

GREEN COMMUNITIES: WHAT IS THE APPEAL AND ARE THEY TRULY  
FUNCTIONING AS SUSTAINABLE DEVELOPMENTS?

By

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For my family

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Abstract of Thesis Presented to the Graduate School  
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Green communities are a new form of alternative development, but their appeal to consumers on the real estate market and their ability to function as truly sustainable developments after new owners move in has not been researched. In June 2006, I conducted a mail survey of new homeowners in the green master-planned communities of Lakewood Ranch and Harmony and the conventional master-planned communities of Palmer Ranch and Rock Springs Ridge in Florida. My objectives were to determine if there were differences in new homeowners' green design preferences, perceptions of the term "green," environmental knowledge, attitudes and behaviors, and retention of green marketing and environmental education initiatives.

New homeowners in the conventional communities, compared to homeowners of green communities, expressed similar interests in many (but not all) of the design features associated with green developments, and most did not have negative connotations with the term "green." Green community homeowners reported higher environmental knowledge on a few issues related to development, but knowledge was low overall and attitudes were no more pro-environmental in the green communities compared to the conventional ones. Green community homeowners also reported more engagement in a few pro-environmental behaviors, but pro-environmental

behavior was also low overall. Many issues stressed through marketing efforts by the developer were retained by new homeowners in the green communities, as were some issues stressed in education initiatives in one green community. Apart from the marketing efforts, homeowners who reside in the green communities for less than a year and a half indicated little community influence on their environmental knowledge and pro-environmental behaviors.

The results suggest that green design features are an important consideration for new homeowners, both in green and conventional master-planned communities, exhibiting that with sufficient advertising and marketing, people would purchase homes in green communities. Sales points used for marketing in the green communities were somewhat absorbed by their new residents; still, marketing practices can be diversified and expanded to reach more consumers on the real estate market. Once new residents move in however, results suggest that they do not come equipped with the environmental knowledge, attitudes and behaviors to make these communities function as truly sustainable developments. Post-construction management of these developments and programs to educate and engage residents can be implemented or expanded in green communities.

# CHAPTER 1

## DEFINING, DESIRING, AND RETAINING “GREEN:” A COMPARISON OF NEW HOMEOWNERS IN CONVENTIONAL AND GREEN MASTER-PLANNED COMMUNITIES IN FLORIDA

### **Introduction**

The current development paradigm is increasingly viewed as a significant and growing problem that entails a wide range of social and environmental costs. Overcrowding, pollution of land, air and water, loss of public spaces, loss of biodiversity, environmental justice issues, physical and mental health risks and loss in sense of community are some problems associated with development (Brown, Burton, & Sweeney, 1998; Haughton, 1999; Duany, Plater-Zyberk, & Speck, 2000; Frank, 2000; United States Environmental Protection Agency, 2000; Power, 2001; Frumkin, 2002; Handy et al., 2002; Otto et al., 2002; Weich et al., 2002). This trend is becoming worse as the amount of land lost to development, both urban and suburban, has increased by 300 % since 1955, while the population has only increased by 75 % (Heinz, 2002). The conversion of natural areas for development space has become a serious threat to America’s native plant and animal species, and it is occurring at an alarming rate (Benfield, Raimi, & Chen, 1999; Ewing et al., 2005).

Americans are beginning to respond to the challenges facing the environment, with more than half believing the environment in the U. S. is getting worse (Global Strategy Group, 2005), and over two-thirds considering themselves either active environmentalists or sympathetic to environmental concerns (Harris Interactive, 2005). An increase in environmental consciousness can have a substantial effect on consumer behavior (Lawrence, 1993). In a 2003 survey of U.S. consumers, more than half showed interest in purchasing products like organic food, hybrid vehicles, renewable power, and energy efficient appliances (Natural Marketing Institute, 2003). A surge in open space preservation initiatives in the late 1990s indicates a rise in concern about

the impacts of development and interest in making growth more sustainable (Myers, 1999; Myers & Puentes, 2001). Sustainable development initiatives have the potential to alleviate many environmental challenges. For example, sustainable construction has much to offer as buildings account for about one-third of energy, water, and resource consumption in the U.S., and nearly that proportion of pollution (Smith, 2003).

Green development is one incarnation of the sustainable development movement. Green development seeks to minimize negative environmental effects associated with building (Stromberg, 2005). Nationally, the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) program gives green certification to buildings based on sustainable site planning, efficient use of water, energy, atmosphere, resources and materials, indoor environmental quality, and innovation and design processes (United States Green Building Council, 2005). Green certification at the state level exists as well. For example in Florida, green certification of homes, developments, commercial buildings, and governments can be attained through the Florida Green Building Coalition (Florida Green Building Coalition, 2003). Both nationally and locally, another way in which conservation and sustainability are promoted in developments is through Audubon International's Signature Program, which offers planning and educational services to assist new developments in protecting natural resources (Audubon International, 2005).

Residential green development incorporates green buildings with site planning and the landscapes that support these buildings, attempting to adapt infrastructure to its surrounding natural setting in a way that encourages healthy interactions between residents and their neighboring ecosystems (Rocky Mountain Institute, 1998; Berke, 2002). Facets of green site design are diverse, ranging from restoration of damaged sites and connection of landscape

fragments to the fostering of community education through displays and the creation of common spaces for gathering (Rocky Mountain Institute, 1998). Special materials, devices and techniques can be used to maximize resource efficiency of a green home (Rocky Mountain Institute, 1998; Urban Environmental Institute, 2002), as well as the resource efficiency and habitat value of a yard (Rocky Mountain Institute, 1998; Mizejewski, 2004). Other residential infrastructure, such as roads, sidewalks and driveways can be ecologically enhanced as well (Booth & Leavitt, 1999).

Consumers may be particularly interested in purchasing homes in communities that are more sustainable as the possible benefits of doing so include improved health and longevity (Baum, 2002; Takano, Nakamura, & Watanabe, 2002), increased property values (Nicholls & Crompton, 2005), heightened aesthetic qualities (United States Environmental Protection Agency 2005), improved conditions for children's development (Taylor, Wiley, & Kuo, 1998), promotion of higher levels of physical activity (Frumkin, 2001), higher quality of life (Burgess, Harrison, & Limb, 1988), and saving money through energy efficiency (Stafford, 2003). If we consider green homes and developments to be consumer products, then environmental consciousness may play a role in the purchasing of homes within green communities. A recent survey by the American Society of Interior Designers (ASID) found that developers may have an enormous opportunity in tapping into this green consumerism (American Society of Interior Designers, 2005). With the many solutions that they offer, green communities can provide clean, healthy, and resource efficient living, which may be appealing to consumers for various economic, social, health and environmental reasons. Determining what is currently appealing about green communities and finding ways to tailor marketing efforts to make other facets

equally desirable is crucial for the advancement of green communities in the United States, and beyond.

In this study, comparing new homeowners' in two pairs of conventional and "green" master-planned communities in Florida, my objectives were to: 1) determine whether green design features were more important to new homeowners in green communities, 2) determine the extent to which the green communities' marketing strategies were retained by their new homeowners, and 3) determine trends in perceptions of the term "green."

## **Methods**

### **Study Sites**

#### **Lakewood Ranch**

Lakewood Ranch, an award-winning master-planned golf community situated in Sarasota and Manatee counties, Florida began residential development in 1995. Master-planned development has various amenities and conveniences built into the design like parks, lakes, golf courses, recreational trails, schools and shopping (Jackson & Martin, 2005). It received green certification for all new phases from the Florida Green Building Coalition in 2004, making it the largest master-planned community in the state to be certified green. Lakewood Ranch covers 7,000 acres, half of which is set aside and protected from any future development. This master-planned community is currently partitioned into five villages, which to date hold approximately 6,000 homes. It has won several environmental awards including the 2005 Residential Environmental Award from the Florida Association of Realtors. Starting in 2005, all new residential phases of Lakewood Ranch have adhered to sufficient green standards for Florida Green Building Coalition (FGBC) certification. The phase that I studied, Village of Greenbrook II, was the first in Lakewood Ranch to be composed entirely of green homes and to obtain FGBC's green development certification. It contains both single family homes and townhouse

condominiums. At the commencement of this study, Greenbrook II held 226 townhouse condominiums, and 605 single family homes. Since the building of Greenbrook II, one other phase has been entirely developed to green standards.

Lakewood Ranch contains over 100 miles of trails connecting lakes, parks and preserves. Native flora is encouraged and reclaimed and recycled water is used for irrigation. In May of 2006, Lakewood Ranch Golf and Country Club was designated a "Certified Audubon Cooperative Sanctuary" by the Audubon Cooperative Sanctuary System. To market the community and educate potential homebuyers about environmental features and practices, Lakewood Ranch opened their "Green Gallery," in 2005. Consisting of a model home and yard, this gallery exhibits green design features available for residents. Lakewood Ranch also uses educational brochures and sales tours to market its green design elements.

### **Palmer Ranch**

Palmer Ranch, a master-planned golf community in Sarasota County, Florida began residential development in the late 1980s. Palmer Ranch covers 10,000 acres, with less than 30% protected from any future development. This master-planned community is partitioned into eighteen villages, which to date hold approximately 8,000 homes. Palmer Ranch does not put special emphasis on ecologically responsible development. In 2004, homes began to be built in Serenade, Palmer Ranch's newest village, and I surveyed the residents of this village. It is composed entirely of condominium homes. At the commencement of this study, Serenade held 258 homes. Approximately 13 miles separate Palmer Ranch and Lakewood Ranch.

### **Harmony**

The town of Harmony, located in Osceola County, Florida is an award-winning master-planned golf community that emphasizes human connection to animals and the natural environment. Residential development began in Harmony in 2000. Though it has not sought

green community certification, it contains many of the design features of green communities. Harmony is comprised of 11,000 acres, containing two large 465 and 505 acre lakes; nearly 60% of open spaces are left as natural areas. All of Harmony's homes are Energy Star compliant. Homes are of Traditional Neighborhood Design (TND) and inter-connected for convenient foot, bike or electric cart travel. This master-planned community currently has four villages, which to date hold 320 homes. Harmony has won several environmental awards including the 2003 Residential Environmental Award from the Florida Association of Realtors and the 2006 Best Practices Green Building Award from Sustainable Florida.

Harmony labels itself as an "environmentally intelligent community." Habitat protection is accomplished through open space conservation, a "no build zone" around the lakes, and other natural areas including a 31-acre gopher tortoise habitat and a 2-acre endangered orchid preserve. Trees and shrubs native to Florida have been used in Harmony's 280-acre "golf preserve," and its wetlands, ponds and upland areas are connected to larger natural systems. Harmony is also a Dark Sky compliant community with specialized lights designed to minimize light pollution, and its community pool is heated geothermally. Various environmental education displays and programs are in place in the community. Harmony has a sales center to help market the community and educate potential homebuyers about environmental features and practices. They use a multimedia CD-Rom, educational brochures and site tours for marketing purposes as well.

### **Rock Springs Ridge**

Rock Springs Ridge, a master-planned golf community in Orange County, Florida began residential development in 1997. Rock Springs Ridge covers about 1,000 acres, with no set % protected from any future development. This master-planned community is currently partitioned into six villages, which to date hold approximately 1,500 homes. Rock Springs Ridge does not

put special emphasis on ecologically responsible development. Approximately 57 miles separate Rock Springs Ridge and Harmony.

### **Participant Selection**

I identified potential respondents through online public Property Appraiser's records for Manatee, Sarasota, and Orange Counties, Florida. Osceola county records were not used, as Harmony provided a list of its residents. Criteria for control community selection were based on the conditions present in the two green communities. For Lakewood Ranch, Greenbrook II was a new phase within the larger master-planned community, thus for Palmer Ranch, the new phase of Serenade was selected as a control. For the purpose of this paper, these subdivisions will still be referred to as communities. For Harmony, the entire community is "green," thus for Rock Springs Ridge, the entire community was selected as well. The controls were the closest master-planned communities having comparable home values and a sufficient number of new homeowners. I selected only new homeowners, defined as those listed as owners of a home with a value between \$100,000 and \$500,000 and a sales date between August 2004 and May 2006. Selecting only new homeowners was important as I was most interested in their mindset when last looking for a home, and needed them to recall that earlier time as accurately as possible. I sent a survey to every new homeowner in the four communities. A total of 211, 258, 166, and 304 surveys were sent out to Lakewood Ranch, Palmer Ranch, Harmony and Rock Springs Ridge, respectively. Of these 73, 87, 59 and 121 surveys were returned, giving response rates of 34.6%, 33.7%, 35.5% and 39.8%, respectively.

### **Survey Instrument**

This mail survey was conducted in June of 2006. I modified the Dillman (2000) method as done by Hostetler & Youngentob (2005), formatting the survey booklet and mailing it in a hand addressed envelope. Also included in the envelope was a cover letter and self-addressed

stamped envelope for survey return. The cover letter provided a general explanation of the project and guaranteed respondents' confidentiality. A total of 939 survey questionnaires were sent and respondents were given three weeks from the mailing date to return their surveys. I matched as many owners as possible with his or her listing in the national White Pages for follow-up phone call reminders. I used phone call reminders for all potential respondents with listed numbers who did not respond by the date specified in the cover letter and first page of the survey. I sent an additional survey packet to those requesting one. I called those for whom I left a message a second time one week after the initial call. Those without listed numbers and those reached only through a message were sent a second copy of the survey packet as well.

### **Question Design**

The survey was pre-tested on a group of fifteen homeowners. Due to the small size of communities used in this study, I did not wish to reduce the possible respondent pool by forming a pre-test group from these residents. I instead formed the group from a master-planned community of similar size and characteristics in Gainesville, FL. I adjusted the survey according to recommendations from this group, in order to enhance the question flow and answerability of the final instrument.

