

QUESTIONING THE USE OF LAWN
IN THE ARID WEST:
TESTING PERSONAL PREFERENCES AND
ANALYZING TURF USE IN UTAH

By

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A thesis submitted in partial fulfillment of
the requirements for the degree of

MASTERS OF SCIENCE IN LANDSCAPE ARCHITECTURE

WASHINGTON STATE UNIVERSITY
Department of Horticulture and Landscape Architecture

MAY 2005

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The members of the Committee appointed to examine the thesis of DAVID AUSTIN SHAW find it satisfactory and recommend that it be accepted.

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Abstract:

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The lawn is a ubiquitous landscape element all over the US and is also one of the biggest drains on city potable water supplies. Water resources in the arid West are under considerable strain, which brings into question current water use patterns and the prevalence of lawns as an ornamental feature. Lawns in residential front yards and around commercial properties are typically ornamental in nature and not intended for functional use. Americans seem to exhibit great reluctance to change their use of and preferences toward lawns despite the vast resources that they require to maintain. This research attempts to probe personal preferences of lawn in residential front yards of the arid western United States. The Salt Lake City, Utah metropolitan area was chosen as the study site

for this research because it has many qualities that are representative of cities and towns located in the arid regions of the intermountain West. Common to these areas is higher than average population growth and limited potable water supplies to serve new and existing residents. Residents from the study area were surveyed to determine their preferences toward residential front lawns. Subjects were asked to look at images representing the same house with varying percentages of lawn in the front yard. They were asked to rank the images according to visual and maintenance preferences.

It was found that preferences toward the front yard lawn vary widely ranging from 25% lawn to 75% lawn. The data showed a strong trend for preferences for a yard to drop off significantly when the lawn covers around 100% of the yard. Also, there is a substantial shift in preference between visual preferences and maintenance and ownership preferences. Homes that had 25% and 50% lawn had a much higher visual preference than others. When looking at what people want to maintain and own the preference shifted to homes with 50% and 75% lawn.

There are many possible avenues to improve water conservation in the arid West. Reducing the amount of the traditional lawn that serves a purely ornamental purpose is one such method that would prove helpful in conserving Western water resources. Taking actions like implementing government ordinances to cap the amount of lawn while offering incentives to explore other equally decorative but more resource efficient landscaping options would be

effective in conserving water and could still allow landscapes to fall within the aesthetic and practical preference levels of the public.

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CHAPTER ONE

INTRODUCTION

There are many landscape elements found around the world that could be considered icons of the countries or regions which they come from. In modern America there is nothing as stable, ever-present and ubiquitous as the American front lawn. The lawn itself could be considered the quintessential image that defines the core of constructed American landscapes. From hot, arid regions to cold, humid regions, this landscape element is found throughout the US (Jenkins, 1994). Americans love lawns, and it is amazing to see the amount of time and effort they will devote to them. Growing up on the East side of the Phoenix metropolitan area I was often struck by the extreme juxtaposition of the vast suburban blanket of velvety green grass blossoming, opposite the cacti and scorched earth. I often wondered how and why people had superimposed such an artificial aesthetic over the top of a very diverse and beautiful natural landscape such as the Senora Desert. This question led me to pursue answers to this enigma. In time, this powerful image led to a search for lawn alternatives and landscape aesthetics that would not only be acceptable to the general public but, more importantly, fit within the climactic and soil conditions that a region could provide.

Landscape architects and landscape designers are systematically changing the face of the earth. This is a profession whose members are engaged in manipulating landscapes everywhere development occurs. Indirectly, the land is changed with every stroke of a pen or click of a mouse that

a practitioner makes. Every decision that is made has a direct effect on the land and the resources associated with it.

When such a landscape is constructed it survives by drawing from the climactic, soil and water resources that are provided by the site. These factors establish a bank of available resources from which organisms in the landscape may draw. To survive, plants and animals must live within the budget afforded by this resource bank or one of two things must happen: (1) If an organism requires more than what the local resource bank has to offer, it must take resources away from another account within the bank. Doing so depletes the available resources in the area, making it harder for organisms there to survive. Or (2) the organism must perish from lack of resources. The parameters set by the local resource bank can be thought of as the resource budget of an area and will be referred to as such in this document. In constructing a new design, a landscape practitioner has the choice to stay within the parameters of the resource budget or to ask for something more. If the proposed landscape falls outside of the capacity of the local resource budget, it will need to be supplemented with additional resources. This decision to “ask for more” could take any of a variety of forms: The constructed landscape may now require different soil conditions, nutrient requirements, sun light exposure, temperature extremes, disease and pest protection or water requirements. While many of these factors can be addressed in constructed landscapes with the usage of technology, the fact remains that outside, and possibly finite, resources must now

be added to sustain the new system. The resource factor that will be focused on in “Questioning the Use of Lawn in the Arid West” is water.

Nearly all constructed landscapes require and are designed with some kind of supplemental watering system. Irrigation design and construction is a major part of the landscape industry. This is a sign that the default approach to landscape design is to ask for more than what a region’s resources can provide. Many of the trees, shrubs and grasses that are commonly used as ornamentals around the nation are not native to this continent. This means that to survive, many of these plants must be supplemented in one or more of the required resource fields. Care is usually taken to ensure that plants will be selected to fit into a region’s temperature and soil budgets, but too often, fitting into a region’s water budget is given little attention. America’s use of non-native grasses for lawns is a demonstration of this particular design habit.

The typical non-native grass used in a lawn requires many times the amount of water that other native or exotic woody and herbaceous plants do. Yet the lawn is an American aesthetic that is prevalent in constructed landscapes from coast to coast. This fact raises the question, “Why do we use lawn the way we do when it requires much more of our water resources than we in the West can afford?” The following research will attempt to answer this question by taking a multifaceted approach. The first section is a review of how the lawn has become so established in the American psyche followed by an analysis of the traditional lawn in the arid West and the water situation surrounding it. These sections provide the basis for a survey conducted to gain an understanding of

personal preferences toward the lawn. In the final chapter, results of the survey are presented followed by a discussion of the research.

CHAPTER TWO

A HISTORY OF THE LAWN

To understand why the lawn is such a staple in American landscape aesthetic it is helpful to look at the lawn's history. The concept of the lawn originated in Europe during the 1600's and was perfected there over many years (Rogers, 2001). In the beginning, these monoculturous swaths were made of cool season grass species native to Europe. They had to be cut with a scythe or grazed by livestock to maintain a uniform surface.

The great manpower – or animal power – required to maintain the lawn meant that only the elite classes were wealthy enough to own one. This would also make the lawn a highly visible symbol of the status of its owner, which must have contributed to its appeal. Before the introduction of irrigation methods, it was impossible to have a green lawn during the hot, dry summers when the cool season grasses would change from green to brown (Jenkins, 1994). The gardens at Versailles were the ideal example of perfection and refinement to such early Americans as George Washington and Thomas Jefferson. It was the great desire of these men to tame this wild new land that they had colonized. George Washington's estate, Mount Vernon, was adorned by one of America's

first grand lawns, and he is often counted as the father of the American lawn (Rogers, 2001).

Early American landscape architects like Andrew Jackson Downing, Fredric Law Olmstead, Jacob Weidenmann, and others concerned with the new American aesthetic, helped popularize the notion that every American front yard should be re-upholstered with lawn. Downing felt that maintaining a beautiful front yard was a patriot's duty, a way to show that Americans were not an uncultured and backward people. With the advent of the push lawn mower, this became a realistic goal for the aspiring middle class and for America as a whole. It is true that in public usage, the lawn was a great blessing to the masses of the poor in the increasingly industrialized urban centers. It, in conjunction with the birth of the parks movement, gave these people contact with "nature" and gave them a naturalistic refuge from the squalor of the cities. In many cases, the new urban parks with their green lawns were people's only access to open spaces that were not paved over by industry (Rogers, 2001).

In the wake of WWI, the mass production of lawn mowers and the fabrication of rubber hose became possible. This, along with the availability of viable grass seed from Europe, made the lawn available to more Americans than ever before. With these new technologies, the lawn was poised and ready to spread. After the Second World War, the American lawn began its trek across the nation. The prevalence of the lawn spread – and has continued to spread - right along with the growth of America's suburbs (Rogers, 2001). This growth has brought us to our present state.

The lawn, of European decent, has now become well established in the history and the landscapes of this country. Its origins root back to the very founding of the United States. While the lawn was making its spread across the American countryside, the grass species that were selected for its creation remained those of European origin. This combination of European grass species and lawn design became the incarnation familiar to the American aesthetic and thus, became something of a tradition in the country: It is this customary pairing that makes up what is thought of as the “traditional lawn.”

CHAPTER THREE

A PSYCHOLOGICAL & EVOLUTIONARY APPROACH

Gerald Young, a professor of Human Ecology at Washington State University, notes that interaction is “the system of processes that links organisms and their surroundings” (Young, 1996). In his works he raises the idea that organisms and their environments are connected to each other through their interactions however varied and diverse those interactions may be. E.O. Wilson took this assertion a step further when he coined the term “biophilia” which he defines as the need for humans to be in close interaction or contact with other non-human organisms. Wilson theorizes that as creatures of the earth, we are deeply connected to and depend on the earth’s web of life in ways that we cannot fully understand. He reminds us that having evolved on this planet, our quality of life will be lessened if the biological diversity of our world is diminished (Wilson, 1992). Wilson also states that, “Only in the last moment of human

history has the delusion arisen that people can flourish apart from the rest of the living world” (Wilson, 1992).

The theory of biophilia suggests that there is some innate need to interact with other organisms that humans have and that this need is not fulfilled through interactions with other humans alone. In fact, the theory suggests that this need would be better met by being surrounded by a vast array of different types of organisms. It seems that people have tried to fill this need by creating park space in cities, moving their homes farther and farther into the countryside, and planting large lawns in their front yards. These things may, in one way or another, fill the human need for closeness to other biological organisms.

G. H. Orians proposed an evolutionary approach to landscape preference when he offered the Savanna Hypothesis. This hypothesis suggests that humans evolved to prefer those landscapes that have savanna-like characteristics. Savannas afford distant views that offer protection from predators increase and ease in sighting food or other resources. Savanna landscapes exhibit a low to knee-high ground cover with scattered trees that also provide protection from the elements (Orians, 1992).

One study suggests that savanna-like landscapes ease stress in humans. Wise and Rosenberg measured psychological response and aesthetic preference in a study examining the role of nature décor in relieving the symptoms of stress. They found that while a scene of a mountain waterscape was the most aesthetically preferred the scene of the savanna produced a significant reduction in the physiological signs of stress. One interesting aspect

of this study was finding that this effect was just as strong for participants who disliked the savanna scene as for those who liked it (Wise and Rosenberg, 1988). This would suggest that there is some kind of psychological connection to savanna-like landscapes that goes beyond what people have socially constructed to be visually preferable. Thus, if a landscape designer's goal is to create landscapes that reduce stress, then the designer would want to create landscapes that mimic savanna-like forms.

If the Savanna Hypothesis is true then it would make sense that the lawn fills an evolutionary preference for a specific landscape form but not necessarily for a specific plant. Manicured turf grass is vastly different from the grasses and shrubs of the African Savanna. It seems that other plant materials that have a similar form and that allow for the same kind of interactions as traditional turf grass could replace the front lawn without significant loss of preference.

Also, if the theory of biophilia is correct it would seem that humans, and specifically Americans, have used the lawn as one of many attempts to fulfill the need to be closer to nature. If this is the case, why is a non-native, monoculturous plant material that requires a greater amount of resources than most of the regions in the United States have to offer often the default choice?

As a designer, one must be more inventive than creating front yard landscapes that replace traditional lawns with displays of gravel and plastic lawn gnomes as an answer to our water shortage dilemmas. Rather, designers must also seek to fulfill the psychological needs of their clients as they seek solutions to restraints posed by the resource budgets of the local region. The goal of the

landscape designer should be to design landscapes that are beautiful and functional while keeping the resource demands of that landscape within the boundaries set by local climactic and soil conditions. Any alternatives to the traditional lawn should be aesthetically pleasing or they are likely to be rejected by the public regardless of compatibility with the natural resource budget of the site.

CHAPTER FOUR

THE LAWN'S INPUT REQUIREMENTS

As we have seen, the lawn is deeply rooted in our human psyche and in our American history, but there are major economic and environmental costs that accompany it. In his book *Redesigning the American Lawn*, Herbert Bormann presents some staggering statistics. He found that the properties of private residential homeowners alone account for some 20 million acres of maintained irrigated lawn. This figure does not include municipal or corporate owned lawns or campuses. He notes that the area covered by these lawns is about the same size as the country of Ireland and a large percentage of this lawn mass is found in “arid or semiarid, or otherwise climactically inhospitable” regions (Bormann, 2001).

Because typical grass species commonly used for lawns in the US are not acclimated or native to this continent they are not readily sustained by the North American resource bank. The climate in the Western portion of the country can

be particularly problematic for nearly all of the commonly used turf grass species. The resulting deficit between the needs of the traditional lawn and what the West's resource bank has to offer makes the traditional lawn is an extremely high input system to sustain. Bormann points out the array of supplements and care practices that the lawn requires. To be kept green a lawn requires fertilizers and irrigation throughout the growing season. The lawn also requires herbicides and fungicides to keep out the weeds, and insecticides to prevent damage from insects and other pests. In addition to all of these required chemical additives a lawn manager must purchase maintenance equipment, seed or sod, and labor must also be supplied (Bormann, 1993). When all of these inputs are considered it is easy to see that the lawn is expensive and high maintenance.

Statistical numbers taken from around the country are indicative of the situation the surrounding traditional lawn. In 1999 Americans spent 8.9 billion dollars on lawn chemicals and equipment (Robbins & Sharp, 2003). The lawn care industry is worth 25 billion dollars annually in the US (Roberts & Roberts, 1988). Las Pilitas Nursery in California provides a cost comparison (represented below) of lawn vs. more acclimated ground cover plantings. These numbers were calculated in 1981 so care must be taken to account for inflation when comparing these costs to our current lawn costs. These numbers do, however, offer a valid comparison of the vast difference between the cost requirements of the two systems.

Differences in Cost

A. A 20-50' lawn with an automatic system costs (if you install yourself), per year with a 20 year life.

1. Seed and topping .(with labor at \$4.00)	\$5.00
2. Sprinklers(Toro 570) & Timer...(labor at \$4.00)	\$25.00
3. Lawn mower,(lasting 10 years)	\$55.00
4. Time to mow(at minumum wage \$4.00).(45 min,mow&edge)	\$156.00
5. Water(65,000 gallons/year at \$.7 /100cu.ft.)	\$61.00
5a. (65,000 gallons /year at \$1.71/100 cu. ft.)	\$150.00
6. Fertilizer and sprays	\$25.00
Total/year	\$777.00
Total for ten years	\$7770.00

Aa. A 20-50' lawn with an automatic system costs (if you have it installed), per year with 20 year life

1. Seed and topping(with labor of leveling at \$25/)	\$15.00
2. Spinklers(Toro 570) & Timer (labor at \$25/)	\$45.00
3. Lawn mower,(lasting 10 years)	\$55.00
4. Lawn maintained professionally	\$600.00
5. Water(at \$.7/100cu.ft.)	\$61.00
5a. Water(at \$1.71/100 cu. ft.)	\$150.00
6. Fertilizer and sprays	\$25.00
Total/year	\$801.00
Total/ 10 years	\$8010.00

B. A 20-50' groundcover using an automatic system (if you install it yourself), per year (a ten year life).

1. Plants(Arctostaphylos Hookerii'Wayside')\$4.00/X 40	\$16.00
2. Sprinklers (first class drip, pvc, not polyethene, poly is cheaper but gophers and people cut it).(labor at \$4.00)	\$35.00
3. Preemergent(a weed killer that stops weeds)	\$10.00
4. Time to weed (at \$4.00/hr.)(35 min./week)	\$104.00
5. Water(8400 gallons/year at \$.7/100cu.ft.)	\$8.00
5a. Water(at \$1.71/ 100 cu. ft.)	\$19.00
Total/year	\$172.00
Total for ten years	\$1728.00

Ba. A 20-50' groundcover using an automatic system (if you have it installed and maintained), per year (ten year life).

1. Plants	\$16.00
2. Sprinklers(as above installed at \$25.)	\$75.00
3. Professional Maintenance	\$360.00
5. Water	\$8.00
Total/year	\$459.00
Total/10 years	\$4590.00

(Las Pilitas Nursery, 2004)

As illustrated, cutting back the lawn results in a reduction of a variety of expenses. It is feasible that the savings would be substantial enough to enable a homeowner to pay a maintenance company to take care of a more xeric landscape *and* still save several hundred dollars a year. While these numbers do not paint a complete picture they do illustrate the point that Americans are willing to spend vast resources (money, water or other) on their lawns.

In addition to all of the direct costs of maintaining a lawn there are a number of relevant but less apparent costs as well. Many of these costs show up in the form of taxes for large municipal water development projects such as dams, water diversions, and water treatment plants are paid for by State or Federal tax dollars (Utah Rivers Council, 2004). Of course, these projects are not constructed only to supply water to irrigate lawns, but would so many projects be necessary if the demand for water was not so great? Lawns will continue to be a great water consumer as long as they continue to spread with current suburban and commercial development.

One of the most damaging consequences of our passion for lawns is the increased strain upon water resources that arises from the lawn's need for intensive watering. The now defunct Xeriscape Council estimated in 1990 that "up to 30% of urban water on the East Coast is used for lawn irrigation. In the West they estimated that 60% of urban water use is for lawn irrigation." (National Xeriscape Council, 1990). In order to remember such an extraordinary need for extra resources, it is important to note that traditional turf grasses are not native to the areas in which they are being introduced; indeed, traditional turf grasses are not native to the United States. Richard Duple (2003), a turf grass specialist for the Texas Agricultural Extension Service states:

Kentucky Bluegrass is native to practically all of Europe, Northern Asia and the mountains of Algeria and Morocco...It is not native to North America. Apparently the early colonists brought seed of Kentucky Bluegrass to this country in mixtures with other grasses.

It is interesting that the American people are so resolute in their desire to maintain a non-native species that is so ill-suited to the landscapes in which they inhabit in the arid West.

CHAPTER FIVE

THE LAWN TODAY

It has been shown that presently there is no measurement method in practice to ascertain the exact acreage of lawn on the ground in this country

(Robbins & Birkenholtz, 2002). Because of this, no exact numbers on the amount of traditional lawn in America exist, but one estimate suggests that there are roughly fifty thousand square miles (32 million acres) of lawn in the US today (Pollan, 1991). In Ohio alone, it was found that 23% of developed land is covered with lawn (Robbins & Brikenholtz, 2002). It is evident that Americans LOVE their lawns!

Bormann offers a definition of what the traditional lawn should be: "*Lawn*, n. a stretch of grass-covered land especially that near a house or park, that is regularly and closely mowed, continually green and to the greatest possible degree, free of weeds and pests." (Bormann, 1993). As an aesthetic form, that takes its origins from America's cultural roots, the lawn has high standards to live up to. In order to be socially acceptable, a lawn must exhibit many, if not all, of the following characteristics: (1) The lawn must be deep green. This element requires that the turf be healthy and not stressed from water or nutrient deficiencies during the growing season. (2) The lawn must be free from "weeds". Weeds in a lawn are defined as *any* plant material - grass or other - which is not the desired species. Maintaining a lawn's monoculture status is either highly labor intensive or highly chemically dependant. (3) The lawn must be short and clean. This requires frequent mowing, raking, and all other activities necessary to keep the lawn as monotone in color as possible. (4) The lawn must be dense, lush, and fine-textured. Density is determined by the number of plants per unit area, the higher the better. The turf is considered lush when it is soft to touch or walk on. The texture of the turf is a factor of the blade width of the plant.

Desirable turf grasses have a thin blade. This adds to the carpet-like look of the turf and usually increases its lushness. The climate and soil conditions in the arid West do not provide the nutrients or water to achieve these socially set standards. This makes the traditional lawn an extremely high input system to maintain.

The most commonly used turf grasses are cool season species from Europe and Asia. The four species that are most widely used are the bluegrasses (Kentucky bluegrass), fescues, ryegrasses, and bentgrasses (Arteca, 2004). These species often need between thirty inches and sixty inches of supplemental water during the growing season. In Utah, giving these species thirty inches will keep the turf alive through the year, but will not keep it from browning out during the hottest parts of the summer. The full sixty inches is required to keep a lawn green for the entirety of the summer season.

The average annual precipitation rates of all of the inland Western states fall far short of the water requirements of a traditional lawn composed of one of these common turf varieties. State wide precipitation rates in Montana, Wyoming, Idaho, Utah, Nevada, Colorado, Arizona and New Mexico range from 9 inches per year, in Nevada, to 17 inches per year in Colorado (Division of Water Resources, 2004).

Chemical Use

Another outgrowth of American's love affair with the lawn is the constant application of insecticides, herbicides, and fertilizers required to maintain the lush, green, monoculture look that Americans so desire. Bormann notes, "The world market for pesticides reached nearly \$37 billion in 1997. Sales of lawn care pesticides in the United States make up a surprisingly large part of the total world expenditure: about 32%." (Bormann, 2001). The average lawn manager or homeowner does not readily see the effects his or her lawn has on the environment or on public and animal health, but the myriad of chemicals used to treat lawns inevitably impacts local biological resources. The long lasting effects of high volume chemical use ranges from the contamination of groundwater, streams and rivers, to the poisoning of many animals and plants across the country (Jenkins, 1994). Bormann notes, "It has been estimated that 60% of the nitrogen applied to lawns ends up in ground water." (Bormann, 2001). Also, the USGS reported detecting pesticides in 99% of urban streams (Robbins & Birkenholtz, 2002). They attribute much of the pollution to runoff of lawn chemicals. If the impact on the surrounding environment is not enough to cause concern in the minds of the American homeowners, perhaps consideration of the potential effects these chemicals have on their children will. Degalman states:

"According to the EPA 95% of the pesticides used on residential lawns are possible or probable carcinogens. In 1989 the National Cancer Institute reported children develop leukemia 6 times more often when pesticides are used around their homes. The American Journal of Epidemiology

found that more children with brain tumors and other cancers had been exposed to insecticides than children without.” (Degalman, 2001).

