences for native plants and eco-friendly designs are confirmed by respondents who were less attached to the lawn. Results of resident survey findings indicate that lawn activity includes children-pet recreation areas, family-friends gatherings, gardening, and bird watching. Additionally, lawn size based on family size, activity level and economic constraints. On the following page figure 3.9 depicts average responses from the three demographic groups: young couples with children, professional couples with no children and retirees. The categories include human activity, lawn size, maintenance requirements, chemical inputs, wildlife habitat, lawn pests and lawn-yard costs. The results are an average of responses and indicate a range of preferences from low, or neutral to high, or strong. These findings suggest that the multiple lawn typologies are influenced by family size and lawn preferences. Maintenance requirements are based on age, income and lawn typology. Photographs of typical respondent neighborhoods are located in figure 3.10 on page 26.

Survey questions were developed for administrators of the three communities to identify existing lawn practices that existed on a management level as well as broader demographic information concerning homeowners. Eleven policy and maintenance questions were developed to explore the concepts of design, nature, and culture. See Appendix C for example of survey questionnaire and detailed responses from each community. An average of responses is shown in figure 3.11 (pg. 27). Survey results show that habitat for wildlife exists throughout residential communities and is increased or decreased by resident landscaping decisions. Lawn dominated recreational areas are minimal with an emphasis on wildlife habitat and focused areas of recreation with alternative materials such as pine straw and hardscape. Additionally lawn maintenance companies have a close relationship with the developments with most developments hiring one company to do all the work. Native plants are encouraged and used frequently in design installations. This correlates with Nassauer (2005) research stating that residents are willing to invest in native landscapes. Responses also suggest an opportunity for designers to produce eco-friendly site plans as communities are open to eco-friendly yard designs. While Figure 3.12 (pg. 28) shows the geographic location of these developments, figure 3.13 (pg. 29) depicts community aesthetics and clearly indicates a neighborhood and development with close ties to their natural surroundings. The examination of these interviews and surveys directly leads to the development of effective sustainable design solutions.

Fig. 3.9: Analysis of Survey results from respondents in three gated communities located in the low country of S.C. Image: M. Ghys

Residential Areas

Fig. 3.10: Images of respondents residential living environments in three gated communities located in the low country of S.C.. Images: M. Ghys 2013.

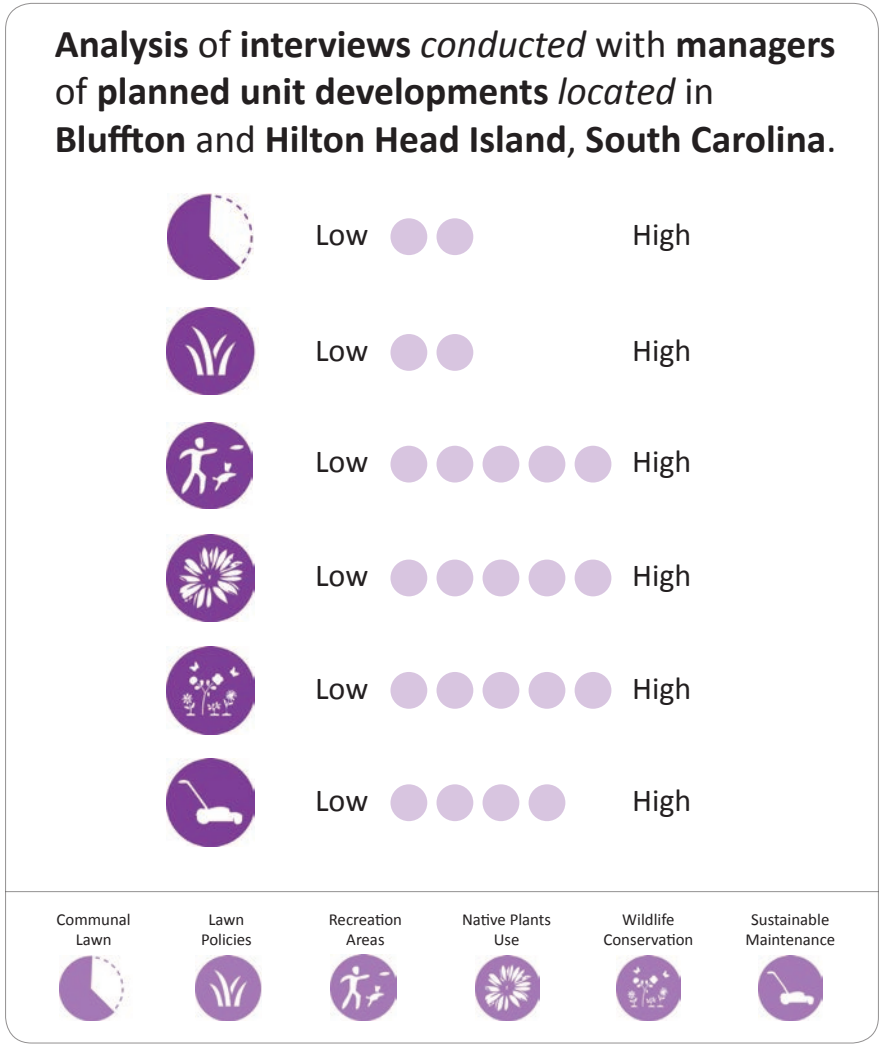


Fig. 3.11: Survey results from administrators in three gated communities located in the low country of S.C. Image: M. Ghys