The questions addressing green design preferences, green marketing initiatives and demographics were grouped together as part of a larger survey, as was the question on the definition of "green." Because the time since purchase ranged between one and 15 months, the survey instructions specified for respondents to answer the green design questions by recalling their preferences when last looking for a home. Seventeen features associated with green community design were chosen for the survey. The green design preference questions were 5 point Likert-like (1932) scale questions. To determine factors that were most important overall regardless of their "green" value, an open-ended question was used asking respondents to list the

top three reasons for choosing the current home that they live in. This home could be either the one in the study site or another if they had not moved into the study site home yet, were using the study site home as a second home, or keeping it as an investment property.

Questions on green marketing features were tailored to each community pair, based on the existing features that were primarily marketed in the green community through the sales center and sales literature. For Lakewood Ranch, questions were designed after a site visit, where a sales representative took me through Lakewood Ranch, Greenbrook II, and the Green Gallery. Marketing materials were collected and an informal interview with the sales representative was conducted as well. I formed twelve green marketing questions based on the information acquired during this visit. The same questions were repeated in the Palmer Ranch survey, substituting the community name where appropriate. This was done for two reasons: first, to standardize the length and content of the two surveys and second, to control for any information related to these questions that respondents could have received outside of Lakewood Ranch's marketing initiatives.

For Harmony, the same procedure was repeated, but due to the amount of green marketing, an extensive list of questions was formed. This list was provided to the Conservation Manager at Harmony and he chose six questions best representing the environmental issues he felt were stressed most at the sales office. For both community pairs, these questions used true, false, and unsure response choices. Survey questions were balanced by using both correct and incorrect statements. The information provided by the green communities' marketing materials was the sole determinant of whether a statement was true or false.

I was also interested in exploring how respondents in the green communities defined "green," compared to those in the control communities, as this term has been used in various

ways. An open ended question, asking respondents to define “green” in terms of the environment was used to test this. Finally, the ten questions addressing demographics asked participants to choose the best response or fill-in-the-blank (See Appendix A for a list of all survey questions.)

## **Analyses**

### **Quantitative**

To identify possible differences among categorical responses in these two communities for individual questions, a Chi-square test was used for non-normal distributions, except when cell frequency (less than 5) made a Fisher’s Exact test more appropriate. For non-categorical responses a Wilcoxon-Mann-Whitney test was used for non-normal data and ANOVA was used for normal data. Normality was determined using a Kolmogorov-Smirnov test.

Green preference questions were analyzed both individually and combined, as were green marketing questions. For individual green preference questions, I was only interested in features that respondents felt were important and only compared those features with a response mean of 4 or greater, which coincided with “important” or “very important.” For green preference questions, Cronbach’s alpha was used to first determine if a scale combining the questions had an acceptable level of reliability (Cronbach’s alpha of .7 or higher). For marketing questions, Cronbach’s alpha was calculated; however, I was interested in overall index scores regardless of scale reliability. For analysis of green marketing questions, respondents were only awarded a score of “1” when they were correct. No points were awarded for incorrect answers or responses of “unsure.” Test index scores from the marketing questions (number correct out of 12) were also converted to a scale of 100 points for interpretation.

It is possible that differences in demographics between the “green” and conventional homebuyers could have an effect on differences observed in their question responses. To control

for this, I first examined any potential demographic differences using the same statistical tests described above. If demographic differences were uncovered by this analysis, Pearson's correlation matrix was used to determine if these demographic variables significantly correlated to any specific questions. If a demographic difference did significantly correlate to a specific question or to a scale, the demographic could be enhancing or masking differences between the two community types on the response variable. I used an ANCOVA to control for the correlation between the demographic variable and the response variable. This test is robust to violations of the normality assumption, so long as the homogeneity of slopes assumption is not violated when group size is unequal (Levy, 1980). Because the numbers of respondents in my community pairs were not equal, I first used Levene's test to check for homogeneity of slopes on non-normal data. The ANCOVA would show whether there was a difference in the response variable, once the demographic variables were controlled for.

To gauge the answers of nonresponders, I compared the responses of the first 25 % of surveys returned to the responses of the last 25 % in each community pair. I used the same statistical procedures as when comparing the two community types. I assumed that if for the most part, the late responders were not answering significantly differently from the early responders then the non-responders, if coerced to respond, may not differ from responders. For all of the above tests, an alpha value of 0.05 was used.

## **Qualitative**

For the open-ended green definition question, I looked for key terms in the responses. Based on visual analysis, I created five categories: 1) environmental, 2) health and safety, 3) aesthetic, 4) negative, and 5) other. The other category included any responses I could not fit into the first four categories. Because respondents could write as much as they desired, multiple categories were assigned to a single respondent's definition, when appropriate (see Appendix C

for criteria used to assign answers to categories). I summed the total number of responses falling in each category.

The same process was used for the open-ended question asking what features (not necessarily green) were the main reasons respondents chose to purchase their current home. I looked for key terms in the responses that had a high rate of repetition. Based on visual analysis, I created nine categories: 1) location, 2) cost and value, 3) home features, 4) natural environment, 5) neighborhood features, 6) sense of community, 7) safety and privacy, 8) schools, and 9) other. The other category included any responses I could not fit into the first eight categories (see Appendix C for criteria used to assign answers to categories). If respondents listed more than three categories as I defined them, I counted the first three. Regardless of the order they were listed in, the total number of responses falling in each category was recorded for the community as a whole.

## **Results**

### **Demographics**

#### **Lakewood Ranch vs. Palmer Ranch**

Significant differences among these two communities existed for four demographic questions (Table 1-1). Lakewood Ranch homeowners were significantly older and had a higher level of attachment with relation to their status with their home. Of those residing in the home full or part time, Palmer Ranch homeowners had resided in the home longer, and were more likely to rent it out. Correlations existed between three of these demographics and three survey questions (all  $P$  values  $< 0.05$ ). No correlations were found for the difference in time residing in the home. All correlations were taken into account with ANCOVA analyses.

## **Harmony vs. Rock Springs Ridge**

Significant differences between these two communities existed for three demographic questions (Table 1-1). Harmony homeowners were more likely to rent their home out. Rock Springs Ridge homeowners were significantly older and had a higher level of guardianship with relation to their parental status. Correlations existed between two of these demographics and eight other individual questions (all  $P$  values  $< 0.05$ ). No correlations were found for the difference in guardianship. All correlations were taken into account with ANCOVA analyses.

## **Early versus Late Respondents**

When early responders were compared to late responders in the combined pool of Lakewood Ranch and Palmer Ranch homeowners, early responders resided in their home longer and placed less importance on having shopping in walking distance when last looking for a home ( $P < 0.05$ ). In Harmony and Rocks Springs Ridge, early responders placed less importance on having energy-efficient appliances when last looking for a home ( $P < 0.05$ ).

## **Green Design Preferences**

### **Lakewood Ranch vs. Palmer Ranch**

Of the questions targeting green design features, homeowners in both communities had six green design features with a survey response mean of four or greater; five of the six were shared between the two communities (See Table 1-2). A mean of four or greater corresponds to rating a feature as “somewhat important” and “very important.” The five important features shared between new homeowners in both communities were indoor air quality, open green spaces nearby, energy efficiency, energy-efficient appliances, and a walkable community. Palmer Ranch homeowners also ranked water-saving appliances as being important. Of these important features, new homeowners in Lakewood Ranch were only significantly more interested in living in a walkable community (Table 1-2).

For both communities only two features had means less than three, indicating that respondents were leaning to the unimportant side of the neutral point. These two features were having public transportation nearby and having a community dog park. When all green design feature questions were collapsed into a scale (Cronbach's alpha = 0.90) no significant difference was found between the two communities (Table 1-2). Beyond features particularly associated with green development, the top choices for choosing one's current home fell into the same three categories for new homeowners in both communities. These were in order of importance: location (Lakewood Ranch = 24.5 %, Palmer Ranch = 33.5%), home features (Lakewood Ranch = 21.8 %, Palmer Ranch = 18.9%), and cost/value (Lakewood Ranch = 15.4 %, Palmer Ranch = 17.9%).

### **Harmony vs. Rock Springs Ridge**

Of the questions targeting green design features, homeowners in both communities preferred at least six green design features, indicated with a survey response mean of four or greater. The six important features shared between new homeowners in both communities were indoor air quality, open green spaces nearby, energy efficiency, energy-efficient appliances, a walkable community, and water-saving appliances. Of these important features, new homeowners in Harmony were only significantly more interested in living in a walkable community (Table 1-2).

Only two features had means less than three, indicating respondents were leaning to the unimportant side of the neutral point. These were having public transportation nearby (in both communities) and having a community dog park (Rock Springs Ridge only). When all the green design feature questions were collapsed into a scale (Cronbach's alpha = 0.88), Harmony homeowners placed more importance on green design overall (Table 1-2). Beyond features particularly associated with green development, the top choices for choosing one's current home

fell into the same category for one of the three choices in both communities. For new homeowners in Harmony the top three were in order of importance: the natural environment (20.5%), location (19.2%), and cost/value (14.7%). For Rock Springs Ridge these were home features (30.7%), location (19.7%), and neighborhood amenities (13.3%), respectively.

## **Green Marketing**

### **Lakewood Ranch vs. Palmer Ranch**

Of the twelve questions related to green marketing efforts, new homeowners in Lakewood Ranch and Palmer Ranch differed significantly on eight questions (Table 1-3). Lakewood Ranch homeowners were more likely to be correct on the questions concerning the following: the extent of green building in their community; the wildlife-friendly status of their community's golf course; the appearance of green homes; the cost of green homes; the resale value of green homes; the durability of low VOC paints; the performance of Energy Star® appliances and the water conservation associated with the Florida Yards & Neighborhoods program. When all questions were combined into a test index (Cronbach's alpha = 0.78), Lakewood Ranch homeowners scored significantly higher overall (Table 1-3); however on a scale of 100%, this score was a 59.3%.

### **Harmony vs. Rock Springs Ridge**

Of the six questions related to green marketing efforts, new homeowners in Harmony and Rock Springs Ridge differed significantly on five (Table 1-3). On four of the five questions, Harmony homeowners were more likely to be correct. These questions concerned the existence in their community of the following: Dark-Sky compliance, a town-wide environmental covenant, prohibitions against planting invasive-exotic plant species, and a community employed conservation manager. Rock Springs Ridge homeowners were more likely to be correct about the number of trees left in their community after development. When all questions were combined

into a marketing index (Cronbach's alpha = 0.2), Harmony homeowners scored significantly higher overall (Table 1-3); however on a scale of 100%, this score was a 61.7%.

### **Defining “Green”**

#### **Lakewood Ranch vs. Palmer Ranch**

Sixty-seven respondents in Lakewood Ranch and 69 in Palmer Ranch gave definitions of “green.” Many definitions contained references to things that fell under more than one category, resulting in 102 category entries for Lakewood Ranch and 109 for Palmer Ranch (Figure 1). Definitions classified as “environmental” were the most common in both Lakewood Ranch (80.4%) and Palmer Ranch (64.2%). In Lakewood Ranch this was followed by definitions classified as “health & safety” (10.8%) and then “aesthetic” (4.9%) and vice versa for Palmer Ranch (aesthetic = 17.4%, health & safety = 14.7%). No negative definitions were given by homeowners in Lakewood Ranch and only two were given in Palmer Ranch.

#### **Harmony vs. Rock Springs Ridge**

Forty-two respondents in Harmony and 56 in Rock Springs Ridge gave definitions of “green.” Many definitions contained references to things that fell under more than one category, resulting in 73 category entries for Harmony and 128 for Rock Springs Ridge (Figure 1). Definitions classified as “environmental” were the most common in both Harmony (68.5%) and Rock Springs Ridge (53.9%). This was followed by “aesthetic” (Harmony = 19.2%, Rock Springs Ridge = 32.8%) and then “health & safety” (Harmony = 11%, Rock Springs Ridge = 7%) in both communities. Only one negative definition was given by a homeowner in Harmony and only three in Rock Springs Ridge.

## **Discussion**

### **Green Design Preferences**

In the first community pair (Lakewood Ranch and Palmer Ranch), the combined scale indicated no overall difference in new homeowners' desire for features associated with green development. This means when they were last looking for a home, green features were rated similarly between the green master-planned homeowners versus homeowners who bought into the conventional one. In fact, residents in both communities rated the same five green features fairly high and only two features were rated as unimportant. In the second pair (Harmony and Rock Springs), Harmony homeowners did place more importance on green design features overall, stemming from the combined scale analysis. However, both green and conventional community homeowners indicated six green features that they reported were somewhat, or very important when last looking for a home and only two features were rated as unimportant. In both community pairs, having public transportation and a dog park nearby were the only features rated as being unimportant. Features that were important in both pairs were open green spaces, a walkable community, energy efficient appliances, water efficient appliances, indoor air quality and overall energy efficiency, which are advantages of a green community.

These results demonstrate that people may prefer development with green features, as long as the option exists and is well marketed. More and more consumers believe that environmental conditions are worsening (Banerjee & McKeage, 1994) and have become more concerned with how their consumer behaviors effect the environment (Krause, 1993). Identifying the green consumer is a challenge (LaRoche, 2001), but only targeting those consumers identified as green would be a mistake (Polonsky & Rosenberger, 2001). Certain individuals will always be motivated to make environmentally responsible purchases, and others will probably always be indifferent, at least for now. However these individuals represent the outliers, and up to 50% of

consumers express some environmental concern but need the extra push to reflect that concern in their purchases (Ottman, 1998). This group of consumers is made up by people like those surveyed from conventional developments in this study and could be a focus of marketers' attention.