Lawn chemicals are easily tracked into homes increasing human exposure. The chemicals are picked up by the feet of humans or animals and brought into the home environment where they adhere to carpet fibers and dust particles. These chemicals are then quickly absorbed by the skin. Small children are at the greatest risk because they are either crawling or playing on the floor (Robbins & Sharp, 2003).

The amount of chemical that is used on lawns on a weight per unit area basis is close to three times the amount used in agricultural production (Robbins & Sharp, 2003). The use of chemicals in agriculture dropped significantly between the years of 1982 and 1997. This drop was due in part to the conversion of many previously agricultural lands into housing developments. During the same time period, however, the use of chemicals for lawn care increased substantially. The overall amount of chemical used between agriculture and lawn care has declined but the decline has been slowed by the massive increase in chemical use for lawn care, as demonstrated in the chart below (Robbins & Birkenholtz, 2003).

	Agricultural Deposition 1997 (Kg/ha.)	Lawn Care Deposition 1997 (Kg/ha.)	Lawn Care Increase 1982-1997 (Kg)
Herbicides	1.612	3.288	2,537,500
Insecticides	0.281	1.141	880,357
Fungicides	0.182	0.537	414,286
Other Pesticides	0.566	0.134	103,571
Other Chemicals	0.597	4.026	3,107,143
Total	3.238	9.127	1,042,856

Table 1: Agricultural use vs. Lawn Care Chemical use in 1997

From Producing and Consuming Chemicals: The Moral Economy of the American Lawn, by P Robbins, & J. T. Sharp, 2003, by *Economic Geography* 79(4), 425 – 451.

It has also been found that the exhaust of the two stroke engines used to power most lawnmowers and other lawn care equipment add to air pollution problems immensely. The annual emissions from lawn mowers in California alone, are estimated to be equal to 3.5 million 1991 model cars driven 16,000 miles each (Bormann, 1993). While the effects lawn maintenance has on air quality and the home environment are serious situations the lawn still seems to take its greatest toll on the water resources of an area.

The Water Situation in the West

Water issues are a hot topic all over the arid West, whose urban areas and populations are expecting rapid growth. According to the Department of the Interior’s campaign “Water 2025: Preventing Crises and Conflict in the West” the

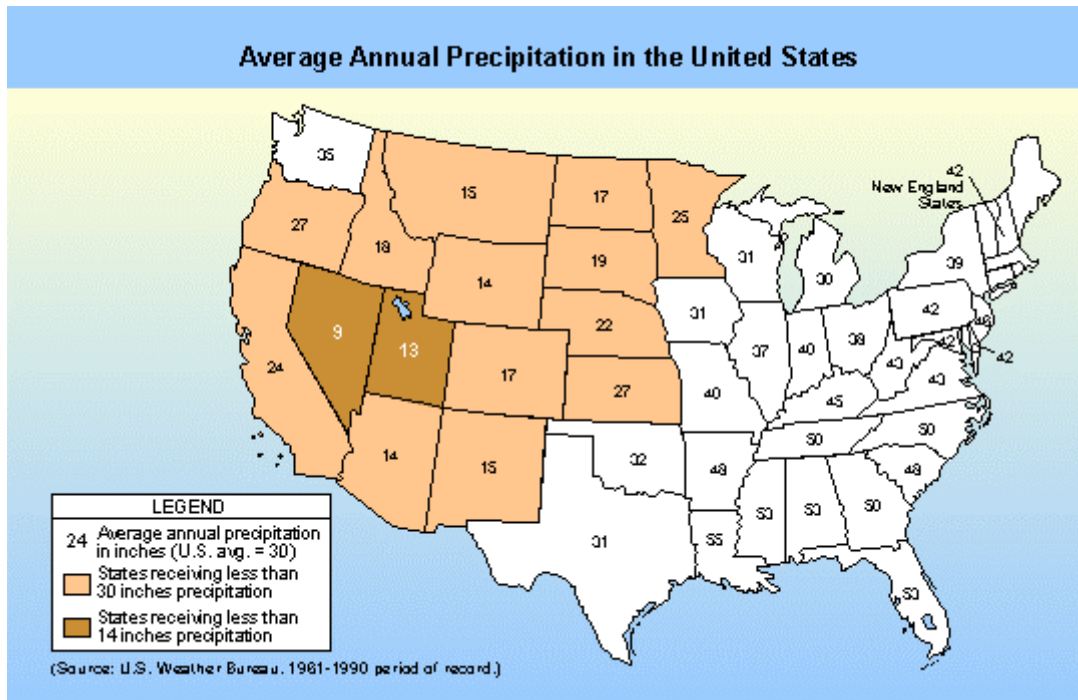


Figure 2. Average Annual Precipitation in the United States

Image from, Division of Water Resources, *Utah's Water Resources: Planning for the Future*, Online source, Retrieved 3/30/05, from <http://water.utah.gov/WaterPlan/uwrpff/Chp-02a.htm#F2>

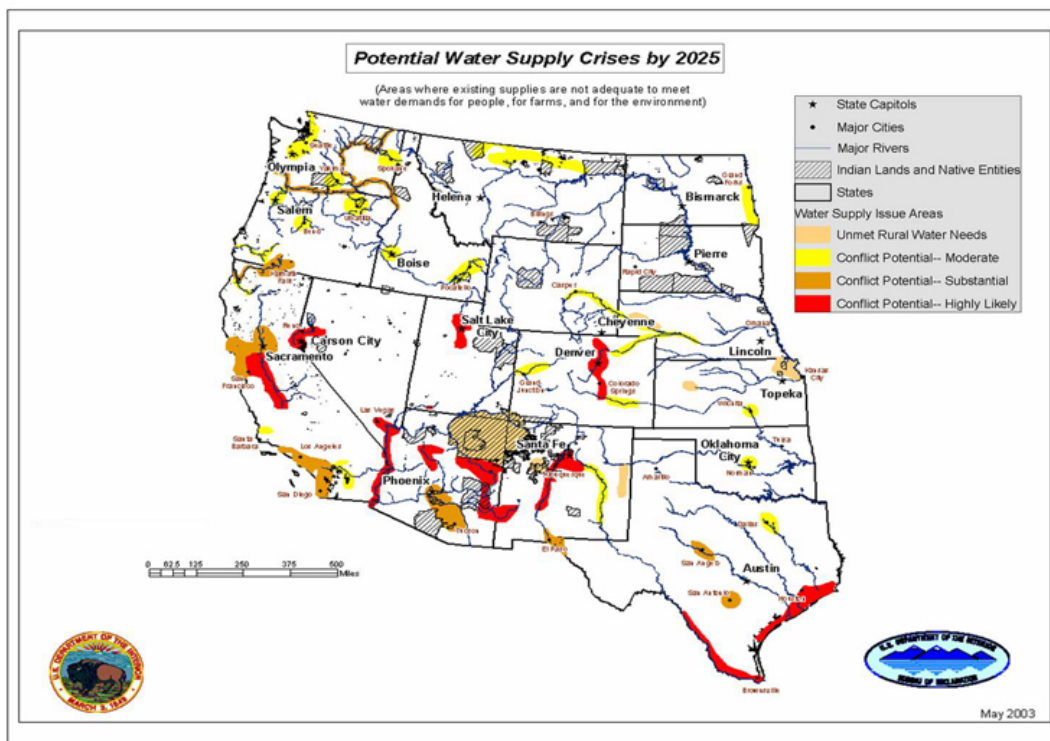


Figure 3. Areas of Potential Water Crises by the year 2025

Image from, U.S. Department of the Interior, *Water 2025: Preventing Crises and Conflict in the West*, Online source, Retrieved 3/30/05, from <http://www.doi.gov/water2025/water2025-report/page9.html>

While lawns are not the sole cause of the water crises in the West they are one of the most obvious places where water consumption could be dramatically cut back. The grass species that are commonly used for turf in the US are exotic species that require climate and soil conditions that are substantially different from those native to the arid West. Because lawns are aesthetic in purpose and are not used to sustain human or animal life, it does not follow that we, as a society, dedicate our water resources to them. This situation presents an ethical dilemma. One must ask the question: Is it truly ethical to continue to use the traditional lawn as a staple element in the constructed landscapes of the arid West?

The State of Denial

David Orr states that “Willful blindness has reached epidemic proportions in our time.” He goes on to say “In our time, great effort is being made to deny that there are any physical limits to our use of the earth or the legitimacy of human wants.” (Orr, 2002). It is staggering to see the endless lawns stretching from suburb to green suburb when visiting the desert states of Arizona, Nevada and Utah. It is almost as if these places are in denial of where they are and what their water situations are. There are severe disconnects between consumers in arid parts of the US and the sources of their water. Wendell Berry expresses concern about this broken connection between humans and nature when he observes “Most people are now fed, clothed, and sheltered from sources toward which they feel no gratitude and exercise no responsibility” (Berry, 2001).

Perhaps people would consider the excessive thirst of their lawn differently if they were required to carry every gallon of water from a stream or well just to keep their grass green.

CHAPTER SIX

ECONOMICS AND WATER USE: A UTAH CASE STUDY

Situated in the heart of the intermountain West is the state of Utah. It is representative of the region on many counts: It is one of the faster growing states in the union, the demand for water is projected to rise dramatically in the future and it has a limited water supply. This is complicated by the fact that Utah has one of the lowest annual precipitation rates in the country. All in all, the state of Utah is a literal showcase of all the problems associated with trying to keep a lawn green in the Intermountain West. For these reasons the Salt Lake City (SLC) metropolitan area was chosen as the regional base for the case study conducted in order to analyze the lawn situation in the West.

The Utah Rivers Council (URC) offers these statistics on water consumption in Utah: “The average person only needs 4 gallons of water a day to survive. The average American uses 190 gallons per day. The average Utahn uses 300 gallons of water per day.” (Utah Rivers Council, 2004). One of the causes of these revealing statistics arises from Utah’s unique water-usage fee situation relative to the rest of the nation. Residents of Utah enjoy the lowest water rates in the West (see figure 4). This is due mainly to the fact that Utah

subsidizes its water with a variety of taxes (Utah Rivers Council, 2004). A press release from the URC has this to say, “Salt Lake Valley residents currently pay property, sales, and income taxes to water suppliers. This allows water suppliers to lower the cost of water rates and thus encourage more water use. Only 50% of the cost of turning on your water tap is paid for in your monthly water bill.” (Utah Rivers Council, 2004). This strategy on the part of water suppliers certainly appears to be effective. Residents of Utah are second in the nation for per capita water usage (see figure 5). Nevada, which incidentally is the driest state in the nation, has the country’s highest per capita water consumption rate.

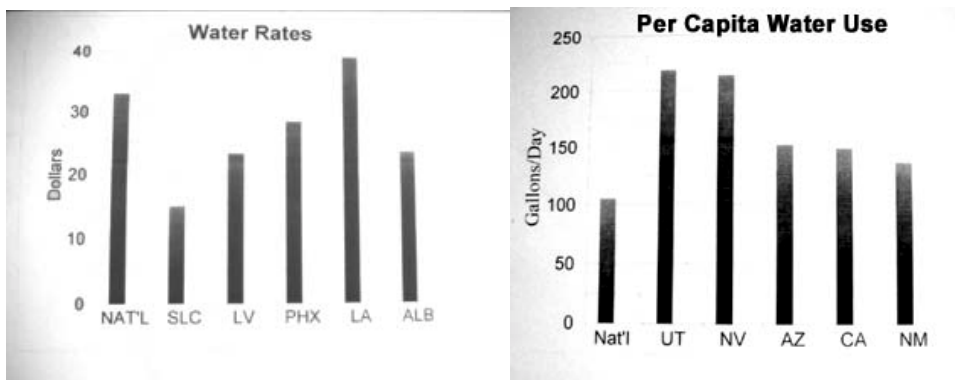


Figure 4 & Figure 5 Relative Water Rates Among Western Metropolitan Areas and Per Capita Water Use Among Major Western Cities

Images from, Utah Rivers Counsel, Water Conservation, Online source, Retrieved 4/21/04, from <http://www.utahrivers.org/conservation.html>

Add to Utah’s current rate of water consumption the fact that the state is looking forward to a sustained growth in population over the next several years. Data from the year 2000 shows that Utah at that time had 2.2 million people living within its borders. Figure 6 shows projected population growth in the state though the year 2050. It is estimated that by the year 2020 Utah will house some

3.2 million people upped to a projected 5 million by 2050 (Division of Water Resources, 2004).

This growth in population will bring with it a heightened demand for water. In order to supply Utah's metropolitan areas with water, based on current rates of use, total water output drawn from local water bodies will need to be doubled (see table 1). Displayed in Table 1 are the current and projected municipal and industrial (M&I) water use rates in the Great Basin area of Utah, which includes the SLC

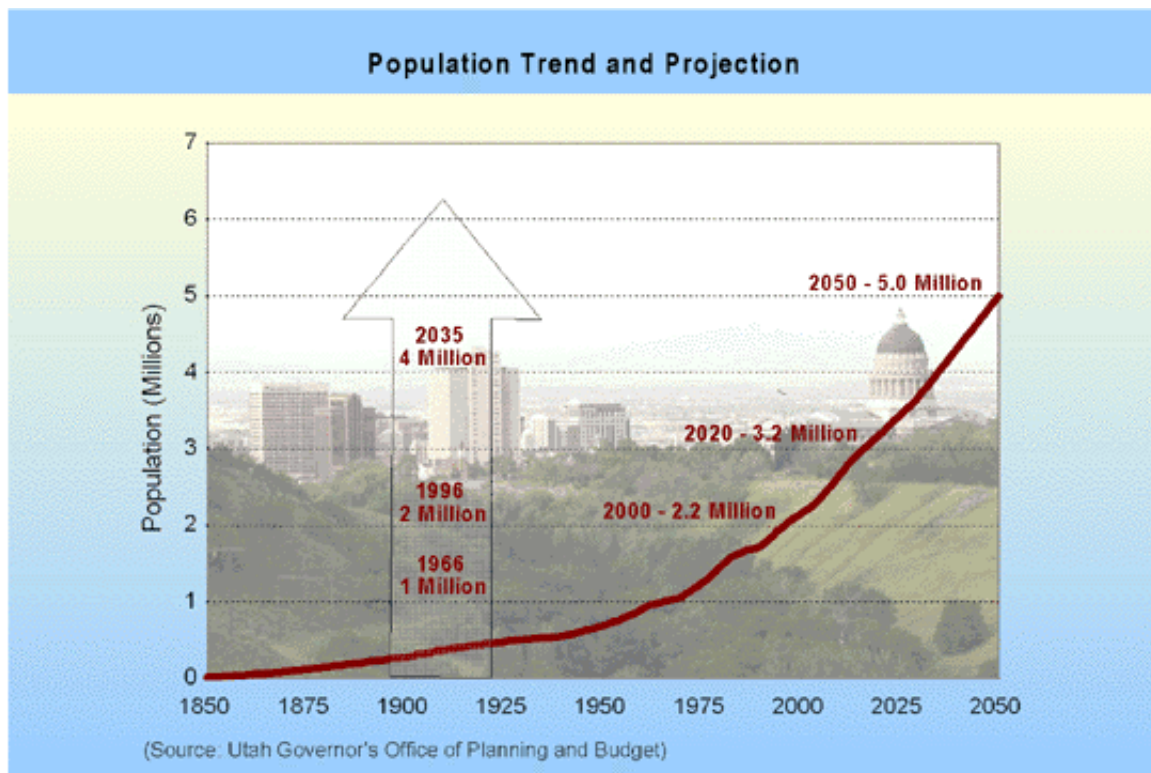


Figure 6. Population trends for the State of Utah projected to the year 2050.

Image from, Division of Water Resources, *Utah's Water Resources: Planning for the Future*, Online source, Retrieved 3/30/05, from <http://water.utah.gov/waterplan/uwrpff/Chp-03a.htm#F7>

metropolitan area along Wasatch Front. The combination of artificially lowered water rates, projected hikes in demand and present high consumption rates add up to a gross overuse of water.

Some laws that are currently instituted in Utah seem to not only be slowing any kind of reform in water use practices but also seem to actually be sustaining the problem. One Utah law states that every residence must have at least 33% of their parking strip covered with vegetation (Bauman, 2002). Some who are conscious of Utah's current water situation have tried to reduced

Present and Projected Total M&I Water Use by Basin			
Basin Water Supply	(acre-feet/yr)		
	Present*	2020†	2050†
Jordan River	332,000	449,000	650,000
Weber River	170,000	267,000	358,000
Utah Lake	134,000	207,000	338,000
Bear River	50,000	71,000	103,000
West Colorado River	51,000	55,000	62,000
Sevier River	48,000	55,000	64,000
Kanab Creek/Virgin River	42,000	86,000	183,000
West Desert	24,000	35,000	53,000
Uintah	24,000	27,000	31,000
Cedar/Beaver	20,000	33,000	51,000
Southeast Colorado River	9,000	10,000	12,000
TOTAL	904,000	1,320,000	1,950,000

* The exact year of the data shown varies from 1992 to 1998, see Division of Water Resources, Municipal and Industrial Water Supply and Uses, (Salt Lake City: Department of Natural Resources, 2000).

† Projections represent future demands based on current use rates and future population projections from the Governor's Office of Planning and Budget. Actual demands will likely be less, depending on the level of conservation that can be achieved.

Table 2. Utah's Total Municipal and Industrial Water Supply Present and Projected

Table from, Division of Water Resources, *Utah's Water Resources: Planning for the Future*, Online source, retrieved 3/30/05, from <http://water.utah.gov/waterplan/uwrpff/Chp-03b.htm#T7>

their usage by removing the lawns in their parking strips and replacing them with native varieties or more acclimated plants. Deseret News reporter Joe Baumen reported that Utah resident, Josh Blumental, was cited by the city for not complying with this law. Personal parking strips are not the only grounds where one can become a lawn outlaw. SLC Code, title 21 (from Utah's zoning ordinances), section 21.80.200 states that every residential home must have some green grass in the front yard (Curwood, 1996). For such laws to be in action in one of the driest states in the nation seems, at best, strange.

Average annual precipitation rates vary widely between regions across the state of Utah. The low deserts will receive a mere five to ten inches a year while the areas at the tops of the mountains will receive between fifty and sixty-five inches annually (Division of Water Resources). Most of the SLC metropolitan development sits on the west foothills of the Wasatch Range known as the Wasatch Front. Most of these areas receive ten to sixteen inches of rain annually. As previously established, traditional turf grasses require sixty inches of water during the growing season to meet socially established aesthetic standards, and Utah residents are doing their best to meet or beat these standards. One five-year study involving residential and business properties in the communities of Layton and West Jordan, Utah found that some residents and small business owners were putting more than three times the water that a normal rainforest receives per year on their lawns (Hayes, 2003). The study found that approximately 80% of Utah residents and business owners over-watered their lawns, some lawns topping out at 200 or 300 inches of water used

over the growing season (Hayes, 2003). This evidence leads one to the realization that our current lawn practices - and the lawn itself - must be reevaluated in order to identify effective solutions to the problem.

It is important to note here that Utah is not unique in its increasingly difficult relationship between a limited water supply and a seemingly limitless demand. The “Water 2025” report shows that under current water-use rates there are many major metropolitan areas in the West that are heading toward severe water conflicts. The report projects that cities like Denver, Las Vegas, Sacramento, Albuquerque, and Phoenix will also be effected if current trends persist (Department of the Interior, 2004). While Utah comprises the specific case study for this project, the ideas presented here are certainly applicable to other states in the arid regions of the West.

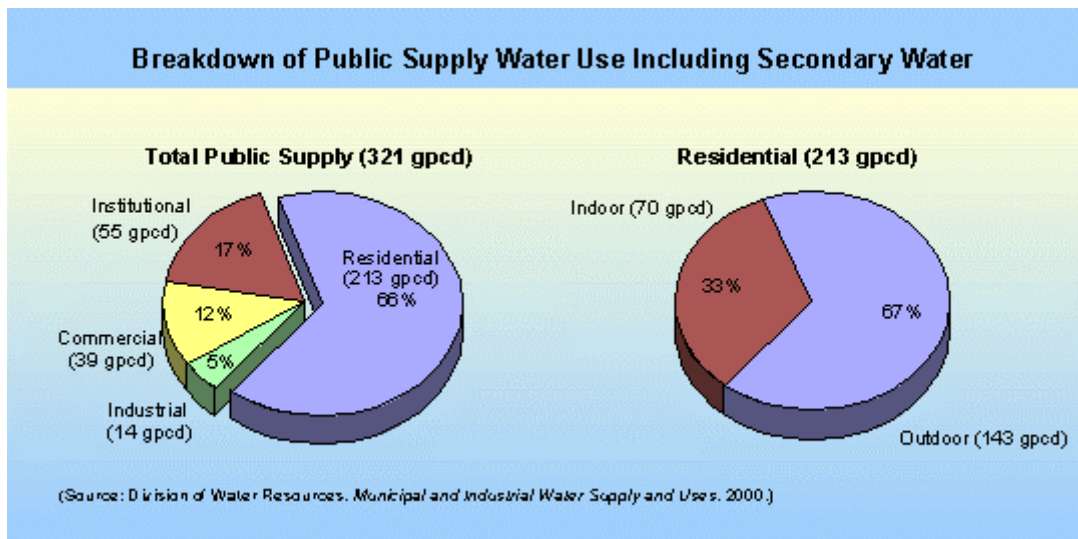


Figure 7. Breakdown of Utah’s public water supply in total public supply and residential use.

Image from, Division of Water Resources, *Utah’s Water Resources: Planning for the Future*, Online source, Retrieved 3/30/05, from <http://water.utah.gov/waterplan/uwrpff/Chp-04b.htm#F11>

In Utah, the water resources are already being severely impacted by the high water use of the residents. As figure 7 shows, 66% of the public water supply of the SLC metropolitan area is dedicated to residential use. Of that 66%, 67% of the water is used in the landscape.