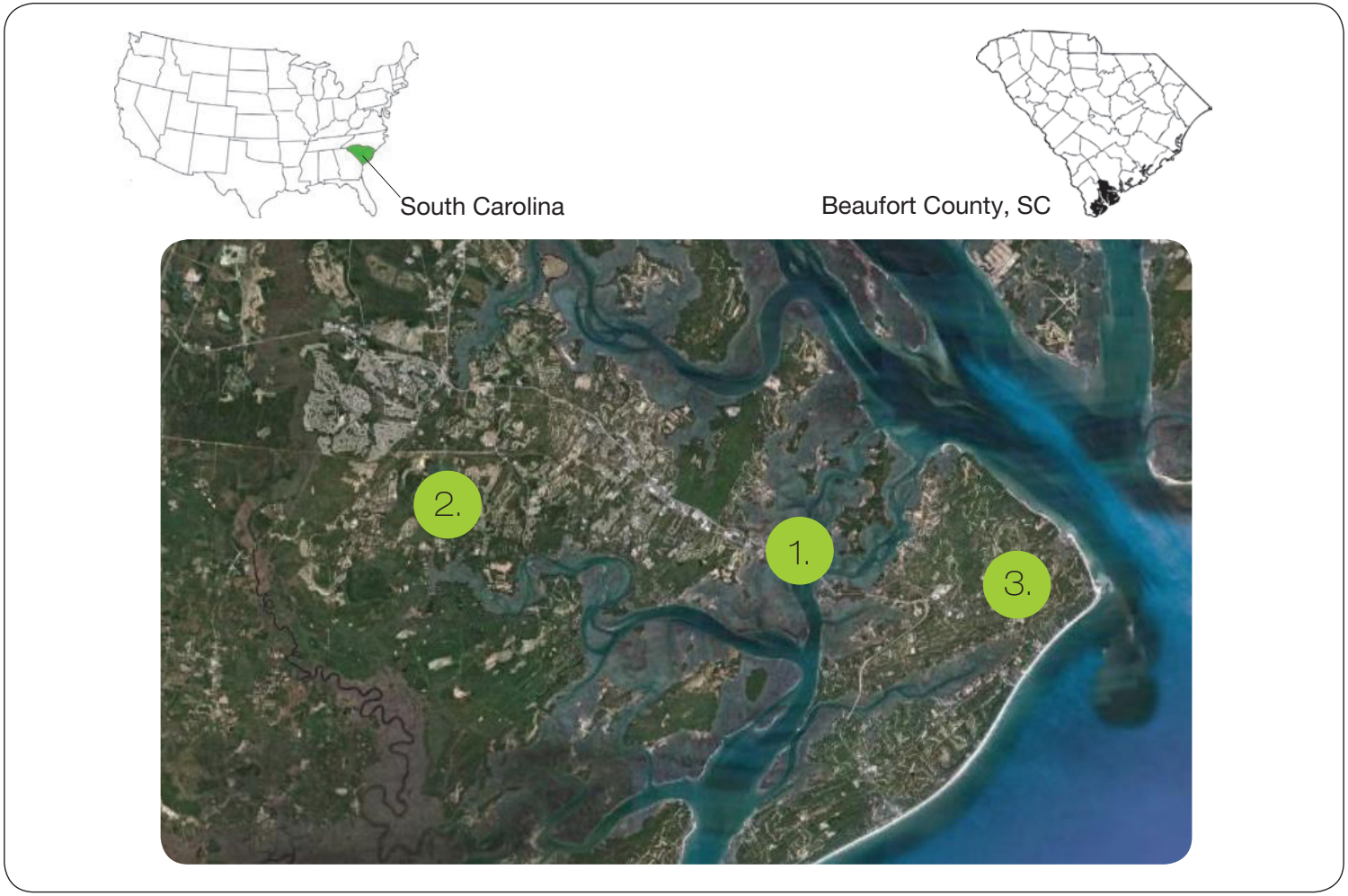


Figure 3.12: Images of regional context for surveys Bluffton - Hilton Head Island, SC. Source: Google earth (2013), Image: U.S. Map: Source: http://www.eprintablecalendars.com/images/maps/blank-map-of-the-united-states.jpg. Adapted by M. Ghys. Map of South Carolina: Source: http://upload.wikimedia.org/wikipedia/commons/thumb/7/71/Map_of_South_Carolina_highlighting_Beaufort_County.svg/752px-Map_of_South_Carolina_highlighting_Beaufort_County.svg.png

Community Areas






Fig. 3.13: Images of respondents' communal areas in three gated communities located in the low country of S.C..
Images: M. Ghys 2013.

CHAPTER 4

FINDINGS

This exploratory study attempted to uncover and understand the concepts of design, nature, and culture in the American lawn. It did so by reviewing the literature; conducting interviews with green industry experts; surveying administrators and residents of PUD communities; and by accessing case studies that were both environmentally oriented and design exemplars. The following findings may be considered particularly relevant to the next phase-which is to recommend sustainable design solutions to the American lawn. Figure 4.0 represents components of the current residential lawn pattern. It also lists elements that are missing, resulting in an unsustainable lawn. Figure 4.1 summarizes the data results of culture, nature and design and the new residential lawn pattern.

Design results acknowledge the necessity of native plant incorporation and site analysis for successful landscape design installations. Also, design and maintenance should correlate-and be in direct relationship to the homeowner's maintenance ability. Most importantly, designers must be willing to engage in conversations with homeowners to better understand cultural contexts and norms; and to present realistic expectations regarding lawn topologies and the resulting maintenance and ecological benefits.

