



**Annotated Bibliography,**

**Literature Review for Project Greenscape:**

**Human Perceptions of Lawns and Landscapes**

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## **Project Overview and Summary<sup>1</sup>**

The health and overall quality of coastal waters has a direct effect on the economic and environmental wellbeing of community members. One of the major factors affecting the health of Florida's coasts is the use of fertilizers and pesticides. During the peak of the recent housing and development boom in Florida, many cities and counties throughout the state experienced severely declining water quality and began to seriously consider ways that it could be improved through public education as well as through the implementation of fertilizer use ordinances. The deleterious effects of certain land-use practices, specifically landscaping with chemical inputs, on water quality is well accepted among environmental groups, yet the reasons that people make the choices they do about their landscaping practices is little understood by resource managers and environmental educators.

Agencies, organizations and advocacy groups in the U.S. spend millions of dollars researching water quality impacts and educating people about best practices. The goal of this research was to seek information about cultural values, attitudes, and behaviors driving the choices people make for overall maintenance of lawns and landscapes. The research was commissioned by the Rookery Bay National Estuarine Research Reserve, Coastal Training Program as part of their collaborative educational effort with the City of Naples and Collier County to promote sustainable landscaping in Southwest Florida.

### **Research Methods**

The literature search focused on human perceptions, uses and cultural beliefs regarding lawns and landscapes, with some specific research on water use and fertilizer practices. Databases used for the searches were Academic One, Wilson, GeoRef, and Google Scholar. Key search terms and phrases included: lawns, cultural landscapes, landscape aesthetics, urban landscapes, cultural practices, and fertilizer. Some common combinations of terms included: "cultural values and lawns;" "cultural factors and turfgrass;" and "landscapes and turf management practices." Research assistants Cory Mills and Lance Anderson were trained in the desired approaches for creating the abstracts and were assigned specific articles to review.

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<sup>1</sup> The authors would like to thank FGCU Dean Donna Henry, as well as Rookery Bay Coastal Managers Tabitha Stadler, Alberto Chavez, and Renee Wilson for their support in the completion of this project.

As noted by Research Associate, Maya Fischhoff with the Environmental Science and Policy Program at Michigan State University (E-Anth Archives, 2007), the science of turfgrass management rarely crosses paths with researchers who focus on the cultural aspects and history of lawns in Western Culture such as Cultural Geographer Paul Robbins, or Environmental Historian Ted Steinberg. This annotated bibliography is a collection of synopses of articles regarding the history of lawns, cultural aspects of lawns, and urban landscapes in relationship to environmental quality and natural resource management. In addition to academic articles and a few books, some particularly relevant technical reports are included that may provide insight to resource managers working in training and public education related to environmentally sustainable landscaping practices. The goal of this work is to provide in a condensed format a review of the literature that will yield new insights, as well as models of research based on qualitative and quantitative methods, that will be useful for use as training tools and for future studies.

### **History of Lawns**

As long as 5000 years ago, lawns were a part of the Chinese landscape (Kendig and Buck, 1986). Evidence suggests that ancient Mesoamericans had lawns in city complexes; small patches of grassy areas were even found among indigenous Mohawk villages in the northeastern United States (ibid). Yet, most historians and scholars of urban landscapes trace the origins of lawns to Europe and link it with upper class prestige, a concept imported from England to New England symbolizing higher status and purity (Jenkins, 1994; Steinberg, 2005). One of the ways in which they symbolized prestige were in their separation from food producing fields, which were associated with peasants, who were of lower classes (Kendig and Buck 1986). A number of other factors contributed to Americans' fixation on lush green lawns. Historian Ted Steinberg (2005) and author Virginia Scott Jenkins (1994) explain that various perceptions of lawns are based on imported traditions associated with early domestic life in Europe, such as the desire to flaunt social status. Lawns, they describe, are connected with the development of public water supplies and various innovations such as the hand pushed lawn mower, rubber hoses and sprinklers. Jenkins and others also tie the American tradition of lawns to the growth of golf courses and the associated marketing of grasses, in part undertaken by the United States Department of Agriculture. Some of the references reviewed, such as *Lawn People* (Robbins, 2007) and *The Lawn, a History of an American Obsession* (Jenkins 1994), document the suburbanization of America. Although this research draws on sources from Canada, Europe and some indigenous cultures, the focus is primarily on the U.S.

Some scholars, in particular John Falk, look for evolutionary reasons for humans' preference for open grasslands. Falk argues that since *Homo sapiens* have lived in open grasslands for at least 200,000 years of our existence, an innate preference for lawns is a biological adaptation to open grasslands that developed to more easily detect predators and locate more game animals (Falk and Balling 2009). Wagner (2008) notes that Europeans converted natural grasslands to agricultural lands, eventually displacing indigenous peoples from their sense of place and connection to their environments. This type of displacement may also result in the destabilization of communities and erosion of culture, as is demonstrated in one article about sense of place in the American South (Johnson and Zipper, 2007).

### **Cultural Values**

The typical cultural value that most people associate with lush green front lawns is that of status (Steinberg, 2005). However, much of the research shows that people actually feel it is their civic duty to maintain their lawns and that a sense of family and community is upheld when they maintain quality homogenous lawns (Robbins 2007, Robbins and Sharp, 2003). It is believed that the lawn symbolizes purity and morality and serves as a "performance space" (Moran, 2008) by allowing others to see one working in one's yard. Despite the reliance of most lawns on fertilizers and pesticides, many studies indicate that residents associate lawns with nature and feel that they are closer to nature by having well-maintained lawns. Some studies show a residents' preference to be near natural wooded areas, yet most residents do not prefer "naturalized" or lawn alternatives with minimal grass. Those who prefer lawn alternatives are often viewed as lacking in morality, lazy, and even disruptive to law and order (Feagan and Ripmeester, 2001).

More than one study revealed that a longer residence in one area tends to promote more connection with the natural environment of the region (Brody and Alston, 2004; Robbins and Berkenholtz, 2003), and often less turf utilization and more Best Management Practices, such as lawn-alternatives or naturalized lawns as well as the use of native plants and trees. Marketing strategies have tended to create and reinforce a notion of an American culture that appears visibly homogenous, despite differences in ethnicities. In residential yards, the display of lawn maintenance activities through the use of lawn mowers and other machinery has been associated with masculinity, in part due to the marketing of lawn equipment (Hutchinson, 2008).

### **Environmental Values**

A sampling of literature of environmental values and behavior showed that a relationship between higher levels of income and education coincided with people being more environmentally aware. Yet, interestingly, this population is more likely to use chemicals on their lawns (Robbins, 2007; Robbins and Berkenholtz, 2003). Therefore, the expected scenario that more highly educated individuals would use less environmentally destructive practices was not confirmed. Instead, more than one research article showed that those who claimed environmental awareness did not have less impact on the environment. One article notes the role of higher institutions in creating environmental education and modeling environmentally sustainable behavior and suggests that these institutions promote “faulty cultural models” because they, themselves portray large expanses of green turf as healthy campus landscapes (Thomson and Green, 2006). Therefore, the change in environmental values, they argue must begin with college campuses. None of the research discussed the role of children and transmission of environmental behavior concerning residential lawns. Some of the literature mentioned the function of front lawns as places where people could display their connections to community and family. None of the literature was reviewed or discovered that specifically addressed differences in ethnicities among Americans, other than to indicate some contrasts with indigenous practices.

### **Fertilizer**

Several of the articles demonstrated that residents, and sometimes professional lawn maintenance companies, over-fertilize lawns or fertilize during the wrong seasons (Osmund and Hardy, 2004; Market Insight 2009). Focus groups conducted in Florida revealed that residents were resistant to a number of advertising concepts used by water management districts to attempt to educate and convince homeowners to fertilize during appropriate seasons, and not during summer months (Market Insight 2009). Some residents were quite vocal about their disbelief in the affects runoff has on the local ecosystem. “Cultural practices” is a term used in the crop science literature that refers to maintenance activities conducted by humans, which may include mowing, fertilization, irrigation, planting and plant selection (Busey and Johnston, 2006). Although only a few of these scientific sources were reviewed, the consensus between crop and agricultural scientists seems to be that grasses and yards cannot be weed-free with merely the use of cultural practices, coupled with the absence of pesticides and herbicides. In other words, the science has shown that for most residential grasses, it is necessary to apply pesticides to maintain the weed-free homogenous look desired by most Americans.

## **Water conservation**

Between 1970 and 1995 in the state of Florida, “public-supply water withdrawals increased 135%” (Haley, Dukes and Miller, 2007). Water use has continued to accelerate rapidly. Earlier studies found that the majority of private homeowners overwater their lawns, well above the minimum requirement to maintain an ideal lawn. Approximately 61% to 64% of all residential water is used for irrigation (ibid).<sup>2</sup> Sources on water conservation have shown that traditional marketing techniques such as the distribution of pamphlets have been ineffective in changing behavior. Some reports from focus groups conducted in Florida indicate that the concept of water conservation seems very difficult to convey, primarily because of the desire for green lawns year round. They also indicate that this perception is also due to a lack of understanding of the process of water waste and drainage moving into the watershed (Moran 2008). Research has shown that irrigated yards tend to use more water than those with hand held sprinklers (Haley, Dukes and Miller 2007). Although few sources were found that specifically looked at attitudes toward water conservation regarding irrigation, one study conducted in Toronto yielded interesting results concerning a strategy of having students ride bicycles around neighborhoods and talk to people about water conservation. This marketing technique resulted in reduced water consumption by 54%, as compared with a 15% increase in water usage among those who received informational flyers (Feagan and Ripmeester, 2001).