Where is all this water coming from? There are many tributaries and lakes that Salt Lake City uses for its water supply. And with the demand for water on the rise and a projected growth in population on the horizon, SLC is looking to develop more of its water resources. The Utah Division of Water Resources has pointed out what the city feels are the most developable water resources in the area (see table 3). The upper Colorado River has been estimated to be able to yield the most water for the area but second in line is the Bear River.

Estimated Developable Water Supply by Basin	
Basin Wter Supply	Developable Supply (acre-feet/yr)*
Upper Colorado River†	420,000
Bear River	250,000
Jordan River & Utah Lake	50,000
West Desert	25,000
Weber River	25,000
Kanab Creek/Virgin River‡	20,000
Sevier River	0
Cedar/Beaver	0
TOTAL	790,000

* Values based on the 1961-1990 period of record.

† Includes the West Colorado River, Southeast Colorado River and Uintah basins, and represents Utah's remaining Colorado River Compact depletion allocation.

‡ Does not include Sand Hollow Project, which is under construction.

Table 3. Developable water resources in the Great Basin area.

From, Division of Water Resources, *Utah's Water Resources: Planning for the Future*, Online source, Retrieved 3/30/05, from <http://water.utah.gov/waterplan/uwrpff/Chp-02d.htm#T5>

The Bear River has been highly favored as a proposed site for development in an attempt to ensure that Utah residents will be able to maintain their current water use practices despite the heavy population growth in the forecast. Two dam sites were proposed: the Honeyville Dam which would be located in Box Elder County and the Amalga Dam in Cache County. While these dams would surely supply more water for Salt Lake City what would be the cost to the Bear River watershed, the people and the wildlife that live in these areas? The costs are many and diverse.

The Bear River watershed supplies 60% of the surface water that enters the Great Salt Lake (Bear River RC&D, 2004). The Salt Lake is the only natural salt water body on the continent and includes a series of wetlands fed by the Bear River that “supports 250 migratory bird species en route from the tip of South America to the Gulf of Alaska and beyond” (Utah Rivers Council, 2004). The installation of dams on the Bear River would seriously affect these wetland systems. Damming the Bear River would reduce the flow of water to the Great Salt Lake, lowering its water levels by 2 to 4 feet and subsequently drying up thousands of acres of the Bear River Migratory Bird Refuge (Utah Rivers Council, 2004). The Utah Rivers Council estimates that if Utah residents were to lower their water consumption by only 20% these dams would not even be necessary. In fact, the amount of water saved by enacting such a reduction would be more water than what the two dams together would be able to supply (Utah Rivers Council, 2004).

Flocks of migratory birds would not be the only local populace that would be affected by building the two dams on the Bear River. When the prospective reservoir areas were examined it was found that over fifty farming families would be displaced and that an estimated fifteen miles of Utah's most productive farmland would be flooded (Utah Rivers Council, 2004). The Shoshone Nation has called these river valleys their homes for nearly a thousand years. If the dams are constructed they will bury hundreds of sites sacred to the Shoshone among which would be ancient ancestral burial grounds (Utah Rivers Council, 2004). Arthur Douglas, President of the Utah Farmers' Union, has said, "Many generations of pioneer, farming, and American Indian history would vanish on Salt Lake lawns." (Utah Rivers Council, 2004). All of this would come to the state with a bill to taxpayers of one billion dollars (Utah Rivers Council, 2004).

In 1999, American Rivers, a non-profit conservation organization dedicated to protecting America's rivers and the life that they sustain, listed the Bear River on its top ten most endangered rivers list because of the threat posed by dam development, urban sprawl, and water withdrawal (American Rivers, 1999). The Utah Rivers Council has formed a coalition of farmers, ranchers, hunters, fly fishermen, birders, Native Americans, and conservationists to protect the Bear River (Utah Rivers Council, 2004). Due in part to the efforts of this group, the Honeyville and Amalga dam sites were removed from the roster in February 2002, by a bill was passed in the Utah House of Representatives (Deseret News, 2002). American Rivers removed the Bear River from its top ten list this year, but the threat of dam development is ever-present. To avoid the

resistance that is apparent in Utah some development companies have gone across the border to Idaho to seek support. In February 2004, a permit to build a two hundred-acre hydroelectric dam downstream from the existing Oneida dam was submitted by the Twin Lakes Canal Company. This dam has also met with resistance from groups like Idaho Rivers United, who recognize the limited benefits of such projects are far outbalanced by the multiple detrimental impacts they have on the overall quality of life of humans and wildlife residing in the effected regions (Idaho Rivers United, 2002).

While conditions in the arid West will vary from state to state, the situation in Utah remains representative of the issues that arise when considering the usage of the traditional lawn in this region. The water supply in the West is fragile, and in some places, like Phoenix or Los Angeles the water supply is completely fabricated from outside resources. Such aggressive water development would not be so necessary if Americans could let go of their commitment to the traditional lawn and pursue landscape alternatives. The impacts of the relentless development of the West's water resources are devastating to human, animal and plant-life alike.

CHAPTER SEVEN

LISTENING TO YOUR PLACE

Each bioregion, as defined by specific topographic and biological factors, has plants that are native to it and that have evolved to survive and thrive in the

soil types and climactic conditions available there. Brian Kermath recounts, “I am often asked, ‘why go native?’ The simple answer is ‘because biodiversity matters” (Kermath, 2003). From deserts to wetlands, deciduous forests to grasslands there is amazing diversity in the landscapes of this country. Ecosystems and humans alike thrive in diversity. Excessive homogeneity leads to weakness and a loss of quality of life. E.O. Wilson’s theory of Biophilia suggests that humans have a strong need for the diversity of other living organisms. He states, “Biophilia, if it exists, and I believe it exists, is the innately emotional affiliation of human beings to other living organisms.” He goes on to say that,

There is no question in my mind that the most harmful part of environmental despoliation is the loss of biodiversity. The reason is that the variety of organisms, from alleles (differing gene forms) to species, once lost, cannot be regained. If diversity is sustained in wild ecosystems, the biosphere can be recovered and used by future generations to any degree desired and with benefits literally beyond measure. To the extent it is diminished, humanity will be poorer for all generations to come.

(Wilson, 1993).

By encouraging biodiversity we are accomplishing two great tasks. One is maintaining the sustainability of our ecological heritage and the other is achieving a unique regional aesthetic that cannot be found anywhere else. Using native plant material in the landscape allows for the expression of what the identity of a

region is and celebrates its beauty and diversity. The antithesis to this notion is the default covering of our landscapes with generic lawn.

Kermath ties the attachment to native plants to the sense of place in a region. He asserts:

How we procure food, recreate, and manage our urban areas, for example, all have landscape expressions that reveal our world views, values, and past judgments. When biodiversity and natural heritage matter more deeply to us, we will see our urban landscapes with more ecologically complex assemblages of native plants that are more wildlife friendly and reliant on natural processes than the ecologically simple, capital intensive, and environmentally toxic industrial landscapes we consume everywhere today. The landscape aesthetic too will shift, so that it is no longer determined by the physical end product alone, but also by weighing in the environmental costs of production and management. When this happens, a truer sense of place that is deeply rooted in a genuine respect and appreciation for earth's life-giving processes will sprout literally from our yards (Kermath, 2003).

By using native plants in the landscape, people interacting with them will come to see them as part of their regional character and accept them as their own. One theory suggests that people prefer plants that they interacted with as children. For example, people raised in a desert region would grow to prefer desert landscapes over others (Ulrich and Parson, 1992). This theory could offer another explanation of why Americans prefer landscapes with lawns because

American children grow up in a landscape saturated with lawns. This theory also offers the hope that if the American lawn aesthetic can be modified that a preference for a more water conscious landscape could grow with new generations.

This is by no means is this an argument that the lawn is the great green plague of the American landscape that should be done away with entirely.

Warren G. Kenfield captures the sentiment well when he says,

I really like lawns. They have the pure clean simplicity of a freshly painted floor or a bolt of monocolored cloth. I like them as I like sheathing evening gowns on other men's women, beautiful to look at but horribly expensive to support. The economic theory of 'cost vs. benefits' is apropos."

(Kenfield, 1966).

As discussed earlier, the costs involved in maintaining a lawn in the arid West is not only economic but are largely ecological as well. While the resource requirements of a traditional lawn typically surpass that afforded by the local resource budget, there are many benefits for humans and the local environment that come from using turf grass.

Traditional lawns have their place in American landscapes when used functionally and not just aesthetically. They have great value and use in public spaces as functional elements of city parks and playgrounds. They are also an important element in residential back yards where children play. There are few other surfaces that compare to turf for its ability to withstand foot traffic and active play.

The traditional lawn has been cited for its positive impacts on the local environment. Turf grasses have been shown to be good filters of storm water as it percolates through the soil toward ground-water resources. The web-like, fibrous root systems of turf grasses catch and filter out many of the particles in storm water runoff that could otherwise seep through soils to contaminate surface or groundwater resources. It has been found that turf grasses are also a means of erosion control. They cover the ground with a thick mat of foliage and their roots stabilize soil. The periodic sloughing off of the extensive root systems of healthy turf areas can also add to the organic matter content of the soil. Dust particles are trapped by the foliage of turf improving air quality and it has been shown that an area of turf grass can be as much as seven degrees cooler than an area of asphalt (Sustainable Urban Landscape Information Series, 2005).

While these benefits are desirable for many landscapes, not all of them are unique to the traditional lawn. Other plant material with fibrous root systems can provide the same stormwater filtration properties. Traditionally used turf grasses are not the only grass species that slough off much of their root systems every year. Many grasses share that trait adding organic matter to the soil. Healthy groundcovers can easily provide the same dense shade that lawns do and many of them have deeper root systems accessing a larger volume of soil for water, requiring less supplemental irrigation. Traditional turf grasses do offer high tolerance to foot traffic making them very well suited for areas where traffic and recreation are the dominant activities.

Thus, the lawn indeed has a place, but the use of lawns needs to be carefully considered. They need to be strategically planned and used as a *special* element in the landscape rather than the default space filler. Unfortunately, it seems to be the common practice among landscape professionals to design a few tree and shrub beds and then fill the remaining space with lawn. Another common approach is to place the lawn first then design the entire yard around that one element. This approach to landscape design declares the lawn to be the most important element in the landscape. Taking such a design stance often leads to a gross excess of turf that serves no other purpose than to be looked at. Given the water, climactic and soil resources available in the arid West, this aesthetic is too expensive to sustain.

CHAPTER EIGHT

RESEARCH METHODS

The research in “Questioning the Use of Lawn in the Arid West” is qualitative in nature. It uses literature review and a survey as strategies to gain an understanding of the use of lawns in the arid West. Conducting a survey of a group of people who live in the arid parts of the western United States allows the researcher to test some of the ideas that are presented in the body of literature cited here. The following is a detailed description of the survey portion of the research.

Understanding why people in arid regions of the Western United States use lawns the way they do is a major factor in understanding their water use patterns. Personal preferences and perception of, an object affects the way that object is viewed or used. If a person has a preference for a large lawn, for instance, it is more likely that he or she will use the means necessary to retain a large lawn, whatever those means may be. Conversely, if a person prefers a small lawn area or no lawn at all in their front yard, the number of resources used would naturally be smaller. For this reason, a survey that would examine personal preferences concerning lawns was chosen as the means to gain a deeper understanding on this subject. Determining individual preferences toward lawns used as ornamental elements in suburban residential front yards is the object of the survey conducted for this research. These lawns are often, if not exclusively, used as a late addition compliment to the structures they adorn. Rarely are these lawns used for recreation or other activities where people come into physical contact with them, other than during routine maintenance. The question, then, becomes “Why do people continue to use the water and other resources necessary to maintain a landscape element that is almost completely passive in nature?” Discovering people’s preferences toward lawns can help answer this question.

The survey was conducted in private homes during large or small group gatherings. Interviewees were chosen from persons present at these gatherings. Prospective interviewees were asked if they would participate in a research study that would take approximately ten minutes. If they agreed they were then asked

to give verbal consent to participate in an anonymous survey (see verbal consent form, Appendix). Each interviewee was given a materials packet and a writing utensil. Each packet consisted of a written copy of the verbal consent form, an interview questionnaire worksheet and a series of images to be ranked in order of the preferences of the participant.

The survey was designed as a closed, fixed-response survey with the intent being to gain an understanding of people's preferences for lawn. All subjects who took the survey were asked the same questions and had to respond to the same set of alternative answers. This approach allowed for the comparison of answers and afforded the ability to track general trends within the subject sample. If the questions in the questionnaire were left open ended the "across the board" comparison of those answers would have been extremely difficult. While it is understood that having interviewees answer from a prescribed list of answers does not completely represent the exact feelings or experiences of the individual subject, such an exercise does allow for a broad representation of the subject's general leanings and ideals.

The first page of the questionnaire asked the subjects to fill in demographic information to gauge lawn preferences in relation to these factors (see questionnaire worksheet, Appendix). On the second and third pages were tables where subjects were asked to rank images of yards with varying amounts of lawn (100%, 75%, 50% and 25%) in order of preference from most preferred to least preferred. The fourth and fifth pages of the questionnaire were dedicated to asking multiple-choice questions that were structured to measure the subject's

behaviors, opinions/values and sensory knowledge about lawns. This last section of questions generated a data pool that was instrumental in drawing conclusions about the factors influencing the preference answers.

As part of the survey, subjects were asked to rank images of homes with varying amounts of lawn according to their personal preferences. Each subject was given two envelopes of images; each containing four images of the same house. One envelope had four images of house A and the other had four images of house B (see Appendix). Every image had a different percentage of the front yard covered in lawn. One image had 100% lawn, another had approximately 75% lawn, another had approximately 50% lawn and the last had approximately 25% lawn. Again, this was done for house A and house B. Lawn percentages were not printed on the images. Photographic images were digitally manipulated using Adobe Photoshop. By using digitally manipulated images rather than photographs of actual residential yards, factors that could have reduced the accuracy of the data were minimized. For instance, if subjects had been given images of four different homes they may have ranked the images based on their preferences for a particular architectural style or size of the home rather than focusing on how much lawn they preferred in the yard. Image sets drawn from two different homes were used. Each home was given a different landscape design style that remained constant though all four images. The amount of lawn vs. shrub/tree beds in the yard was the only variable. The purpose of this aspect was to reduce the effects of preference toward one particular design style. This

approach provided the lowest number of confounding factors and gave a much more controlled approach to the testing of lawn preferences.

Finding a sample large and diverse enough to gain representative data is always a challenge. The Salt Lake City, Utah metropolitan area was chosen for the study because of its water issues and widespread use of the traditional lawn in residential front yards and on commercial grounds. Also, the Salt Lake City area, in terms of its restricted or limited water resources, is fairly representative of other populated areas in the arid intermountain West. Therefore, data collected there could viably be applied to other populated areas displaying similar regional attributes. In conducting the survey it was imperative that people from a wide variety of age ranges, socioeconomic statuses and both genders were interviewed. Interviewees were collected from among the attendees of two large and a number of small family gatherings. A major advantage of this approach was having a diverse pool of potential subjects. One disadvantage to this approach is that many, but not all, of the subjects were related either by blood or by marriage.

CHAPTER NINE

RESULTS

In total, 49 surveys were given. Demographic and preference data was completed for all 49 and all other questions were completed by 48 of the 49. Preference data for house A and house B was collected and analyzed

separately. It was found that there was very little difference in preference data between the two homes so the preference numbers were averaged together to yield the final numbers reported here.

The first round of analysis was focused on preference scores only. Later analyses looked at demographic information in relation to preference. To count preferences only votes were tallied from the surveys. Subjects were asked to rank images in the following categories: Most Preferred, Second, Third and Least Preferred. They were asked to do this based on their visual preferences and then again for preferences on what they would maintain and own. The number of votes was tallied for each lawn percentage. For instance, for the 100% lawn image all votes for the most preferred choice were counted then votes for second were counted, then third then least preferred. This process was repeated for each image. This process yielded an accurate view of where preferences toward front yard lawns lay.

The category of Visual Preferences focused on the subject's visual preferences only. They were asked to rank the images based only on what looked the best to them. Seventy six point three percent of subjects voted the 100% lawn images as their least favorite. This suggests that the majority of the public do not like to see a front yard that has nothing but lawn. Four point one percent voted this as their most preferred visually.

100% Lawn Visual Preference

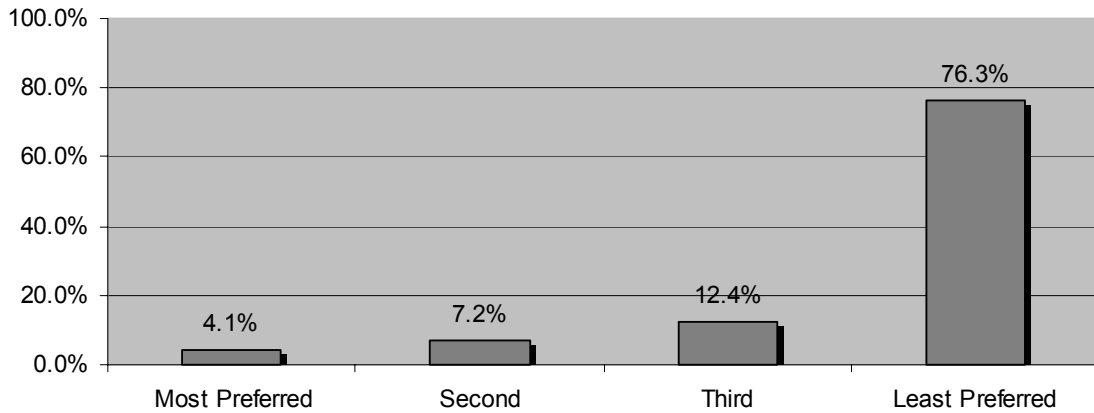


Figure 8. Visual preferences toward yard images with 100% lawn coverage.

When the amount of lawn was trimmed back to 75% the numbers were quite different. Forty four point three percent of subjects voted these images as their third favorite. Substantially less voted it as their least preferred when compared to the 100% images (6.2%). The great increase in preference when the amount of lawn is decreased by only 25% is probably due to the increased depth and interest when some hardscape and plant materials are introduced into a landscape.

Subjects gave their most positive votes to the images with 50% lawn. 48.5% voted these images as their second favorite and 40.2% voted them as their most preferred visually.

When the amount of lawn was decreased further to 25%, the results were surprisingly mixed. Thirty three percent voted these images as their third favorite and close behind were the votes for most preferred at 30.9%. While these images showed no strong consensus in any particular direction they do suggest

that there is a considerable population (nearly one third of the total) that would prefer to have as little as 25% lawn in their front yards.

75% Lawn Visual Preference

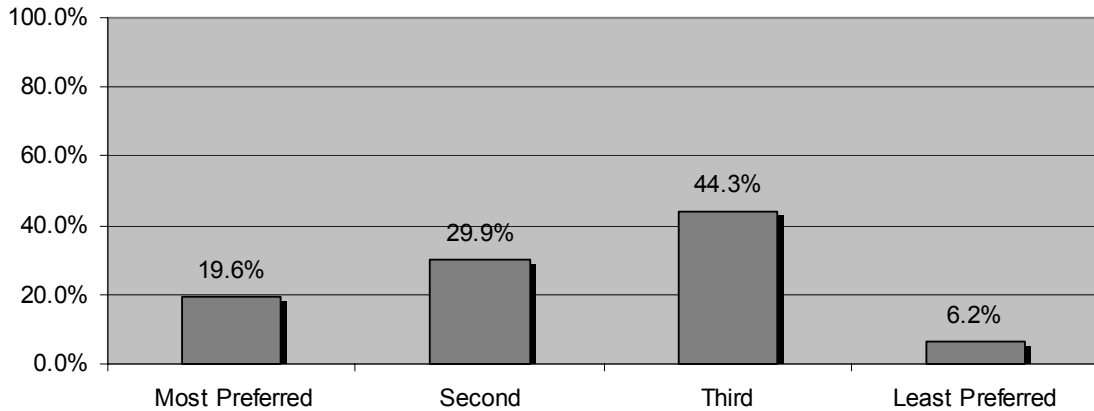


Figure 9. Visual preferences toward yard images with 75% lawn coverage.

50% Lawn Visual Preference

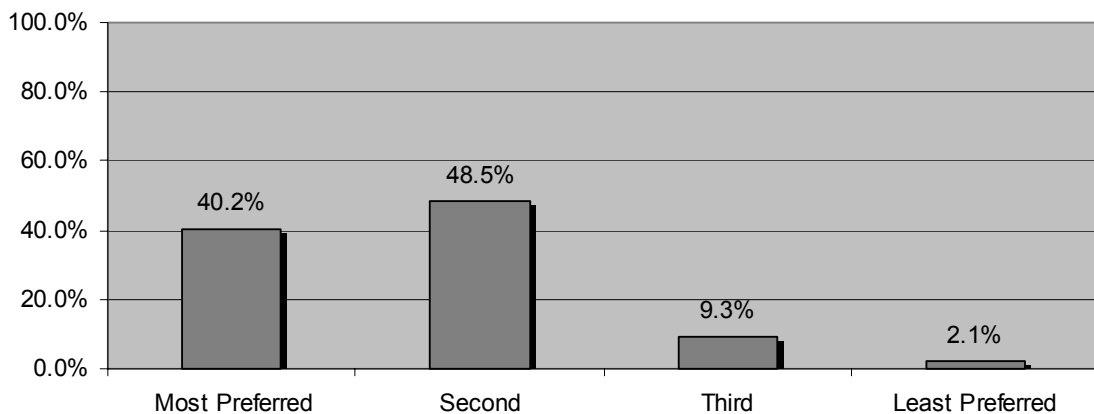


Figure 10. Visual preferences toward yard images with 50% lawn coverage.