Developing and marketing green communities can benefit more than the environment. Businesses addressing environmental stewardship may create a sustainable competitive advantage (Menon et al., 1999) through enhanced reputation and consumer relations (Arora & Cason, 1996) and improved marketing and financial performance (Miles & Corvin, 2000). In fact the "green" aspect of a community may serve as a tie-breaker for consumers considering equal properties (Peattie, 2001). Of course for a home other important features like location, home features, neighborhood amenities, and cost and value still need to be satisfied, but a home in a green community can also provide this, as these four features were also top reasons green community homeowners reported for choosing a home in my study.

### **Green Marketing**

It appears that Harmony's and Lakewood Ranch's green marketing initiatives were somewhat absorbed by new homeowners. Harmony homeowners scored significantly higher overall and on 4 of the 6 individual questions. Lakewood Ranch homeowners scored significantly higher overall and on 8 of the 12 individual questions. Still on a scale of 100%, Lakewood Ranch homeowners only scored a 59.3% and Harmony homeowners only a 61.7%. For Harmony and Rock Springs Ridge, a low Cronbach's alpha resulted from combining the 6 marketing questions. Though this means the small number of diverse questions was not addressing an overlying construct, I was more interested in totaling the individual score to see not only if they differed between communities, but how they were scoring overall. Results suggest new homeowners retained some, but not all environmental information as a result of the

combined effect of the sales centers, which contained educational materials addressing environmental issues, and sales personnel. The green marketing points that were not better absorbed by Lakewood Ranch homeowners concerned the health threat of indoor air quality, the functioning ability of Energy Star® Appliances, the mental health benefits of natural lighting, and the durability of flooring made from biodegradable materials and those not better absorbed by Harmony homeowners concerned Harmony's gopher tortoise preserve and number of trees left after development. Of these, indoor air quality and energy efficiency were important issues to even conventional homeowners, so better marketing of these issues may be important when targeting the average homebuyer.

The green marketing issues that were retained by Harmony and Lakewood Ranch homeowners may very well be the selling points that resonated best with them, however diversifying marketing techniques can reach even more potential buyers (Peattie, 2001). It is crucial for green marketers to find a way to reach all audiences (McCarty & Shrum 1994). Marketers can also play the role of environmental educators through green initiatives (Mendleson & Polonsky, 1995) and can use campaigns to increase consumer concern about issues to enhance their future customer base (Schlegelmilch & Bohlen, 1996). Training for real estate professionals is perhaps one way to reach consumers about sustainable features within a community, as they usually have the most contact with potential buyers. This can provide immediate benefit for the developer; for example, the Florida Green Building Coalition awards points for such things as staff training, and environmental education in marketing materials (Florida Green Building Coalition, 2003).

Some important determinants of green purchasing behavior are consumers' level of clarity about the product (Scholsberg, 1993), their perception of the problem the product

attempts to alleviate and their responsibility to solve it (LaRoche, 2001), and the degree of compromise associated with the purchase, pitted against the degree of confidence in the product's ability to make a real difference (Peattie, 2001). One other crucial determinant is the social norms associated with purchasing the green product (Kalafatis et al., 1999). As people with various motivations increasingly purchase the green option of a product, others may sense that doing the same is expected. Purchasing a green product can then create a sense of pride, especially with positive reinforcement from family, friends, neighbors, etc. As the green option becomes common, not purchasing it may even create a sense of shame or guilt.

Marketers must be clear about a development's green attributes, advertise the convenience associated with living in a green community, explain the lasting impact of a large, one-time decision to buy a green house and find ways to exhibit the difference they would be making in a way that resonates with them (Brower & Leon, 1999; Bei & Simpson, 1995; LaRoche, 2001). One technique could be using analogies with vivid imagery to convey the amount of money and natural resources saved or pollution prevented over time, resulting from the decision to purchase a green home versus a conventional one. For example, monetary savings over time can be expressed as how many "free years" of energy a homeowner could receive; energy savings could be expressed as the number of schools that can be powered with the community savings a whole; pollution prevention over time can be made equivalent to the number of cars it could "take off" the road; and water savings from appliances can be equated to the capacity of a local water body. This technique can put the impact of the purchase in perspective and demonstrate the large difference this single decision can make, both as an individual purchase of a green home and as one piece in a larger green community.

To promote green consumerism as a social norm, alliances can be formed with credible environmental organizations (Mendleson & Polonsky, 1995). Lakewood Ranch has formed one such alliance with Audubon International for their certified golf course. Forming an alliance with the media is also critical to keeping green issues as a top priority (Thogersen, 2006). Alliances with scientists and other professionals can be beneficial as well (Coddington; 1993); for example Harmony has worked with staff from the United States Centers for Disease Control and Prevention, the American Society for the Prevention of Cruelty to Animals, and with faculty from nine universities in planning their community. In addition, on site education, beyond the sales center, is important to engage residents and increase levels of sustainable practices being adopted (Youngentob & Hostetler, 2005).

### **Defining “Green”**

New homeowners in all four communities predominately defined “green” in the “environmental” category, meaning pro-environment in one way or another. Other definitions included references to human-centered concepts (health and safety) and general references to plant and animal life (aesthetics). If we think of “green” as being synonymous with “sustainable,” defining “green” with human-centered concepts may be equally legitimate. Sustainability has been depicted as three equal rings representing the environmental, social and economic sectors with their intersection being the best case scenario (International Council of Local Environmental Initiative, 1996). People who engage in pro-environmental behaviors like green purchasing have a variety of motives for doing so, including egoistic, social-altruistic, and biospheric concerns (Schultz 2000). Finding the best ways to frame environmental issues to appeal to different people will have a broader effect than using a single angle (Schultz, 2003). An example of this framing technique is used by Lakewood Ranch during the marketing phase,

where the theme in their Green Gallery is “Save your planet, save your money, save your health.” This marketing technique is one that can be expanded in green communities.

Defining “green” with general references to plant and animal life can be both positive and negative. Associating the term with native plants and animals, even for an aesthetic reason is positive, but assuming that any biological life in any place is good for the environment can be dangerous. Invasive species and high numbers of common species without regard to imperiled species are two examples of when the simple presence of biological life is not enough for a healthy environment. Another example is respondents’ repeated reference to the traditional American lawn in their definitions. Further education would be necessary for homeowners who come into a green community with this pre-conceived notion. The most promising result was that even for homeowners in the conventional communities, the term “green” was rarely given a negative definition. This is a legitimate concern as there can be a stigma attached to green housing, when customers believe there are risks involved like cost, aesthetics, safety and convenience (Department of Industry, Technology and Commerce, 1991), but in this case new homeowners did not seem adverse to the concept overall.

## **Conclusion**

Although this research was conducted on four specific communities in Florida, the insights it provides can still be valuable to the future of green development. Green design features were an important consideration for new homeowners, both in green and conventional master-planned communities. Including green elements in the design of more communities, combined with adequate marketing and education through a sales center, can benefit the environment and improve sales. In this study, new homeowners’ perceptions of “green” were not negative and many homeowners preferred green features that could be incorporated in master-planned communities. With a growing concern in the problems caused by the current development

paradigm and a growing interest in solving these problems, green communities represent a way to build a sustainable relationship with the environment that resonates with consumers. It seems that a “green” sales center that educates homeowners about environmental features available within a community can help improve environmental knowledge. However, knowledge is only one step and the translation to sustainable behaviors was not addressed in this study. Future research should not only look at consumer green design preferences and evaluating green marketing efforts on a broader scale, but monitor whether residents translate environmental understanding into everyday practices.

TABLE 1-1. Significant differences in demographics of survey respondents from paired green and conventional communities in Florida

Question	Lakewood Ranch <sup>G</sup> vs. Palmer Ranch						Harmony <sup>G</sup> vs. Rock Springs Ridge						Statistic <i>P</i> -Value	
	n		M		SD		Statistic <i>P</i> -Value	n		M		SD		
	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR		HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	
Status with home in community <sup>a</sup>	71	80	3.87	2.91	1.55	1.82	X <sup>2</sup> = 24.28 <i>P</i> < .0001	-	-	-	-	-	-	-
Length of residence <sup>b</sup>	43	36	0.52	1.17	0.97	0.42	Z = 1.97 <i>P</i> = .049	-	-	-	-	-	-	-
Year of birth, 19__ <sup>c</sup>	70	83	59.41	55.01	12.79	12.97	F = 4.45 <i>P</i> = .037	55	112	63.78	56.54	11.19	11.15	X <sup>2</sup> = 13.83 <i>P</i> = .0002
Do you ever rent out this home? <sup>d</sup>	66	85	0.20	0.45	0.40	0.50	X <sup>2</sup> = 10.39 <i>P</i> = .0001	59	118	0.15	0.03	0.36	0.18	FET <i>P</i> = .011
Parental status <sup>e</sup>	-	-	-	-	-	-	-	59	116	2.78	2.82	1.38	1.21	X <sup>2</sup> = 10.82 <i>P</i> = .013

NOTE: Results based on Chi-squared, Fisher's Exact (FET), Wilcoxon-Mann-Whitney and ANOVA tests where significant difference was found between at least one pair of communities; Green community indicated with a<sup>G</sup>; a. higher mean = higher attachment with home (1 = investment property, 2 = future secondary residence, 3 = future primary residence, 4 = current secondary residence, 5 = current primary residence); b. In years; c. older = lower mean; d. 1 = yes, 0 = no; e. higher mean = more guardianship (1 = no children, 2 = no children reside with respondent, 3 = some children reside with respondent, 4 = all children reside with respondent); Actual question wording can be found in Appendix A.

TABLE 1-2. Important green design features indicated by survey respondents from paired green and conventional communities in Florida

Green Design Feature	Lakewood Ranch <sup>G</sup> vs. Palmer Ranch						Harmony <sup>G</sup> vs. Rock Springs Ridge							
	n	M	SD	Statistic	n	M	SD	Statistic						
	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	P-Value	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	P-Value
Indoor air quality	73	87	4.14	4.40	0.92	1.03	FET <i>P</i> = 0.116	59	121	4.49	4.51	0.77	0.70	F = 2.46 <sup>C</sup> <i>P</i> = 0.088
Open greenspaces nearby	72	87	4.52	4.31	0.82	0.96	FET <i>P</i> = 0.341	59	121	4.66	4.34	0.58	0.81	FET <i>P</i> = 0.072
Energy efficiency	73	87	4.41	4.16	0.88	0.99	FET <i>P</i> = 0.350	59	121	4.53	4.61	0.68	0.61	FET <i>P</i> = 0.414
Energy efficient appliances	73	87	4.25	4.20	0.94	0.95	FET <i>P</i> = 0.915	59	121	4.49	4.55	0.68	0.63	FET <i>P</i> = 0.824
Walkable community*	73	87	4.25	4.11	0.91	0.93	F = 2.84 <sup>C</sup> <i>P</i> = 0.027	59	120	4.58	4.29	0.65	0.95	F = 4.15 <sup>C</sup> <i>P</i> = 0.018
Water saving appliances	73	87	3.93	4.01	0.98	1.03	FET <i>P</i> = 0.831	59	121	4.39	4.27	0.70	0.85	F = 4.15 <sup>C</sup> <i>P</i> = 0.018
Green Preference Scale* ( $\alpha$ = 0.88)	-	-	-	-	-	-		57	111	33.32	39.16	7.82	10.00	F = 14.8 <i>P</i> = 0.0002

NOTE: Results based on Fisher's Exact (FET), ANOVA and ANCOVA tests where means for at least one community were > 4; Green community indicated with a <sup>G</sup>; ANCOVA F values indicated with a <sup>C</sup>; For all questions, a higher mean expresses a higher level of importance placed on the feature when last looking for a home; \*Indicates green community with significantly more interest.

TABLE 1-3. Significant differences in scores on green marketing questions of survey respondents from paired green and conventional communities in Florida.

Question	Lakewood Ranch <sup>G</sup> vs. Palmer Ranch						Harmony <sup>G</sup> vs. Rock Springs Ridge							
	n	M	SD	Statistic	n	M	SD	Statistic						
	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	P-Value	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	P-Value
Since January 2005 every new village in __ has been built "green"	73	87	0.59	0.08	0.49	0.27	F = 23.91 <sup>C</sup> P < 0.0001	-	-	-	-	-	-	
__ has taken steps to make its golf course more wildlife friendly	73	87	0.64	0.05	0.48	0.21	F = 27.09 <sup>C</sup> P < 0.0001	-	-	-	-	-	-	
"Green" homes look different from traditional homes	73	87	0.74	0.34	0.44	0.48	X <sup>2</sup> = 26.09 P < 0.0001	-	-	-	-	-	-	
"Green" homes cost more to maintain than traditional homes	73	87	0.72	0.34	0.45	0.48	X <sup>2</sup> = 22.66 P < 0.0001	-	-	-	-	-	-	
Being "green" decreases a home's resale value	73	87	0.85	0.49	0.36	0.50	X <sup>2</sup> = 23.38 P < 0.0001	-	-	-	-	-	-	
Paints with low Volatile Organic Compounds (low VOC paints) have less durability than traditional paints	73	87	0.31	0.17	0.47	0.38	X <sup>2</sup> = 4.41 P = 0.036	-	-	-	-	-	-	
Energy Star appliances can perform as well as traditional appliances	72	87	0.74	0.59	0.44	0.49	X <sup>2</sup> = 4.16 P = 0.041	-	-	-	-	-	-	
A yard certified by Florida Yards & Neighborhoods can save water	73	87	0.5	0.31	0.50	0.46	X <sup>2</sup> = 6.28 P = 0.0122	-	-	-	-	-	-	
Marketing Test Index (LR/PR $\alpha$ = 0.82, HM/RSR $\alpha$ = 0.62)	72	87	7.12	4.27	3.00	2.97	Z = 5.51 P < 0.0001	59	120	3.7	1.17	2.27	1.96	Z = 9.14 P <.0001
There are fewer trees in __ now than before it was developed*	-	-	-	-	-	-	-	59	120	0.36	0.64	0.49	0.48	X <sup>2</sup> =12.53 P = 0.0004
__ is a Dark-Sky compliant community	-	-	-	-	-	-	-	59	120	0.85	0.15	0.36	0.36	F = 79.43 <sup>C</sup> P < 0.0001
__ residents have a town-wide environmental covenant to follow	-	-	-	-	-	-	-	59	120	0.73	0.06	0.45	0.24	F = 77.18 <sup>C</sup> P < 0.0001
There are at least some prohibitions against planting invasive-exotic plant species in __	-	-	-	-	-	-	-	59	120	0.83	0.07	0.38	0.26	F = 63.98 <sup>C</sup> P < 0.0001
__ employs a full-time conservation manager	-	-	-	-	-	-	-	59	120	0.78	0.17	0.42	0.37	X <sup>2</sup> = 65.72 P < 0.0001

NOTE: Results based on Chi-squared, Fisher's Exact (FET), Wilcoxon-Mann-Whitney, ANOVA and ANCOVA tests where significant difference was found between at least one pair of communities; Green community indicated with a <sup>G</sup>; ANCOVA F values indicated with a <sup>C</sup>; a higher mean expresses a greater number of correct responses; \*Indicates conventional community with higher score.