## **Conclusion**

Marvin Harris, a well-known anthropological theorist and proponent of a school of thought called “cultural materialism” believed that culture is an artifact of technological means. He drew on Marxist notions that the production of labor reproduced societal traits. In other words, systems of production, or the ways in which people conduct their everyday lives and meet everyday needs, are the drivers of cultural models and behaviors (McGee and Warms 2008). Much of the in-depth research on attitudes and behaviors concerning lawns has shown that identifying oneself as being environmentally conscious or aware does not necessarily lead to environmentally friendly behavior.

In the cultural materialist view, the current economic recession would be the primary driver of changes in cultural values and behaviors. As Americans find themselves having to make choices regarding family budget cutbacks, perhaps the timing is right to introduce lawn-alternatives under the realm of possibilities for ways to meet overall economic needs, thus ultimately leading to more acceptance of

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<sup>2</sup> None of the materials other than Moran discussed grey water. Many of the research articles did not specify whether “household water use” included irrigation water.

lawn-alternatives among struggling families and homeowner associations. As demand for polluting lawn care products diminishes, the lawn-care industry will need to provide alternatives, such as low maintenance, drought tolerant plants, and non-invasive ground covers.

Some gaps identified by the research include the lack of qualitative data on cultural values of American residential landscapes, and studies of urban landscapes with stratification according to age, gender, and ethnicity. Virtually no research was discovered that focused on transmission of knowledge regarding landscaping practices from parents to children. Further, little research and education that actually models sustainable or lawn-alternatives has been conducted on college campuses.

Future research using mixed methods such as those developed by Robbins, as well as purely qualitative and ethnographic studies would likely yield useful insights into new paths for educators regarding sustainable landscaping practices. The strategy used by Market Insight in which focus group studies were not informed of the sponsor, seemed to yield more honest feedback from participants than other focus group studies where the sponsors, usually resource managers were identified. Further, research is lacking on professional landscapers, including company owners, managers, and employees, yet it is essential that more research is conducted with this group in order to understand this complex dynamic and ultimately change behavior.

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## Annotated Bibliography: Human perceptions of lawns and landscape

### Academic Articles

#### **Brody, Samuel D., Wes Highfield and Letitia Alston**

2004. Does Location Matter? Measuring Environmental Perceptions of Creeks in Two San Antonio Watersheds. *Environment and Behavior*. Vol. 36, No. 2: 229-250.

This research utilized Geographic Information Systems (GIS) in order to collect quantitative data on how location and proximity affects environmental perceptions. Previously, the field of environmental psychology based similar research designs on socioeconomic or demographic factors. The authors contend that knowledge of and support for protecting landscape features are also influenced significantly by one's location, setting and nearness to such natural features. The geographic variables included driving distance, land use and land cover. Driving distance from residence to the creeks was shown to have a direct correlation with how familiar respondents were with them, as well as their views on the water quality and safety of those waterways. The sample selection of 1,005 geocoded (using GIS) respondents was drawn from an initial random sample of 4000 households contacted by telephone surveys based on addresses.

The report begins with a review of past literature on environmental perceptions based on socioeconomic data and reveals some of the limitations of those research models. The inclusion of proximity data obtained with GIS is shown to augment previous research methods and provides quantitative precision and a broader range of insight into public perceptions. Gender, education and income were shown to affect attitudes toward the creeks in question. Of particular interest for Florida, the length of stay or "tenure" has also been linked to an increase in awareness and growing connection with the physical environment (235). Details of research methods employed are provided here. These multi-faceted GIS-inclusive methods should provide valuable tools for policy and public education. "Examining how the mosaic of interaction among residents in specific locations or neighborhoods contributes to collective environmental awareness may further increase our ability to explain environmental perceptions in general" (245).

Key words: environmental psychology; geographic information systems (GIS); environmental perceptions; watersheds; proximity; Texas

#### **Busey, Philip, and Diane Johnston**

2006. Impact of Cultural Factors on Weed Populations in St. Augustine Grass Turf. *Weed Science*. Vol. 54: 961-967.

This article covers an experiment, which determined weed populations on turf that was exposed to varying levels of cultural interactions, irrigation, fertilization and mowing. Patches of turfgrass and dollarweed were allotted one of three levels of irrigation: daily, conditional weekly or only when severely wilted. Patches were fertilized at varying frequencies: high medium and low. Each week every section of the turf was mowed to one of three heights. Samples of turf were extracted every year, the quality of the grass was evaluated, and then the turf was divided into St. Augustine grass, dollarweed and other weeds, dried and weighed.

It was found that turf watered daily had higher quantities of dollarweed than the severely wilted turf. However, the wilted turf had higher quantities of other weeds than the turf that was watered daily. Further

fertilization frequency did not have a dramatic effect on the prevalence of dollarweed, but areas frequently fertilized had slightly lower levels of weed population than areas fertilized less frequently. Also, mowing seemed to have little effect on dollarweed populations, but the turf that was maintained at the highest level did have slightly higher quantities of other weeds. Finally, none of the grass samples were determined to be of acceptable quality, although the best turf grass was from the sample that received the highest amount of water, fertilizer and had the lowest height during mowing.

Key words: IPM, lawn, turf, St. Augustinegrass, irrigation, fertilization

**Catron, Philip**

1996. Fighting Clean, Green in Modern Turf Wars. Forum for Applied Research and Public Policy. Vol. 11: 72-75.

This article discusses the American lawn over the last twenty years, which has been dominated by a one size fits all approach to lawn-care, and brings to light the organic and natural methods of pest control, fertilization and fungus control. The author advises readers to change their perceptions towards their lawns.

Homeowners in America take great pride in the appearance of their home lawns. High expectations are placed on the homeowners to have lawns that will look manicured year-round and not interfere with the homeowner's personal and social pursuits. The lawn care industry and turf breeders were able to provide a home lawn that met consumer needs and required regular use of synthetic and biological agents, the result of which has been that during the past twenty years lawns have had to bear a heavy the weight of too much lawn care. Despite this, organic and natural methods of pest control have existed for decades and promote the use of integrated controls of coping with lawn issues and maintenance.

Keywords: Lawns, homeowners, homebuilders, chemical fertilizers, pesticides, fertilizers, lawn care industry, chemical bombardment, "green myth", integrated pest management, fungicide, organic lawn care, weed control.

**Cobern, Melissa K., Brian E. Porter, Frank C. Leeming and William O. Dwyer**

1995. The Effect of Commitment on Adoption and Diffusion of Grass Cycling. Environment and Behavior. Vol. 27: No. 2: 213.

This study is an assessment of how well the technique of grass-cycling is diffused between residents in designated test areas. Grass-cycling is a method of lawn care which promotes leaving grass clippings on the lawn, thereby eliminating the use of lawn trash bags which are then laid to waste in land fills. The test areas in this article were three similar suburbs of a large mid-southern city, two of which were adjacent to each other and the other three miles away. The three suburbs were divided as follows: the commitment group, commitment/agent group, and the control group. The study occurred in four stages; twelve weeks of investigation were followed by a final four-week investigation one year after the initial investigation. The experimenters of this investigation sought to determine the effectiveness of using a grass-cycling technique associated with home lawn maintenance. One goal was to determine if grass-cycling could be increased by obtaining written consent of homeowners in the assigned test areas. A second goal was to observe the effectiveness of change-agents within a community, which would allow researchers to determine how well the grass-cycling technique could be passed from residents acting as change-agents to their neighbors. Participants from the commitment/agent group were asked to both adopt the technique and promote it to their neighbors. Participants from the commitment only group were asked to give written commitment that they would only adopt the grass-cycling technique. While in the third group, (the control group), participants were not asked to do anything, but rather their behavior was juxtaposed against the two other groups of committed participants.

The data indicated lasting effects up to a year from the initial investigation for those residents in the commitment/agent group. The data from this group was consistent with previous studies on recruiting change agents as a means of diffusion, indicating a strong success rate of diffusion when individuals take on a greater degree of responsibility for a cause. Participants from the commitment only group did not show a great deal of difference from the control group, despite the written commitment to the researchers. The researchers postulate that the reason for the continued support of grass-cycling by the commitment/agent group is relative to the perceived cost-effectiveness associated with the new lawn maintenance technique. This leads the writers of this article to believe that the double-commitment intervention used in this study is an effective means of promoting significant behavioral change in a community.

Keywords: Grass-cycling , grass clippings, diffusion, pro-environmental behavior, change agents, cost effectiveness, behavior change, intervention.

**Feagan, Robert, and Michael Ripmeester**

2001. Reading Private Green Space: Competing Geographic Identities at the Level of the Lawn. *Philosophy & Geography*. Vol. 4, No.1.

This paper analyzes the differences between “*lawn dissenters*,” those who have yards landscaped with alternatives to lawns, and “*lawn keepers*,” those who have conventional lawns in Ontario, Canada. A review of the symbolism of lawns is provided, with some description of the ways in which lawns are sites of identity politics. Lawns are traditionally viewed as symbols of purity, and while those with alternative lawns have naturalization philosophies, they too consider their approach to be more pure. Twelve sites were selected; each had at least one lawn alternative. Qualitative interviews were conducted with individuals in each neighborhood that had the conventional lawns and with those who had installed lawn alternatives, or “naturalized” lawns.

The history of lawns is discussed briefly, tying the purity concept in North America to Andrew Jackson Downing and Thomas Jefferson. The origins of marketing concepts like “Lawns for Happier Living” and “A Good Lawn Builds Moral” were noted as related to institutions created in the late 1800s, such as the American Lawn Institute and the Professional Lawn Care Association of America.