25% Lawn Preference

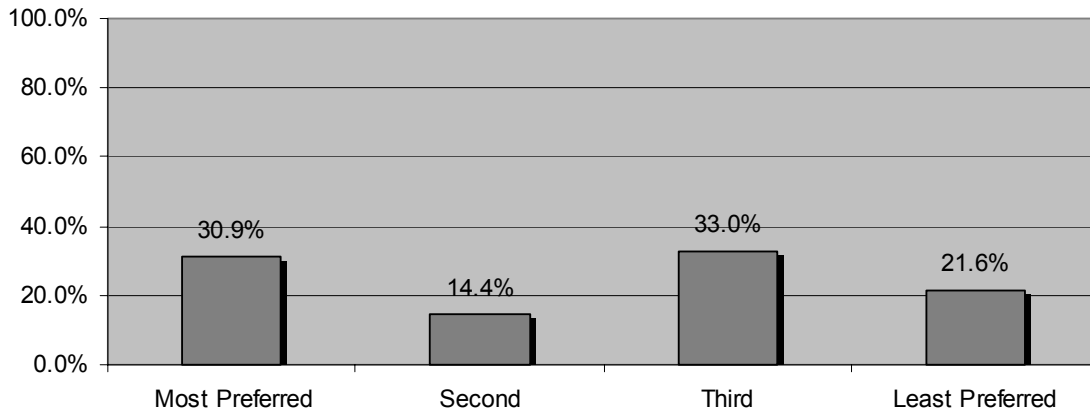


Figure 11. Visual preferences toward yard images with 25% lawn coverage.

After subjects ranked the images based on their visual preferences they were asked to rank them again based on what kind of landscape they would prefer to maintain and own. The survey votes were tallied the same way as the visual preference group by counting number of votes cast for each lawn percentage group.

When looking at maintenance and ownership preferences for the images with 100% lawn it is interesting to note that the preference has risen slightly. It is evident that 100% lawn is still highly disliked to maintain and own with 47.4% voting it as their least preferred. This is a notable increase in preference from the votes on visual preference though. This suggests that people are not as opposed to maintaining a yard with 100% lawn as they are to looking at one.

100% Lawn Maint./Own Preference

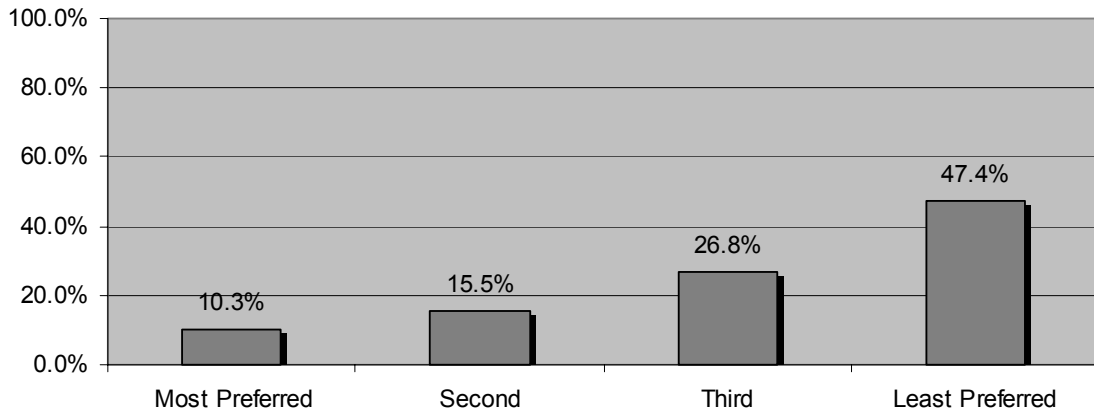


Figure 12. Maintenance and ownership preferences toward yard images with 100% lawn coverage.

When the lawn is decreased to 75% the preference jumps up dramatically. Forty one point two percent voted these images as their most preferred to maintain while 28.9% and 27.8% voted these images as their second and third favorite respectively. This increase in preference is probably rooted in issues like maintenance know how or preference for specific maintenance tasks such as mowing or pruning.

Again, when the lawn is lowered to 50% coverage it proves to be quite preferable to maintain and own. Images with 50% lawn received the highest positive marks with 44.3% voting this as their second favorite. Only 1% voted it as their least preferred.

75% Lawn Maint./Own Preference

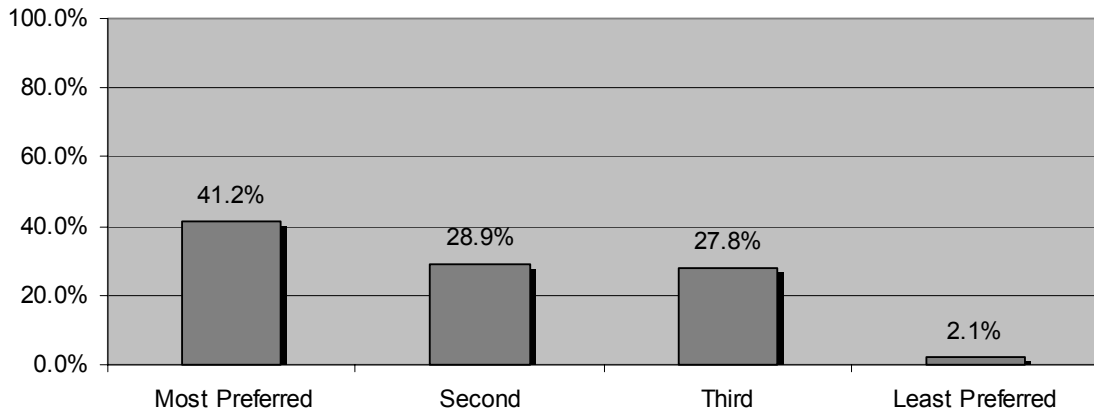


Figure 13. Maintenance and ownership preferences toward yard images with 75% lawn coverage.

50% Lawn Maint./Own Preference

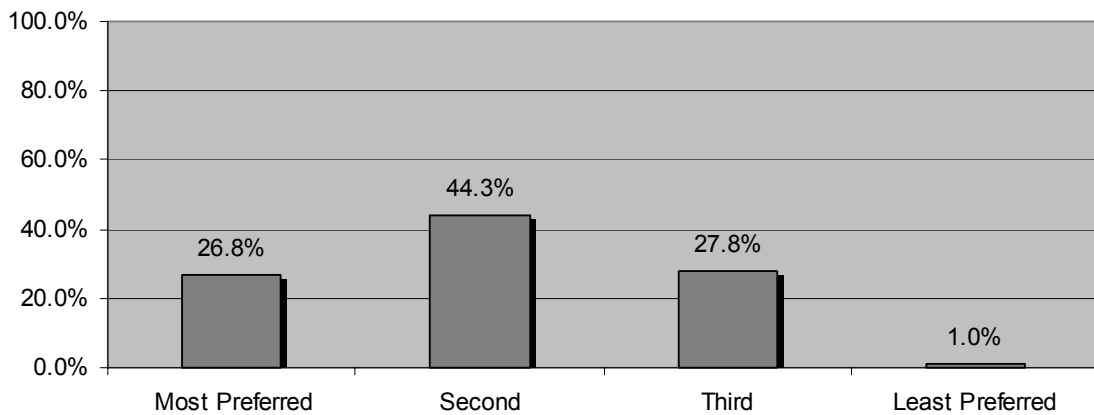


Figure 14. Maintenance and ownership preferences toward yard images with 50% lawn coverage.

As the lawn drops further to 25% the preference drops. Most subjects voted these images as their least preferred (50.5%). This data would suggest

that in general people would rather not maintain 75% trees, shrubs and flowers. This may stem back to the idea that most Americans have grown up with yards filled with grass and are familiar with the maintenance practices associated with it. Many people in America know how to drive a lawnmower over a patch of grass to keep it cut. On the other hand relatively few probably know proper pruning techniques or how to take proper care of herbaceous plants. The maintenance practices that one must employ for these activities may go beyond the horticultural knowledge of the average American home owner. The task does not seem so daunting to the few individuals that were interviewed here. Nineteen point six percent voted the 25% lawn as their most preferred to maintain and own. This is still down though from the 30.9% that voted these imaged their favorite to look at. This suggests that people would rather look at a landscape

25% Lawn Maint./Own Preference

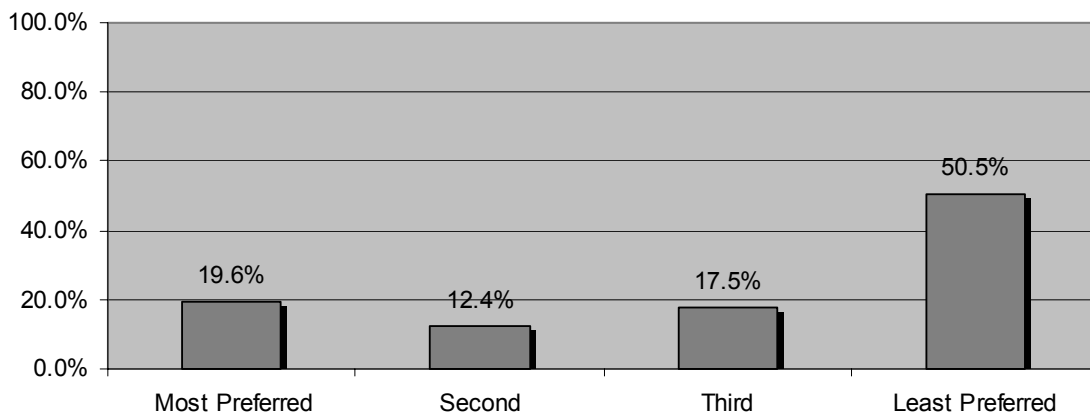


Figure 15. Maintenance and ownership preferences toward yard images with 25% lawn coverage.

like this than take care of it. The 19.6% in this category may represent the portion of the American public who really enjoy gardening and are not intimidated by landscape maintenance practices other than mowing.

The next group of analyses was done to determine if there were any correlations between different demographic characteristics and preference. Each subject was asked to give their age, gender and the property value of the home in which they currently reside. Each of the demographic groups was broken down into categories or ranges that represent categories of the general public. Then most preferred and least preferred votes were counted for each lawn percentage for visual preferences and maintenance/own preferences. For example, the gender category was broken up into females and males. All of the female votes for most preferred lawn percentage were tallied then all their votes for least preferred were tallied. These numbers were then graphed and displayed. That process was repeated for all of the following groups of data and graphs.

Age vs. Preference

To determine if there was a correlation between age and preference the surveys were divided up into different age groups that roughly represent three different generations. The first and youngest age group was that of 18 to 25 year olds. This generation is sometimes called "Generation Y". These are individuals that are in college or starting careers. Most are single and a few have families. There were a total of 23 individuals in this group. Figure 16 shows that this

Age 18 -25 Visual Preference

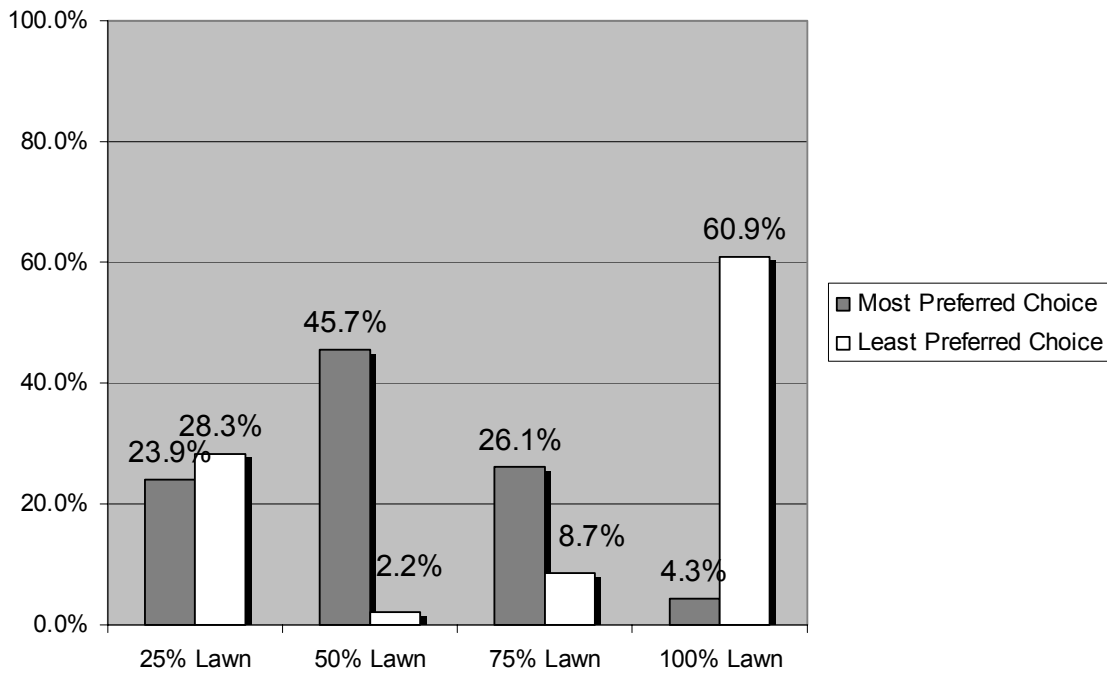


Figure 16. Most and least preferred choices for visual preferences of age range 18 to 25

group visually preferred the 50% lawn images with 45.7% voting them as their most preferred choice. The 25% and 75% lawn images were a close tie for second favorite at 23.9% and 26.1% respectively. On the other hand, this group really disliked the 100% lawn images giving them 60.9% of the votes for least favorite. Another interesting turnout here is the apparent polarization of this group over the 25% lawn images. 23.9% voted these images as their most preferred while 28.3% voted them as their least favorite. This is a shift in preference that is not seen in the other two age groups that will be discussed next.

When asked which landscapes this group would like to maintain and own, the numbers came out quite differently. The most preferred landscape jumped from 50% lawn to 75% lawn. Fifty six point five percent voted the 75% lawn images as their most preferred landscape to maintain. Also, this group had no apparent interest in maintaining a yard with 25% lawn and 75% other plant material. Sixty seven point four voted the 25% lawn images as their least preferred to maintain and own. Many of the rest, 30.4%, said that the 100% lawn was their least preferred in this category. It is shown here that the polarization over the 25% lawn is shattered. The data here suggests that this group would rather maintain more lawn than what they want to look at.

Age 18 - 25 Maint/Own Preference

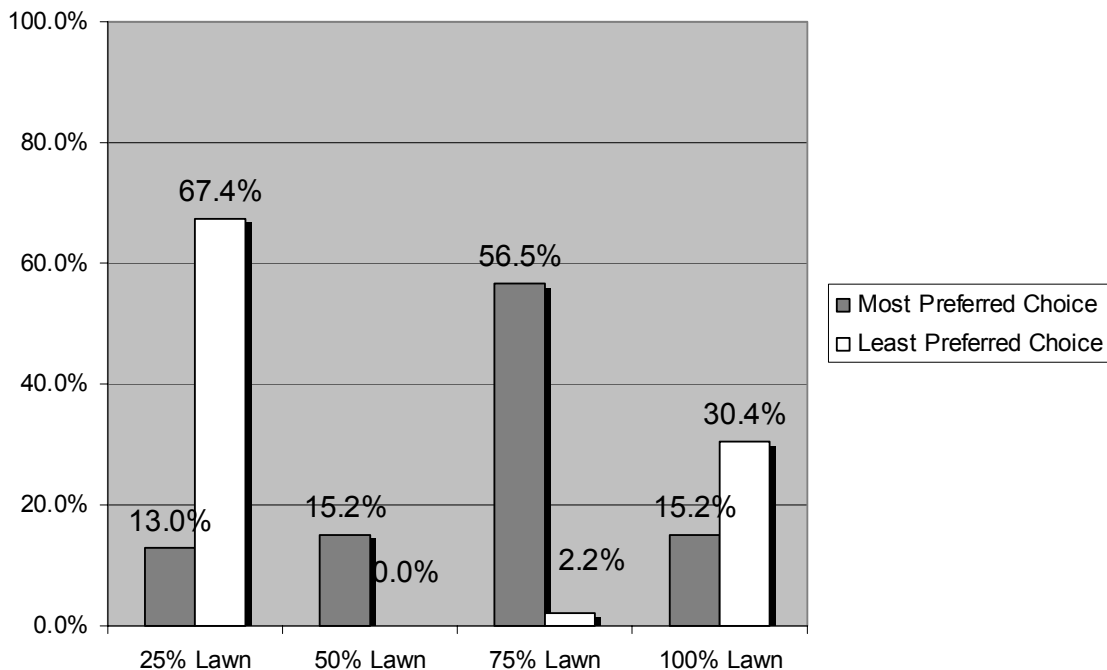


Figure 17. Most and least preferred choices for maintenance and ownership preferences of age range 18 to 25

The next age group was that of the 26 to 45 year olds. This group represents Generation X. This group is made up of people who are settling into or have established careers. Many are married and some have families. There were 12 individuals from the sample that fell within this group. Interestingly enough, this group proves to be fairly polarized as well when it comes to their visual preferences. Fifty percent of people voted the 25% lawn images as their most preferred. On the flip side, 54.2% voted the same images as their least preferred visually. The graph also shows that the 100% lawn images were very much disliked by this age group.

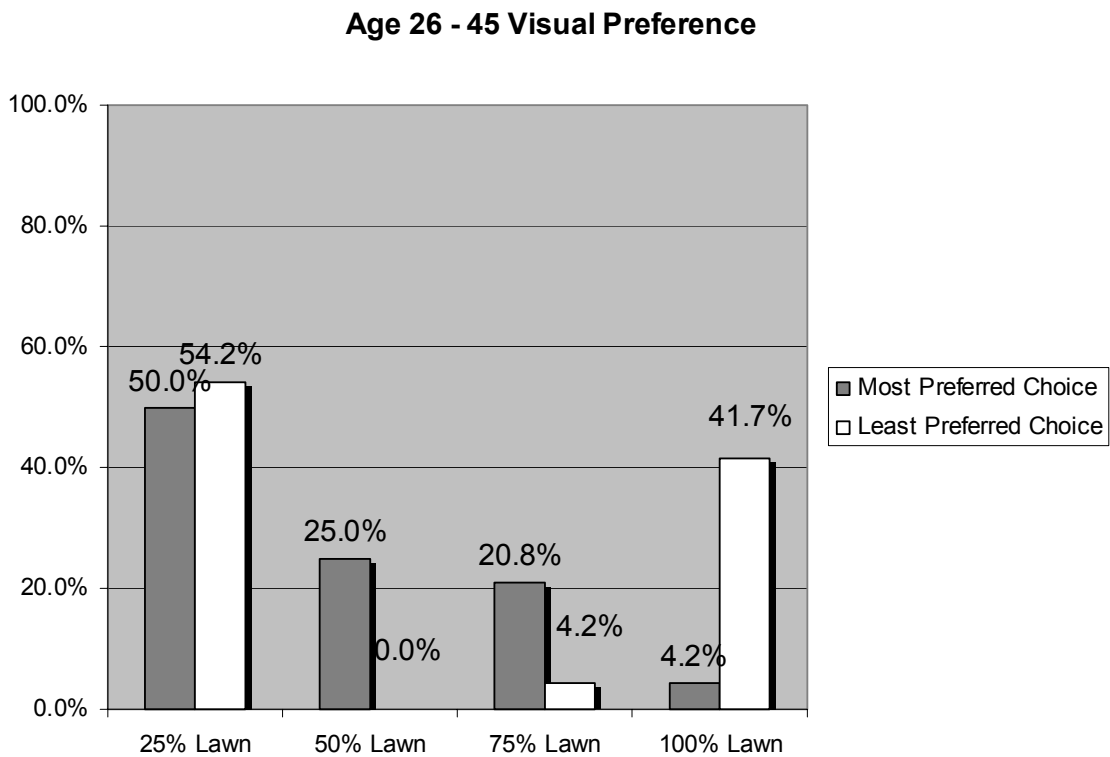


Figure 18. Most and least preferred choices for visual preferences of age range 26 to 45

When this group was asked what they would prefer to maintain and own the numbers followed closely with that of the general preference numbers. The preference shifted so the 50% lawn images received the most favorable votes at 37.5%. Twenty nine point two percent voted the 75% lawn images as their most preferred choice and 25.0% voted the 25% lawn images as their most preferred choice. This arrangement forms a nice bell curve over the 50% lawn images. For this category, the least preferred vote was split between the 25% and 100% lawn images. This would suggest that this group would rather maintain and own a yard with 50 to 75% lawn.

Age 26 - 45 Maint/Own Preference

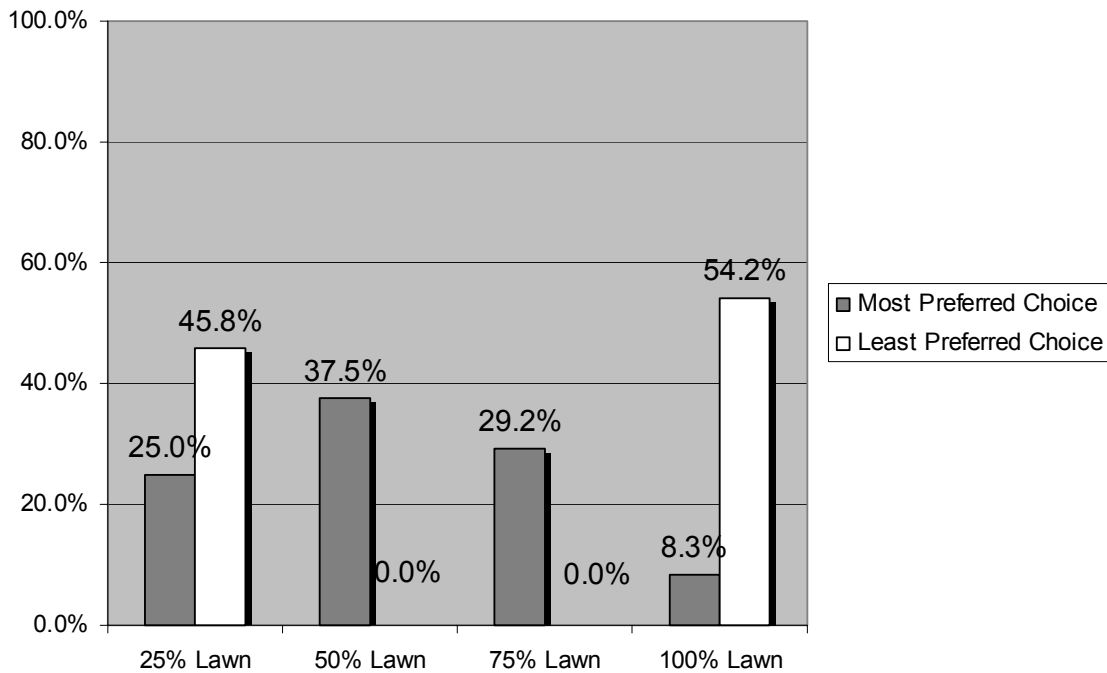


Figure 19. Most and least preferred choices for maintenance and ownership preferences of age range 26 to 45

The data here suggests that, in general, this group does not like the landscapes that are on the extremes but that there is a group of them (nearly half) that do like the look of the 25% lawn images even if they would rather maintain something with a little more lawn. This is a noticeable difference from those in the earlier age group who preferred yards with around 75% lawn and did not like the yards with 25% lawn.