Culture results are clear-in order for practices to change the aesthetic perceptions need to also change. There is agreement that unrealistic lawn preferences and expectations are integral in the unsustainable existing lawn pattern. People's lawn preferences are strongly influenced by their memories and past experiences and a dependency on chemical inputs is the norm which thwarts sustainability. Surveys indicate that the lawn is perceived by individuals as necessary or unnecessary based on personal experience and cultural preferences. Expectations are formed in much the same way and are difficult to combat with empirical data

Nature findings indicate that native plants and diverse plantings have strong ecosystem benefits. Developments are aware of integrating nature as a cultural connector and have sustainable landscape practices in effect to mitigate unnecessary pollution or natural disturbances.

Most importantly it is important to recognize the interplay of design, culture, and nature in the process of recommending a

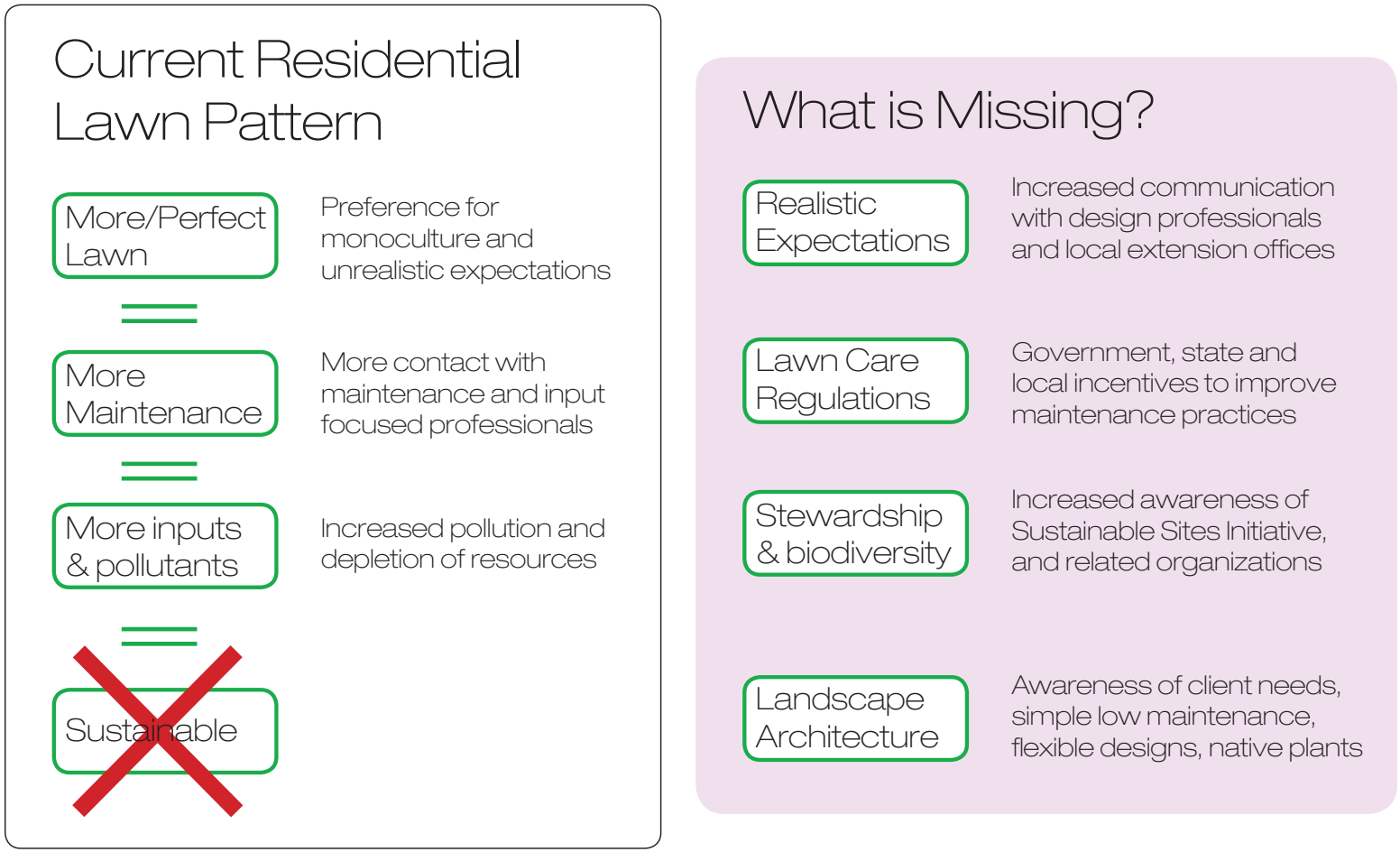


Figure 4.0: Data results: current residential lawn pattern: Maria Ghys, 2013

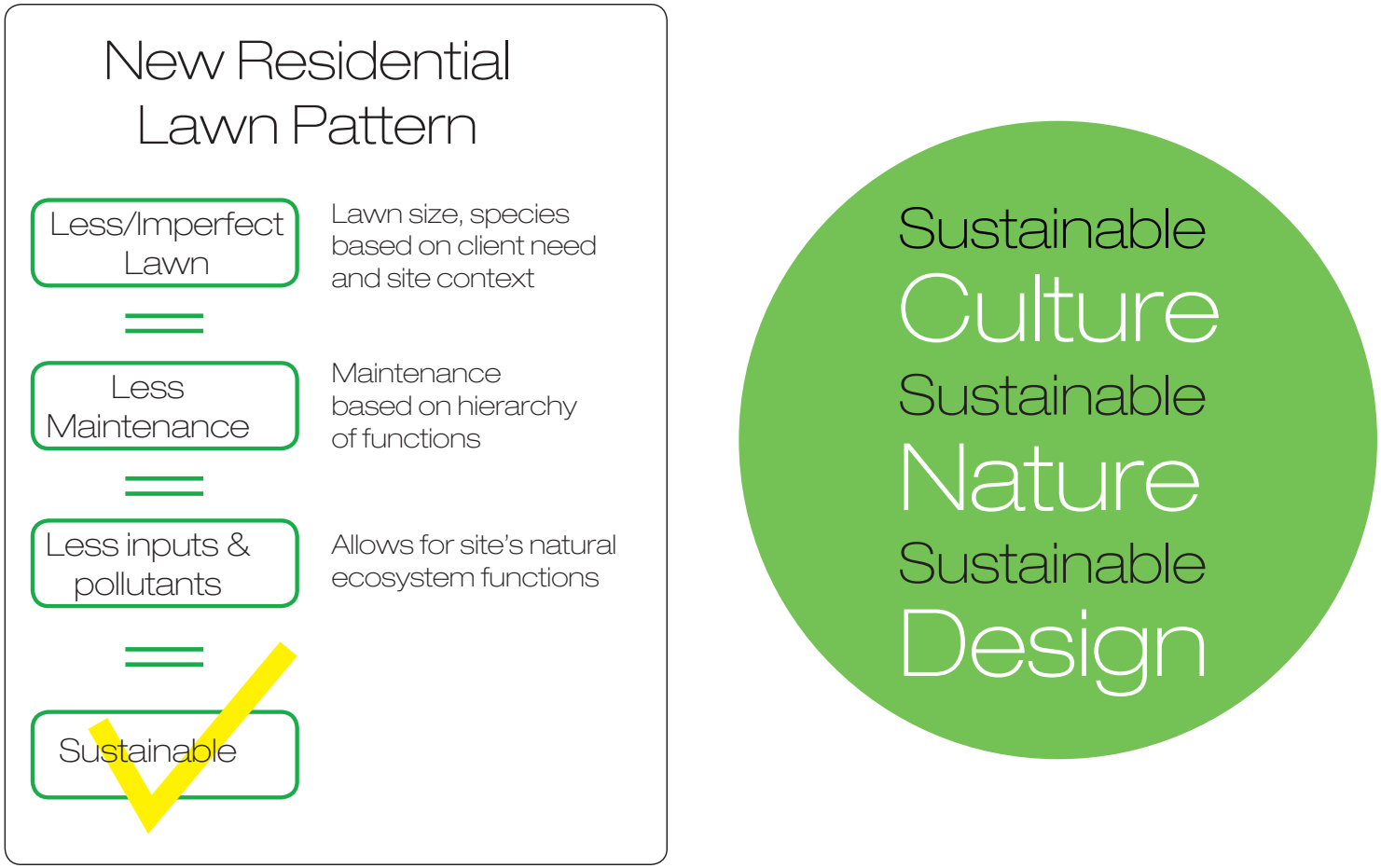


Figure 4.1: Data results: new residential lawn pattern: Maria Ghys, 2013

sustainable American Lawn. By acknowledging client preferences and discussing expectations it is possible to create successful sustainable landscape design for residents. Finally figure 4.2 shows the old and proposed new lawn pattern based on the evolving cultural and environmental values of the 21st century. This figure represents the old lawn pattern in the 21st century based on an existing lawn culture of