The lawn is presented as a site of conflicts in identities and political ideology as illustrated in excerpts from interviews with lawn keepers and lawn dissenters. The lawn dissenters strongly felt that lawns contributed to environmental degradation and contamination, loss of biodiversity and other environmental problems. They articulated a strong concern for the environment and “sense of place” by connecting to native species planted in their yards, instead of lawns. They saw their yards as a site of potential community-building through naturalization. Lawn keepers, on the other hand, were appalled at the alternative lawns in their neighborhoods, and saw them as polluting, and disruptive of law and order. The alternative lawns represented lack of morality, laziness, irresponsibility, poverty and even selfishness. The authors note limitations of the research due to its short-term timeline and cite one neighborhood in the city of Toronto as an example of a region undergoing transformation to more acceptance of lawn alternatives because it already has 15- 20 % of naturalized front yards. They predict that change toward acceptance of lawn alternatives will occur, but do not suggest how fast or slow this might be.

Key words: naturalized lawns, lawn dissenters, lawn keepers, plant selection, identity, culture, symbolism, environmentalism

**Grove, J. Morgan and William R. Burch, Jr.**

1997. A Social Ecology Approach and Applications of Urban Ecosystem and Landscape Analyses: A Case Study of Baltimore, Maryland. *Urban Ecosystems*. Vol. 1: 259-275.

Urbanization became "recognized as a significant global, ecological trend" at first for vigorous growth, and currently because of a decline of population and economic strength, which has created systemic ecological concerns (259-260). An integrated approach to observation and analysis of urban ecosystems is presented by the authors, based on the idea of urban ecosystems being a type of biosocial system that is similar to other human ecological systems, but also possessing specific and unique properties. This analysis seeks to avoid the dichotomies of "human impact" (biological sciences) versus the "human-centered approach" (social sciences) by "treating this unique type of ecosystem in its own right as neither an aberration nor an evolutionary end point of nature" (271). While embracing seminal early twentieth century research models, the authors also include spatial heterogeneity of urban ecosystems in their integrated research methods, where cycles and flows of essential biological and social resources are examined (e.g. energy, nutrients, population, capital, labor, genetic data, materials). A basic question posed is how access to and control of resources affect the function and structure of urban ecosystems.

In this case-study a human ecosystem and landscape analysis of Baltimore, Maryland explored how social differentiation can be applied spatially at different scales. The Urban Resources Initiative (URI) was the organization with which the authors sought to link urban revitalization with environmental restoration. Geographic Information Systems (GIS) were utilized to create GIS databases for the Baltimore region, which were then integrated with ecosystem models to measure correlations between biophysical patterns and processes. Questions were developed and addressed such as, "Is soil erosion linked to human erosion (e.g. declines in nutrition, employment, housing, family structure, norms)?" (265). In other words, "How are the fortunes of people tied to the fortunes of place?" (Logan and Molotch 1987 in Grove and Burch).

The authors present different methods, techniques and tools for employing an integrated approach to urban research. In conclusion, they stress that the active participation of local people is "critical to the success of any study" in that local knowledge typically improves research and locals' involvement can ensure that results are useful to their needs since "an ultimate goal of research is to improve the social well-being of the people who are affected by the research" (270).

Key Words: human ecology; social ecology; urban; human; urban ecosystems; landscape.

**Henderson, Scott P.B., Perkins, Nathan H., and Maurice Nelischer**

1998. Residential Lawn Alternatives: A Study of Their Distribution, Form and Structure. *Landscape and Urban Planning*. Vol. 42: 135-145.

This article discusses the factors that appear to be the largest influence on homeowners' landscaping decisions. The study is concerned with the pervasive question regarding why homeowners choose traditional turf grass residential lawns over less destructive lawn alternatives. A homeowner's preference for residential lawns is often a reflection of the homeowner's own willingness to conform to the collective image, despite the associated high cost, both ecologically and financially. In response to the high costs and negative environmental effects associated with having a lawn of turf grass, a movement towards lawn alternatives has been promoted. However, the reasons for adopting the lawn alternative remain highly anecdotal. This study sought to find what factors may influence the alternative adoption by documenting the location and characteristics of the lawn alternatives. A total of 295 lawns, a 1.5 % sample of all front yards in Guelph, Ontario were surveyed. Findings suggest that lawn alternatives were primarily clustered in older neighborhoods with established mature trees, small lots and in some cases terrain making turf grass care difficult.

One factor considered during the process was how the environmental factors or physical characteristics of a lot have an influence on the adoption process. The assumption was that any similarities would elucidate the social and cultural bias against and for lawn alternatives. Analysis of the research was directed at three levels; citywide patterns, neighborhood characteristics and residential lot characteristics. The distribution of lawn alternatives was influenced by processes working at several scales, including changes in method of residential development and street type. For the purposes of the study, "lawn alternative" was defined as a yard that included less than 40% turf cover. The study assumes that since most cities and suburbs in North America are structured similarly, the same distribution of lawn alternatives occurs in other cities throughout North America. The study analyzes the physical environment primarily, but includes other factors that may influence the homeowner's choices. The study indicates that physical factors, including the variation between areas and over time, have a considerable influence over the homeowners' decisions regarding the adoption of lawn alternatives. Therefore, the authors assume that an assessment of the physical factors of lawn alternatives would lead to a better understanding of cultural preferences.

Key words: Lawn alternatives, Ontario, adoption of lawn alternatives, characteristics of homeowners, Andrew Jackson Downing, Frank J. Scott, Fredrick Law Olmsted, Frank A. Waugh, Sub-urban landscape, turf grass, Foundation planting, landscape preference, Nassauer, ecological integrity, ecological awareness, urban ecological health.

### **Hitchings, Russell**

2006. Expertise and Inability: Cultured Materials and the Reason for Some Retreating Lawns in London. *Journal of Material Culture*. Vol. 11, No. 3: 364-381.

Material culture and some of the various meanings and implications of the concept are explored here, specifically in regards to human interaction with plants. While material culture implicitly involves various concepts of control and authority, the author points out that gardening illustrates the intrinsic, indomitable attributes of the natural world. The author contends that, "To fully find pleasure from plants, people must become enjoyably expert in understanding that any complete control is unlikely" (364). Hitchings traveled to domestic, urban gardens in London for observation, interviews and photography concerning gardeners' practices and attitudes toward their pursuit of creating planted environments. The author posits that retreating lawns were in part due to gardeners' acquiescence to biophysical processes.

This report begins with an examination of material culture analyses that addresses a tendency to minimize the ways in which physical things can possess agency. Based on the response of the gardeners the author believes that although human culture theoretically stands "elevated and aloof from...earthly experience, this is never the case" (368). Hitchings emphasizes that understanding materiality as "physical docility," is a "precarious achievement" (369).

The gardeners revealed that with time and experience they began to comprehend the "evident living creativity of vegetative matter" (372). They also spoke of receiving significant pleasure from their cooperation with and witnessing of those processes. They recognized individual temperaments of certain plants, and shared photo albums that resembled family albums. Hitchings states that a "kind of garden animism" emerged during the interviews (ibid). "It was possible to think about plants as message bearers for the endless chain of biophysical processes at work in the world" (373). Gladly embracing expertise *and* inability, and allowing for a cooperative versus dominance attitude toward the plant environment was clearly a recurrent theme among those who self-identified as gardeners, ranging from the domestic interviewees to BBC experts. They conceded cheerfully that they could not always answer questions concerning the natural processes at work.

This research has implications for Florida lawn management and planting practices regarding allowing some degree of natural process to coexist with controlled cultivation. Or, as the author states, " In order to get the maximum well-being from these sites, it emerged that these gardeners had to skillfully find a way of simultaneously taking charge and ceding control" (377). This also has implications regarding Western consumptive practices offset by a more "enchanted" materialism (378).

Key words: material culture, agency, plant selection, gardening, wellbeing, control, pleasure, expertise

**Herzog, Thomas R., Herbert, Eugene J., Kaplan, Rachel, and C.L.Crooks**

2000. Cultural and Developmental Comparisons of Landscape Perceptions and Preferences. *Environment and Behavior*. Vol, 32: 323.

This study explores, from a cultural and evolutionary perspective, the complex reasons for the varying perceptions toward several Australian landscapes. Using six stimuli categories of different landscapes derived from factor analysis, the researchers tested the perception of several Australian sub-groups and American undergraduate students towards these various Australian landscapes.

The researchers of this study used a three-pronged analytic approach, including: cross-cultural correlations, comparison of means, and stimulus grouping, which helped elucidate the relationship between nature, evolutionary biases toward a particular landscape and nurture the cultural influences that affect one's perception of a particular landscape. A similar study had already been conducted by Kaplan and Herbert in 1987, and using it as a prototype the study was repeated. However, this time a broader sample of settings was used and sub-cultural groups in the Australian sample were examined. This resulted in a far more complete and thorough sub-cultural comparison than is typically seen in landscape preference studies. The sample sizes consisted of 384 individuals from the Australian group and 250 from the American set. Participants were then shown 60 color slides of natural environments in Australia, equally representing six a priori categories consisting of rivers, dry lake beds, flood plains, terraces, mallee plains and culturally affected environments. Participants were shown all 60 slides and asked to rate each for preference (how much they liked it). The results were analyzed and compared on a variety of levels: a cross-cultural level examining American students against Australian students; an Australian sub-cultural level; a comparison between differing age groups; and an evaluation between Australian college students, and Australian adults. This study supported much of what was already discovered in the previous study by Kaplan and Herbert, and maintains that the three-pronged analytical approach to cross-cultural comparisons is quite useful.

Keywords: environmental psychology, landscape perception, nature vs. nurture, cross-cultural comparison, sub-cultural comparison, environment-behavior interaction, environmental preferences.