The last age group roughly represents the generation known as the baby boomers. These are the sons and daughters of the WWII generation. The age range here is from 46 to 69 years old. 69 is the top of this range because it is the age of the most senior individual in the sample. There were 13 individuals from the sample that fell into this category. Again, in this category we see an interesting shift in preference. Visually this group very much preferred the 25% and 50% lawn images with them receiving 42.3% and 50.0% of the most preferred votes respectively. When looking at what this group does not like visually there seems to be a strong consensus. Ninety six point two percent of the least preferred votes were cast for the 100% lawn images. Almost no one in this group wants to look at a yard with 100% lawn. Perhaps this group, as a consequence of their age, has a more refined sense of aesthetics and prefers more complex landscapes.

Age 46 - 69 Visual Preference

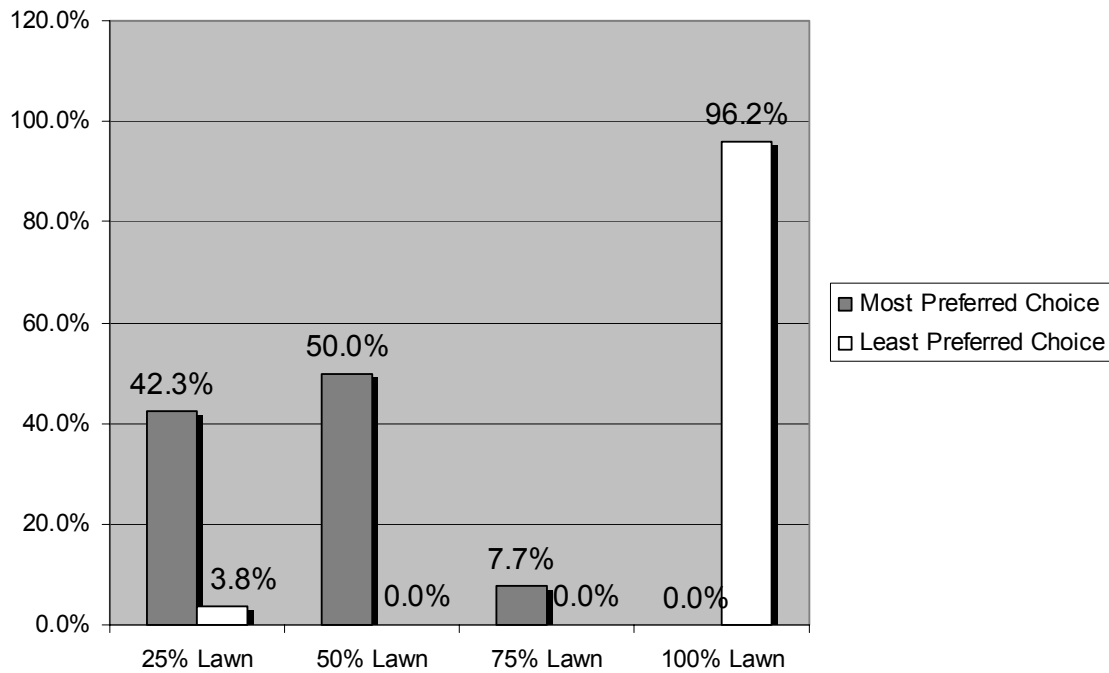


Figure 20. Most and least preferred choices for visual preferences of age range 46 to 69

When this group was asked what they would like to maintain and own the preference shifted again toward the yards with a higher percentage of lawn. Also, some of the least preferred votes went to the 25% lawn images suggesting that they may feel that caring for that many trees and shrubs would be more than what they would like to do. Strong disliking for the 100% lawn images continues to persist here also.

Age 46 - 69 Maint/Own Preference

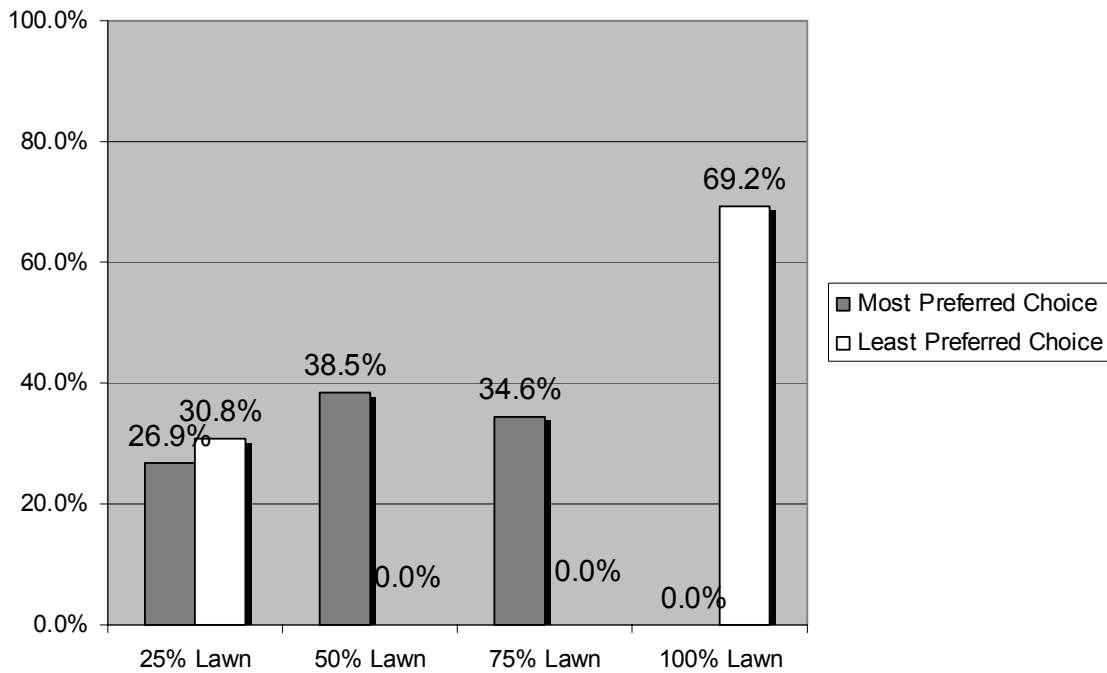


Figure 21. Most and least preferred choices for maintenance and ownership preferences of age range 46 to 69

Gender vs. Preference

The next category was set up to determine if gender played a roll in preferences toward the lawn. Surveys were divided into gender groups. There were a total of 29 females and 18 males that could be used from the sample in this category. Two participants did not record any gender information and their surveys could not be used for this analysis.

When females were asked which images they liked best they tended to vote more often for the 25% and 50% lawn images. They received 37.9% and 44.8% of the most preferred votes respectively. Visually,

Female Visual Preference

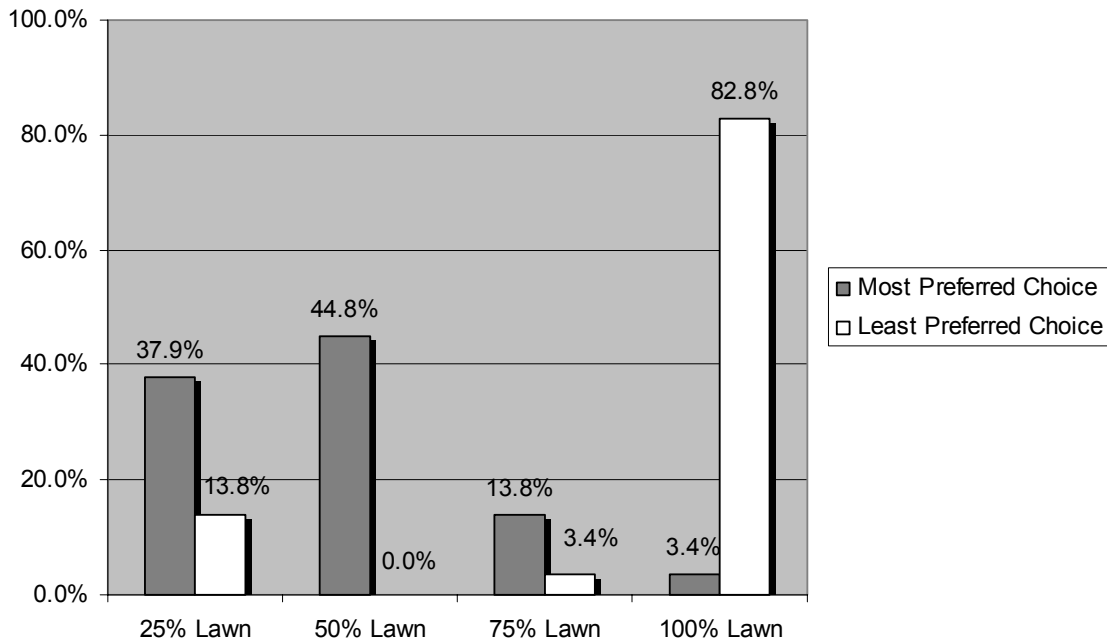


Figure 22. Most and least preferred choices for visual preferences of Females

this group did not like the 100% lawn images giving them 82.8% of their least preferred votes.

When looking at what females would prefer to maintain and own, a similar shift takes place that has been observed in nearly all of the above data analyses. It seems that females would prefer to maintain a yard with closer to 75% lawn. They gave these images 43.1% of their most preferred votes. The majority of the remaining most preferred votes went to the 50% and 25% lawn images, 34.5% and 19.0% respectively. Next it is seen that the votes for least preferred choice was split between the 25% and 100% lawn images. They received 44.8% and 55.2% respectively, of the least preferred votes

Female Maint/Own Preferences

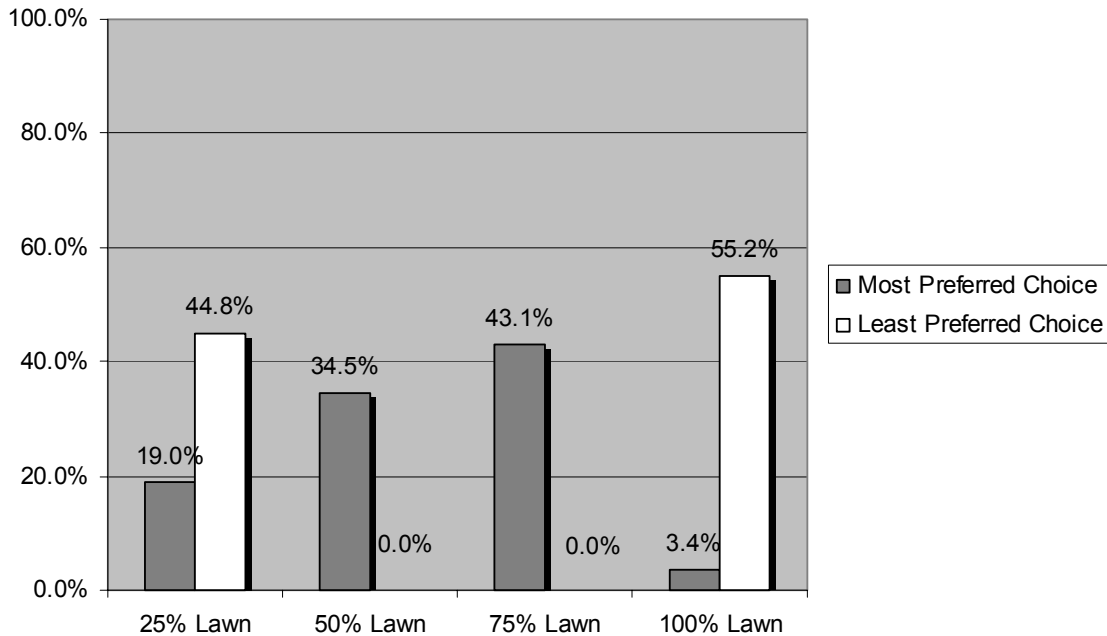


Figure 23. Most and least preferred choices for maintenance and ownership preferences of Females

Males visually tended to prefer more lawn than their female counterparts. They gave a higher percentage (27.8%) of their most preferred votes to the 75% lawn images and a little less to the 50% and 25% lawn images when compared to the females. In the realm of maintenance and owning the majority of males preferred the 75% lawn images giving them 47.2% of their most preferred votes.

Interestingly, the least preferred votes were switched in comparison to that of the females. More females gave their least preferred votes (55.2%) to the 100% lawn images where males gave more of their least preferred votes (58.3%) to the 25% lawn images. While there are some differences between male and female

preferences toward the lawn they do not seem to be substantial enough to have a profound impact on overall preference of the general public.

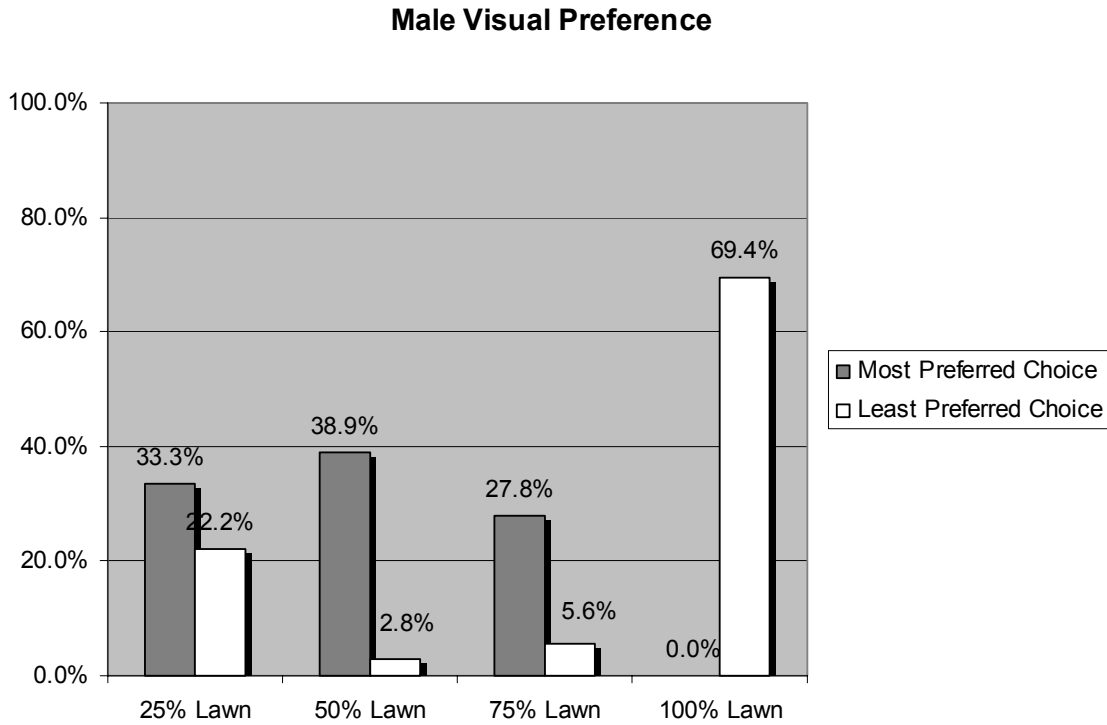


Figure 24. Most and least preferred choices for visual preferences of Males

Male Maint/Own Preference

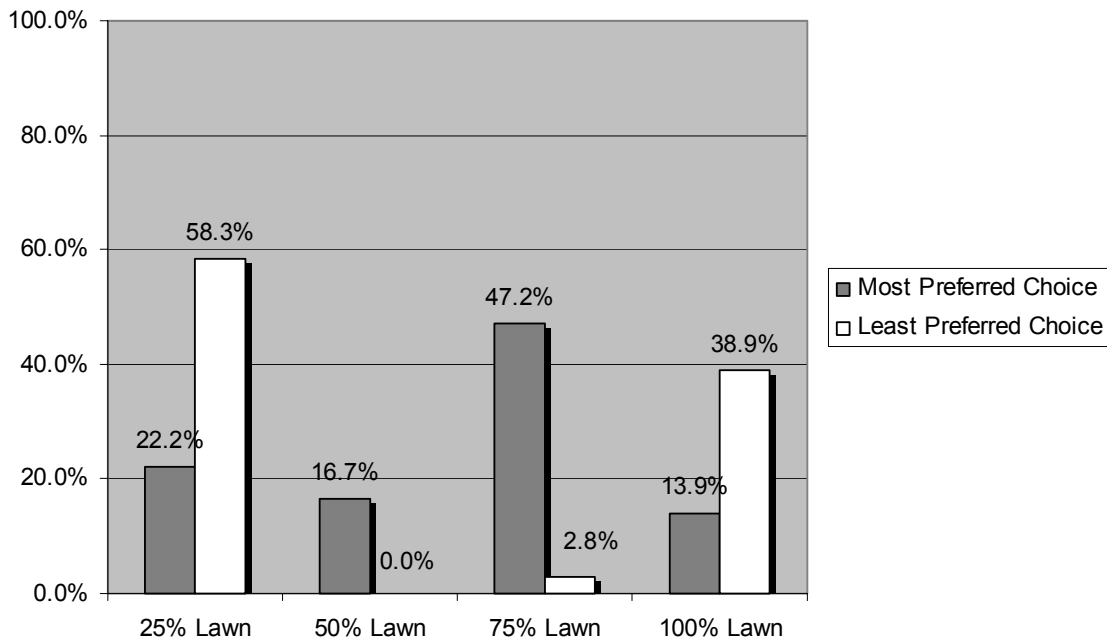


Figure 25. Most and least preferred choices for maintenance and ownership preferences of Males

Property Value vs. Preference

The next category tested the property values of subjects' current homes against their preferences toward lawn. Property values were broken up into four tiers. The first tier was those who have homes valued at \$100K or below. The next group had homes valued between \$100K and \$150K. The next group had homes valued between \$150K and \$250K. The last tier had homes valued at \$250K and above.

There were 9 individuals in the sample whose homes were valued at \$100K or less. When this group voted on their visual preferences they gave the 25% lawn images the most votes at 44.4%. As the amount of lawn increased the number of most preferred votes tapered off. No most preferred votes were given to the 100% lawn images. There was a strong consensus for the least preferred choice within this group. They cast 77.8% of their least preferred votes for the 100% lawn images. Visually this group preferred the 25% lawn images.

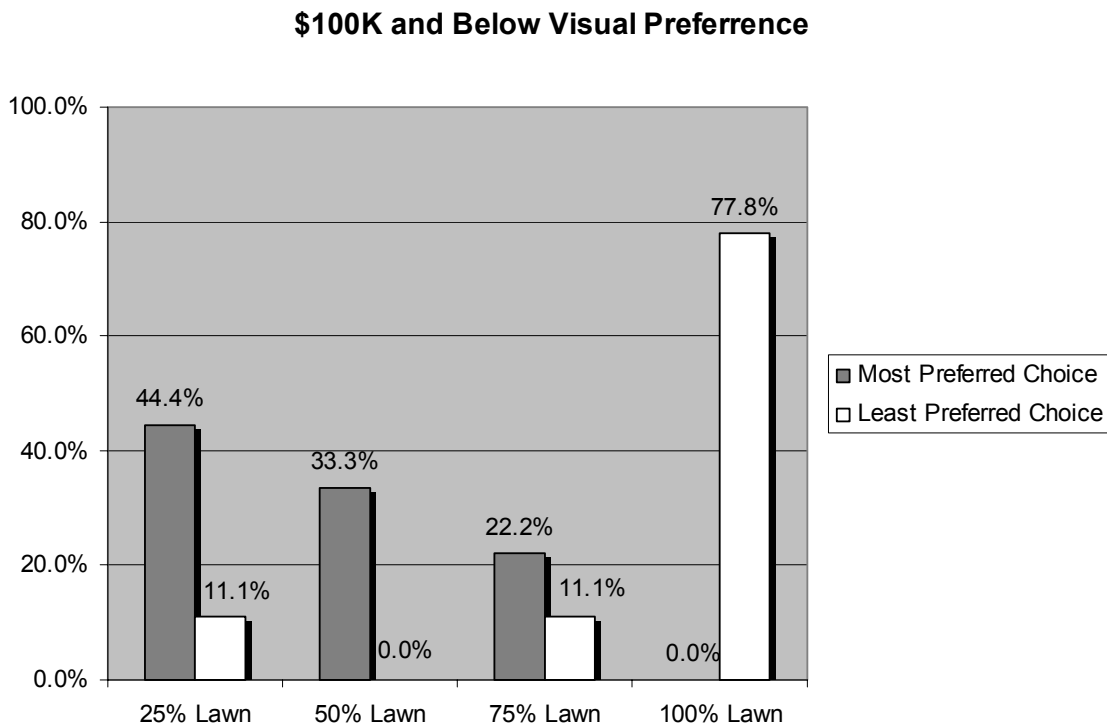


Figure 26. Most and least preferred choices for visual preferences of those with property values of \$100,000 or less.

In the context of maintenance and owning the different yards, this group showed the predictable shift in preference. They said that they preferred the 50% and 75% lawn images most and the 25% and 100% lawn images least.