unrealistic expectations and stewardship combined with misguided cultural and moral connotations associated with the lawn. By looking at Olmsted and Downing's prior successes in the early 20th century as a model to change current lawn patterns, it is possible for landscape architecture to promote a new more sustainable lawn pattern. Sustainable landscape design can define a new lawn culture with realistic lawn expectations, promote cultural stewardship, and renew cultural and moral connotations associated with the lawn. It is essential to remember that the components of culture, nature and design are interwoven and linked to the sustainability triads of the Brundtland and Sustainable Sites Initiative definitions as depicted in figure 2.15.

Summary

Precedent case studies offer residents who have the financial means to move to communities with shared cultural ideals. Residents attempting to diversify their existing lawn areas should incorporate native plants and grasses while establishing a turf strip in areas where a more natural plant pallet would not be tolerated. Precedent landscape architects and gardeners can offer components by which to create a successful sustainable landscape design guideline. Some of these elements include: outdoor rooms, native grasses, perennials, multiple foci, strips of turf, and hardscape materials.

Culture, nature and design are interwoven and integral components of the American lawn. By examining these themes through the lens of sustainability, as defined by the Brundtland Report (1987) and the Sustainable Sites Initiative (2009) there is a greater potential to create sustainable alternatives that result in an eco-friendly lawn.