**Jenkins, Virginia Scott**

1994. *The Lawn, a History of an American Obsession*. Washington: Smithsonian Institution Press.  
And

**Bogart, Michele H.**

1995. *The Lawn: A History of an American Obsession* by Virginia Scott Jenkins. Book Review. *American Quarterly*, Vol. 47, No. 3: 556-562.

This annotation is a combined synopsis of the book by Jenkins and a review by Bogart. In the introduction, Jenkins explains how, as a young child, she was fascinated by Americans' obsession with lush green lawns. She notes that her father tended the family lawn as she grew up in Connecticut and that the lawn is a man's domain, whereas other aspects of the yard are usually women's domains. Jenkins states that Americans spend billions of dollars each year on lawns, and that the lawn care industry

employs thousands of people. She describes earlier types of yards that were prevalent in Europe until the mid-19<sup>th</sup> century. In Europe, lawns were parts of larger gardens that might surround a house in front and back. Towns in the U.S. consisted of homes built close to the street. Yet, over time lawns became a symbol of wealth; this symbolism was borrowed from French and English aristocratic landscape architecture beginning in the late 18<sup>th</sup> century. After the Civil War and the rise of the new single-family household structure, front lawns became more commonplace in the U.S.

Bogart explains that Jenkin's work is politically charged, highlighting gender issues, the rise of corporate power and even militaristic ideology, and that she disapproves of lawns overall. Nonetheless, the book is reviewed as a "lively cultural history" and broadly insightful. The lawn is explained as the perfect example of "conspicuous consumption" [a term commonly used in the social sciences]. The book is divided into two parts. Part One covers the history of lawns in America, the growth of civic groups associated with lawns, the influence of the golf industry and the role of the United States Department of Agriculture, as well as the major influence of advertising on the cultural perceptions of lawns. Part Two emphasizes the growth of the lawn care industry, primarily after 1930 through the early 1990s. Here Jenkins discusses gender roles, the idea of conquering nature, and high-tech horticulture. In her concluding chapter the author discusses the rise of environmental awareness, and the conflicts between organic lawn advocates and the commercial lawn-care industry. Jenkins ends with a call for Americans to adopt lawn-alternatives.

Key words: cultural values, lawns as status, history of lawns, perceptions of lawns, plant selection

### **Kaplan, R and M. Austin**

2003. Out in the Country: Sprawl and the Quest for Nature Nearby. *Landscape and Urban Planning*. Vol. 69: 235-243.

The focus of this article was on the growing American desire for country-style living. Over the past couple of decades, Americans have displayed a growing propensity for moving away from the cities and into the "consumer-based subdivisions at the urban fringe" (236). It is believed that the driving force behind this sprawl is the American desire to be closer to nature. This article deals more specifically with the various natural settings available to homeowners and how their satisfaction with their neighborhood is connected to their perception of local natural settings. The information for this study was gathered through a collection of mailed questionnaires from the Hamburg Township in Michigan. One of the largest data pools came from the open-ended question that preceded the multiple-choice questionnaire. Participants were asked: "If you were to describe your residential neighborhood to a friend, what four to five things would you be sure to mention?" In these responses, references to nature or open space were not only the most commonly listed category, but it was also the most likely category to be listed first. In the responses, mentioning of nature as a benefit of a neighborhood was more common than characteristics of the neighborhood, feelings of security or even community aspects. The researchers concluded that natural characteristics, mowed areas, trees and landscaping, "are the features most likely to be mentioned... and are rated as the highest priority in selecting a home" (242).

When participants were asked to rate pictures of natural settings regarding availability to their homes and preference for availability, there was a clear preference for forested areas, even though there was a relatively low percentage of households who claimed to live near forested areas. Further, neighborhoods and individual residences with greater access to trees and forested areas received the highest levels of occupant satisfaction. Conversely, wetland settings were listed as the least prevalent, and least desired natural setting. This data suggests that people are more likely to purchase a home, or claim to be satisfied with their neighborhood, when there is access to trees and forested areas within walking distance. Finally, Kaplan and Austin conclude that closeness to nature is an important part of the suburbanization of the American population. However, as the development of these urban fringe neighborhoods expands,

the natural aspects that originally drove the expansion are being decimated. Therefore, it is for the benefit of the developers, as well as for the presiding local government, to invest in the preservation and protection of local natural resources and development strategies that are more sustainable.

Key Words: natural areas, neighborhood satisfaction, sprawl, suburb, open space

**Johnson, Cassandra Y. and Wayne C. Zipper**

2007. Culture, Place and Urban Growth in the U.S. South. *Urban Ecosystems*. Vol.10: 459-474.

This paper discusses identity in the context of connection to land in Southern (U.S.) society. Little research has focused on the impacts of urban growth to culture because research related to growth is often concerned with physical landscapes or economy, rather than with culture. The authors illustrate how sense of place may be altered by landscape moderations and that Southerners possess “cultural mores” which distinguish them from people in other parts of the country.

Between 1982 and 2003, the percentage of developed land in the U.S. has increased by approximately 50%. The article explores the concept of culture loss and changes in sense of place in the American South. The authors provide a review of the concept of sense of place while noting that culture is not static, but that environmental change may result in culture change, specifically among Southerners. The example of Southerners is used because, as noted by historians, cultural attachment to place has persisted longer in the South due to lags in industrial and economic development. Residents perceive influxes of newcomers as contributing to a loss of way of life. The authors make an interesting and cogent argument noting that reproduction of non-regional types of development, such as strip malls, leads to destabilization of community and homogenization resulting from culture loss. In Florida, one study found that landscape oriented individuals are more likely to visit public open space parks, as compared with community oriented individuals. The article cites useful technical reports and other references, including the *Southern Wildland Urban Interface Assessment* focus group study, and the *EPA's Community, Culture, and the Environment: A Guide to Understanding Sense of Place* (which offers a practical method for conducting community assessments). Emphasis on meanings, memories, feelings, attitudes, and symbols associated with landscape and site are explained. Managers need to recognize that humans are part of ecosystems to be more effective. The article does not suggest that cultural factors and concepts such as emotion or memories need to be managed, but that they provide a relevant context for decision-making in all regions.

Key words: sense of place, urban growth, landscape, culture, Southern.

**Kendig, Frank and Lisa Buck**

1986. Savanna Syndrome. *Omni*. Vol. 8, No. 6: 26, 80.

The authors explore the question of why we continue to devote large amounts of residential lands to lawns, and question whether our love of lawns is cultural or something deeper, potentially an evolutionary adaptation. The cultural argument can be traced to the Middle Ages, when open fields surrounding castles served as protection against surprise attacks. As lawns were introduced to the Americas in New England from the British, one of the ways in which they symbolized prestige were in their separation from food producing fields, which were associated with peasants, or those of lower classes. John Falk's research is cited because he has studied landscape preferences from around the world. Falk notes evidence of lawns over five thousand years ago in China and the probable occurrence of lawns among ancient Mayas and Aztecs, as well as traditional Mohawk villages in the U.S. having areas with short grass. He believes that the human preference for savanna-like landscapes is the result of an innate survival mechanism developed during the early periods of human evolution in which lawns provide a form of safety due to the ability to

see predators in open areas and to forage for food. Falk believes cultural factors also play a role, but may not be the predominant reason for humans' preference for savanna-like lawns. (See also: Falk, John H. and John D. Balling. 2009. Evolutionary Influence on Human Landscape Preference. *Environment and Behavior*. August 7, Online First.)

Key words: landscape preference, evolutionary psychology, lawns, plant selection, perception.

**McKenzie-Mohr, Doug**

2000. Fostering Sustainable Behavior through Community-Based Social Marketing. *American Psychologist*. 531-537.

By integrating psychological research methods into sustainability marketing strategies, a marked increase in social behavior change has been noted. As the global population increases, there will be a greater need for widespread sustainable living. In the United State and Canada, millions of dollars are invested annually on advertisements and marketing strategies that encourage citizens to adopt sustainable practices. Until now however, there has been very little involvement of psychology and psychological methodology in these marketing strategies, which is counterintuitive to the desired objectives of these movements. Most sustainable-living marketing strategies have relied heavily on educating and informing the public about sustainability issues and proposed solutions. For example, to curb the annual increase in domestic water use during the summer in Toronto Canada, informational pamphlets were distributed to households explaining some ways for families to save water. This method has proven to increase awareness and interest in the specific field, but has had very slight results in the actual amounts of water used. In fact, there was a measured 15% increase in water usage. This is because information increases awareness, but does not necessarily inspire behavioral change. This is where psychology comes into play.

The first step in creating a psychology based marketing strategy is to identify barriers to behavioral change. People tend to forget to lower a thermostat at night and many women do not know how to check tire pressure. Many devise experiments to eliminate these barriers. In a second attempt to decrease domestic water use in Toronto, students were hired for the summer to ride their bicycles around neighborhoods to talk to people about water conservation, to give out lawn watering gauges and prompts to hang above outdoor water spouts to remind the residence to reduce lawn watering on days when it rained and to only water their lawns every other day. They also asked residents to sign a commitment to document a promise to water only every other day. This method returned a dramatic reduction in water use. In fact, it resulted in a decrease of 54% of water use, compared to the increase in the neighborhood that received the informational flyer. By including psychological research methods to determine barriers to lifestyle change and proposed solutions for those barriers, an increased use of social marketing can lead to dramatic shifts in sustainable living.