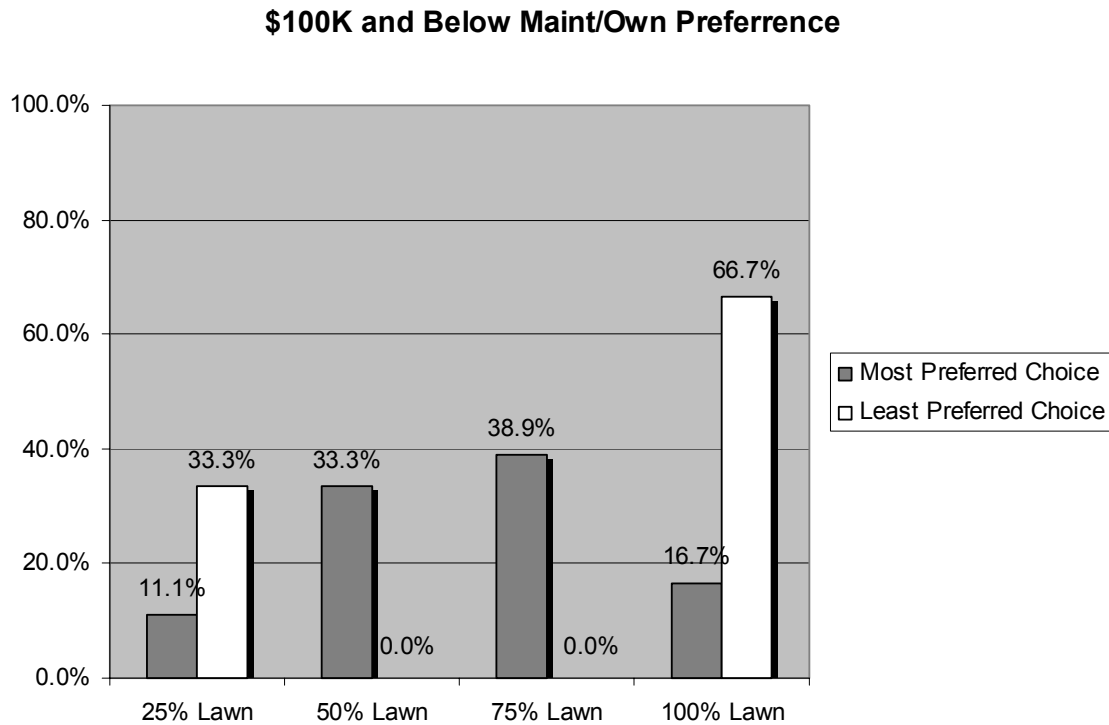


Figure 27. Most and least preferred choices for maintenance and ownership preferences of those with property values of \$100,000 or less.

The next tier had homes valued between \$100K and \$150K. There were 11 individuals that fell into this tier. This group preferred the 50% lawn images most giving them 54.5% of their most preferred votes. This group shows a shift toward preferring more lawn than the last group. Like the last group though, this tier cast most (77.3%) of their least preferred votes toward the 100% lawn images.

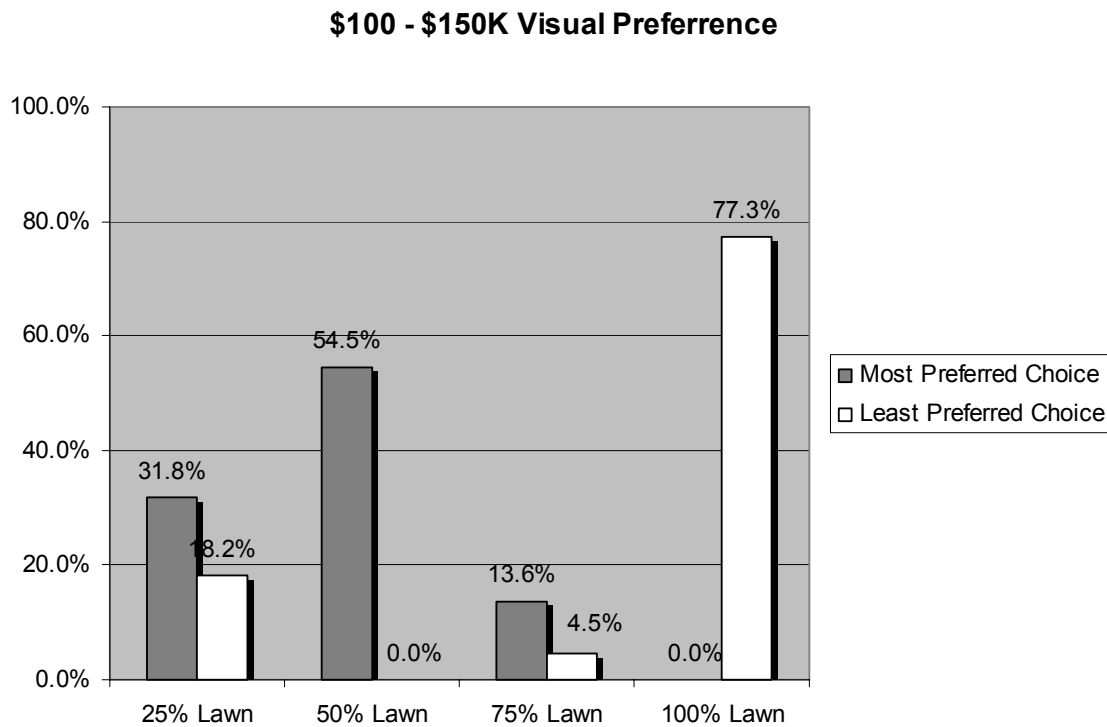


Figure 28. Most and least preferred choices for visual preferences of those with property values of \$100,000 to \$150,000.

When this tier was asked what they would prefer to maintain and own the preference shifted from the 50% to the 75% lawn images. They cast 54.5% of their most preferred votes for these images. Another shift occurred here with the least preferred choice of this group. They disliked the 25% lawn images (giving them 59.1%) more than the 100% lawn images (giving those 36.4% of the least preferred votes). This is a major shift from their visual preferences.

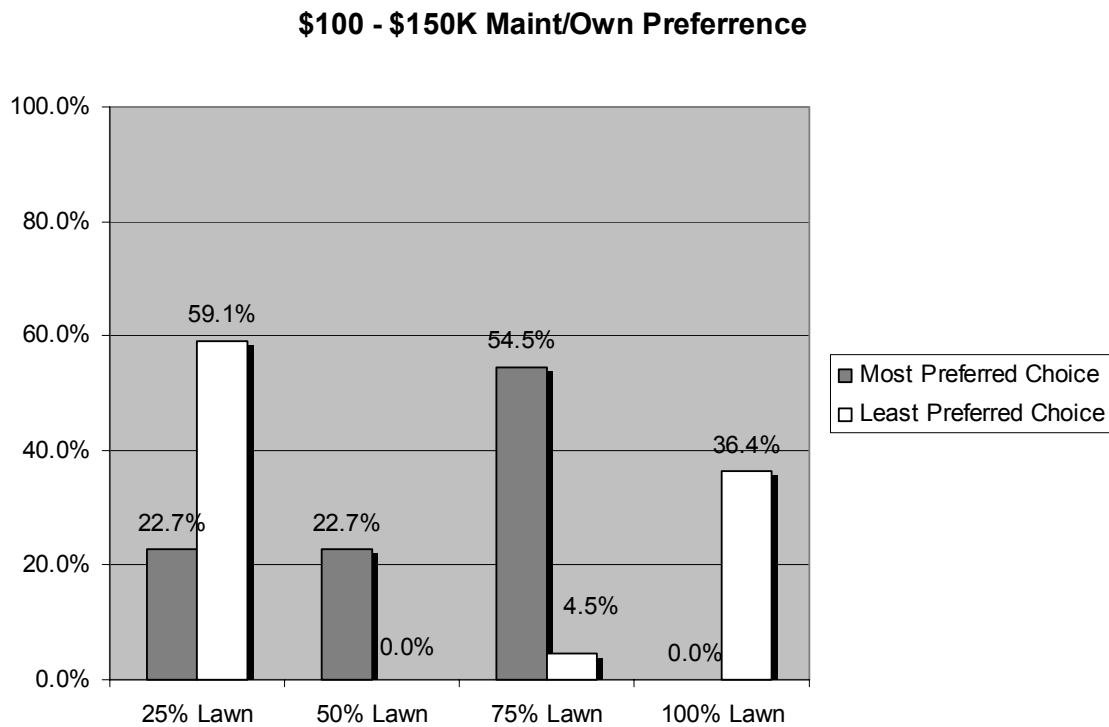


Figure 29. Most and least preferred choices for maintenance and ownership preferences of those with property values of \$100,000 to \$150,000.

The tier whose homes were valued at \$150K to \$250K had 15 individuals in it. This group's visual preferences were split fairly evenly over the 25%, 50% and 75% lawn images giving those 33.3%, 30.0% and 30.0% of their most preferred votes respectively. Seventy three point three percent of the least preferred vote was given to the 100% lawn images and 26.7% were given to the 25% lawn images.

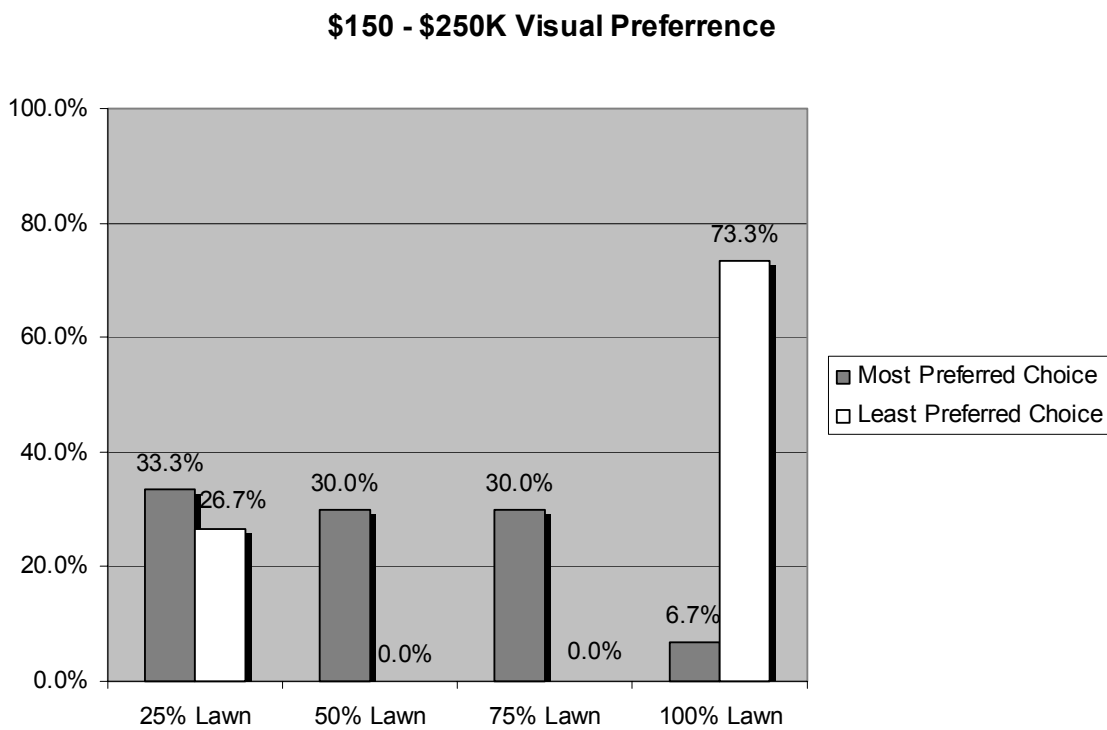


Figure 30. Most and least preferred choices for visual preferences of those with property values of \$150,000 to \$250,000.

When asked what they would maintain and own, this group gave 43.3% of their most preferred vote to the 75% lawn images and 30.0% to the 25% lawn images. For their least preferred choice they gave 60.0% to the 25% lawn images and 40.0% to the 100% lawn images.

The data from this tier suggests that they like to look at a variety of landscapes except for those approaching 100% lawn. When thinking about maintenance issues this group would prefer a yard with around 75% lawn. There is a group (about one third of the group) who would be willing to maintain a yard that has as little as 25% lawn.

\$150 - \$250K Maint/Own Preference

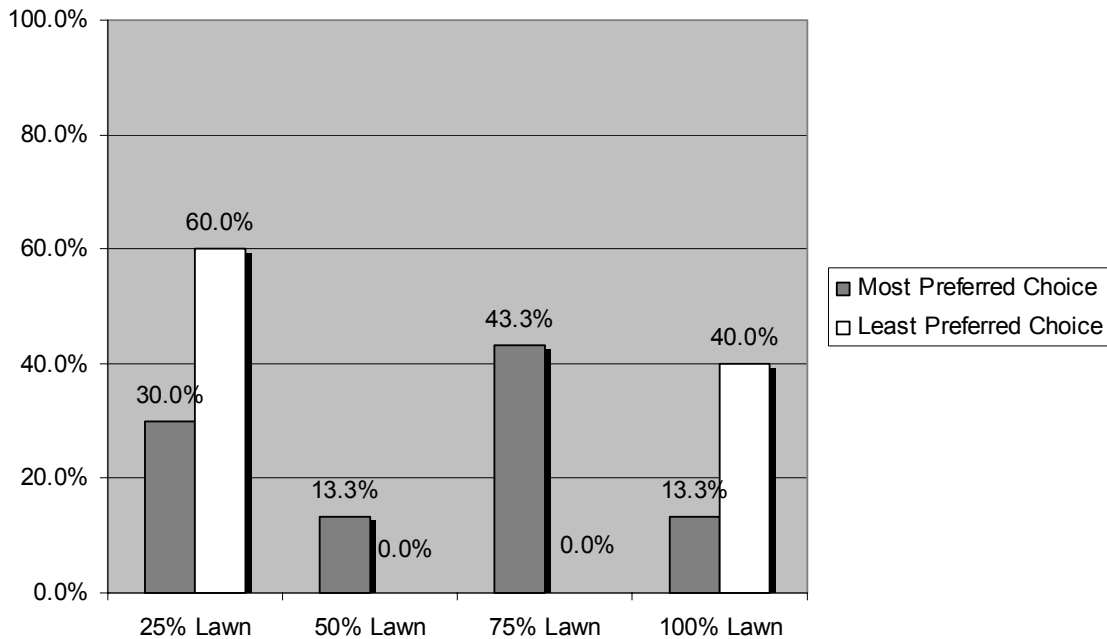


Figure 31. Most and least preferred choices for maintenance and ownership preferences of those with property values of \$150,000 to \$250,000.

The fourth and final tier for this category held individuals whose homes were valued at \$250K and above. There were 13 individuals in this group. The data shows that 50.0% of the most preferred votes were given to the 50% lawn images and 36.4% were given to the 25% lawn images. It is interesting to note that these numbers are similar to those of the \$100K tier. Also, 76.9% of this group voted the 100% lawn images as their least preferred visually.

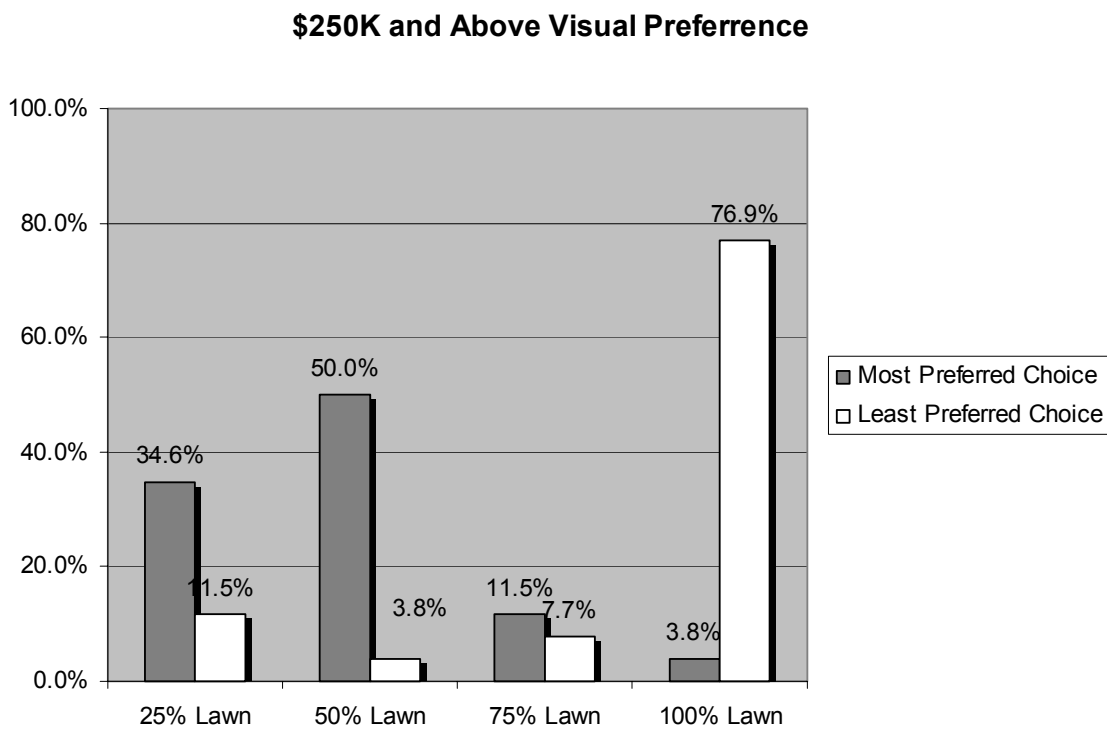


Figure 32. Most and least preferred choices for visual preferences of those with property values of \$250,000 and greater.

As seen in many of the other graphs, preference has shifted in this group to yards with more lawn when maintenance and ownership is considered. This tier gave 42.3% and 38.5% of their most preferred votes to the 50% and 75% lawn images respectively. Also, a shift occurred here in the least preferred choices that are similar to that seen in the other groups. More negative votes were given to the 25% lawn images (57.7%).

\$250K and Above Maint/Own Preference

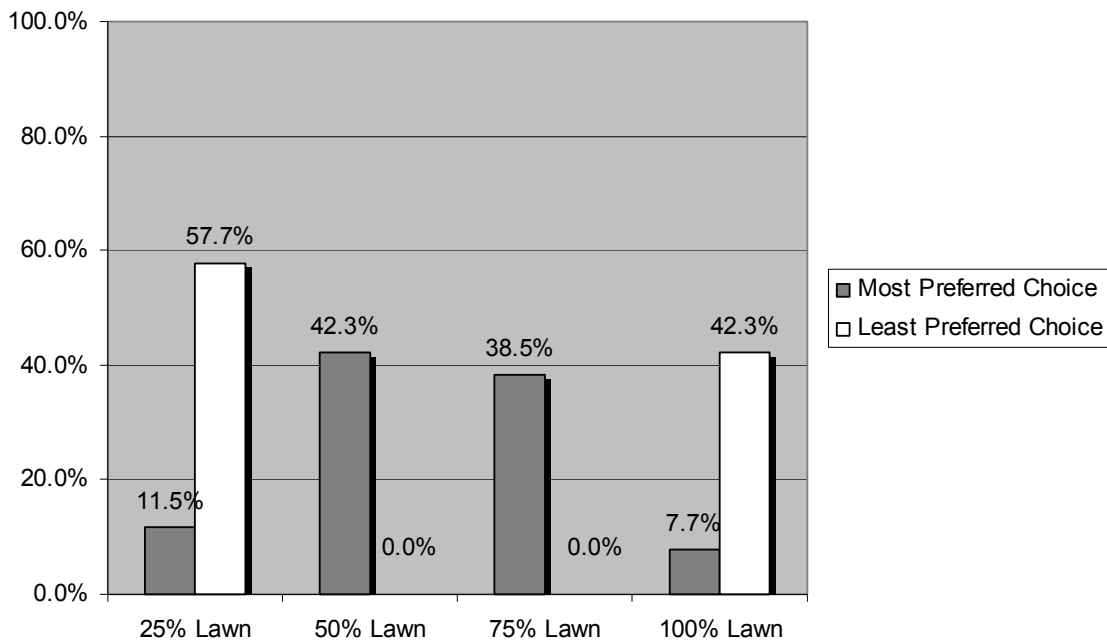


Figure 33. Most and least preferred choices for maintenance and ownership preferences of those with property values of \$250,000 and greater.

This group, like the others, seems to like to look at less lawn than other landscape elements like trees, shrubs and flowers. They would rather maintain more lawn than they prefer to look at but they do not want to look at or maintain a yard with around 100% lawn. Conversely the idea of maintaining a yard that is mostly other plant material does not seem to appeal to this group.

Questionnaire Answers

After subjects ranked landscape images based on their preferences they were asked to fill out a questionnaire on the following pages of the worksheet. The questionnaire was designed to help provide a basis for understanding why people have the preferences that they do. Are people's preferences based in maintenance issues, design style, concern for water use in the landscape or some other factor? The following is a report of the answers that subjects gave to the questionnaire.

Questions one through three were linked questions. Subjects were asked:

1. Does your current front yard fit your personal preferences?

Yes or No

2. If your answer to question 1. is "Yes" then what percent of your front yard would you *estimate* is covered in lawn?

3. If your answer to question 1. is "No" then what percent of your front yard would you *estimate* is covered in lawn and what would you change that percentage to?

Subjects then wrote down how much of their yard they thought was covered in lawn and what percentage they would rather have. Answers were varied.

To gain an understanding of the answers to these first three questions the surveys were broken up into groups depending on what the subject thought was the amount of lawn in their front yard. The percentage ranges were set to surround those of the images that were used in the survey. The first group was of people who estimated 100% to 86% lawn in their front yard. The second group estimated 85% to 61% lawn. The third group estimated 60% to 41% lawn and the final group estimated they had 40% to 0% lawn in their yards.