Old lawn pattern in early 21st century U.S.	Pattern Shift via LANDSCAPE ARCHITECTURE	New lawn pattern in early 21st century U.S.
Lack of cultural stewardship, unrealistic turf expectations	OLD lawn culture inspires Landscape Architecture to redefine NEW lawn culture	Cultural stewardship, realistic lawn expectations
Misguided cultural and moral connotations associated with lawn	DOWNING AND OLMSTED: DESIGN SHAPES CULTURE	Renewed cultural and moral connotations associated with lawn

Figure 4.2: Data results - historical shifts. Image: Maria Ghys, 2013

CHAPTER 5

NEXT STEPS

The look of the landscape speaks of the people who live there and it is important to recognize these cultural variances as they shape preferences, expectations and aesthetics (Nassauer, 2011). While people in the low country of South Carolina move there because they want to live under the canopy of live oaks and Spanish moss, there is still a strong tie to memories and pre-existing values. Culture is about people. It is important to remember that fact when designing residential site plans. Without a thorough client interview and site analysis, the failure of a sustainable design lays in the designer not the client. When people consider themselves stewards, they may begin to view their residential landscapes as opportunities for biodiversity. Figure 5.0 on the following page summarizes the data responses. Culturally lawn preferences should change regarding aesthetics and levels of use. Lawn maintenance companies have an obligation to provide healthy green lawns but should be clear with homeowners about realistic turf expectations. This discussion of turf species and appropriate location is a subject that must be discussed prior to installation by the appropriate turf specialist. Soil samples of home site are an integral part of establishing appropriate plant species and potential issues prior to design. Dialogue promotes awareness and realistic expectations and can help mitigate unrealistic goals for perfection.

Design Limitations

This was an exploratory study examining the processes and underlying concepts necessary to discussing sustainable design solutions for the American lawn. Small sample sizes should be increased in the future and the generalized approach could be narrowed in order to isolate and understand more specific elements involved in understanding the American lawn.

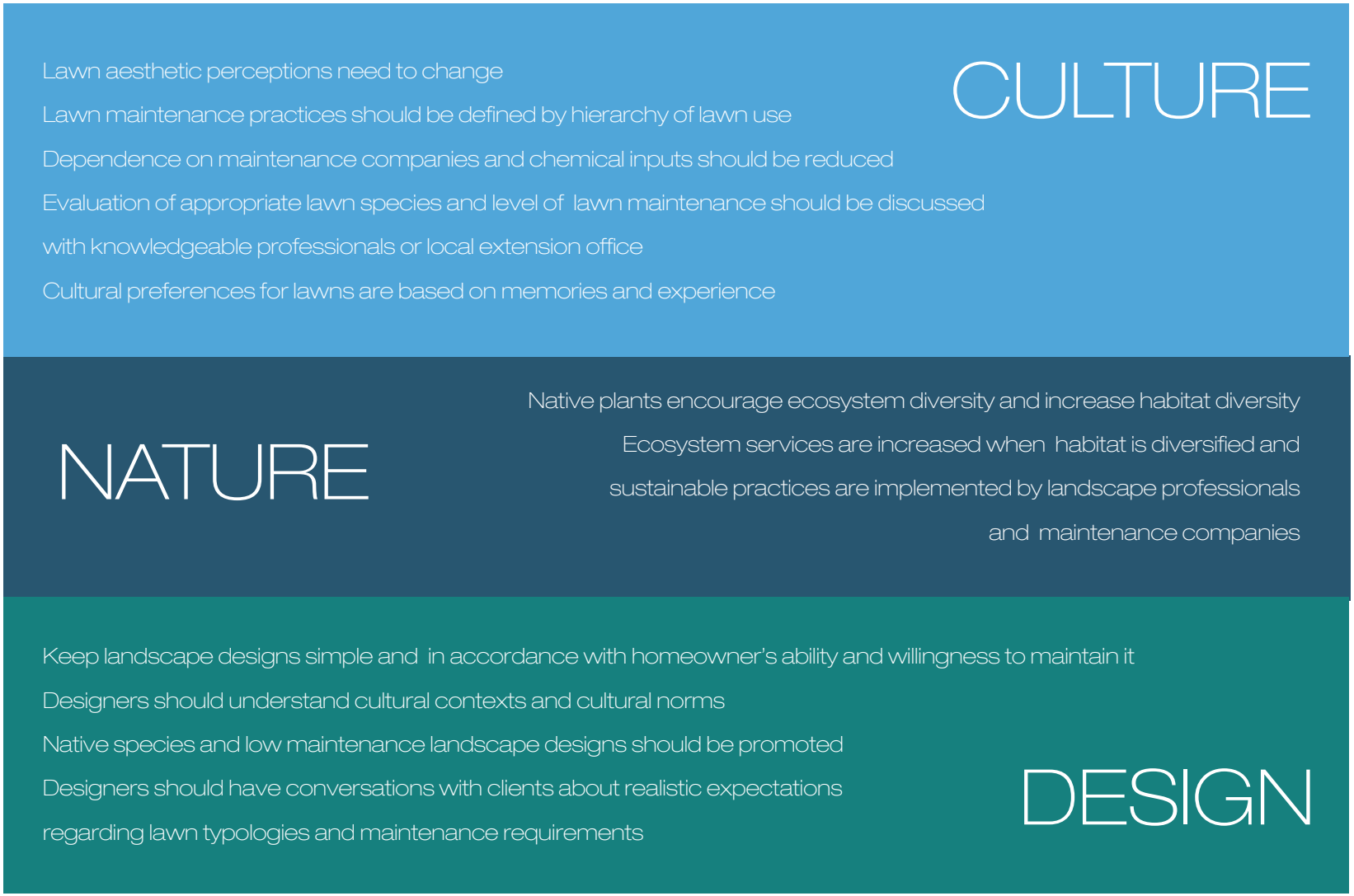


Figure 5.0: Data results: culture, nature, design. Image: Maria Ghys, 2013

Design Recommendations

Lawns must be flexible and simple. Lawns should use native plants. Hardscape materials are an effective approach to lowering maintenance costs. Grasses and perennials offer structure and seasonality as a means to improve aesthetics while also offering wildlife habitat and food. Outdoor rooms should be based on functional needs and should be flexible in that they can be transformed from softscape to hardscape as the client's needs change. Levels of maintenance requirements offer lowered inputs as well as economic savings. The design recommendations on the following pages will discuss levels of maintenance and indications of care and provide templates for design applications. Figures 5.1 through 5.3 represent the design guidelines that include but are not limited to a successful sustainable residential lawn. Figure 5.4 is an image showing the correlations among culture, nature, design, stewardship and sustainability. Eco-friendly designs should acknowledge that lawn is a reflection of culture. Culture inspires design. Designs should respect nature. As a result, nature can instill stewardship and stewardship promotes sustainability. In conclusion these design recommendations form a foundation for further exploration of the sustainability of the American lawn.