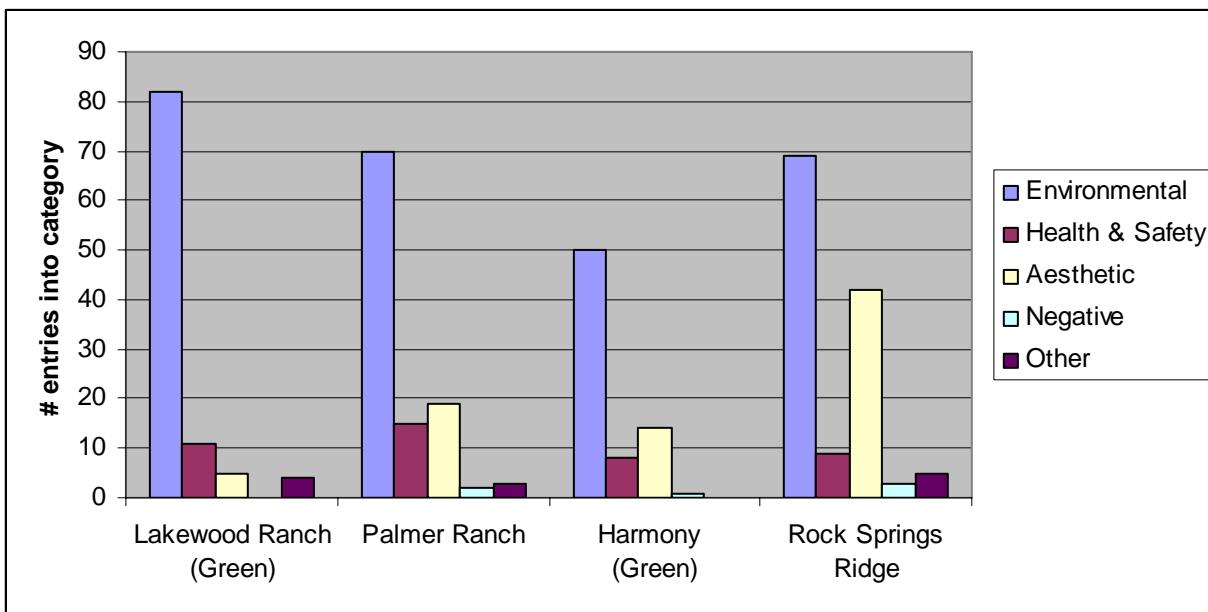


Figure 1-1. Categories of green definitions indicated by survey respondents for paired green and conventional communities in Florida

## CHAPTER 2

### ENVIRONMENTAL KNOWLEDGE, ATTITUDES, AND BEHAVIORS OF NEW HOMEOWNERS IN CONVENTIONAL AND “GREEN” MASTER-PLANNED COMMUNITIES IN FLORIDA

#### **Introduction**

The built environment has changed radically in the United States over the course of the twentieth century (Southworth & Owens 1993). Sprawl, both urban and suburban, has become the overwhelming trend and is characterized by a lack of integrative planning resulting in low-density, auto-oriented, monotypic development (Benfield, Raimi, & Chen, 1999). Though the intention of development in the U.S. may be to make the “American Dream,” a reality, the problems associated with sprawl are now undermining that dream (Duany, Plater-Zyberk, & Speck, 2000). Social problems resulting from the current development paradigm are diverse and include loss of public spaces (Power, 2001), fiscal stress (Burtchell et al., 2005), environmental justice issues (Haughton, 1999), and loss of sense of community (Brown, Burton, & Sweeney, 1998). Many human health issues, both physical and mental have been tied to sprawl (Handy et al., 2002; Weich et al., 2002). Degraded air quality (Frank, 2000) and reduced and degraded water supplies (Otto et al., 2002) are some negative environment effects, and wildlife also suffers from the loss and fragmentation of their habitats (United States Environmental Protection Agency, 2000).

While its definition has been the spark of many debates (Jabareen, 2004), sustainable development seeks to integrate conservation and development, satisfy basic human needs, achieve equity and social justice, provide cultural diversity, and maintain ecological integrity without compromising future generations’ ability to do the same (Brundtland, 1987). Though development by its nature will always leave a footprint behind, this footprint can be minimized through environmentally sensitive development techniques, and such development can also

provide social benefits (Srinivasan, O'Fallon, & Dearry, 2003; Leyden, 2003). In fact there has been a significant call from the American public for such sustainable development, exhibited in the form of hundreds of ballot initiatives (Chen, 2000).

New forms of development are aiming to decrease the negative side effects of conventional development, while simultaneously creating benefits. Some examples of alternative development forms include neotraditional development, urban containment, compact cities, and eco-cities (Jabareen, 2006). Master-planned development aims to foster a sense of community by having various amenities and conveniences built into the design like parks, lakes, golf courses, recreational trails, schools and shopping (Jackson & Martin, 2005). A fairly new alternative is green development, which seeks to minimize negative environmental effects associated with the built environment (Stromberg, 2005). Residential green development incorporates green buildings with site planning and the landscapes that support these buildings (Rocky Mountain Institute, 1998). Certification is available for green development on a national level through the U.S. Green Building Council's Leadership in Energy Efficient Design (LEED) Program (U.S. Green Building Council, 2005), as well as through state-level organizations such as the Florida Green Building Coalition (Florida Green Building Coalition, 2003).

While a green development may boast infrastructure that is more sustainable, there is another piece to the equation. Following the physical design and completed construction of a green community, challenges can arise when people must manage their neighborhood in a sustainable manner, utilizing various environmentally-friendly practices on their own (Youngentob & Hostetler, 2005). Williams and Dair (2006) suggest that there are two types of sustainability associated with sustainable development. The first is "technical sustainability," which is reflected by things like building materials and construction methods used to create

developments and the second is “behavioral sustainability,” which is reflected by the behaviors of residents living in them. Green building and design elements create a community with more technical sustainability than other conventional developments, but it can only truly become a functional green community if residents are utilizing these elements correctly and exhibiting behavioral sustainability (Youngentob & Hostetler, 2005; Williams & Dair 2006).

The reasons for peoples’ engagement or lack thereof in pro-environmental behaviors has been the core subject matter of many theoretical models (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980; Hines, Hungerford, & Tomera, 1986–87; Hungerford & Volk 1990; Blake, 1999; Stern, 2000; Kaplan 2000). Predicting pro-environmental behavior is complex (Kollmus & Agyeman, 2002), involving a vast amount of variables, however one potential predictor of pro-environmental behavior that hasn’t received much attention is the built environment. Though the built environment has been shown to affect physical activity in general (Frank & Engelke, 2001), the effects that it has on behaviors particular to sustainability is still not clearly understood. Some alternative development types, such as New Urbanism, have been promoted as being able to foster such behavioral sustainability (Katz & Scully, 1994; Brown & Cropper, 2001; Congress of New Urbanism, 2001), however evidence exists to the contrary (Till, 2001; Zimmerman, 2001; Youngentob & Hostetler, 2005).

In the case of green development, understanding the level of environmental consciousness (in terms of knowledge, attitude, and behavior) of people buying into these communities is important. It can reveal if people attracted to such developments come with pre-existing behavioral sustainability. If they do not, and assuming that the built environment cannot alone promote the behavioral sustainability necessary for functional green communities, knowledge of this can have major implications for the future design and management of green

developments. For development to be truly sustainable, organization and management may need as much attention as physical design (Talen & Ellis, 2002; Youngentob & Hostetler, 2005).

In this study, comparing new homeowners' in two pairs of conventional and "green" master-planned communities in Florida, my objectives were to: 1) determine whether the environmental knowledge, attitudes, and behaviors of new homeowners differed between conventional and green communities and 2) determine the extent to which residents, within their first year and a half of living in a community, retained any environmental knowledge and behaviors as a result of community interactions or specific education initiatives present in the green communities.

## **Methods**

### **Study Sites**

#### **Lakewood Ranch**

Lakewood Ranch, an award-winning master-planned golf community situated in Sarasota and Manatee counties, Florida began residential development in 1995. It received green certification for all new phases from the Florida Green Building Coalition in 2004, making it the largest master-planned community in the state to be certified green. Lakewood Ranch covers 7,000 acres, half of which is set aside and protected from any future development. This master-planned community is currently partitioned into five villages, which to date hold approximately 6,000 homes. It has won several environmental awards including the 2005 Residential Environmental Award from the Florida Association of Realtors. Starting in 2005, all new residential development in Lakewood Ranch has adhered to sufficient green standards for Florida Green Building Coalition (FGBC) certification. The phase that I studied, Village of Greenbrook II, was the first in Lakewood Ranch to be composed entirely of green homes and to obtain FGBC's green development certification. It contains both single family homes and townhouse

condominiums. At the commencement of this study, Greenbrook II held 226 townhouse homes, and 605 single family homes. Since the building of Greenbrook II, one other village has been entirely developed to green standards.

Lakewood Ranch contains over 100 miles of trails connecting lakes, parks and preserves. Native flora are encouraged and reclaimed and recycled water is used for irrigation. In May of 2006, Lakewood Ranch Golf and Country Club was designated a "Certified Audubon Cooperative Sanctuary" by the Audubon Cooperative Sanctuary System. To market the community to potential residents, Lakewood Ranch opened their "Green Gallery," in 2005. Consisting of a model home and yard, this gallery exhibits green design features available for residents. Lakewood Ranch also uses educational brochures and sales tours to market its green design elements.

### **Palmer Ranch**

Palmer Ranch, a master-planned golf community in Sarasota County, Florida began residential development in the late 1980s. Palmer Ranch covers 10,000 acres, with less than 30% protected from any future development. This master-planned community is partitioned into eighteen villages, which to date hold approximately 8,000 homes. Palmer Ranch does not put special emphasis on ecologically responsible development. In 2004, Serenade became Palmer Ranch's newest village. It is composed of entirely of condominium homes. At the commencement of this study, Serenade held 258 homes. Palmer Ranch and Lakewood Ranch are separated by approximately 13 miles.

### **Harmony**

The town of Harmony, located in Osceola County, Florida is an award-winning master-planned golf community that emphasizes human connection to animals and the natural environment. Residential development began in Harmony in 2002. Though it has not sought

green community certification, it contains many of the design features of green communities. Harmony is comprised of 11,000 acres, containing two large 465 and 505 acre lakes; nearly 60% of open spaces are left as natural areas. All of Harmony's homes are Energy Star® compliant. Homes are of Traditional Neighborhood Design (TND) and inter-connected for convenient foot, bike or electric cart travel. This master-planned community currently has four villages, which to date hold 320 homes. Harmony has won several environmental awards including the 2003 Residential Environmental Award from the Florida Association of Realtors and the 2006 Best Practices Green Building Award from Sustainable Florida.

Harmony labels itself as an "environmentally intelligent community." Habitat protection is accomplished through open space conservation, a "no build zone" around the lakes, and other natural areas including a 31-acre gopher tortoise habitat and a 2-acre endangered orchid preserve. Trees and shrubs native to Florida have been used in Harmony's 280-acre "golf preserve," and its wetlands, ponds and upland areas are connected to larger natural systems. Harmony is also a Dark Sky® compliant community with specialized lights designed to minimize light pollution, and its community pool is heated geothermally. Harmony has a sales center to help market the community and educate potential homebuyers about environmental features and practices. They use a multimedia CD-Rom, educational brochures and site tours for marketing purposes as well.

Once a home is purchased, Harmony seeks to further educate residents about the environment through various programs. Through the Harmony Institute, an independent foundation created to "promote human health and well-being through the interaction of people, animals and the environment," educational programming such as *Living in Harmony, a City for People and Animals* are offered. Harmony contains a WildSide Walk™ of educational kiosks and hosts a website ([www.wec.ufl.edu/extension/gc/harmony](http://www.wec.ufl.edu/extension/gc/harmony)) to help homeowners better

conserve natural resources and abide to Harmony's town-wide environmental covenant. Residents also have access to a monthly on-site Farmer's Market, a monthly newsletter and an online resident journal that promote Harmony's "environmentally intelligent" theme. Resident participation in environmental programs is encouraged through Conservation Club activities and through field trips, outdoor laboratories and habitat studies for students of the on-site schools.