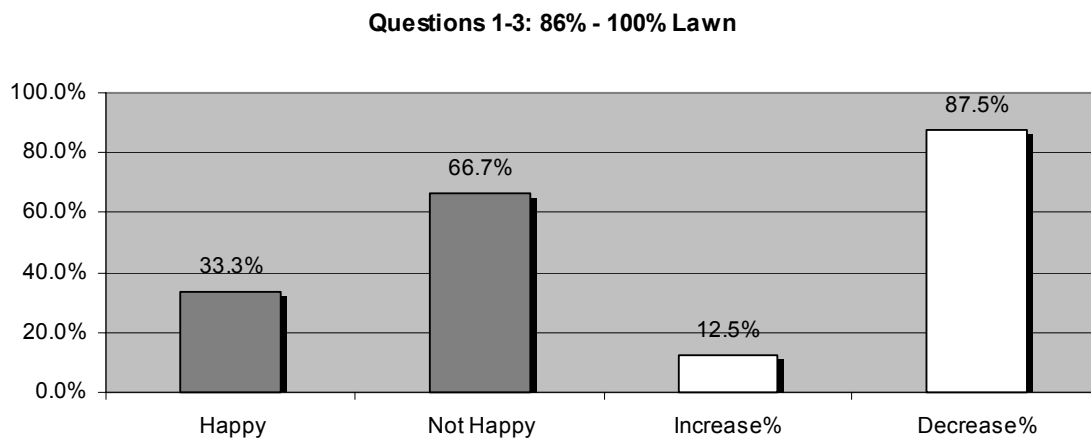


Figure 34. Answers to survey questions 1 through 3 for those who estimated between 86% and 100% lawn coverage in their front yards.

There were 12 individuals who estimated they had 100% to 86% lawn in their front yards. Thirty three point three percent of them said that they were happy with the amount of lawn they have. Sixty six point seven percent said that they were not happy with their yards. Of those who were not happy 87.5% said

that they would decrease the amount of lawn in their front yards and only 12.5% said that they would increase the amount.

The next group estimated that they had 85% to 61% lawn in their front yards. There were 9 individuals that fell within this group. This group reported that 66.7% of them were happy with their front yards as they are. Thirty three point three percent said that they were not happy. Of the 33.3% all of them said that they would decrease the amount of lawn in their front yard.

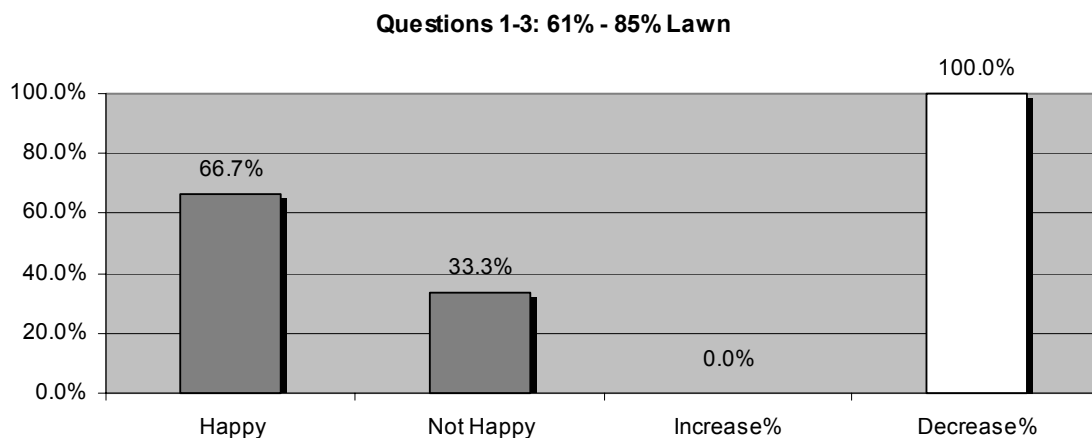


Figure 35. Answers to survey questions 1 through 3 for those who estimated between 61% and 85% lawn coverage in their front yards.

There were 12 individuals who reported having 60% to 41% lawn in their front yards. 53.3% of those reported being happy with their yards and 41.7% said that they were not happy with them. Of those who were not happy 40.0% said that they would like to increase the amount of lawn and 60.0% said that they would like to decrease it.

Questions 1-3: 41% - 60% Lawn

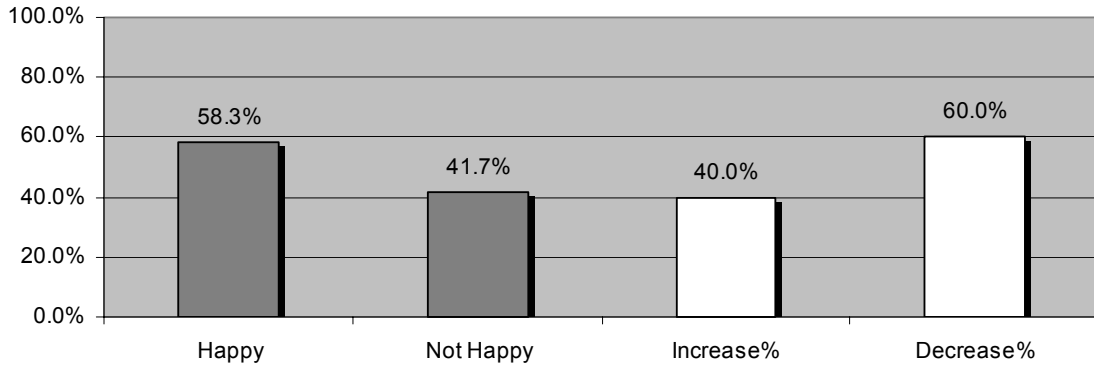


Figure 36. Answers to survey questions 1 through 3 for those who estimated between 41% and 60% lawn coverage in their front yards.

The last group estimated that they had 40% to 0% lawn in their front yards. There were 15 individuals in this group. Sixty percent of them said that they were happy with their yards and 40.0% said that they were not happy. Of those who were not happy 66.7% said that they would like to have the amount of lawn in their yards increased and 33.3% said they would like it decreased.

Questions 1-3: 0% - 40% Lawn

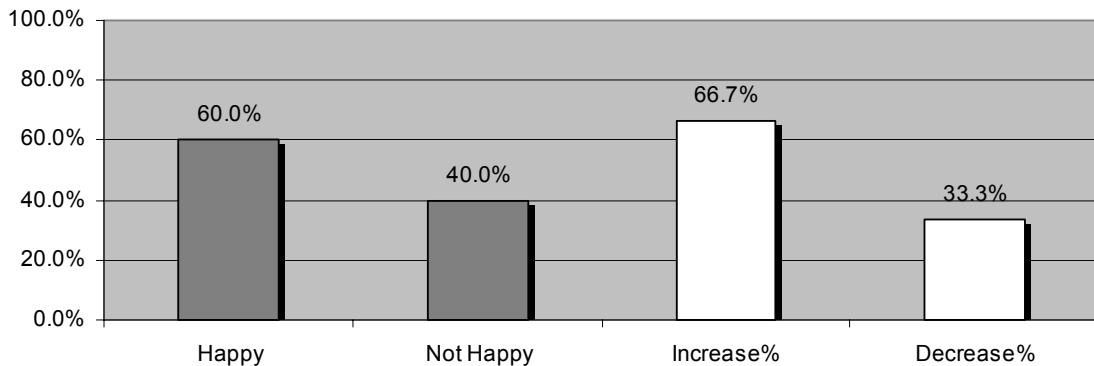


Figure 37. Answers to survey questions 1 through 3 for those who estimated between 0% and 40% lawn coverage in their front yards.

Forty eight of the 49 individuals that took the survey were used for this analysis. One individual did not fill out the questionnaire past the ranking of the different images. The numbers from the first three questions support trends seen in the preference ranking section. People tended to be happiest with a yard that is covered with around 60% grass or less. This also shows that people with high percentages of lawn (86% to 100%) are very dissatisfied with their yards. A high number of those with this lawn percentage wanted to decrease the amount of lawn in their front yard.

Questions four through six were designed to gauge how people would approach changing their yards. These questions were designed to further support the data collected in the ranking exercise.

Question four asked:

4. If you were able to change your front yard in any way, which of the following approaches would you take?
 - a. Would you remove lawn area and replace it with trees, shrubs and/or flower?
 - b. Would you remove trees, shrubs and/or flower and replace them with more lawn area?

Seventy five point six percent of the subjects said that they would remove more grass and 24.4% said they would add more grass. This suggests that in general people would actually like to have less grass.

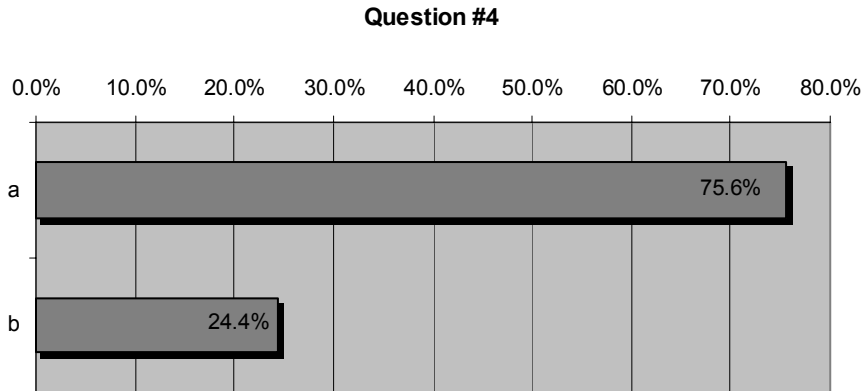


Figure 38. Answers to survey question #4.

Question five asked:

5. Which of the following factors would prevent you from having your preferred front yard? Circle all that apply to you.
 - a. The time required to remodel
 - b. The expense of remodeling
 - c. Time of maintenance of the new landscape
 - d. The maintenance know-how (i.e.: pruning, mowing, fertilizing, etc.) of the new landscape

For this question 35.1% of the respondents cited the expense of remodeling their main deterrent to having the type of yard they would really like. The second greatest deterrent was the time required to do the remodeling with 26.6% of the votes. The time required and the maintenance know how were slightly less of a concern receiving 18.1% and 20.2% respectively, but still seem to be quite valid in the minds of most people.

Question #5

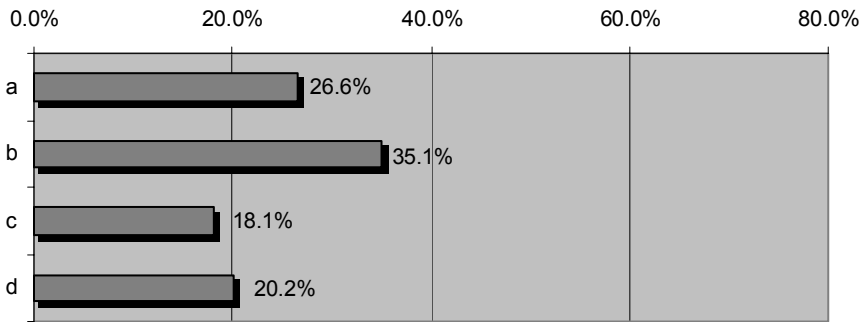


Figure 39. Answers to survey question #5.

Question six asked:

- 6. When looking for a new home what type of yard do you look for in comparison to the yard at your current residence?
 - a. One with more lawn area than you currently have?
 - b. One with less lawn (i.e.: more trees, shrubs, paths, and/or flowers) than you currently have?
 - c. The yard does not have much influence on your decision because you would change it as you have indicated in question 4 anyway.

Question #6

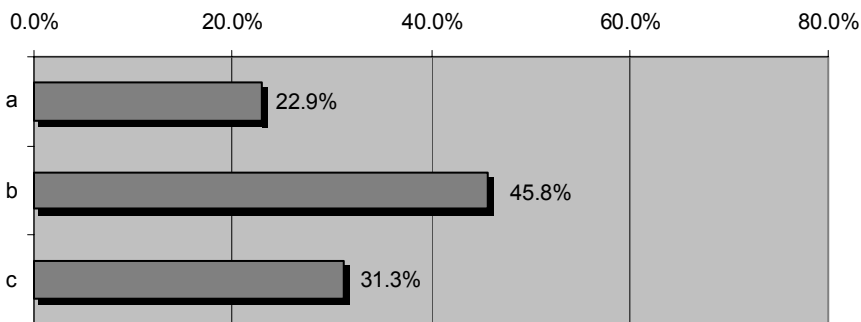


Figure 40. Answers to survey question #6.

For this question 45.8% of respondents said that they would look for a home with less lawn than they currently have. Another 31.3% said that the yard does not have much influence on choosing a new home because they could change it to suit their needs. The fewest respondents (22.9%) said that they would look for a home with less lawn than what they currently have. The answers to this question suggest that overall there is too much lawn being used in residential front yards. This data would also suggest that someone might be more likely to buy a home that has relatively “less” lawn. From the data presented earlier, the least preferred percentage of lawn is that greater than 75%. From this it can be deduced that a yard with around 50% lawn coverage might sell better than one with more.

Questions seven and eight were designed to determine if people’s preferences for lawn change over time.

Question seven asked:

7. When thinking specifically about the front lawn as a landscape element, how has your preference for it changed over time?
 - a. My preference for front lawn has *not* changed.
 - b. I prefer less lawn in the front yard and more trees, shrubs, paths, and or flowers now than I used to.
 - c. I prefer more lawn in the front yard now than I used to.

Fifty eight point three percent of respondents to this question said that they prefer less lawn now than they used to. This is evidence of a shift in preference for landscapes with less lawn than what is traditionally used. This suggests that there is a demand among the public for landscapes with relatively

less lawn. Thirty one point one percent said that their preference for lawn has not changed and 10.4% said that they prefer more lawn now than they used to.

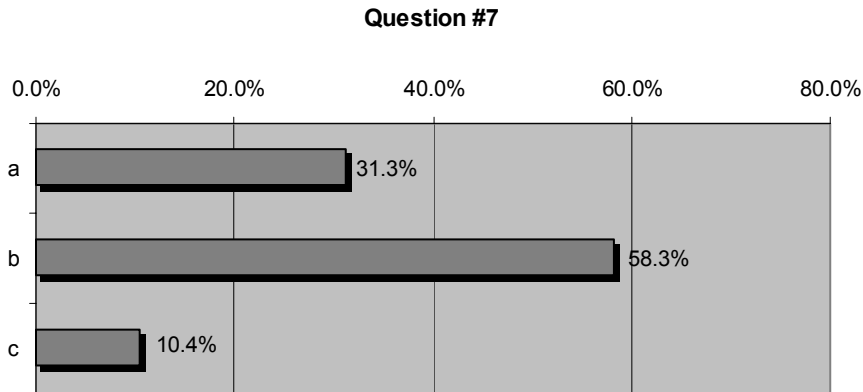


Figure 41. Answers to survey question #7.

Question eight asked:

8. If your answer to question 7. was "b" or "c" which of the following factors have most influenced that change in preference? Circle all that apply to you.
 - a. Maintenance issues
 - b. Visual preferences
 - c. Costs of yard care
 - d. Concerns about landscape water use
 - e. Other

This question expounded on question seven looking only at the group whose preferences toward lawn have changed. The answers provided are among the most common issues surrounding landscapes and humans' interaction with them. This data shows that visual preference has the largest influence on changing preference toward the lawn. Thirty eight point seven

percent of respondents said that the visual aspects of the landscape are what changed their preference over time. Second to this were maintenance issues which received 24.2% of the votes. Next were concerns for water use in the landscape which received 19.4% of the votes. There is a public campaign afoot in Utah that attempts to educate the public on Utah's water issues. The "Slow the Flow" campaign produces TV commercials and literature educating the public on how to use less water in the home and in the landscape. This campaign may be part of the cause of the high percentage of respondents who sited water use as a factor in changing their preferences. This was followed by costs of yard care and other issues which received 12.9% and 4.8% of the votes respectively. This data demonstrates the strength of aesthetics to change people's preferences.

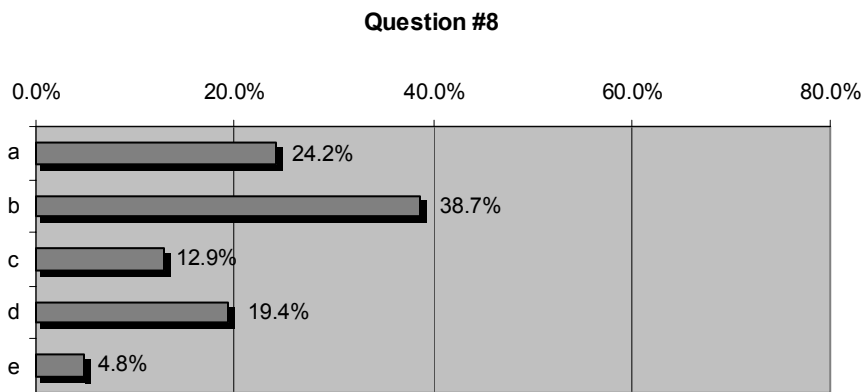


Figure 42. Answers to survey question #8.

The data gathered from question seven was further analyzed to gain a greater understanding about the individuals who answered. Tables of subject profiles were drawn up to see if there were any similarities among those who

gave the same answers. The first table shows those who indicated that their preference for the lawn has not changed over time. When this table was drawn up it was seen that they visually preferred yards with around 52% lawn and to maintain they would prefer between 67% and 70% lawn. This group estimated that they had 62% lawn in their front yards and only six of the fifteen said that they are happy with their current front yard. The most interesting pattern that

Question 7 Answer a Profiles			Preference Not Changed					
Age	Gender	Home Worth	Vis Pref. A	Vis Pref. B	Maint. Pref. A	Maint. Pref. B	Current yard fit Pref?	Est. Lawn
21	Female	150 - 200	100%	100%	100%	100%	Yes	95%
21	Male	101 - 150	50%	25%	75%	75%	No	95%
23	Male	100 - 150	50%	75%	75%	75%	No	95%
23	Male	151 - 200	50%	25%	75%	75%	No	50%
24	Male	100 -	75%	75%	100%	100%	No	10%
24	Male	150 - 200	75%	75%	75%	75%	No	25%
24	Male	150 - 200	75%	75%	100%	100%	Yes	95%
26	Female	101 - 150	25%	50%	75%	50%	No	1%
30	Male	250 -300	75%	50%	75%	75%	No	95%
42	Male	300 - 350	25%	25%	75%	50%	No	75%
52	Female	400 +	50%	25%	50%	50%	Yes	50%
53	Female	150 - 200	50%	50%	75%	75%	No	100%
57	Female	150 - 200	25%	25%	25%	25%	Yes	30%
60	Female	100 -	25%	50%	50%	50%	Yes	70%
69	Male	400 +	25%	50%	25%	25%	Yes	50%
Averages			52%	52%	70%	67%		62%

Table 4. Profiles of subjects who answered “a”, their preferences toward the lawn has not changed, on survey question 7

appeared from this table was found in the ages of those who said their preferences had not changed. All but two of the respondents were either in their

twenties or they were over fifty. This all but skips the group that fell into generation X.

The next group was those who said that they prefer less lawn now than they used to. One of the patterns seen here was that all who answered this way in question 7 also said in question 8 that water use in the landscape was one of the factors that influenced their change in preference. Another pattern seen here is that 11 of the 12 individuals that said they prefer less lawn now were female. This group reported visual preferences toward yards with an average of 40% to

Question 7 Answer b Profiles			Prefer Less Lawn Now, All Indicated Concerns About Water Use					
Age	Gender	Home Worth	Vis Pref. A	Vis Pref. B	Maint. Pref. A	Maint. Pref. B	Current yard fit Pref?	Est. Lawn
40	Female	100 -	25%	25%	50%	50%	Yes	45%
24	Female	100 -	25%	25%	25%	25%	Yes	30%
27	Female	100 - 150	25%	25%	25%	25%	Yes	40%
25	Female	101 - 150	25%	25%	25%	25%	Yes	60%
27	Female	400 +	25%	75%	50%	75%	Yes	40%
51	Female	150 - 200	25%	50%	25%	50%	No	0%
20	Female	250 - 300	50%	50%	75%	75%	Yes	30%
40	Female	350 - 400	50%	50%	50%	50%	No	90%
50	Male	300 - 350	50%	50%	50%	50%	Yes	50%
25	Female	301 - 350	50%	50%	75%	50%	No	95%
18	Female	100 - 150	50%	50%	50%	50%	No	75%
21	Female	100 -	75%	75%	75%	75%	No	3%
Averages			40%	46%	48%	50%		47%

Table 5. Profiles of subjects who answered “b”, they prefer less lawn now than they did in the past, on survey question 7

46% lawn. They also reported a desire to maintain and own a yard with 48% to 50% lawn on average. This group said that they have an average of 47% lawn in

their yards and seven of the twelve said that they were happy with their current yards.

Finally, the group that said they prefer more lawn now than they used to were profiled. There were 5 individuals in this group and they preferred on average 47% lawn visually and 59% to 66% lawn to maintain. They estimated 59% lawn coverage in their current yards on average and three of the five said that they were happy with their current front yard. The age range in this group was again very interesting. Four of the five in this group were between 20 and 22 years old. The fifth member of this group was 54 years old. Again, this group skips the age group of generation X.

Question 7 Answer C Profiles			Prefer More Lawn Now None Indicated Concern About Water Use					
Age	Gender	Home Worth	Vis Pref. A	Vis Pref. B	Maint. Pref. A	Maint. Pref. B	Current yard fit Pref?	Est. Lawn
22	Male	250 - 300	25%	25%	75%	25%	Yes	75%
22	Male	100 -	50%	50%	100%	75%	Yes	75%
20	Female	100 - 150	50%	50%	50%	75%	No	40%
21	Female	100 -	25%	25%	75%	75%	No	75%
54	Female	100 - 150	50%	50%	75%	75%	Yes	20%
Averages			47%	47%	66%	59%		59%

Table 6. Profiles of subjects who answered “c”, they prefer more lawn now than they used to, on survey question 7

Summary and Highlights of Results

The data shows that there is a shift in preference toward more lawn when comparing visual preferences to maintenance and owning preferences. People

prefer to look at yards with 25% to 50% lawn over yards with 75% to 100% lawn. On the other hand people showed more interest in having a yard with 50% to 75% lawn when asked what they would prefer to maintain and own. Images with 100% lawn were consistently voted least preferred visually by all groups. Images with 25% to 50% lawn received the majority of the visually most preferred votes. When asked what they would prefer to maintain and own most groups looked unfavorably on both the 100% lawn images and the 25% lawn images giving them the majority of the least preferred votes. Conversely, the 50% and 75% lawn images received few least preferred votes.