Design Recommendation One

Eco-friendly designs should include outdoor rooms that encourage wildlife habitat. Native plants and ground cover should be incorporated to reduce lawn size. Grasses and perennials offer food and shelter for wildlife and can be colorful, textural visuals that transform with the seasons. A turf strip may delineate areas that might otherwise look unkempt. Bio swales can be incorporated to capture and filter water run-off and can include tree plantings which offer shade for pedestrians.

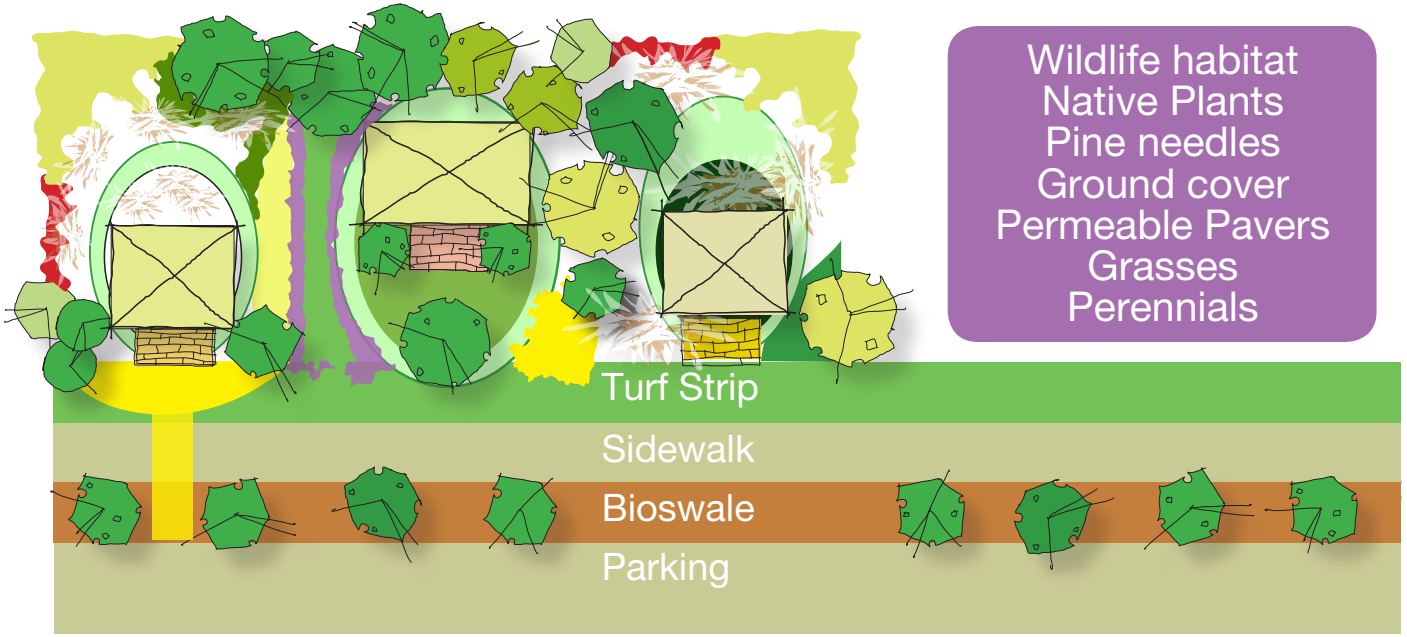


Figure 5.1: Elements of an American sustainable residential neighborhood. Image: Maria Ghys, 2013

Design Recommendation Two

Eco-friendly designs should include materials that encourage permeability and reduce environmental impact. Incorporating native plants, perennials, trees and grasses can offer variety and create outdoor spaces that are dynamic and offer greater biodiversity and habitat for wildlife. Lawn alternatives include pine needles, mulch, and other low maintenance ground cover. For pedestrian circulation and gathering, permeable paving creates surfaces that encourage water filtration and reduce lawn related maintenance. Additionally, rain collectors such as rain barrels and rain gardens offer attractive, functional alternatives to traditional storm water drainage materials.