Key Words: sustainability, psychological methods, social marketing

**Maunder, Mike**

2008. Beyond the Greenhouse. *Nature*. Vol. 455, No. 2, October.

Botanic gardens have recently broadened their mission to include global biodiversity preservation, conservation through public education, and to serve as repositories for seed banks. This is partly in response to the decline in botanical research at universities. Botanical gardens have become key in promoting and educating the public about plant conservation and throughout the world. Some 2500 botanic gardens are broadening their cultural identities along with newly emphasized conservation agendas. Some even have important roles in the United Nations' Global Strategy for Plant Conservation. Without funding from scientific settings in universities, botanical gardens must rely on public funding

sources, and increasing the development of strong links with communities. As a result, the scientific and cultural value of botanic gardens must also be conveyed through these strong links with communities. The author notes that visitors to a good botanic garden experience a deep sense of emotional satisfaction. Maunder suggests that it is this emotional response that should be used to change people's behavior so that individuals become more conservation oriented in their own yards and elsewhere.

Key Words: gardens, seed banks, conservation, behavior

**Nassauer, Joan Iverson**

1995. Culture and Changing Landscape Structure. *Landscape Ecology*. Vol. 10, No. 4: 229-237.

To better understand the connection between culture and landscape design and perception, Dr. Joan Nassauer identifies four underlying principals. The first is that human landscape perception, cognition and values affect the landscape and are affected by the landscape. This principle has a few associated theories explaining the connection between human cultural development and landscape: the Biological theory connects landscape preference to human evolution. Studies have found that children have an innate preference for open fields because of our evolutionary history in the Savannah of Africa. Information-processing theory (IPT) proposes that humans have evolved in a way that allows us to draw information from our environment and typically prefer landscapes to which we are more accustomed. The Transactional theory is similar to IPT. However, the in IPT humans are typically viewed as outside the system, whereas in the Transactional theory humans are seen as a part of the system, affecting and being affected by the landscape in which the landscape essentially becomes a medium for information to be read and displayed. And finally there is the Behavioral theory, which proposes that humans actively alter, and sometimes create their surrounding landscapes. These four theories are used to hypothesize how humans interact with and change the environment.

The second principle explained is that cultural practices affect how a population will perceive and interact with the landscape - both inhabited lands and natural lands. The third principle explains that cultural perceptions of landscape are not the same as scientific perceptions. So what is viewed as desirable to a population may or may not be ecologically efficient. And the final principle is that the layout of a landscape will express cultural values and norms. One of the clearest examples of this is the American cultural value for homogeny and neatness, leading to the pervasiveness of the turf grass lawn. Nassauer proposes that by taking these principles into consideration, it is possible to conduct experiments testing cultural perceptions of landscapes and designing landscapes that will maintain cultural preference in the future.

Keywords: culture, change, perception, theory, landscape ecology

**Osmond, Deanna L. and David H. Hardy**

2004. Landscape and Watershed Processes, Characterization of Turf Practices in Five North Carolina Communities. *Journal of Environmental Quality*. Vol. 33, No. 2: 265-575.

A door-to-door study was conducted to assess turf practices in five suburban communities in North Carolina. The study is highly quantitative and provides a sample of the survey that would be useful for developing similar research projects. N fertilizer use in landscapes is expected to contribute the highest percentage of urban nonpoint-source pollution, as opposed to inputs from animal and plant waste, septic systems, and atmospheric deposition. Very little data is known about residential uses of fertilizers, and the lack of data on urban N fertilizer use is common throughout the U.S. This study seeks to address the lack of data.

Five communities in the Neuse and Tar-Pamlico basins were sampled. The total sample size of each community ranged from 60-300. Residents were interviewed using the same survey instrument, with slight variation among communities and volunteers administering the survey. More than one-half of the residents use fertilizer on turf. Centipedegrass was the most common grass used. Those who had higher incomes were more likely to use commercial lawn care companies. Commercial lawn care companies on average applied greater amounts of fertilizers than homeowners. The majority of lawn care providers and homeowners applied fertilizers during the wrong time periods, especially pertaining to warm season grasses, despite results showing a high percentage of homeowners who report reading and following instructions for application. Residents were also surveyed about water use, and watering practices varied from city to city. Survey results did not show a difference for time watered between residents with fixed sprinklers and those who hand watered, yet no data on rates of water used was collected. The authors identify the following areas necessary for homeowner education: 1) timing of fertilizer applications; 2) cleaning fertilizers from impervious surfaces; 3) N fertilizer rates; 4) selection of appropriate fertilizer analysis; and 5) soil testing.

Key words: fertilizer practices, lawn care practices, turf management, N fertilizer; survey, North Carolina.

**Pickett, Steward T. A., et al.**

2008. Beyond Urban Legends: An Emerging Framework of Urban Ecology, as Illustrated by the Baltimore Ecosystem Study. *BioScience*. Vol. 58, No. 2: 139-150.

In this article, the authors recognize that the field of Urban Ecology, though quickly growing, does not have a stable theoretical foundation. To help facilitate the development of this theoretical foundation, the authors list twelve observations gained through the Baltimore Ecosystems Study that they feel challenged or expand upon preexisting beliefs shared by urban ecologists. The first observation was that class, income level and ethnicity do not always determine perceptions of environmental problems. Their studies found that all people in the testing range had generally consistent comprehension of environmental issues despite these alleged factors affecting perception. Secondly, they found that environmental inequity was not limited to people of color. Instead, lands that were determined to be detrimental to the occupant's wellbeing were more often occupied by Caucasians than people of color in Baltimore. They felt this resulted from historical causes than from intentional discriminatory practices or economic associations. The third observation was that even in urban centers, there was significant biodiversity of both invasive and native species, and that many of these ecosystems had developed out of urbanization.

Forth, they learned that the urban riparian zones, such as areas between land and rivers or streams that are responsible for removing nitrates from groundwater before it enters running water, are not acting as nitrogen sinks, but instead sometimes producing more nitrogen. They feel that this is largely because of the altered watersheds created by urbanization. Fifth, they found that nitrate water pollution forms in higher quantities in the suburbs than in urban zones, mostly because of landscape and agricultural fertilization. Sixth, they determined that traditional land-use maps were inefficient in representing ecological heterogeneity. They recommend the development of a new classification system that takes into account land use and ecological factors, like soil quality and landscape. Seventh, they found that not all urban soils are disturbed and polluted. Instead, soil samples from urban cities show great variety in the composition and fertility of urban soils.

Their eighth observation was that some urban areas seem to be capable of contributing to the carbon balance cycle. Though fertilization, irrigation and landscape maintenance all take their toll on the atmospheric carbon levels. Maintained landscapes do help to remove and contain atmospheric carbon with perhaps greater efficiency than unmanaged lands because of the increased growing cycle of artificially watered and fertilized landscapes. Ninth, they learned that vegetation change lags behind

social change by an estimated twenty years. Tenth, they discovered that lawns impact both social and biochemical systems. Eleventh, they found that urban ecosystems are still influenced by natural processes of carbon and nitrogen cycling, and no matter how developed a land may become, these natural processes will continue to function. Finally, the twelfth observation was that feedback between human health and policymaking had a direct connection to the development of urban ecology. As humans create policies to protect or better their lives, the social geography and local ecology are affected.

Keywords: city, coupled natural-human system, patch dynamics, social-ecological system, urban ecosystem, urban ecology

**Robbins, Paul**

2007. *Lawn People, How Grasses, Weeds, and Chemicals Make Us Who We Are*. Philadelphia: Temple University Press.

And

**Guthman, Julie**

2008. Book Review, *Lawn People, How Grasses, Weeds, and Chemicals Make Us Who We Are*. *The Professional Geographer* by Paul Robbins. Vol. 60, No. 3.

This annotation is a combined synopsis of the book by Robbins and a review by Gattrell. According to Gattrell, Robbins' analysis of the "characteristics of lawn people inverts expectations" commonly held by researchers, environmentalists and educators. A primary finding is that well-informed, highly educated, higher-income people who ascribe to environmental values are more likely to use lawn chemicals than others, which contrasts with previous studies (and a generalized assumption among many environmental educators) suggesting that more highly educated people and people from higher social classes engage in more environmentally protective behavior. Robbins employed a variety of primary research methods, including a national homeowner survey, interviews with pesticide applicators, ethnographic interviews, and photographic land cover surveys. Additionally, his comprehensive work used secondary sources to develop his explanations of the ecology and cultural values associated with turfgrass. His findings emphasize the fact that the American lawn needs constant care if it is to remain lush and green. Due to a number of factors, including the hybrid varieties of grasses, lawns are in need of chemicals to maintain these culturally desirable characteristics. An overarching theme is that individuals often go against their stated environmental values and apply "necessary" chemicals for what is perceived as the "collective, community good."

Key Words: turfgrass, lawns, cultural values, environmental values, chemicals, political ecology, history of lawns, geography

**Robbins, Paul and Trevor Birkenholtz**

2003. *Turfgrass Revolution: Measuring the Expansion of the American Lawn Land Use Policy*. Vol. 20: 181-194.

This paper presents a methodological protocol for measuring monocultural lawn coverage in urban and suburban environments. The authors explain that this necessary methodology had not been previously developed and is necessary in order to accurately assess ecological impacts, including toxic chemical inputs, energy use, air quality, soil profile, stormwater runoff, water consumption, micro-fauna diversity, and opportunities and constraints for wildlife. The authors approach lawn coverage calculation through the lens of Land Use/Cover Change (LUCC), previously used in non-urban environmental analyses, and describe in some depth their technique, which incorporates tax assessor's data, census data, survey information and aerial photography. The lawn as an ecological problem is explored here with details

relating to the history of turfgrass lawns, chemical exposure, water demands and air emissions and terrestrial and avian wildlife. Overwatering is common in the arid west and elsewhere in the U.S. where percentages of lawn cover tends to increase with newer homes.