When people who estimated they had a high percentage of lawn in their front yards (86% to 100%) were asked if they were happy with their yards most of them said that they were not. Again, the majority of those said they would like to decrease the amount of lawn in their yards. Whereas people who estimated they had less than 85% lawn in their front yards were in general happy with their yard. Among those who were not happy with these percentages many said they would like to decrease the amount more. The only deviation from this trend was the group who estimated they had 0% to 40% lawn. Most of them were happy with their yards but of those who were not happy the majority said that they would like to increase the percentage of lawn. These trends support the analysis that preference is higher with landscapes that have around 50% lawn. This percentage seems to strike a balance between visual satisfaction and ease of maintenance.

The data from questions 4 and 5 show that people would rather remove lawn from their front yards and replace it with other plant material or landscape elements but their biggest deterrent is the expense of remodeling. Questions 6 shows that when people are in the market for a new home they are more often than not looking for a home with less lawn than what they currently have. Questions 7 and 8 shed some light on how people's preferences have changed. It is seen that the majority of people like less lawn now than they used to and that the major factors driving that change are based in visual preferences.

CHAPTER TEN

DISCUSSION

The American front lawn is a landscape element that is homogeneous throughout the country and one that does not fit within the resource budget the West has to offer. It fails to reveal the diversity and variety that is found in America's native landscapes. Traditional lawns of Kentucky Bluegrass, Rye grasses, and cool season fescues require more supplemental water than nearly any other landscape plant and is often given much more water than it needs. More water is used on Western landscapes than in Western homes, yet people in the West cling to the lawn as a major aesthetic element in the landscape.

If landscapes were devised using designs that are informed by the principles of the Savanna hypothesis (allowing for open views and incorporating

areas of refuge), the specific plant material or landscape element used in implementing those designs would be less important than that “Savanna-like” sense of openness they are able to convey. This gives the designer the independence (and the responsibility) to make plant selections that are more suited to the region where a project site is located.

Making use of lawn alternatives or using less lawn answers only a portion of a much larger issue. The concern of water use in the arid West is a dilemma that will, no doubt, be here as long as people are. Conserving water by using less lawn, in the traditional sense, is one comparatively painless approach to help with this dilemma. America’s attachment to its lawns is deeply rooted in its history and this connection has developed over many generations. Because of this, it is a tremendous design challenge to attempt to establish some kind of alternative. A change in preference toward landscapes that celebrate unique nature of each region is not something that will happen quickly in this country. David Orr alluded to this process when he stated:

Every human culture that has artfully added itself to challenges and opportunities of a particular landscape has done so by the patient and painstaking accumulation of knowledge over many generations; an age-long effort to fit close and ever closer into a particular place (Orr, 2002).

Americans, for the most part, have taken a very different approach to their landscapes, imposing what they want on the land rather than being sensitive to what it affords them. The vast amount of lawn covering this country, especially in the arid West, attests to that.

In the same vein, Orr states, “At a deeper level the issue has to do with art and beauty. In the largest sense, what we must do to ensure tenure on the earth is to cultivate a new standard that defines beauty as that which causes no ugliness somewhere else or at some later time.” (Orr, 2002). It has been the goal of this research to, in part, discover what people think is “beautiful” or preferable. This information then establishes the basis from which those involved in any kind of landscape development may begin to push the boundaries of landscapes back into the envelope that is set by the resources found in their regions.

Conclusions from the Data

The data from the survey shows that preferences toward the front yard lawn vary widely. The images of yards from 25% lawn to 75% lawn all received positive votes. The 100% lawn images received very few positive votes in any of the categories tested. This suggests that there is no single percentage category that defines the overall preference of Utah residents but rather a range of preference that varies to fit the needs of individual homeowners. One trend that is seen in the data is that when the lawn approaches 100% of yard space peoples’ visual and maintenance preference for the landscape drop off significantly.

Although preferences were seen to cluster around 25% to 75% lawn they were split between visual and maintenance/ownership preferences. In terms of visual preference, the majority of the subjects would rather look at yards with

around 25% lawn. This type of landscape offers a visually complex site with the bulk of the designed space being taken up by trees, shrubs, flowers and possibly other landscape elements like paths or patios. The data also suggests that age plays some role in visual preference. Generation Xers (26 to 45 years old) prefer less lawn - around 25% lawn - than those in Generation Y (18 to 25 years old), who liked around 50%. The Boomers' (46 to 69 years old) visual preferences were split between 25% and 50% lawn. The visual preferences of the gender and property value groups fell within the 25% to 75% lawn range. Maintenance issues were cited as a compelling factor for those people who did not like the 25% lawn images. This could be attributed to the fact that most Americans are familiar with yards that contain abundant lawn, but not accustomed to the maintenance practices associated with shrubs, trees and other herbaceous plants. Part of the concern over maintenance issues that the 25% designs raised may be rooted in a fear that taking care of other types of plants would take too much time as seen in answers to question five.

The data shows that the majority of the maintenance and ownership preferences are gathered around the 50% and 75% images. This type of landscape appears to provide the appeal of having enough complexity to be visually stimulating and not too much lawn to be boring. Also, people may prefer these landscapes because they feel more confident in maintaining lawn than other landscape plants. Question five asked interviewees what would prevent them from having their preferred landscape. Maintenance know-how was cited by 20.2% as a deterrent to having their preferred yard. Question four shows that

75.6% of people would like to decrease the lawn in their yards and question six shows that 45.8% of the subjects, when looking for a new house, would buy one with less lawn than they now have. These responses support the concept that there comes a point where the lawn takes up too much of a yard and preference drops off, even from a maintenance standpoint. The shift in preference toward 50% to 75% lawn when discussing maintenance issues is prevalent across all groups: age, gender and property value.

Increased education may prove to be an important key in changing preferences toward lawn. If citizens of a region knew more about water use issues in their area they would perhaps be more inclined to take those into account when making a decision regarding what kind of landscape to buy or maintain. Greater education about the volume and implications of the lawn's water requirements could lead to people choosing to remove lawn in favor of other landscape elements while being more conscious about how they water the lawn that they have. Also, if people were more familiar with maintenance practices of non-lawn plant materials they may feel more comfortable installing yards that use these alternative plant varieties and that would also more closely reflect their visual preferences more closely. The more people interact with landscapes that have less lawn the more familiar they would be with them which, in turn, could lead to greater preference for them. These ideas go beyond the scope of this thesis and further research would be needed to validate them.

CHAPTER ELEVEN

PRACTICAL APPLICATION

Because human beings are varied and diverse it is hard, if not impossible, to create generalizations that fit with all people and in all situations. The best way to discover and record general trends among people is to find a variety of subjects that will represent the public as a whole. The larger the sample and the more random the selection the more representative the data collected from that sample will be. The more representative the data is the more one can rely on it for prescriptive measures. If the data does not show high representation of the public in one way or another the data is more suggestive in nature and would need further research to draw prescriptive conclusions. Such is the case with this thesis. The data gathered from the 49 subjects however, does raise many important questions. While the sample may not be large enough to yield data upon which such things as public mandates could be set, it does offer a starting point from which one could launch deeper into the topic.

Guidelines for Land Developers and Landscape Designers

As intended, the data gathered can inform guidelines for land developers and landscape designers. The data strongly suggests that as the percentage of lawn nears 100% the preference for the landscape drops significantly. Also, the more lawn a landscape has the more water it will need to use and the more chemicals it will require to remain healthy amidst resource budget the West has

to offer. It is common, not only in the arid west but all over the nation, for suburban housing developments to be built with landscapes that are planted with only lawn. This approach is very inexpensive when looking at the initial installation costs, but over a number of years lawn proves to be very expensive to maintain. Between water bills and water use the strain on monetary and regional water supplies would be much less if this practice was not continued. Most importantly, the data gathered by the survey found that people do not prefer this type of landscape visually or when considering maintenance issues. Land developers and landscape designers should not make landscapes with high percentages of traditional lawns in the arid West. They use too much water and people don't like them.

Question six of the survey further supports this idea. It was found that when people in the SLC Metro area are looking for a new home 45.8% of them will be looking for a home with less lawn than they currently have. This suggests that the amount of lawn in a yard has an influence on nearly half of those who are in the market for a home. From this research it has been shown that a landscape that has between 25% to 75% lawn would sell better initially and satisfy the preferences of the homeowner. Developers, homeowners and local water resources would all be better off if this was always the approach.

Landscape designers and land developers have both the opportunity and responsibility to get creative with other landscape elements that could replace traditional lawns. These professionals need to ask themselves what other elements are available to them that would serve the same purposes. Another

approach is to establish a water budget that is responsive to the site's precipitation, hydrology and soils. The designer would then need to create the landscape so it fit in that water budget. This would inspire landscape professionals to scrutinize their use of lawns and look for other elements that may suit the same purposes.

Guidelines for Municipalities

Water use is a big issue for many municipalities in the arid West especially in areas that are growing quickly like Utah and Nevada. Some are taking measures to conserve their water resources with marked success. In July 1992 the city of Las Vegas passed ordinance 30.64.030 outlining many new landscaping regulations. Section j. of that ordinance addresses the use of turf in a number of different applications. It restricts lawns in residential front yards to 50% of the total landscaped area and turf areas on commercial grounds to 30% (Clark Co. Comprehensive Planning, 2004). In response to the new ordinance the Southern Nevada Water Authority has launched an extensive public awareness and education campaign called "Water Smart" which includes a yearly water wise landscape competition, water wise hotline, and financial incentives for replacing lawn with other more xeric plant material (Southern Nevada Water Authority, 2004). While Nevada remains a state with one of the highest per capita water consumption rates in the nation (Utah River Council, 2004), steps like these will inevitably help to ease the demands that the growing population will make on local water resources.

The data from the survey suggest that if a municipality was to install a cap on the percentage of lawn residents could have in their front yards that fell within the 25% to 75% lawn range they would be able to reduce the amount of water used on lawns and allow people to have a yard that fits or comes close to their preferences. To reduce the amount of lawn even further to around 20% to 30% visual preference would be higher than maintenance preference. This is assuming that people's maintenance preferences would not change. It is reasonable, though, to assume that as people become more familiar with the maintenance practices associated with planting beds that their preferences may shift toward landscapes with less lawn.

Another way for states that have water use/supply conflicts to promote more water conservation in built landscapes is to reward those who conserve. A state could offer tax breaks for new development that proposes to use less lawn and incorporate water wise landscape materials. A program like this could even weight rewards toward those who use the least water. A state could also offer to reimburse homeowners for the expense of removing lawns and replacing them with xeric landscapes, much like what Nevada has done. The Southern Nevada Water Authority offers to pay homeowners one dollar for every square foot of lawn that is removed and replaced with xeric plant materials (Southern Nevada Water Authority, 2004).

The International Turf Producers Foundation offers the idea of establishing a "water budget" for city water users where the price of their water is determined by usage tiers. Water prices would be normal to a certain point then would jump

for every unit used beyond that point. They say that this approach allows the consumer the freedom to choose where they want to use their water without imposing a variety of restrictions on the type of plants they use (ITPF, 2005).

Holding water wise landscape competitions is another way that a state, county or city could promote water conservation. An added benefit to this approach is that it could encourage people to create landscapes that reflect the native landscapes in which they live. Out of this kind of activity may come a greater identity with arid landscapes of the West and an increased a sense of place. Municipalities in desert states need to completely remove any laws that require the use of lawns. Laws that mandate the use of traditional lawns are counterproductive in the pursuit of water conservation.

Professional Advice for Homeowners

Design and land development professionals are a major source of information for lay homeowners in the area of water conservation in built landscapes. Because of this, landscape practitioners in arid regions have a unique opportunity to aid in educating the public on reasons for using less traditional lawn and conserving water. For instance, the data from the survey shows that 45.8% of people looking for a new home, are looking for one with less lawn and that 75.6% of people would like to reduce the amount of lawn in their front yards.

Other research shows that property values are affected by visually pleasing landscaping. A study conducted in Quebec Canada found the relative market values of many different landscape elements. The overall conclusion said that good landscaping increases the market value of a home but some elements are more valuable than others. They note that a landscaped patio increased the market value of a home by 12.4%. A hedge increased home value between 3.6% and 3.9%. The research showed that a landscaped parking strip or “curb” increased property value by 4.4% (Rosiers, 2002). These findings support the notion that a landscape should not be filled with a high percentage of lawn because it could lead to a decreased market value of the home.

Question five shows that while the time required for landscape maintenance was recorded as a factor in people’s landscape preferences it received the least votes out of the choices offered. Also, when looking at the time required maintaining landscapes on a minutes-per-square foot basis, lawns and tree/shrub beds require the same amount of time over the growing season (McManus, 2004). The pattern of maintenance is different though. Lawns require short but frequent maintenance visits over the growing season. Shrub and tree plantings require two to three maintenance visits over the entire year, but each visit is substantially longer than those performed on lawns (McManus, 2004). This would suggest that if Americans were to replace many of their traditional lawns with planting beds they would not necessarily be spending more time out in the yard maintaining it. It does mean, though, that they would have to

become more familiar with the maintenance practices associated with planting beds, namely, pruning and herbaceous plant care.

CHAPTER TWELVE

FURTHER RESEARCH

Is it the grass? Could another landscape element fit the preference for lawn? Lawns provide an open simple look that is found in savanna type landscapes. They give the eye a break or a place to rest from the complexities of other landscape elements. There are other landscape elements and materials that have a similar form to that of a lawn. Mat-like and leafy groundcovers, beds of meadow grass, beds of gravel or rolled stone, or even hard surfaces like patios or porches connected by paths could provide the same openness and accessibility that lawns do. Further research could be conducted to test people's preferences toward these other landscape elements compared to preferences toward lawns. This type of research could determine if people prefer the particular plant species that are used for lawns or if they would prefer some other plant or element that has a similar form.

Another alley that could be explored would be to find out if there is a preference for a particular grass species. There are many grasses that are more acclimated to the arid West and require substantially less water than the traditional Kentucky bluegrass lawn does. Bermudagrass, Buffalograss, Blue Grama Grass and Tall Fescues have all been successfully used to make more

xeric lawns. While these species have the positive of low water use they have other characteristics that some may not find so appealing. Some of these alternatives “green up” later in the spring than traditional cool season grasses and often brown out during the hottest parts of the summer following the natural drought/rain cycles of the region in which they are growing (Turf Resource Center, 2005). These “lawn alternatives” could be used in much the same way traditional lawns of Kentucky bluegrass and Ryegrass are used. The traditional lawn is just the default element that Americans have used for many years. So, do people prefer Kentucky bluegrass over other species? Would the characteristics that make other grasses more drought resistant be too much of a visual deterrent that people would not prefer them? Would that opinion change with education on water issues and plant water use?

The sample in this survey was taken from the Salt Lake City Metropolitan area. This is only one of many metropolitan areas in arid parts of the country. To gain a greater understanding of peoples’ preferences of lawn in the arid West it would be of great worth to duplicate this study in other parts of the country. For instance, the Southwest states, where the summer heat makes it very difficult to maintain a lawn, could be interviewed. Other major metropolitan areas – such as Phoenix, Las Vegas, Denver and Albuquerque - could be examined. Many of the states in the West have water resources that are strained because of population growth and increased demand for water. It would also be valuable to survey individuals in the Mid West or Eastern United States where annual precipitation rates are much higher than those in the West. Studying “wetter” areas like these

could provide a control group to compare the data gathered from Western states. To study each of these regions may produce data that could lead to solutions that would be specific to their regions.

Repeating the study in Utah with a larger sample could prove to be valuable. The size of the sample in “Questioning the Use of Lawn in the Arid West” and the methods of obtaining the sample make the study more suggestive than prescriptive. A larger sample of 200 to 300 individuals, which are collected randomly, could produce more conclusive data.

The survey in “Questioning the Use of Lawn in the Arid West” focuses on visual and maintenance preferences toward the traditional lawn. There are also many costs involved in maintaining this type of lawn in the West. Comparing the water use and dollar costs of the traditional lawn to that consumed by beds of more xeric plant materials would greatly strengthen this research. One study, analyzing water use of turf on the campus of Washington State University - Pullman, selected three large turf beds as case studies. This study found that nearly 200,000 gallons of water is applied annually to these areas alone (Dildine, 2004). The tested areas accounted for just over 70,000 square feet of the total campus grounds. The study went on to calculate the costs of converting turf beds to xeric landscaping. On average the cost of conversion was \$0.53 per square foot (Dildine, 2004). The water use of the xeric landscape was then calculated and water savings were derived. It was found that the university could save an average of 24.2 gallons of water per square foot per year on grounds converted from lawn to xeric landscaping (Dildine, 2004). The study says that

savings in water use are dependant on irrigation system design, soil conditions, slope gradient and aspect and visibility of the site. A study could be conducted that combined visual preference testing along with an educational section on the monetary costs of lawns and the savings associated with low water-use landscaping. Preference for lawns could be tested before and after the educational segment was presented. This approach could test the impacts of education on preference toward lawns. That information could then be used by municipalities to determine how much they could spend on public education on water conservation.

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APPENDIX

RESEARCH MATERIALS

A. Verbal Consent Script

**Thesis – David A. Shaw
11-04**

Verbal Consent Script:

The researcher will say the following to each subject before the interview is begun:

“I am asking you to volunteer to take part in an anonymous research study. You can choose whether you want to take part in it or not. This is a one-time interview and should take between 15 and 30 minutes. You will be asked to rank images of residential front yards according to your preferences. You will then be asked to give some personal information so I can look for changes in preference over a variety of perimeters. Questions will include topics such as: age, gender, value of current home, changes in landscape preferences, etc. You have the right to forgo the interview process at any time during the interview if you feel infringed upon in any way. You have the right to not answer a question during the interview. You have the right to ask me any questions you may have about the research process. You have the right to accept or reject any compensation provided. If you have questions about your rights as a volunteer I will provide you with contact information for the WSU Institutional Review Board.

The possible risks of being involved in this study could be stress or being uncomfortable answering some of the questions and/or stress over a change in your normal routine due to time taken for the interview. Also the interview process itself may make you feel uncomfortable. The interview is designed to not be any more stressful than anything a person would experience in everyday life. The purpose of this study is to gain an understanding of personal preferences about the percentage of lawn that people like in their front yards. This study could act as a guide for design professionals to know better what the public is looking for. ”

“Do you have any questions about the study?”

“Do you consent to volunteer to take part in this anonymous study?”

WSU Institutional Review Board at (509)335-9661

B. Questionnaire Worksheet

Questionnaire

David Shaw
November 2004
MSLA, WSU

Participant information:

Age: _____

Date: _____

Gender: Male Female

City of residence: _____

Estimated sale price range of current residence:

- a. \$100,000 and below
- b. \$100,000 - \$150,000
- c. \$150,000 - \$200,000
- d. \$200,000 - \$250,000
- e. \$250,000 - \$300,000
- f. \$300,000 - \$350,000
- g. \$350,000 - \$400,000
- h. \$400,000 and up

Worksheet

The following worksheet is for ranking the images provided based on your personal preferences. These front yards are a typical representation of front yards in America. They are intended to be visual in function and act as an accent to the home. Please assume that these spaces are not designed to be used for gathering, picnic, play, etc. These spaces are designed to be a visual accent to the front of the home.

Instructions:

For this section you will be provided images of homes with five different front yards. In column A please rank the images based on your visual preference only (which ones look the best to you) with 1 being your favorite and 5 being your least favorite. In column B rank the images based on what you would like to own and maintain. In column C rank the images again after seeing the annual cost analysis over a ten-year life span.

House A:

Visual Preference	What would you like to own and maintain?
1.	1.
2.	2.
3.	3.
4.	4.

House B:

Visual Preference	What would you like to own and maintain?
1.	1.
2.	2.
3.	3.
4.	4.

Questionnaire:

The following questions are designed to gauge personal preferences concerning lawn areas that are purely aesthetic (visual in function only, not used for gathering, picnic, play, etc.). This type of lawn is usually found in residential front yards and around commercial buildings as a visual accent to the building and not intended for any functional use. Please apply the answers to these questions to this type of lawn only.

1. Does your current front yard fit your personal preferences?

Yes or No

2. If your answer to question 1. is "Yes" then what % of your front yard would you *estimate* is covered in lawn?

3. If your answer to question 1. is "No" then what % of your front yard would you *estimate* is covered in lawn and what would you change that percentage to?

4. If you were able to change your front yard in any way, which of the following approaches would you take? **45 Answers**

a. Would you remove lawn area and replace it with trees, shrubs and/or flower?

75.6%

b. Would you remove trees, shrubs and/or flower and replace them with more lawn area?

24.4%

5. Which of the following factors would prevent you from having your preferred front yard? Circle all that apply to you. **94 Answers**
- a. The time required to remodel **26.6%**
 - b. The expense of remodeling **35.1%**
 - c. Time of maintenance of the new landscape **18.1%**
 - d. The maintenance know-how (i.e.: pruning, mowing, fertilizing, etc.) of the new landscape **20.2%**
6. When looking for a new home what type of yard do you look for in comparison to the yard at your current residence? **48 Answers**
- a. One with more lawn area than you currently have? **22.9%**
 - b. One with less lawn (i.e.: more trees, shrubs, paths, and/or flowers) than you currently have? **45.8%**
 - c. The yard does not have much influence on your decision because you would change it as you have indicated in question 4 anyway. **31.3%**
7. When thinking specifically about the front lawn as a landscape element, how has your preference for it changed over time? **48 Answers**
- a. My preference for front lawn has *not* changed. **31.3%**
 - b. I prefer less lawn in the front yard and more trees, shrubs, paths, and or flowers now than I used to. **56.3%**
 - c. I prefer more lawn in the front yard now than I used to. **12.5%**
8. If your answer to question 7. was "b" or "c" which of the following factors have most influenced that change in preference? Circle all that apply to you. **62 Answers**
- a. Maintenance issues **24.2%**
 - b. Visual preferences **38.7%**
 - c. Costs of yard care **12.9%**
 - d. Concerns about landscape water use **19.4%**
 - e. Other _____ **4.8%**

C. House A Images





D. House B Images



B3



B4