### **Rock Springs Ridge**

Rock Springs Ridge, a master-planned golf community in Orange County, Florida began residential development in 1997. Rock Springs Ridge covers about 1,000 acres, with no set % protected from any future development. This master-planned community is currently partitioned into 6 villages, which to date hold approximately 1500 homes. Rock Springs Ridge does not put special emphasis on ecologically responsible development. Approximately 57 miles separate Rock Springs Ridge and Harmony.

### **Participant Selection**

I identified potential respondents through online public Property Appraiser's records for Manatee, Sarasota, and Orange Counties, Florida. Osceola county records were not used, as Harmony provided a list of its residents. Criteria for control community selection were based on the conditions present in the two green communities. For Lakewood Ranch, Greenbrook II was a new subdivision within the larger master-planned community, thus for Palmer Ranch, the new subdivision of Serenade was selected as a control. For the purpose of this paper, these subdivisions will still be referred to as communities. For Harmony, the entire community is "green," thus for Rock Springs Ridge, the entire community was selected as well. The controls were the closest master-planned communities having comparable home values and a sufficient number of new homeowners. Due to small community sizes and the potential influence of the environmental theme of the survey on the response rate of new homeowners in green

communities, control communities with a higher number of new homeowners were selected to ensure the minimal amount of returned surveys necessary for analysis. New homeowners were defined as those listed as owners of a home with a value between \$100,000 and \$500,000 and a sales date between August 2004 and May 2006. Selecting only new homeowners was important as I was most interested in their mindset when last looking for a home, and needed them to recall that earlier time as accurately as possible. I was also interested in the impact of any community interactions or educational initiatives within the first year and a half of moving into a new community. I sent a survey to every new homeowner in the four communities. A total of 211, 258, 166, and 304 surveys were sent out to Lakewood Ranch, Palmer Ranch, Harmony and Rock Springs Ridge, respectively. Of these 73, 87, 59 and 121 surveys were returned, giving response rates of 34.6%, 33.7%, 35.5% and 39.8% respectively.

### **Survey Instrument**

This mail survey was conducted in June of 2006. I modified the Dillman (2000) method as done by Hostetler & Youngentob (2005), formatting the survey booklet and mailing it in a hand addressed envelope. Also included in the envelope was a cover letter and self-addressed stamped envelope for survey return. The cover letter provided a general explanation of the project and guaranteed respondents' confidentiality. A total of 939 survey questionnaires were sent and respondents were given three weeks from the mailing date to return their surveys. I matched as many owners as possible with his or her listing in the national White Pages™ for follow-up phone call reminders. I used phone call reminders for all potential respondents with listed numbers who did not respond by the date specified in the cover letter and first page of the survey. I sent an additional survey packet to those requesting one. I called those for whom I left a message a second time one week after the initial call. Those without listed numbers and those reached only through a message were sent a second copy of the survey packet as well.

## **Question Design**

The survey was pre-tested on a group of fifteen homeowners. Due to the small size of communities used in this study, I did not wish to reduce the possible respondent pool by forming a pre-test group from these residents. I instead formed the group from a master-planned community of similar size and characteristics in Gainesville, FL. I adjusted the survey according to recommendations from this group, in order to enhance the question flow and answerability of the final instrument.

The questions addressing environmental knowledge, attitudes, and behavior as well as community environmental education and demographics were grouped together as part of a larger survey. Questions addressing environmental knowledge asked respondents to self-rate their level of knowledge on thirteen environmental issues related to development using a 5 point Likert-like (1932) scale. The selection of these issues was based on previous surveys (Roper Worldwide, Inc. 1997, 1999) with additional questions included that addressed other relevant issues. The New Ecological Paradigm (NEP) was used to measure environmental attitude, as it has had wide and diverse use in the past and has been shown to be a reliable scale (Dunlap et al., 2000). Questions addressing environmental behavior were also based primarily on a previous survey (Youngentob & Hostetler, 2005), with additional questions included that addressed more behaviors related to pro-environment lifestyles.

It is possible that through educational materials and programs and/or through conversation with neighbors, the community itself contributed to the level of environmental knowledge or participation in pro-environmental behaviors of new homeowners that have lived in the community for a short period of time. To examine this, I provided respondents with check boxes coinciding to each question on environmental knowledge and behavior and asked them to

denote which knowledge and/or behaviors were influenced by living in the community (See wording of instructions in Appendix A).

Questions on community environmental education efforts (beyond the sales center) were tailored to each community pair, based on the existing features of the green community. At the time of my visit to Lakewood Ranch, no additional educational materials were provided to residents after move-in, thus no additional questions were included for this community pair. For Harmony, questions were drawn from a website ([www.wec.ufl.edu/extension/gc/harmony](http://www.wec.ufl.edu/extension/gc/harmony)) Harmony hosts for homeowners to help them incorporate more environmentally friendly practices in their lives. There are additional environmental education features and programs in Harmony, however the website was chosen because it is equally accessible to all new homeowners and was promoted at the sales center, regardless of their living status with their home in Harmony at the time. Due to the amount of environmental education materials on this website, a thorough list of questions was formed. This list was provided to the Conservation Manager at Harmony to choose six questions best representing the environmental issues he felt were most important. Community environmental education questions used a true, false, or unsure response scale. Statements that were both correct and incorrect, based on the website's content were used to remain balanced. The same questions were repeated in the Rock Springs Ridge survey, substituting the community name where appropriate. This was done for two reasons: First, to standardize the length and content of the two surveys and second, to control for any information related to these questions that respondents could have received outside of Harmony's web site. The information provided by Harmony's website was the sole determinant of whether a statement was true or false. Finally, the ten questions addressing demographics

asked participants to choose the best response or fill-in-the-blank (See Appendix A for a list of survey questions.)

### **Analyses**

To identify possible differences among categorical responses in these two communities for individual questions, a Chi-square test was used for non-normal distributions, except when cell frequency (less than 5) made a Fisher's Exact test more appropriate. For non-categorical responses a Wilcoxon-Mann-Whitney test was used for non-normal data and ANOVA was used for normally distributed data. Normality was determined using a Kolmogorov-Smirnov test.

Environmental knowledge questions were analyzed both individually and combined into a scale, as were environmental behavior questions and questions coming from Harmony's website. Attitude was only analyzed as a scale. For environmental knowledge, attitude and behavior questions Cronbach's alpha was used to first determine if a scale combining the questions had an acceptable level of reliability (Cronbach's alpha of .7 or higher). For questions coming from Harmony's website, Cronbach's alpha was calculated; however, I was interested in overall scores regardless of scale reliability. For these questions from the website, respondents were only awarded a score of "1" when they were correct. No points were awarded for incorrect answers or responses of "unsure." This test score (number correct out of 6) was also converted to a scale of 100 points for interpretation. The total number of boxes checked by respondents reporting they currently used the home in question as a primary or secondary residence, indicating the variables on which living in the community had an influence was counted. The total was compared between all of these respondents and between only those respondents checking at least one box.

It is possible that differences in demographics between the green and conventional homebuyers could have an effect on differences observed in their question responses. To control

for this, I first examined any potential demographic differences using the same statistical tests described above. If demographic differences were uncovered by this analysis, Pearson's correlation matrix was used to determine if these demographic variables significantly correlated to any specific questions. If a demographic difference did significantly correlate to a specific question or to a scale, the demographic could be enhancing or masking differences between the two communities on the response variable. I used an ANCOVA to control for the correlation between the demographic variable and the response variable. This test is robust to violations of the normality assumption, so long as the homogeneity of slopes assumption is not violated when group size is unequal (Levy, 1980). Because the numbers of respondents in my community pairs were not equal, I first used Levene's test to check for homogeneity of slopes on non-normal data. The ANCOVA would show whether there was a difference in the response variable, once the demographic variables were controlled for.

To gauge the answers of nonresponders, I compared the responses of the first 25 % of surveys returned to the responses of the last 25 % in each community pair. I used the same statistical procedures as when comparing the two community types. I assumed that if for the most part, the late responders were not answering significantly differently from the early responders then the non-responders, if coerced to respond, may not differ from responders. For all of the above tests, an alpha value of 0.05 was used.

## Results

### Demographics

#### Lakewood Ranch vs. Palmer Ranch

Significant differences among these two communities existed for four demographic questions (Table 2-1). Lakewood Ranch homeowners were significantly older and had a higher level of attachment with relation to their status with their home. Of those residing in the home

full or part time, Palmer Ranch homeowners had resided in the home longer and were more likely to rent it out. Correlations existed between demographics and seven survey questions. All correlations were taken into account with ANCOVA analyses.

### **Harmony vs. Rock Springs Ridge**

Significant differences among these two communities existed for three demographic questions (Table 2-1). Harmony homeowners were more likely to rent their home out. Rock Springs Ridge homeowners were significantly older and had a higher level of guardianship with relation to their parental status. Correlations existed between demographics and nine other individual questions as well as one scale. All correlations were taken into account with ANCOVA analyses.

### **Early versus Late Respondents**

When early responders were compared to late responders in the combined pool of Lakewood Ranch and Palmer Ranch homeowners, early responders resided in their home longer and participated in environmental education programs more often ( $P < 0.05$ ). In Harmony and Rock Springs Ridge, early responders refused bags at the grocery store less often, and scored significantly higher on the education test index based on Harmony's website.

### **Environmental Knowledge**

#### **Lakewood Ranch vs. Palmer Ranch**

Of the 13 questions targeting environmental knowledge related to development, new homeowners in Lakewood Ranch and Palmer Ranch differed significantly in their knowledge on three issues (Table 2-2). Lakewood Ranch homeowners reported having significantly higher knowledge about "green" development and water conservation in the yard. Palmer Ranch homeowners reported having significantly higher knowledge about air pollution resulting from energy production. When all environmental knowledge questions were collapsed into a scale

(Cronbach's alpha = 0.88) no significant difference was found between the two communities. No issues had means between 1 and 2 (translating into knowing "a lot" or "a fair amount") for Lakewood Ranch. The only issue in Palmer Ranch ranked as such was recycling household items.

### **Harmony vs. Rock Springs Ridge**

Of the 13 questions targeting environmental knowledge related to development, new homeowners in Harmony and Rock Spring Ridge differed significantly in five questions (Table 2-2). Harmony homeowners reported having significantly higher knowledge about air pollution resulting from energy production, biodiversity loss resulting from residential development, "green" development and problems associated with feeding wildlife. Rock Springs Ridge homeowners reported having significantly higher knowledge about recycling household items. When all environmental knowledge questions were collapsed into a scale (Cronbach's alpha = 0.91) Harmony homeowners reported significantly higher knowledge overall. The only issue for which Harmony homeowners had a mean between 1 and 2 (translating into knowing "a lot" or "a fair amount") was the problems associated with feeding wildlife. The only issue in Rock Springs Ridge ranked as such was recycling household items.

### **Environmental Attitude**

No significant differences were found on New Ecological Paradigm scale scores between Lakewood Ranch and Palmer Ranch, or between Harmony and Rock Springs Ridge (all tests  $P > 0.05$ ). The NEP score that coincides with the strongest possible pro-environmental attitude is 75. A score of 15 coincides with the strongest possible anti-environmental attitude, making a score of 45 neutral. All four communities had very close NEP score means, ranging from 37.58 to 38.59 (Lakewood Ranch = 38.59, Palmer Ranch = 38.019, Harmony = 37.58, Rock Springs Ridge = 38.21).

## **Environmental Behavior**

### **Lakewood Ranch vs. Palmer Ranch**

Of the twelve questions targeting pro-environmental behaviors, new homeowners in Lakewood Ranch and Palmer Ranch differed significantly on five questions (Table 2-3). When landscaping, Lakewood Ranch homeowners used native plants more often than Palmer Ranch homeowners and when given the opportunity, they participated in environmental education programs more often than Palmer Ranch homeowners. When going to work or running errands, Palmer Ranch homeowners walked, rode a bike, took a bus, or carpooled instead of taking a personal automobile more often than Lakewood Ranch homeowners. Even when they are more expensive, Palmer Ranch homeowners more often bought an environmentally friendly version of a product instead of other brands when given the option and also more often purchased food labeled "natural" or "organic." When all environmental behavior questions were collapsed into a scale (Cronbach's alpha = 0.75) no significant difference was found between the two communities. The only behavior for which Lakewood Ranch homeowners had a mean between 1 and 2 (translating into engaging in an action "always" or "often") was switching off the light when leaving the room. This was also the case in Palmer Ranch, with the addition of recycling items that can be recycled as well.

### **Harmony vs. Rock Springs Ridge**

Of the twelve pro-environmental behaviors, new homeowners in Harmony and Rock Spring Ridge differed significantly on three questions (Table 2-3). Rock Springs Ridge homeowners recycled trash that can be recycled more regularly. Harmony homeowners walked, rode a bike, took a bus, or carpooled instead of taking a personal automobile more often and when replacing a light bulb they more often used a compact fluorescent bulb. When all environmental behavior questions were collapsed into a scale (Cronbach's alpha = 0.74) no

significant difference was found between the two communities. The only behavior for which Harmony homeowners had a mean between 1 and 2 (translating into engaging in an action “always” or “often”) was switching off the light when leaving the room. This was also the case in Rock Springs Ridge, with the addition of recycling items that can be recycled as well.

### **Initial Community Influence**

#### **Lakewood Ranch vs. Palmer Ranch**

Nearly 58% of respondents living in Lakewood Ranch and only 16.2% from Palmer Ranch checked at least one box out of a possible 25, indicating the issue(s) on which their respective community may have contributed to their knowledge or behavior by providing educational materials/programs or through conversations with neighbors in the community. Of the 185 checked boxes in Lakewood Ranch, 131 coincided with environmental knowledge issues and 54 with pro-environmental behaviors. Of the 57 checked boxes in Palmer Ranch, 28 coincided with environmental knowledge issues and 29 with pro-environmental behaviors. Overall Lakewood Ranch homeowners checked more boxes (Table 2-4); however, when considering only those respondents who checked at least one box, no significant difference was found between the two communities. As a whole, Lakewood Ranch homeowners checked only 4 boxes on average.