Critical elements of the ecological impacts of turf grass are discussed, including the fact that low-input (of chemicals) methods of management are rarely chosen by homeowners voluntarily, that high levels of chemical input are proportionate to high levels of income and education of homeowners "...who not only claim environmental concerns but who also acknowledge the negative impacts of their actions" (183). The authors explain that lawn chemicals are tracked into homes with ease, and deposited on clothing, with the effects of exposure, especially in children, still not completely understood. Due to the decrease in cultivated land, coupled with more regulation, the agricultural use of pesticides has declined, while the home use of pesticides has become an ever-increasing issue. For example, pesticides have been detected with greater frequency and in higher amounts in urban watersheds than any other watershed, including agricultural ones (182). Also, a significant amount of non-methane hydrocarbon emissions are emitted by gasoline powered lawn maintenance equipment relative to automobiles and even diesel engines. The authors provide a new research framework with which to approach the fundamental change in land cover management and the associated risks involved in it.

Key words: turfgrass, water use, pesticides, homeowners

**Robbins, Paul and Julie Sharp**

2003. Producing and Consuming Chemicals: The Moral Economy of the American Lawn. *Economic Geography*. Vol. 79, No. 4: 425-451.

Robbins and Sharp explore possible reasons for a seeming paradox in lawn chemical use: individuals with high levels of income, education and environmental concern are most likely to utilize chemicals (both fertilizer and pesticides). The authors feel that this phenomenon is largely due to marketing efforts by the producers of lawn chemicals, which have linked the appearance of the lawn to "community, family and environment" (427), thus making its upkeep a social obligation for many. Their mixed-methods study included historical and fiscal analysis of the lawn care industry, a phone survey of 594 "lawn managers," and an undisclosed number of "intensive follow-up" phone interviews and face to face interviews. All were conducted in Ohio. The Scotts Company was found to be the world leader in the industry accounting for 55% of the market in the U.S. and 25 % of the market in Europe, with net sales of \$ 1.74 billion in 2001.

While the use of agricultural herbicides declined throughout the late 1990's, lawn care chemicals saw steady growth. Robbins and Sharp argue that the previous emphases on economic and demographic explanations are insufficient to explain the sales growth in light of American environmental awareness. They suggest that increased financial pressure on lawn chemical formulators led them to begin marketing directly to consumers and, through these campaigns, they sought to link lawn appearance to the creation of outdoor space for family bonding, community building and social status. The article includes examples of ads as illustrations of the tactics used. Once lodged in public consciousness, maintenance of a green lawn has become a "social obligation" in some communities. Despite awareness of the negative environmental impacts of chemical use, respondents from this study expressed their feelings that a green lawn not only earned respect from the neighbors and preserved property values; it also offered a link to the natural world. Time spent on maintenance fostered neighborly interaction. Robbins and Sharp explore possible theoretical explanations for this and cite the utility of recognizing the role of morality in lawn caretaking as well as the longing for productive work, community and nature. If these desires can be harnessed and inverted by laws banning pesticide use or through alternative landscaping practices, social pressure could work to quickly change landscape ideals and to reduce lawn chemical use.

Key Words: urban growth, consumption, social obligation, social status, community bonding, marketing, cultural perception of lawns, environmental awareness

**Steinberg, Ted**

2005. Lawn and Landscape in World Context, 1945-2000. OAH Magazine of History. Vol. 19, No. 6: 62-68.

In this article, Steinberg explains the origins of the American obsession with the perfect lawn and how this idea has continued to spread across the globe. He begins by explaining that the American lawn is anything but American. Almost all turf grasses in America came from Europe through the Colombian Exchange (63). These grasses were spread, intentionally and unintentionally with imported livestock, and quickly out-competed native grasses. Though many wealthier Americans throughout history had large estates with manicured lawns, the lawn did not become a major part of the American way of life until the late 1800s, as urban centers began to spread out and develop sub-urban regions. Still, the lawn was uncommon and typically used as a small farm area to feed a single goat or cow, or a few chickens to help feed the family. It was not until after the Second World War, that the lawn became a part of the American Dream. Mass suburbanization, the newly established consumer based economy and an increased cultural expectation of conformity made the perfect lawn a national goal. An excellent example of the American stigma toward lawn care was found in an article in *Life* magazine, right in the midst of the Cold War, which compared the perfect lawn to the hardworking and honest American, and a lawn specked with crabgrass to the “green menace” and Soviet sympathizers (64).

Steinberg argues that the American ideal of the perfect lawn was intensified and globalized by the increased popularity of golf (64). As the sport gained popularity, more research, money and labor was placed in the maintenance and preservation of golf courses, which quickly became the image of the perfect lawn, and a promise that with hard work and proper consumer habits, anyone could achieve such a lawn. This led to an increase in irrigation practices, as well as to an increase in usage of fertilizers, pesticides and fungicides. However, the most significant increase noted by Steinberg was the reliance on foreign labor. Many landscape workers today are illegal immigrants, with limited knowledge of English, who perform dangerous and labor intensive work, often without proper protective wear, and usually for well below minimum wage. The author continues to explain how this “American Ideal” has spread across the world, having both positive and negative effects in every country it touches. His major emphasis is on the spread of golf courses, especially in developing nations in Western Asia. For example, he explains that international golf tourism has led to deforestation in Malaysia and has displaced hundreds of peasants and farmers in Thailand (66). However, he identifies the greatest danger as the overuse of water for irrigation purposes. This has led, at least in part, to cholera outbreaks and reduced food supplies due to destruction of farmlands. He concludes his article by explaining that there has been growing support for local organizations that oppose the spread of lawns and the overuse of pesticides and fertilizers, and support the use of native plant species and natural fertilizers all across the globe (67). Though these organizations have been gaining in number, and there is speculation that the perfect lawn will see an agricultural revolution in the upcoming years, Steinberg feels these movements are still in the beginning stages, and that the American lawn will be around for a while longer.

Key words:

Turf grass, perfect turf ideal, planned obsolescence, history, landscape workers, marketing, golf courses

Thompson, Robert and William Green

2006. When Sustainability is not a Priority. International Journal of Sustainability. Vol. 6. No. 1: 7-17.

Thompson and Green assert that institutions of higher education (IHEs) are an ideal and necessary place to model sustainable practices, as they are often “microcosms of the larger world,” and are responsible for training future leaders and decision makers. Their article reviews a few reasons why administrators at many IHEs have failed to make sustainability a top priority and examines some best practices for drawing attention to issues of sustainability and to creating positive changes at an IHE. Based on their work at the University of Rhode Island, the best practices identified by the authors are the recognition of factors preventing the campus community from utilizing issues of sustainability, seeking and taking advantage of windows of opportunity for change, and creating demonstration sites (“sites of unconventional wisdom”) to protect and conserve existing resources. Thompson and Green note the high value of presidential leadership in quickly creating institutional change toward more sustainable practices in IHEs, but they recognize that many presidents may not view this as a top priority and advocate for leadership by other members in the campus community.

The authors note that higher institutions promote “faulty cultural models,” or rather the assumption that a healthy campus entails broad expanses of green turf. The role of the institution should be to provide new cultural models and correct faulty ones. But if this is not practiced through education and modeling, the authors note that cultural models are very persistent, and deliberate efforts must, therefore, be made to change them. Hydrology is presented as one way to provide new cultural models; by educating students about the storm water drainage and its effects on the watershed, it is presumed that cultural models will begin to shift. Another example of change in students’ perspectives on sustainability and landscapes was shown in the University of Rhode Islands’ strategy in using visual images of ecological histories of the campus. Through the visual representation in the form of maps and photographs, students began to truly understand the concept of degradation; presumably the creation of new cultural models would lead to behavior change on and off campus.

Keywords: higher education, sustainability, best practices, educational leadership, campus sustainability, marketing.

**Wagner, John R.**

2008. Landscape Aesthetics, Water, and Settler Colonialism in the Okanagan Valley of British Columbia. *Journal of Ecological Anthropology*. Vol. 12: 22-36.

Wagner’s article examines the current and historic settlement patterns in British Columbia’s Okanagan Valley in order to explain how a landscape aesthetic can affect culture and the natural environment over time. The valley historically featured many diverse landscapes including wetlands, forests, mountains and areas of open grassland. The valley’s original inhabitants, the Syilx indigenous people, made seasonal rounds and utilized the many different resources. Colonial settlers, however, sought to recreate English settlement patterns and to plant orchards, envisioning and portraying the valley as an oasis with abundant water for agriculture and other activities. Indigenous peoples managed open grasslands with the use of fire and used them as hunting and gathering territories – not agricultural one. This is problematic as the water resources are not readily replenished and are taxed by water-intensive agricultural practices. Additionally, the changes made to the landscape by those favoring year round use of open grassland or agriculture have damaged the local ecosystem, leaving many species endangered.

Wagner reviews these historic processes and compares them to the contemporary transition from orchards to vineyard-based tourism in the valley, concluding that the driving factor behind both changes is the flawed perception of Okanagan valley as oasis created by the early settlers.

Keywords: settlement patterns, ecosystem damage, oasis, vineyards, water shortage, Indigenous knowledge, agriculture, grasslands

**Weigert, Andrew J.**

1994. Lawns of Weeds: Status in Opposition to Life. *The American Sociologist*. Vol. 25, No.1: 80-96.

The essential focus of this article was to address and analyze the historical conditions, which resulted in the creation of the modern, “industrialized lawn” and the social and physical responses of its creation. To support his argument the author cites “Simmel’s Lemma,” an interpretive strategy, which states that everyday meanings are derived from symbolically transformed social actions, and roots knowledge in institutions, such as language. Weigert makes the claim in his article that a “lawn” is perceived through its social context and so he examines the “social meanings and biophysical effects of social action towards a single cultural object, a lawn.”(82).