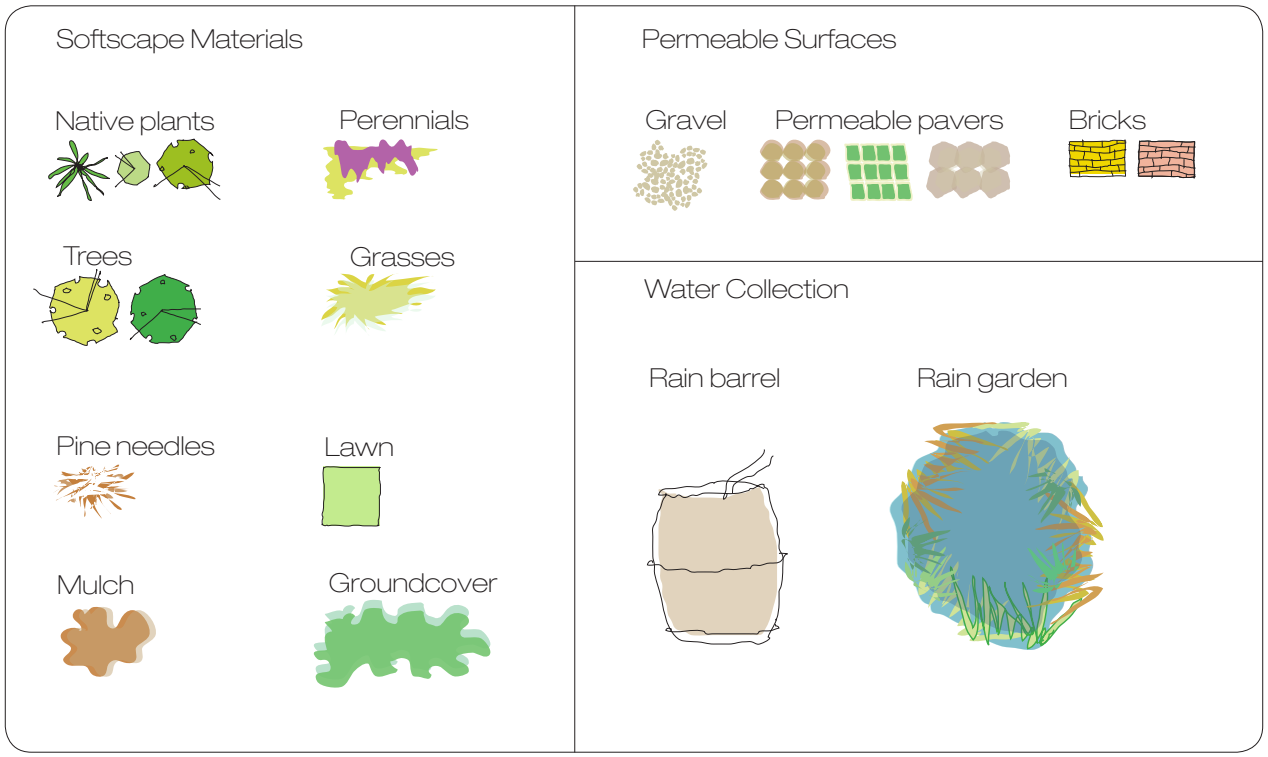


Figure 5.2: Recommended materials for alternative lawn design. Image: Maria Ghys, 2013

Design Recommendation Three

Eco-friendly designs should include zones of importance that require varying levels of maintenance. Zones that have perceived value or frequent use should receive higher levels and more frequent maintenance. This includes thresholds, delineations of spaces which may appear unkempt, social gathering areas and elements that contribute to curb appeal. Other zones may require less maintenance and can be created using alternatives to lawn such as pine needles, grasses, and perennial beds. Permeable paving is also a low maintenance alternative.

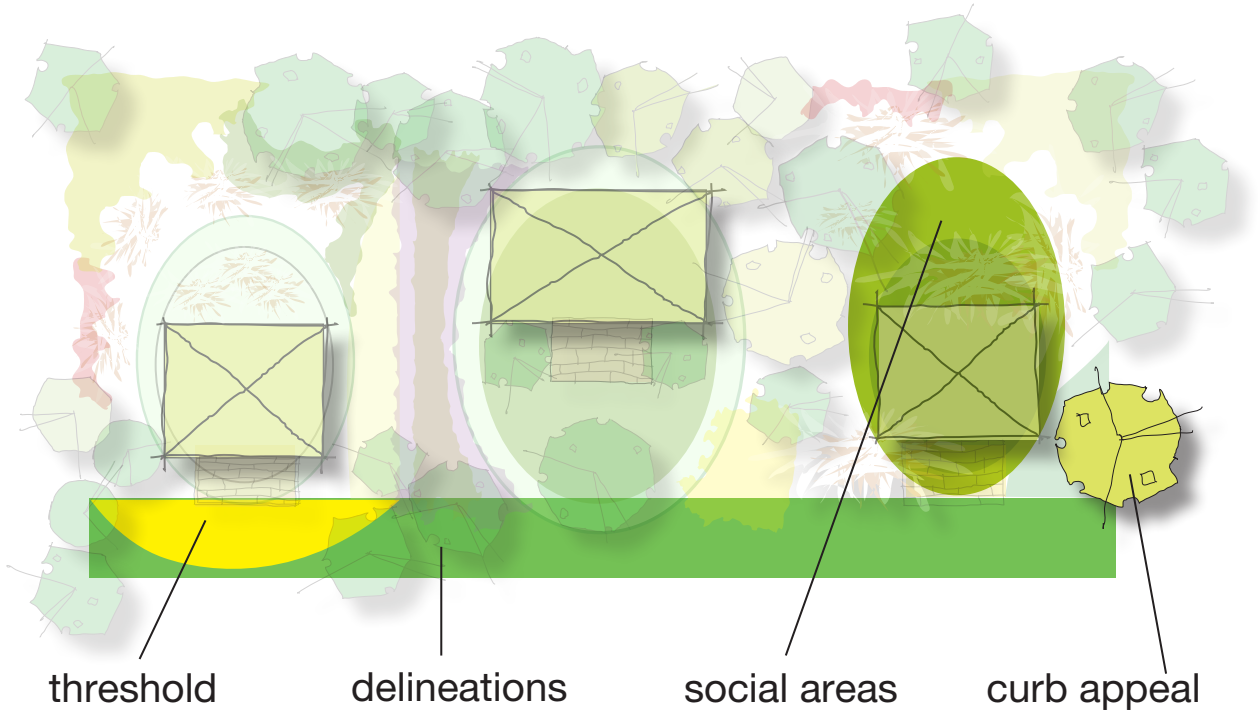


Figure 5.3: Figure showing concept of varying maintenance levels based on hierarchy of needs. Image: Maria Ghys, 2013