#### **Harmony vs. Rock Springs Ridge**

Nearly 46% of respondents from Harmony and 34.5% from Rock Springs Ridge checked at least one box, indicating the issue(s) on which their respective community may have contributed to their knowledge or behavior by providing educational materials/programs or through conversations with neighbors in the community. Of the 91 checked boxes in Harmony, 70 coincided with environmental knowledge issues and 21 with pro-environmental behaviors. Of the 110 checked boxes in Rock Springs Ridge, 64 coincided with environmental knowledge

issues and 46 with pro-environmental behaviors. Both overall and when considering only those respondents who checked at least one box, no significant difference was found between the two communities. As a whole, Harmony homeowners checked less than 2.5 boxes on average.

Of the six questions related to green education efforts associated with the Harmony's environmental web site, new homeowners in Harmony and Rock Springs Ridge differed significantly on four questions (Table 2-4). Harmony homeowners were more likely to be correct on questions concerning the existence of a website to help homeowners incorporate environmentally friendly practices in their lives, on the effects of outdoor cats on wildlife, and on the benefit of forest fires. Rock Springs Ridge homeowners were more likely to be correct on the question concerning yard waste and landfills in Florida. When all questions were combined into a test index (Cronbach's alpha = 0.35), Harmony homeowners scored significantly higher overall (Table 2-4); however, on a scale of 100% this score was a 64.7%.

## **Discussion**

### **Environmental Knowledge and Attitude**

In the first community pair (Lakewood Ranch and Palmer Ranch) there was no difference overall in the amount of reported knowledge of environmental issues related to development, nor in environmental attitudes. From individual questions, green homeowners reported higher knowledge about green development and water conservation in the yard. Higher knowledge of these two issues is not surprising as the Greenbrook II is a certified green development and promotes the Florida Yards & Neighborhood Program in their Green Gallery. Even with these few individual differences there was a lack of knowledge overall, as there was not a single issue on which green community homeowners reported having at least a fair amount of knowledge.

In the other community pair, Harmony residents also did not have significantly different attitudes, but did report higher knowledge overall. Looking at individual knowledge questions,

Rock Springs Ridge homeowners reported more knowledge about recycling household items. This is most likely due to the fact that the City of Apopka (where Rock Springs Ridge resides) has a recycling program in place, while the Town of Harmony does not at the present time. A large proportion of comments written on the Harmony surveys were homeowners expressing their desire for a town wide recycling program.

The fact that the green community scored higher overall in this second community pair may be attributed to Harmony's environmental education efforts (e.g., environmental sales center, environmental web site, kiosks, Conservation Club, etc.), but it could also be that the community attracted a more well-informed buyer, as Harmony resident's did not indicate a greater amount of community influence on knowledge of environmental issues related to development, as indicated by checked boxes. The results from these check boxes should be interpreted with caution however. Though directions for checking boxes in the survey immediately followed the first set of directions, some respondents may have skipped these directions. At times respondents checking no boxes would write in a comment about learning something by living in the community, indicating that skipping this portion of the directions did happen in some instances.

Overall, it may be that Harmony's educational efforts may have reinforced a somewhat informed section of homebuyers, more so than Lakewood Ranch's efforts; however more research is needed to determine how well Harmony's programs are working over time before exporting them to other developments, and this research is currently underway (Hostetler, personal communication). Even though Harmony residents were relatively more knowledgeable, there still remains a paucity of environmental knowledge for Harmony's new homeowners. There was only a single issue (problems associated with feeding wildlife) that Harmony

homeowners reported having at least a fair amount of knowledge. To add to this paucity of knowledge, homeowners in both green communities not only lacked stronger pro-environmental attitudes compared to conventional homeowners, but their overall attitudes tipped toward the anti-environment side of the scale.

Similar to results found by Youngentob and Hostetler (2005), my results show that people buying homes in the green communities are not sufficiently equipped with either the knowledge or attitude necessary to implement sustainable behaviors once they move in. This is not surprising because though the environmental movement has become very visible to the general public during the past few decades, the public's level of environmental knowledge has still been shown to be very low (Coyle, 2005). Alone, increasing environmental literacy and attitudes may not be able to promote pro-environmental behavior, but environmental education can also be seen as a tool to change attitudes, values, and motivation levels (Jensen, 2002). Benefiting from this aspect of environmental education would be crucial in green communities in my study, as their residents' attitudes were no more pro-environmental than those in the conventional communities. Environmental education can also respect and tap into pre-existing knowledge, challenge assumptions, create the opportunity for reflection, reveal areas where people can make the biggest impacts, develop alternatives, and provide opportunities for hands-on learning (Clover, 2002).

## **Environmental Behavior**

There were no differences in the level of engagement in pro-environmental behaviors overall between homeowners in Lakewood Ranch and Palmer Ranch. From individual questions, Lakewood Ranch homeowners reported more engagement in two (using native plants when landscaping and participating in environmental education programs) but Palmer Ranch homeowners also reported more engagement in two other behaviors (using alternative

transportation and purchasing environmentally friendly products). The only behavior that Lakewood Ranch homeowners reported doing often was switching off the light when leaving the room. While this is a positive difference for the environment, switching off lights is probably the easiest of all measured behaviors and in isolation is hardly enough to constitute behavioral sustainability.

The case is similar in Harmony and Rock Springs Ridge. There was no overall difference in pro-environmental behavior. Harmony homeowners reported higher engagement in two behaviors (using alternative transportation and using compact fluorescent light bulbs) but Rock Spring Ridge homeowners reported recycling more often than Harmony green homeowners. Overall, the only behavior that Harmony homeowners reported doing often was switching off the light when leaving the room.

It seems that for both community pairs, even though the green development may have achieved some level of technical sustainability, it is not attracting new homeowners who are any more environmentally conscious and so has yet to achieve behavioral sustainability. This reinforces past research on the inability of other forms of alternative development that seeks to combat the negative effects of sprawl (like New Urbanist development) to encourage sustainable behaviors through physical design alone (Bealey, 2000; Kreiger, 1998). This type of research has been scarce in green developments (but see Youngentob & Hostetler, 2005).

For those new homeowners who were residing in the community at the time of this study, it could be that they have not lived long enough in their respective communities to absorb the possible “social norm” of the green community that may be promoting sustainable behaviors. In addition, barriers may be present that limit the expression of a sustainable behavior (e.g., lack of curbside pickup in Harmony for recyclables.) While some respondents from Harmony wrote that

they took their recyclables to an off-site facility, this was rare. Lack of convenience is a large barrier to sustainable behavior (Green-Demers, Pelletier, & Menard, 1997; Pelletier et al., 1999). This is an example of a barrier that could be removed from the management level to promote behavioral sustainability. Another barrier may be community policies that discourage or prohibit some pro-environmental behaviors. For example, a few respondents from Lakewood Ranch wrote that they were not allowed to compost. It is important that developers (who often form community covenants in the early stages of a development before homeowner associations assume the responsibility), set the tone for behavioral sustainability by not restricting pro-environmental behaviors in community covenants. Under FGBC standards, developments are currently rewarded points for the absence of language that prohibits green practices in covenants and deed restriction (Florida Green Building Coalition, 2003).

Specific design features that can promote sustainable behaviors have been suggested (Holden, 2004; Jabareen 2006). Recently, Williams and Dair, (2006) created a framework for monitoring the actual behavior of residents who live in neighborhoods displaying such physical features. This framework provides a thorough reference of physical features with the specific sustainable behaviors they have been suggested to affect. It can help planners understand the purported relationships between design and behavior and assist researchers in designing more empirical studies to investigate them. In many cases, design may not be enough. The “Research House” in Queensland, Australia, a green house used to learn how people interact with sustainable housing, has shown certain areas where design alone is not enough to make sustainable behaviors a reality (Buys et al., 2005). The ecological footprints (Rees & Wackernagel, 1994) of residents in the Environmental Home Guard, a cooperative of houses in Norway striving to be more green, were found to be no smaller than their counterparts in non-

green communities when all other factors were taken into account (Holden, 2004). Youngentob and Hostetler (2005) found that environmental behaviors did not differ between residents of green residential communities versus conventional residential communities.

### **Initial Community Influence**

Harmony homeowners were more knowledgeable overall of some issues stressed in their community's environmental web site. They specifically knew of this community website, and that some forest fires can be beneficial; however Rock Springs Ridge homeowners were more knowledgeable concerning yard waste going to landfills in Florida. If we think of overall scores as a test, than Harmony homeowners still received a D score (64.6%). It is important to note, however, that this survey used a small number of questions for this measure. More in-depth data on the efficacy of Harmony's environmental education features is needed to see how it affects residents over time, as these are new residents and may have not explored the web site or participated in any educational activities available at Harmony. For both green communities, very few respondents indicated that environmental knowledge or behaviors were enhanced by living in the community. This last result, based on the number of checked boxes should be interpreted with caution as discussed earlier.

### **Going Beyond Design**

If the physical environment cannot produce sustainable behaviors on its own, what else can be done? Sustainable behaviors can be managed through structural change in policies as well as personal changes for individuals (Holden, 2004a; Williams & Dair, 2006a). For example, land use policies and how individuals manage their own yards and neighborhoods can have a direct impact on bird distributions (Hostetler & Knowles-Yanez, 2003). Green development can be coupled with "smart growth" programs that propose environmental, social, and institutional policies to manage these areas for sustainability (Jabareen, 2006). Still, even with these

structural changes, some believe a huge paradigm shift is necessary in individual knowledge, attitudes, and behaviors towards our environment (Hay 2005, 2006).

Recently, there has been increasing attention to psychology's role in promoting sustainable behaviors (Oskamp et al., 2000; Zelezny & Schultz 2000; Werner 1999; Kurz 2002; Schmuck & Schultz 2002). Conservation psychology is “the scientific study of the reciprocal relationships between humans and the rest of nature, with a particular focus on how to encourage conservation of the natural world” (Saunders, 2003). Community developers can collaborate with conservation psychologists to consider how the infrastructure will be used after residents move in (Churchman, 2002).

While traditional environmental education alone may not be enough to foster sustainable behaviors, much attention is now being given to “education for sustainability” (Bonnet, 2002; Knapp, 2002; Herremans & Reid, 2002; Elliot, 1999; Tilbury, 1995). Monroe (2003) suggests that there are two ways to use education for promoting conservation behaviors. The first is to change specific behaviors in the short term, and the second is to cultivate broad environmental literacy for the long term.

To change specific behaviors, social participation and engagement are key elements and are the core features of programs such as the Natural Step for communities (Upham, 2000) and the community visioning process (Ames, 1994). One of the most popular programs for promoting pro-environmental behavior change is community-based social marketing. This technique has been effective in fostering sustainable behavior in communities when it reduces the barriers and increases the benefits of engaging in such behaviors using tools like commitment, reminders, effective messaging, incentives and social diffusion of community norms (McKenzie-Mohr & Smith, 1999). Community-based social marketing is available to

anyone seeking to change behaviors in their community, and there are dozens of successful case studies of communities that have implemented it in order to increase behavioral sustainability.

Hiring a social marketer to help implement community-based social marketing in a green community is one option for community developers to consider (McKenzie-Mohr, personal communication.)

Promoting environmental literacy means using environmental education to foster a sense of responsibility, create a sense of urgency for action, empower people, and create a norm that embraces action (Monroe, 2003). Hay (2005) has suggested that personal involvement in environmental education through activities ranging from ecotourism, outward bound type programs, community land care activities, and helping with environmental research can result in people becoming “ecosynchronous,” which is necessary for the creation of truly sustainable developments. Within a community this type of experiential education can be in the form of resident participation in local habitat projects (Barton, Grant, & Guise, 2003; Bott, 2003). This type of education is already underway in Harmony, through the town’s Conservation Club and its involvement in student projects, however there is currently a small group of participants. Both green communities could benefit by encouraging resident participation in experiential neighborhood projects and programs.

## **Conclusion**

Although this research was conducted on four specific communities in Florida, the insights it provides can still be valuable for the creation of functional green communities that have both technical and behavioral sustainability. As green development types increase in popularity due to the current issues associated with the current development paradigm, it is necessary to ensure that residents are sufficiently educated and empowered to embrace sustainable behaviors in their everyday lives. While the technical sustainability associated with the physical design and

construction of the development may lay the foundation for environmental literacy and sustainable behaviors, more must be done. Planners and developers can work more collaboratively with conservation psychologists and other environmental professionals trained in the social sciences. Policies can be implemented to manage such developments and communities can offer comprehensive environmental education programs for sustainability. Only through the implementation of management and education can these developments become functional green communities.

TABLE 2-1. Significant differences in demographics of survey respondents from paired green and conventional communities in Florida.

Question	Lakewood Ranch <sup>G</sup> vs. Palmer Ranch						Harmony <sup>G</sup> vs. Rock Springs Ridge						Statistic <i>P</i> -Value	
	n		M		SD		Statistic <i>P</i> -Value	n		M		SD		
	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR		HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	
Status with home in community <sup>a</sup>	71	80	3.87	2.91	1.55	1.82	X <sup>2</sup> = 24.28 <i>P</i> < .0001	-	-	-	-	-	-	-
Length of residence <sup>b</sup>	43	36	0.52	1.17	0.97	0.42	Z = 1.97 <i>P</i> = .049	-	-	-	-	-	-	-
Year of birth, 19__ <sup>c</sup>	70	83	59.41	55.01	12.79	12.97	F = 4.45 <i>P</i> = .037	55	112	63.78	56.54	11.19	11.15	X <sup>2</sup> = 13.83 <i>P</i> = .0002
Do you ever rent out this home? <sup>d</sup>	66	85	0.20	0.45	0.40	0.50	X <sup>2</sup> = 10.39 <i>P</i> = .0001	59	118	0.15	0.03	0.36	0.18	FET <i>P</i> = .011
Parental status <sup>e</sup>	-	-	-	-	-	-	-	59	116	2.78	2.82	1.38	1.21	X <sup>2</sup> = 10.82 <i>P</i> = .013

NOTE: Results based on Chi-squared, Fisher's Exact (FET), Wilcoxon-Mann-Whitney and ANOVA tests where significant difference was found between at least one pair of communities; Green community indicated with a<sup>G</sup>; a. higher attachment with home = higher mean; b. In years c. older = lower mean d. 1 = yes; 0 = no. e. more guardianship = higher mean; Actual question wording can be found in Appendix A.