Weigert states that the modern American lawn, a clean, manicured, homogenous, collection of one grass species, holds with it certain social particularities. Using examples from Mary Douglas’ work, he agrees that a social object, such as a lawn, comes with a simple dichotomy of “good-bad.” So for example, if society deems a certain kind of “grass” to be good, by default every other type of “grass” is deemed bad. Following this dichotomy is a “status theory” created from the definition of a social object. A good lawn is associated with good neighbors, or good community, or wealth, or education, all of which are social constructs, which stem from historical actions of the wealthy landed English class in America and perpetuated over time. The modern “industrial lawn” is a cultural form that came from England to the United States. After the civil war the rate of single-family suburban homes with lawns increased dramatically. Technological innovation, such as the lawn mower, and the increase of affluent, suburban residents after World War Two, coupled with the growing lawn-care industry and the expanding chemical industry put the modern lawn in reach of all suburbanites. To keep this trend alive, natural enemies were given negative reputations for the caretakers of lawns to be constantly battling; weeds being a great example of one such natural enemy. The redefining of words was an effective means of transforming how society perceived a lawn.

The second half of Weigert’s article examines how the modern lawn actually is in opposition to life. He examines the variables, which indicate the unsustainability of modern lawns, highlighting the following: “cides” of all kinds used to kill pests and their effects on the greater ecology of an environment; the use of gasoline in two-cycle engines; chemical runoff from fertilizers; and excessive water use. The author identifies a disconnection between the care-takers of high status lawns and the instructions necessary to properly care for their lawns, leading to excessive chemical use, fertilizers, “cides” and the like. These are all examples of how a high status, modern “industrialized lawn” acts in opposition to natural biology.

Key Words: Industrialized lawn, lawnscape, Simmel’s Lemma, opposition to life, lawn, status theory, American lawn, biological effects, dialectic of opposites, social object, lawn as a cultural form, lawn norms, weeds, status dimensions, dualistic environmental sociology perspective, cultural perception of lawns.

**Yabiku, Scott T., David G. Casagrande, and Elizabeth Farley-Matzger**

2008. Preferences for Landscape Choice in a Southwestern Desert City. *Environment and Behavior*. Vol. 40, No. 3: 382-400.

The authors propose that individuals choose a residential landscape design after taking into consideration four factors: cost of maintenance, ecological constraints of an area, laws and covenants, and personal

preference. To better understand this system, an experiment was conducted by Arizona State University to research landscape preferences of people living in Phoenix, Arizona by comparing water intensive mesic turf lawns to more sustainable arid landscaping. This project was conducted in North Desert Village, a part of the university's student housing complex. Four blocks were isolated from this housing complex, with a different type of landscape installed in each. One received a "desert" landscape, composed of all native plants and requiring no irrigation; one was a xeric landscape, consisting of mixed native and non-native low-water-use plants with a drip irrigation system; a mesic landscape, consisting of the traditional turf grass and non-native trees that required heavy irrigation; and an oasis style landscape, which consisted of aspects of the former three designs. The researchers believed that since all occupants were renters, with no control or responsibility for the landscaping, the factors of cost, ecologic constraints and laws could be held constant, while preference could be evaluated. 55 respondents from 25 housing units were interviewed and asked to rate their level of satisfaction with each of the four landscapes. They were also asked questions pertaining to the four fields that the researchers felt most affected preference: environmental attitude, socialization, aesthetics and demographics.

The results demonstrated that the mesic landscape received the highest level of preference at 3.72 out of 4, of the four landscapes. Oasis received a rating of 3.35, xeric received a 2.25 and desert style landscapes received the lowest level of approval with a 2.11. They found that the longer a person lived in Arizona, the more they disliked the desert and xeric landscapes. They theorized that this is because most of the older parts of Phoenix and urban Arizona use the mesic style, and that arid landscapes, where they do exist, are usually found in new developments in the suburban fringe, so people raised in Phoenix, or who have been living there for many years, are much more accustomed to mesic styles. They also found that people with children, and women in general, preferred landscapes with more turf and disliked the desert and xeric landscapes for, what the researchers believed to be, a perceived danger by many arid plants such as prickly cacti. However, they also found that people who scored high on the New Ecological Paradigm (NEP) questionnaire, the system they used to estimate individual environmental attitude, typically had lower preference for the mesic landscapes. They also found that residents who claimed to find natural Arizona desert to be aesthetically pleasing had a greater preference for the arid landscape designs. This led the researchers to theorize that environmental education and exposure to natural landscapes can lead to a preference for more sustainable land use. Finally, of the four, the oasis landscape was the only one to receive very little differentiation in preference response, leading researchers to theorize that the oasis style stood for a valid compromise between traditional designs and more sustainable landscaping techniques.

The authors conclude with a hypothesis that arid-style landscaping techniques have the potential to gain preference through increased exposure and education. They found that most individuals had little experience with arid landscaping and many viewed desert flora as being potentially dangerous. They argue that with increased use of arid landscaping on public lands and with government incentives for sustainable landscaping, the more frequent exposure would lead to an increase in the general land use preference.

Key Words:

Landscapes; preferences; attitudes; water consumption; Southwestern United States

### **Water Conservation**

**Haley, Melissa B., Michael D. Dukes, P.E., and Grady L. Miller**

2007. Residential Irrigation Water Use in Central Florida. *Journal of Irrigation and Drainage Engineering*. Sep/Oct: 427-433.

Rapid growth in the state of Florida and nationwide is straining water supplies. Between 1970 and 1995 “public-supply water withdrawals increased 135%.” Earlier studies found that the majority of private homeowners over-water their lawns well above the minimum requirement to maintain an ideal lawn. Approximately 61% to 64% of all residential water is used for irrigation. This article is a scientific study of residential water use treatments in three Florida communities, which compares three types of irrigation systems with a total sample of 27 homes over the course of 30 months. These include: T1) existing irrigation systems with rotary sprinklers and spray heads used to irrigate both landscape and turfgrass; T2) similar to the first group, but with adjustments made for historical evapotranspiration (ET) (this term refers to evaporation from sources such as soil and canopy, the movement of water from within, and loss of water from plants); and T3) an irrigation system designed for optimal efficiency, minimizing turfgrass and maximizing ornamental landscape plants. The plants were irrigated on separate irrigation zones from turfgrass, (using microirrigation) in contrast with standard systems, which combine turfgrass and plant irrigation within zones.

T1 and T2 had 75% turfgrass and T3 had 31 % turfgrass with the rest ornamental plants. T1 had the highest percentage of total water use at 75%, T2 had 51% and T3 averaged 51%. The reduction in water use for T3 is considered statistically different from the other treatments. Across all treatments, water use was reduced in cooler months. No other seasonal trends were apparent. Overall, T3 irrigation water consumption was reduced by 30 % compared to T1 (the most common treatment used by homeowners in Florida). [This article is an excellent example of a scientific study on how to reduce water use, but includes no information on cultural or societal factors, which would lead to acceptance of the practices. Combining this information with other literature on cultural models, values, and attitudes would be a useful approach for considering behavior change].

**Johnson, Linda S.**

2002. Water Versus Development in Florida. *International Journal of Economic Development*. Vol. 4, No. 3-4.

Water use in Florida is examined from two points in time - 1980 and 1990 with the purpose of looking at the “impact of the governance institutional system, economic development and land use on freshwater withdrawal.” Between 1970 and 1993 economic problems and community development were considered two of the top issues in the state, with water becoming a third priority. The author provides a useful overview of the history of water use, decreasing availability, the Water Resource Law of 1957, and the Florida Water Resources Act of 1972, leading to the creation of five water management districts. The purpose of the Act (one of several passed at the time) was to provide incentive to better manage Florida’s natural environment, in conjunction with development and population growth. This article would be useful to environmental managers new to the state of Florida, as it would familiarize them with the legal and institutional framework for water management. The Southwest Florida Water Management District (SWFWMD) was one of five districts created, and is the oldest. The Florida Department of Natural Resources and the Florida Cabinet along with the five districts became the hybrid governing body for water management in the state. There are significant differences among the five districts; the article describes each of them.

Johnson refers to Nobel Peace Prize winner Elinor Ostrom’s theory of “common pool resources” and notes how this theory does not apply because the institutions for water management are created by humans. Therefore, Ostrom suggests that external authority such as the water management districts is necessary for water governance. The study looks at freshwater withdrawal in millions of gallons with data from sixty-five counties. Increases in wage jobs increases water withdrawal at a rate of 365 gallons per day. Agriculture is not as directly correlated with increases as is assumed. The decrease in agricultural land in the period from 1980 to 1990 did not have a major impact on decreased water production. Instead,

higher water use is correlated with a one-unit change in jobs. One surprising finding was a negative correlation of new housing permits with water withdrawal. The authors attempt to explain this through the possibility that the housing permits are for multiple dwellings (condos and townhouses), but note this is an area in need of further research.