Figure 5.4: New Sustainable Lawn Pattern. Image: Maria Ghys, 2013

APPENDICES

Appendix A

Green Industry Professional Interview Questions

1. How would you describe American's relationship with the lawn?

2. What is the main function of the American residential lawn in your opinion?

3. Do you have a lawn at your home?

4. How do you recognize a sustainable landscape when you see it?

5. Do lawns play a positive role in ecosystem?

6. Is there a place where the ideal sustainable residential lawn exists?

7. Could you describe (the place) and how the people interact with it?

7. What size should the ideal sustainable residential lawn be?

8. What needs to happen to make the American residential lawn more sustainable?

9. What needs to happen to make the ideal sustainable lawn acceptable to Americans?

10. How should the American lawn be designed in order to function well for both people and the natural environment?

11. How will future Voluntary Green Building certification programs affect sustainability and the lawn?

12. Do you have any advice for Americans who want to practice sustainable landscape design?

Appendix B

Resident Survey with Response

1.What sorts of activities that occur on your lawn/yard? Just watering,mowing, regular traffic that two people can generate

2.What are things you like/dislike about your lawn/yard? Lot's of trouble with grass dying the last couple of years. Nothing different as far as watering, no intense heat. Lot's of lawns have suffered in Hilton Head the last few years

3.What would you change about your lawn/yard? Different type of grass from centipede or St. Augustine. Maybe zoysia.

4.How is your lawn/yard maintained? Mowed every week, watered probably 2-3 time a week

5. How many hours a month would you say are spent maintaining the lawn/yard? 12-15 hours/month

6. Does your lawn require fertilizer/pest control? yes

7.How do you use your lawn? Just to look at and enjoy an evening sitting around with a nice glass of wine

8. What could be different about the lawn that would make it better? Different type of grass and an irrigation system

9.Why did you move to _____Hilton Head Island,SC_____. Career opportunity

10.How do you feel about lawns? Feel they are a VERY IMPORTANT feature of a home.

11.Do you have any particular memories about lawns in your past? Just that they are a "hobby" of mine to maintain.. My way of "escaping"....

Appendix C

Administrator Survey Questionnaire

1.What policies are in place at _____ regarding wild animals?

2.Do you have any policies regarding the use of native plants?

3.What are your policies regarding residential lawns?

4. Who maintains it?

5.How many people live in _____?

6.How would you describe the demographic make-up of the residents in _____?

7.How many acres of lawn exist in _____?

8. What percentage of the total lawn area would you say is made up of communal recreations space?

9.How many acres is your (residential) lawn?

10.Is there a place that you would say most people hail from?

11.What is the average cost of a home in _____?

Appendix C

Administrator Survey Responses

Hilton Head Plantation

Hilton Head Island, SC
Established: 1973
Total Residents: 13,000
Residents from: OH (2/3), NY, MD
Residents Age: 2/3: +65, 1/3: 30+
Average cost of home: $500,000
Total Acreage: 4,000
Communal Lawn Policy: Natural Ecology- Minimal Lawn
Total Residential Lawn Acreage: Approx. 750
Lawn Policy: Require a strip between home and edge of pavement (Ecological)
Native Plants Policy: No policy but encourage
Wildlife Policy: Focused on habitat. Alligators- keystone. Deer culling 1x/year
Lawn Maintenance: 1 Landscaping Co. provides all services for development
Audubon Member: *Cooperative Sanctuaries*- Bear Creek Golf Course

Moss Creek Plantation

Bluffton, SC
Established: 1975
Total Residents: 1,800
Residents from: OH (2/3), NY, MD
Residents Age: 2/3: +65, 1/3: 30+
Average cost of home: $400,000
Total Acreage: 1,042
Communal Lawn Policy: Minimal - Encourage Natural Ecology
Total Residential Lawn Acreage: N/A
Lawn Policy: Require a strip between home and edge of pavement (Ecological)
Native Plants Policy: No policy but encourage
Wildlife Policy: Focused on habitat. Alligators- keystone. Deer culling 1x/year
Lawn Maintenance: 1 Landscaping Co. provides all services for development
Audubon Member: *Cooperative Sanctuaries*

Hampton Lake

Bluffton, SC
Established: 2008
Total Residents: 2,000
Residents from: OH (2/3), NY, MD
Residents Age: 2/3: +65, 1/3: 30+
Average cost of home: $300,000
Total Acreage: 960
Communal Lawn Policy: Minimal - Encourage Natural Ecology
Total Residential Lawn Acreage: N/A
Lawn Policy: Require a strip between home and edge of pavement (Ecological)
Native Plants Policy: No policy but encourage
Wildlife Policy: Focused on habitat. Alligators- keystone. Deer culling 1x/year
Lawn Maintenance: 1 Landscaping Co. provides all services for development
Audubon Member: *N/A*

Survey results from managers in three gated communities located in the low country of South Carolina

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