TABLE 2-2. Significant differences in environmental knowledge of survey respondents from paired green and conventional communities in Florida

Environmental Issue	Lakewood Ranch <sup>G</sup> vs. Palmer Ranch							Harmony <sup>G</sup> vs. Rock Springs Ridge						
	n	M	SD	Statistic	n	M	SD	Statistic	n	M	SD	n	M	P-value
	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	P-value	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	P-value
Water conservation in your yard	71	86	3.69	3.59	0.92	1.21	F = 2.98 <sup>C</sup> P = 0.054	-	-	-	-	-	-	-
Air pollution resulting from energy production	71	86	2.96	3.01	1.06	1.11	F = 3.14 <sup>C</sup> P = 0.046	59	119	3.37	2.90	0.93	1.14	X <sup>2</sup> = 11.13 P = 0.025
"Green" development	71	85	3.45	2.86	0.94	1.26	X = 16.56 P = 0.002	59	117	3.19	2.72	1.06	1.29	X <sup>2</sup> = 12.00 P = 0.017
Biodiversity loss resulting from residential development	-	-	-	-	-	-	-	59	120	3.02	2.68	0.99	1.26	X <sup>2</sup> = 9.80 P = 0.044
Recycling household items*	-	-	-	-	-	-	-	59	120	3.86	4.12	1.05	0.85	F = 7.36 <sup>C</sup> P = 0.0009
Problems associated with feeding wildlife	-	-	-	-	-	-	-	59	118	4.14	3.45	0.85	1.26	F = 7.55 <sup>C</sup> P = 0.0007
Environmental Knowledge Scale ( $\alpha = 0.88$ )	-	-	-	-	-	-	-	55	111	32.67	35.79	8.28	10.10	Z = -1.92 P = 0.055

NOTE: Results based on Chi-squared, Wilcoxon-Mann-Whitney and ANCOVA tests where significant difference was found between at least one pair of communities; Green community indicated with a <sup>G</sup>; ANCOVA F values indicated with a <sup>C</sup>; For all questions, a higher mean expresses a higher level of self-reported knowledge about the environmental issue; \*Indicates environmental issue that conventional community reported higher knowledge about.

TABLE 2-3. Significant differences in pro-environmental behavior of survey respondents from paired green and conventional communities in Florida

Question	Lakewood Ranch <sup>G</sup> vs. Palmer Ranch						Harmony <sup>G</sup> vs. Rock Springs Ridge							
	n	M	SD	Statistic	n	M	SD	Statistic						
	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	P-value	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	P-value
Even when they are more expensive, how often do you buy an environmentally friendly version of a product instead of other brands when given the option?*	73	88	2.88	2.93	0.97	1.06	F = 4.01 <sup>C</sup> P = 0.020	-	-	-	-	-	-	
When given the option, how often do you purchase food labeled "natural" or "organic"?*	73	88	2.48	2.83	0.99	1.15	F = 3.21 <sup>C</sup> P = 0.043	-	-	-	-	-	-	
When landscaping, how often do you use only native plants?	70	81	3.24	2.60	1.23	1.27	X <sup>2</sup> = 13.75 P = 0.008	-	-	-	-	-	-	
When given the opportunity, how often do you participate in environmental education programs?	71	87	2.04	1.86	0.96	1.01	FET P = 0.0141	-	-	-	-	-	-	
When going to work or running errands, how frequently do you walk, ride a bike, take a bus, or carpool instead of taking a personal automobile?*	73	88	1.56	1.92	0.88	1.15	FET P = 0.05	59	121	1.73	1.45	0.98	0.77	F = 3.3 <sup>C</sup> P = 0.039
How regularly do you recycle trash that can be recycled?*	-	-	-	-	-	-	-	59	121	2.76	4.12	1.59	1.18	F = 22 <sup>C</sup> P < .0001
When replacing a light bulb, how often do you use a compact fluorescent bulb?	-	-	-	-	-	-	-	59	119	2.80	2.69	1.44	1.29	F = 3.88 <sup>C</sup> P = 0.023

NOTE: Results based on Chi-squared, Fisher's Exact (FET) and ANCOVA tests where significant difference was found between at least one pair of communities; Green community indicated with a <sup>G</sup>; ANCOVA F values indicated with a <sup>C</sup>; For all questions, a higher mean expresses a higher level of engagement in pro-environmental behaviors; \*Indicates pro-environmental behavior that conventional community engages in more.

TABLE 2-4. Differences in retention of green education efforts and initial influence of community on knowledge and behavior of survey respondents from paired green and conventional communities in Florida

Question	Lakewood Ranch <sup>G</sup> vs. Palmer Ranch								Harmony <sup>G</sup> vs. Rock Springs Ridge							
	n	M	SD	Statistic	P-value	n	M	SD	Statistic	P-value						
	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR	LR <sup>G</sup>	PR		HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR	HM <sup>G</sup>	RSR			
Community influence (all respondents using home as primary or secondary residence)*	45	37	4.11	1.54	6.6	4.82	Z = 3.87 <i>P = 0.0001</i>	37	110	2.46	1.55	4.06	4.07	Z = 0.41 <i>P = 0.49</i>		
Community influence (only respondents checking at least one box)**	25	6	7.12	9.5	8.11	10.57	Z = -0.05 <i>P = 0.963</i>	17	38	5.35	4.47	5.48	5.81	Z = 0.69 <i>P = 0.49</i>		
(Community name) has a website to help homeowners incorporate environmentally friendly practices in their lives	-	-	-	-	-	-	-	59	120	0.68	0.18	0.50	0.39	F = 28.28 <sup>C</sup> <i>P &lt; .0001</i>		
In Florida, yard waste is allowed in landfills**	-	-	-	-	-	-	-	59	120	0.12	0.29	0.32	0.46	F = 4.84 <sup>C</sup> <i>P = 0.009</i>		
Outdoor cats are harmless for wildlife	-	-	-	-	-	-	-	59	120	0.67	0.54	0.48	0.50	F = 3.38 <sup>C</sup> <i>P = 0.0362</i>		
All forest fires are detrimental	-	-	-	-	-	-	-	59	120	0.8	0.65	0.40	0.49	X <sup>2</sup> = 6.70 <i>P = 0.0096</i>		
Education Test Index	-	-	-	-	-	-	-	59	120	3.88	2.84	2.27	1.96	F = 6.71 <sup>C</sup> <i>P = 0.0003</i>		

NOTE: Results based on Chi-squared, Wilcoxon-Mann-Whitney and ANCOVA tests; Green community indicated with a<sup>G</sup>; ANCOVA F values indicated with a<sup>C</sup>; P-values for significant differences are indicated in italics; a higher mean expresses more correct responses; \*Measured as total number of checked boxes for environmental knowledge issues and pro-environmental behaviors; \*\*Indicates question on which conventional community reported higher level of community influence, or had more correct responses.

## APPENDIX A

### SURVEY QUESTIONS

The following are the 17 survey questions addressing green design preferences. Respondents were asked report how important each was when they were last looking for a home. All questions used a 5-point Likert-scale. All 17 questions were included in the Green Design Preference Scale.

- 1) Energy efficiency
- 2) Indoor air quality
- 3) Water-saving appliances
- 4) Energy-efficient appliances
- 5) House made from environmentally-friendly materials
- 6) Environmentally-friendly regulations for the community
- 7) Open green spaces nearby
- 8) Ability to see wildlife
- 9) Preservation of natural habitat
- 10) Shopping in walking distance
- 11) Greater sense of community
- 12) Walkable community
- 13) Smaller negative environmental impact
- 14) Reduced yard maintenance
- 15) Ability to see the stars
- 16) Public transportation nearby
- 17) Dog park nearby

The following are the 13 survey questions addressing environmental knowledge. Respondents were asked report how much they felt they knew about each issue. They were also provided a box to check for each issue, if they felt the community had contributed to their knowledge of the issue by providing educational materials/programs and/or through conversation with neighbors. All questions used a 5-point Likert-scale. All 13 questions were included in the Environmental Knowledge Scale.

- 1) Water pollution resulting from residential communities
- 2) Air pollution resulting from energy production
- 3) Biodiversity loss due to residential development
- 4) Problems caused by invasive exotic plants
- 5) Energy conservation at home
- 6) “Green” development
- 7) Recycling household items
- 8) Problems associated with feeding wildlife
- 9) Availability of locally grown foods
- 10) Wildlife native to your area
- 11) *Energy Star* Program
- 12) Water conservation at home
- 13) Water conservation in the yard

The following are the 15 New Ecological Paradigm (NEP) scale questions addressing environmental attitude. Respondents were asked report how much they agreed with each statement. All questions used a 5-point Likert-scale.

- 1) We are approaching the limit of the number of people the earth can support
- 2) Humans have the right to modify the natural environment to suit their needs
- 3) Humans are severely abusing the environment
- 4) Human ingenuity will ensure that we do NOT make the earth unlivable
- 5) When humans interfere with nature it often produces disastrous consequences
- 6) The earth has plenty of natural resources if we just learn how to develop them
- 7) Plants and animals have as much right as humans to exist
- 8) The balance of nature is strong enough to cope with the impacts of modern industrial nations
- 9) Despite our special abilities humans are still subject to the laws of nature
- 10) The so-called “ecological crisis” facing humankind has been greatly exaggerated
- 11) The earth is like a spaceship with limited room and resources
- 12) Humans were meant to rule over the rest of nature
- 13) The balance of nature is very delicate and easily upset
- 14) Humans will eventually learn enough about how nature works to be able to control it
- 15) If things continue on their present course, we will soon experience a major ecological catastrophe

The following are the 12 survey questions addressing environmental behavior. Respondents were asked report how often they engaged in each behavior. They were also provided a box to check for each issue, if they felt their community had contributed to their engagement in a behavior by providing educational materials/programs and/or through conversation with neighbors. All questions used a 5-point Likert-scale. All 12 questions were included in the Environmental Behavior Scale.

- 1) How regularly do you recycle trash that can be recycled?
- 2) How frequently do you turn off the faucet while brushing your teeth to conserve water?
- 3) Even when they are more expensive, how often do you buy an environmentally friendly version of a product instead of other brands when given the option?
- 4) When checking-out at a grocery store, how often do you refuse a paper or plastic bag when you only have a few items?
- 5) When going to work or running errands, how frequently do you walk, ride a bike, take a bus, or carpool instead of taking a personal automobile?
- 6) How often do you try to find alternatives to using common household (including lawn) chemicals because you are worried about how they might affect the environment
- 7) When given the option, how often do you purchase food labeled “natural” or “organic”?
- 8) How often do you compost organic materials instead of placing them in the trash?
- 9) When landscaping, how often do you use only native plants?
- 10) When replacing a light bulb, how often do you use a compact fluorescent bulb?
- 11) When leaving a room, how often do you switch the light off?

- 12) When given the opportunity, how often do you participate in environmental education programs?

The following are the 18 survey questions addressing the marketing initiatives of the green communities. Respondents were asked to choose true, false, or unsure for each statement. All questions were included in the Green Marketing Test Index.

#### Lakewood Ranch and Palmer Ranch

- 1) Since January, 2005 every new village in *Community Name* has been built “green”
- 2) *Community Name* has taken steps to make its golf course more wildlife friendly
- 3) “Green” homes look different from traditional homes
- 4) “Green” homes cost more to maintain than traditional homes
- 5) Being “green” decreases a home’s resale value
- 6) Indoor air quality is the nation’s leading environmental health problem
- 7) Paints with low Volatile Organic Compounds (low VOC paints) have less durability than traditional paints
- 8) *Energy Star* appliances can perform as well as traditional appliances (i.e. wash dishes as well)
- 9) Natural lighting has been shown to have greater mental health benefits compared to electric lighting
- 10) Flooring made from biodegradable materials cannot be durable
- 11) A yard certified by *Florida Yards & Neighborhoods* can save water
- 12) Native plants are better able to attract wildlife than non-native plants

#### Harmony and Rock Springs Ridge

- 1) There are fewer trees in *Community Name* now than before it was developed
- 2) *Community Name* is a *Dark-Sky* compliant community
- 3) *Community Name* residents have a town-wide environmental covenant to follow.
- 4) There are at least some prohibitions against planting invasive-exotic plant species in *Community Name*
- 5) *Community Name* employs a full-time conservation manager
- 6) *Community Name* has a gopher tortoise preserve

The following are the 6 survey questions addressing the community environmental education initiatives in Harmony. Respondents were asked to choose true, false, or unsure for each statement. All questions were included in the Community Education Test Index.

- 1) Harmony has a website to help home owners incorporate environmentally-friendly practices into their lives
- 2) It is safe for compact fluorescent bulbs be disposed of in the regular trash
- 3) The color of your roof can affect your energy bills
- 4) In Florida, yard waste is allowed in landfills
- 5) Outdoor cats are harmless for wildlife
- 6) All forest fires are detrimental

The following question addressed reasons for choosing one's current home. Respondents were asked to write in their top 3 reasons.