Key words: water, development, Florida, water management districts, water resource law, water withdrawal, residential water use, water institutions

**Moran, Sharon**

2008. Under the Lawn: Engaging the Water Cycle. *Ethics, Place, and Environment*. Vol.11, No. 2: 129-145.

The author explores several ways in which water technologies are related to the linkage of people's relationship with nature in domestic environments. Moran explores how and why the topic of septic systems and low-tech alternatives, such as composting toilets, is an important area for further research. The literature on lawns is a topic of relatively recent attention by scholars, and lawns are "one of the most familiar landscape features in North America," with a total of over 8 billion dollars spent in maintenance in the U.S. alone. The symbolism of the house as civilization juxtaposed with the lawn representing nature is one reminder of peoples' connection to nature, regardless of their artificial construction. While much work has centered on the history of suburbanization, and a considerable amount of research has recently focused on lawns, very little has been done with regard to the topic of septic systems. The use of low-tech septic alternatives is a contributing factor to people's stronger connections to their environments. The author provides a detailed review of major concepts associated with the recent literature on the symbolism and meanings of lawns, such as domestic tranquility, display of concern for civic duty – including performing maintenance on one's lawn to control natural environments, which is often considered harmful to neighborhoods.

Septic systems account for 25 % of all households waste treatment systems in the U.S. and an estimated 50 % may be malfunctioning. Unlike lawns, septic systems are not visible performative spaces. They are uncontrolled and remain hidden, for a number of reasons, including our aversion to the subject of human waste. Despite increasing public awareness of water issues, very little research, public education, or awareness about alternative wastewater technologies has been conducted. Moran demonstrates an argument that alternative wastewater technologies could serve as a mechanism to connect people to their environments. She notes that the public does not have an understanding of how groundwater flows in general, and even less knowledge regarding wastewater and wastewater treatment. Septic systems, in particular, are widely misunderstood; they are simple devices with two main parts, and if maintained properly they discharge (including pumping sludge every two or three years) minimal pollutants. However, most homeowners do not maintain them properly and system malfunction is expected to rise quickly in the next few decades throughout the U.S.

Low-tech alternative wastewater systems are a useful solution to the problem. These systems include composting toilets paired with constructed wetlands. Estimates are provided, claiming the alternative technologies would decrease household water use by as much as 40%, and pollutants by 90%, which she notes are primarily derived from toilet wastes. [Note: some studies refer to "household water" as that which includes irrigation water for yards, yet its meaning is unclear in this article]. Other studies provide evidence that low-tech alternatives may be adopted sooner than most would assume. Moran conducts in-depth qualitative interviews with a small sample of individuals who have adopted the alternatives. She notes that common themes included more awareness of peoples' interactions with their environments because of the limitations for disposal of products using this technology. Their awareness of consumer

practices became heightened to the point that people were more conscious of various products they purchased and brought into their homes.

Key words: alternative waste technologies, lawns, water use, composting toilets, wetland construction

## **Technical Reports**

### **Center for Social Marketing**

2009. Preliminary Qualitative Research Brief, Gulf of Mexico Alliance Environmental Awareness Campaign. Tampa: University of South Florida, College of Public Health.

This qualitative study was conducted for the Gulf of Mexico Alliance as part of the planning process for an environmental education and awareness campaign throughout states along the Gulf of Mexico. The overall impetus stemmed from a desire to reduce nutrient loading and the objective of developing a branding campaign to improve community participation in the health of the Gulf. Focus groups and in-depth interviews were conducted with a total of 74 participants. Most of the data was collected from focus groups; some in English and some in Spanish. The primary focus group attendees were from the general public, with in-depth interviews conducted among policy makers, environmental advocates, and scientists.

The general public seemed to convey a strong sense of connection to the gulf, although this varied by state. The biggest barriers to implementing fertilizer reductions or other actions to protect or restore the gulf environment were perceived lack of awareness, lack of environmental education, and lack of a sense of responsibility for the gulf. Policy makers seemed primarily concerned with economic issues, while noting a strong sense of connection to the gulf, whereas environmental advocates routinely cited water pollution, non-point source runoff, overall water quality, and the “dead zone” as primary concerns. Scientists noted the need for a balance of human behavior with efforts to safeguard the environment, and the need for greater consensus among scientists regarding the health of the Gulf and needs for its protection. Policy makers also provided recommendations for strengthening the Gulf of Mexico Alliance. Responses are presented according to various sub-populations, for example: homeowners association representatives, business representatives, general public, etc. The conclusions noted that a personal connection to the Gulf is necessary for better protection and that it is essential to include education of children in the process. Various quotes are provided from focus groups.

Key Words: Marketing, water conservation, irrigation, perceptions of lawns, policy, focus groups, fertilizer.

### **Market Insight**

2009. Analysis of Focus Group Research. TBEP's (Tampa Bay Estuary Program) Fertilizer Education Campaign. Market Insight, 4370 South Tamiami Trail, Ste. 310. Sarasota, FL 34231.

This informative report was developed in response to the guidelines for fertilizer use, the Model Ordinance Regulating Non-Agricultural Use for the Tampa Bay region in 2008. Market Insight was hired to conduct the research. The objective of the research was to evaluate the effectiveness of educational messages regarding fertilizer application and to consider which messages would be most likely to influence behavior change. The study also sought to assess homeowners' levels of knowledge about fertilizer use and concerns they had about the requirements and recommendations in the ordinance. The ordinance was under consideration for adoption by Hillsborough, Manatee, and Pinellas County

governments. Methods of information gathering included two in-person focus groups, and two Online Bulletin Board Focus Groups. The sample was selected through telephone recruitment, and participants were screened to be sure they were able to read English and not employed in related or sensitive occupations. Each group had a mix of age, educational level, gender, and residence location. Participants were compensated for their time, and the sponsor was not identified until the end of the project. The document includes a number of revealing verbatim quotes from transcripts. Topics covered in the report include: lawn care attitudes and practices, preferred concept statements, reactions to creative concepts and videos, difficulty in accepting credibility of preferred lawn care practices, and recommendations for preferred media in campaigns.

Some notable conclusions regarding behavior and beliefs were a “deep-rooted belief that fertilizer is necessary to having a lush green lawn” and a pervasive belief that the best time to fertilize a lawn is in the summer months. After a series of educational activities, concept statements and discussions, several participants insisted that the best time to fertilize is in the summer months and were not convinced that “runoff from it is harmful and ...that their lawns would survive without it [fertilizer].” The values associated with a lush green lawn were pride, conforming to the community, a sense of security in belonging, and enhanced self-esteem. A few participants had already redesigned their lawns using Florida Friendly landscaping, but these lawn-alternatives provoked resistance from other focus group members. Visuals prepared by the Southwest Florida Water Management District were discussed and recommendations regarding the most effective visuals were documented, along with reasons for the lack of adoption of the message conveyed. Overall recommendations for improving fertilizer education campaigns are offered, based on the research.

Key words: fertilizer, lawn care, cultural values, beliefs, water quality, education, campaign.

### **Souto, Leesa and Brent Marshall**

2007. Southwest Florida Water Management District, Outdoor Water Use Focus Group Research (August-September 2007) Final Report. Orlando: University of Central Florida, Stormwater Management Academy and Department of Sociology.

This lengthy report sought to use focus groups to understand homeowner’s feelings about their lawns and landscaping; determine levels of involvement of homeowners in decision making about their lawns; investigate motivation regarding changes in irrigation practices; determine if and “to what extent people are changing irrigation patterns in response to changing weather patterns”..; as well as to “suggest perceived barriers to behavior change and possible strategies for motivating behavior change.” Most residents expressed a desire for a green lawn but many seemed receptive to having less grass and more trees. The rainy season and the amount of rain throughout the year is a motivator for irrigation practices, but most residents do not rely on working sensors, instead relying on visible cues to adjust irrigation practices. A consistent finding was that residents did not think it was possible to overwater due to the prevalence of sandy soils. The lack of understanding of the concept of dormancy was found to be a barrier to changing behavior because many residents did not understand that grass has a naturally dormant period.

Recommendations include strong suggestions for further research to collect representative data, the development of programs utilizing interested and engaged homeowners to become “water stewards” in their communities, since findings reported that people relied on neighbors for information on their lawn care. The report also suggested that cost saving be used as a rationale for conveying the benefit of water conservation. Further recommendations included extension assistance with maintenance of rain sensors, and the installation of separate metering systems for outdoor water use. Involvement of the Southwest Florida Water Management District in educating and encouraging the adoption of water conservation

regulations that “encourage the use of drought-tolerant grasses, reduction of turf areas, xeriscaping, and Florida-friendly landscaping” was also highly recommended.

Key Words: water conservation, perceptions of landscapes and lawns, focus groups, education, fertilizer, stewardship.

## Newsletters

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2009. Statewide Repository for Social Marketing Data. Florida Stormwater Education (Newsletter). Vol. 10, No. 3. Spring.

This newsletter article discusses plans for the Community-Based Social Marketing Committee’s (CBSM) plans for an online statewide repository for stormwater social marketing data. The CBSM is a project of the Stormwater Management Academy at the University of Central Florida. The goal of the repository is to help practitioners prioritize non-point source polluting behaviors and to plan education and social marketing strategies. The Committee identified existing websites that serve as models. These include: 1) [www.toolsofchange.com](http://www.toolsofchange.com), 2) the Water Atlas website: [www.wateratlas.usf.edu](http://www.wateratlas.usf.edu) which has data on water bodies in ten counties and cities in Florida, 3) the National Extension Water Outreach Education web site: [www.wateroutreach.uwex.com](http://www.wateroutreach.uwex.com), and 4) the Inter-University Consortium for Political and Social Research website: [www.icpsr.umich.edu](http://www.icpsr.umich.edu). Each of these websites is explained in this article – primarily as models for the proposed repository, but some, such as the Tools of Change Website have useful information and step-by-step plans for developing social marketing campaigns. Contact Leesa Souto at [lsouto@mail.ucf.edu](mailto:lsouto@mail.ucf.edu) or Ondine Wells at [owells@pandionsystems.com](mailto:owells@pandionsystems.com).

Key words: community-based, social marketing, non-point source, polluting behaviors, education

### Appendix: Additional Resources

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