- 1) Please list three reasons why you chose to live in your current home, in the order of their importance to you.

The following question addressed perceptions of the term "green." Respondents were asked to write in a definition.

- 1) In your own words, please write down what you think the term "green" means, in reference to the environment.

The following are the 15 questions addressing demographics. Respondents were asked to choose the best response, or fill-in-the-blank.

- 1) Which statement best represents your status with the home you have purchased in *Community Name*? It is my permanent address and I have been living here for \_\_\_\_\_ years \_\_\_\_\_ months; It will be my permanent address, but I have not moved in yet; It has been used as a second home for \_\_\_\_\_ years \_\_\_\_\_ months; It will be used as a second home, but I have not moved in yet; It is strictly income property
- 2) Which statement best represents your parental status? I have no children; I have a child or have children, but none reside with me; I have a child or have children, but only some reside with me; I have child or have children, and they all reside with me
- 3) I am: Female; Male
- 4) I was born in 19\_\_\_\_\_
- 5) My ethnic background is (check all that apply) Caucasian (White); African American; Latino/Hispanic; Native American; Other \_\_\_\_\_
- 6) Do you ever rent-out your property in *Community Name*? Yes; No
- 7) What is your current career field? \_\_\_\_\_
- 8) Do you consider yourself a: Democrat; Republican; Independent; Other
- 9) What is the highest level of education that you have completed? High school or less; Some College (including Associates Degree); Bachelor's Degree; Master's Degree or other professional degree; Doctorate Degree

## APPENDIX B SURVEY COVER LETTER

The following is a copy of the cover-letter that was mailed to every selected participant along with the survey questionnaire and a stamped, self-addressed return envelope.



**IFAS**

Department of Wildlife Ecology & Conservation

June 1, 2006

215 Newins-Ziegler Hall  
PO Box 110430  
Gainesville, FL 32611-0430  
(352) 846 - 0568  
[www.wec.ufl.edu](http://www.wec.ufl.edu)

Hello. My name is Krystal Noiseux, and I am a graduate student at the University of Florida. I am conducting a study in conjunction with the University of Florida to learn about homeowner interactions with their environment as well as homebuyer community design preferences. You were selected from a group of recent Florida community homebuyers. **Regardless** of whether or not you have moved to *Community Name* yet, or whether or not you will move there full or part time in the future, *the success of this study depends on your participation!*

Enclosed is a questionnaire for you to complete at your leisure. It should only take 15 minutes. **Please** do not throw this away. This is a University study and there are no commercial agencies involved in this research. We hope to publish the results of this study in widely read academic journals and make use of this information locally to create programs and opportunities that meet your interests as well as the interests of homebuyers in the future. The benefit of participating in this study is the opportunity to have your voice heard, and the chance to shape communities for the better in the future!

You do not have to answer any question which you do not wish to answer. Your name and address will not appear in any public materials or publications relating to this study or provided to any outside sources. Because your honest participation is valued, **all responses will be kept anonymous, and your identity as a participant will be kept strictly confidential to the full extent of the law.** There are no anticipated risks or compensation for participating in this study. Your participation is completely voluntary and you may withdraw your consent at anytime without penalty.

Anyone whose name is on the deed of the home within the *Community Name* community in *City*, Florida can complete the survey. Please mail only the survey booklet in the enclosed, pre-paid envelope by June 21<sup>st</sup> or as soon after as possible. If you would like to know the results of our study, I would be happy to share them with you. As a graduate student working to make communities better for people and for the environment, I want to thank you in advance for your time and participation!

Sincerely,

Krystal K. Noiseux  
University of Florida  
Department of Wildlife Ecology & Conservation  
Email: knoiseux@ufl.edu  
Phone: (352) 846-0647

Dr. Mark Hostetler  
Asst. Professor, Extension Wildlife Specialist  
Department of Wildlife Ecology & Conservation  
Email: hossman@ufl.edu  
Phone: (352) 846-0568  
Fax: (352) 392-6984

If you have any questions about your rights as a participant or the confidentiality of the information you provide, you can contact the UF Institutional Review Board (UFIRB), University of Florida, Box 112250, Gainesville, FL 32611, ph: (352) 392-0433.

## APPENDIX C

### CRITERIA FOR ASSIGNING CATEGORIES

The following are the eight categories used to classify definitions of “green.” Listed for each are general descriptions of write-in responses that were placed in each category.

- 1) Environmental:** energy efficiency, general efficiency, alternative energy, natural light, natural ventilation, conservation of a particular resource (water, fossil fuels, etc.), future, renewables, stewardship, environmentally conscious, environmentally aware, environmental concern, getting educated about the environment, respect for the environment, balance, co-existence, ratio of nature to development, build with nature, work with nature, and laws of nature, environmentally-friendly, ecologically-friendly, ecologically sound, smaller impact, smaller footprint, less destruction, specific environmentally friendly techniques (recycling, composting, etc.), less destructive, conservation, preservation, protection, restoration, back to nature, in natural state, close to natural state
  - 2) Health & Safety\*:** safer, safe product, health, non-toxic, natural products, organic products, low emissions, less pollution, no chemicals, no littering, a particular clean resource (air, water, etc.)
  - 3) Aesthetic:** things that are the color green, trees, shrubs, flowers, natural surroundings, nature, oxygen producing, alive, life, thriving, proliferation, wildlife, animals, parks, greenspaces, upkeep lawn, lawn maintenance
  - 4) Negative:** anything anti-environment
  - 5) Other:** any responses we could not fit into the first seven categories
- \*Note: While resources and products that are safer and/or healthier to humans are safer for the environment as well and can arguably be categorized as such, this category was created for those things more commonly associated with human health than other things falling in the environmental category.

The following are the nine categories used to classify respondents’ top three reasons for choosing their current home. Listed for each are general descriptions of write-in responses that were placed in each category.

- 1) Location:** general location, liked area, and location to or convenience to work/school/highway/shopping/restaurants/family/friends/other specific area, away from traffic/noise/urban areas, weather, climate, sunshine, quiet, peaceful
- 2) Cost/Value:** cost, price, value, investment, re-sale value, home market, appreciation, affordability, taxes, warranty
- 3) Home Features:** home size, floor plan, garage, beautiful home, layout, design, room, lot, newer, better quality, aesthetics, nicer, pool, storage, comfortable, appearance, acres, style, features included, cleanliness, view of pool specifically, balcony, yard, meets needs, condo, space, well-built, builder reputation, name of builder, efficiency
- 4) Natural Environment:** view, greenspace, large trees, beautiful surroundings, environment, nature, wildlife, lake, parks, trails, plants, countryside, preservation, green community, woods, river, horses, reserve, setting, organic farm, dark sky, environmentally-friendly, restricted development, environmental programs, rural, low impact building, conservation

- 5) **Neighborhood Features:** amenities, golf, upkeep, maintenance, recreational facilities, new, common areas, dog park, upscale, size, attractive, desirable, parks, not cookie-cutter, wide streets, walking paths, landscaping, sidewalks
- 6) **Community:** anything referring to community, neighborhood, atmosphere, subdivision, neighbors (planned, vision, values, family-oriented, sense of, etc.)
- 7) **Safety & Privacy:** safety, security, gated, privacy
- 8) **Schools:** good schools, quality schools
- 9) **Other:** any responses we could not fit into the first eight categories

**APPENDIX D**  
**SCRIPT FOR REMINDER PHONE CALL**

Phone call reminders were given to respondents that failed to return their questionnaire within three weeks. The following script was used for these reminders.

**Hello. May I please speak to Mr. or Ms. (insert participants name here)? Hi. My name is Krystal Noiseux, and I am a graduate student at the University of Florida. I am conducting a study in conjunction with the University of Florida to learn how homeowners interact with their community and the environment.**

**You should have received a questionnaire from me in the mail approximately 3 weeks ago. Your participation is extremely important to the success of our research. According to my records, I have not received your response, and I am calling to request that you please return your completed booklet as soon as possible.**

**If you have lost or misplaced your booklet I would be happy to send you another copy.**

(If this is an answering machine message) **You can reach me in my office at The University of Florida's Department of Wildlife Ecology and Conservation at 352-846-0647 or at my e-mail address which is knoiseux@ufl.edu. Feel free to contact me for a replacement survey or to answer any questions that you might have. If you have already returned your survey, thank you and please disregard this message.**

(If this is a live conservation and the participant responds that they need another survey)  
**I will mail you a replacement questionnaire this week and I'll look forward to receiving your response.** (Skip to end remark.)

(If respondent seems hesitant) **Are there any questions that I can answer for you?** (If response is no, skip next. If yes or hesitant, continue to next.)

(If appropriate) **This is a University study and there are no commercial agencies involved. Your identity as a participant will be kept completely confidential and you do not have to answer any question that you do not wish to answer.**

(If they have not expressed an unwillingness to participate and they tell me that they do not need another survey) **Can I look forward to receiving your response?**

**Thank you very much** (for your participation). **Have a wonderful** (morning, afternoon, evening).

**APPENDIX E**  
**UFIRB APPROVED PROPOSAL**

The following is the final UFIRB approved research outline.

**1. TITLE OF PROTOCOL:**

You, the Environment, and Your Community

**2. PRINCIPAL INVESTIGATOR(s):** Krystal Noiseux, Master's Student, Master's Research, Department of Wildlife Ecology and Conservation, Home Address: 519 NE 5<sup>th</sup> Street, Gainesville, FL 32601, Phone: (321) 695-1972, E-Mail: knoiseux@ufl.edu

**3. SUPERVISOR (IF PI IS STUDENT):** Dr. Mark Hostetler, Department of Wildlife Ecology and Conservation, Wildlife Extension Office, Newins-Ziegler Hall, University of Florida, Phone: (352)846-0568, E-Mail: hoszman@ufl.edu, Fax: (352)392-6984

**4. DATES OF PROPOSED PROTOCOL:** From May 2006 to May 2007

**5. SOURCE OF FUNDING FOR THE PROTOCOL:**

Lakewood Ranch, Town of Harmony

**6. SCIENTIFIC PURPOSE OF THE INVESTIGATION:**

The purpose of this research is (1) to identify whether or not people purchasing homes in a green community differ from those purchasing homes in a non-green community in terms of their environmental knowledge, attitudes, and behaviors as well as preference for green design elements, and (2) to evaluate the extent to which the green design elements, environmental education features, and marketing strategies are absorbed and understood by those living in the green community. It is important to know what works for attracting people to purchase homes in such communities and how to foster sustainable behaviors and attitudes once people move in. Such information will help to tailor education and marketing efforts to create functioning sustainable communities.

**7. DESCRIBE THE RESEARCH METHODOLOGY IN NON-TECHNICAL LANGUAGE.**

This research will require participants to take part in a written mail survey that will be sent to the home of each potential respondent, to be filled out in the privacy of their home and returned to the researcher, via mail, once they are finished.

**8. POTENTIAL BENEFITS AND ANTICIPATED RISK.**

There are no foreseen physical, psychological, or economic risks involved for the participants taking part in this survey. The respondents will be assured of the confidentiality of their responses in the cover letter that will accompany the survey and they will not be required to pay for any postage to mail or receive the survey.

**9. DESCRIBE HOW PARTICIPANT(S) WILL BE RECRUITED, THE NUMBER AND AGE OF THE PARTICIPANTS, AND PROPOSED COMPENSATION (if any):**

Potential respondents (participants) will be sent a survey packet to their home address in the mail. If the potential respondent does not return the completed survey in the included self-addressed, stamped envelope, then two more attempts (maximum) will be made to reach the participants by sending them a second and third copy (if necessary) of the survey packet in the mail to their home address. The participants will be chosen from property appraiser records of homes within one of four communities

The neighborhoods will be selected based upon size (200-250 households), type (master-planned sub-communities), status (green or non-green), price range (\$100,000 to \$400,000), and location (Osceola, Manatee, and Sarasota Counties, FL). The participants will be adults, age 18 or older. The maximum number of participants that I plan to recruit will not exceed 1000. The participants will not receive any monetary compensation. The survey packet that they receive will provide them with the information necessary to find out the results of this survey if they are interested.

Additionally, survey respondents who do not respond to the first mailing within three weeks may be contacted by telephone between the hours of 9 am and 9 pm to remind them to please return their survey booklet. A maximum of two answer machine messages may be left to attempt to contact the recipient. I will make no more than two attempts to contact the potential participant by phone. Please review the attached telephone script. The survey will not be administered by phone. The phone call will only serve to remind the participant to return their mail questionnaire and let us know if we need to send the participant another copy of the survey and consent form.

**10. DESCRIBE THE INFORMED CONSENT PROCESS. INCLUDE A COPY OF THE INFORMED CONSENT DOCUMENT (if applicable).**

Potential participants will receive the survey booklet in the mail with a cover-letter that informs them of their rights and the confidentiality agreement. A copy of the cover-letter and the survey are included as attachments.

Please use attachments sparingly.

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Principal Investigator's Signature

---

Supervisor's Signature

I approve this protocol for submission to the UFIRB:

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Dept. Chair/Center Director Date

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## BIOGRAPHICAL SKETCH

Krystal Kay Noiseux was born in Providence, Rhode Island on April 9, 1982. She decided on a career in conservation at the age of 10, when her 5<sup>th</sup> grade teacher recognized her interests in the natural world and nurtured them. Krystal received her bachelor's degree in environmental science from Juniata College in Huntingdon, Pennsylvania. She has worked as a wildlife rehabilitator, sea turtle biologist, and environmental educator. She has pursued her strong interests in sustainability at the University of Florida where she accepted an assistantship to study for her master's degree in wildlife ecology and conservation, focusing on the human dimensions of conservation. This thesis is a product of her two years of research at the University of Florida. Krystal hopes to pursue a career in experiential education for sustainability in urban environments.