Environmental Attitudes, Knowledge, and Behaviors of Residents of the Midlands Region, S.C.

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Executive Summary

In May 2009, Carolina Clear of the Clemson University Restoration Institute contracted with researchers from Clemson University's Department of Sociology and Anthropology (Dr. Catherine Mobley and Dr. James Witte) and the School of Computing (Dr. Roy Pargas) to conduct a telephone survey of residents of the Midlands region of South Carolina.

The population of the Midlands region is such that a sample of 385-400 respondents would permit estimates of the survey results with a margin of error of $\pm$ 5% at a 95% confidence level. The survey was conducted from mid-July to early August 2009. Data were collected from 403 residents from the following 28 zip code areas in the Midlands region:

29016	29061	29150	29169	29201	29205	29210
29033	29063	29152	29170	29202	29206	29212
29040	29072	29153	29172	29203	29207	29223
29053	29073	29154	29177	29204	29209	29229

The main goal of the survey was to obtain information about residents' attitudes, knowledge, behaviors, and intentions as they relate to the environment. The results can serve as a baseline for measuring the success of future environmental and stormwater education efforts. The information collected about the various subgroups (and reported in the cross-tabulation analyses of the full report) can assist staff in targeting educational efforts by sociodemographic characteristics.

Brief Description of Sample

When compared to the general population as reflected in Census 2000 data, the Midlands region survey sample was disproportionately female (63.3% of the sample vs. 51.7% of the actual population in the 28 zip code areas, as reported by the U.S. Bureau of the Census) and better educated than the general population (with 52.4% of the sample earning a bachelor's degree or higher vs. 28.5% of the general population). With respect to race, 74.7% of the sample was white as compared to 61.0% of the general population. There were also some differences in the age profiles, with the survey comprised of a greater proportion of individuals 55 and older than found in the general population (46.3% vs. 24.0%, respectively) and a lower proportion of 18-24 year olds (5.3% of the phone survey vs. 15.8% of the general population). Approximately 88.5% of respondents indicated they were homeowners (as compared to 2/3 (66.0%) of the general population) and a minority of 41.2% of respondents indicated they lived next to a creek, stream, river, pond or other water body.

Research has shown that some of these segments of the population (e.g., higher-educated females) are more likely to participate in surveys. Thus, we adjusted for the demographic differences between the telephone sample and Census data by using standard statistical weighting procedures. The resulting weighted data are a closer approximation of Census population figures and are thus a better representation of the public's views on the issues covered in this survey. The results reported and discussed in this Executive Summary and the full report are based on the weighted data.

Main Findings

Survey results reveal a complex picture of the environmental views of Midlands residents. The summary below presents some of the main research findings.

- **Residents of the Midlands region are concerned about water quality in the region and place a high value on greenways.** Approximately 44.5% of respondents are "very concerned" and 37.6 % are "somewhat concerned" about pollution and the environmental quality of local streams and waterways. Nearly 81% of respondents indicated that greenways were valuable assets to the community.

- **Residents have a basic level of understanding about the various causes of poor water quality.** When asked about the impact of humans on the environment, 62.6% of respondents indicated that what people do on the land affects the quality of their local streams and waterways "a great deal." Nearly 78% of respondents "strongly agreed" or "agreed" that inspection and pump out of septic tanks protects water quality; 13.0% indicated "do not know" for this question. Slightly more than 79% of respondents "strongly agreed" or "agreed" that pet waste is a source of bacteria pollution in local waterways (although nearly 10% indicated they did not know). Regarding beliefs about the treatment of stormwater, nearly 3/4 of respondents (74.1%) did not believe that stormwater was treated before reaching lakes, rivers and streams.

  Respondents were also asked to rate the extent to which nine different activities impacted streams and lakes in the area. Respondents were most likely to say that the following sources of pollution had either a "great impact" or "some impact" on water quality: fertilizers and lawn chemicals (83.4%), fuel and oil leaks from trucks, buses or automobiles (82.9%), and industrial sites (81.1%). Of the items listed, respondents were most likely to indicate that the following sources of pollution had either "very little impact" or "no impact" on water quality: waste from birds (49.4%); run off from people washing their cars (43.0%) and pet waste (35.8%).

- **The high level of concern about water quality is generally matched by a fairly good level of knowledge among residents about the basics of watersheds.** When asked to choose the correct definition of the term "watershed," nearly one-third (33.1%) of respondents selected the correct answer ("area that drains into specific river or lake"). However, slightly more than one-fourth (25.3%) of respondents indicated "do not know" when asked to choose the correct definition of the "term" watershed. A nearly equal proportion selected either "low area that retains water" (14.7%) or "reservoir that serves as a municipal water source (14.6%). When asked if they could name the local body of water that absorbs runoff after a rainstorm, a large proportion of respondents (43.6%) indicated they could not do so.

- **For the most part, Midlands residents are involved in water and environmental conservation efforts.** Slightly more than 72% of respondents of respondents indicated that, in the past two years, they had made an effort to reduce water usage out of concern for water quantity (i.e., drought) issues. However, a smaller proportion (40.8%) reduced water usage out of concern for water quality. In general, Midlands residents are somewhat active in citizen-based environmental efforts: nearly 26% of respondents indicated they had participated in a lake or river cleanup and 15% had joined or volunteered for a conservation organization in the past two years.

- **There are some indications that Midlands residents are engaging in environmentally-friendly household behaviors, although some residents are engaging in behaviors that could harm local rivers and streams.** Nearly all respondents (99.5%) indicated that, in the past two years, they "never" stored fertilizers and pesticides in leaking containers, disposed of oil, paint, or other chemicals down storm drains (98.8%) or dumped grass clippings down storm drains or backyard creeks (98.4%). Nearly 82% (81.7%) of respondents indicated they "never" operated a motor vehicle with a leak. However, a slight majority of respondents (50.7%) indicated that they "never" washed their car on the lawn or gravel instead of pavement, 42.2% of respondents indicated they "never" considered the likelihood of a rainstorm before treating their lawn with fertilizers or pesticides, and nearly 30% of respondents indicated they "never" cleaned up after their pets when taking them for a walk.

- **Midlands residents are not very active in outdoor recreational behaviors, especially as it concerns water-based recreational activities**. Hiking and fishing were the two most popular recreational activities for Midlands respondents (with 17.2% and 10.7% of respondents indicating they participated in these activities "often," respectively). However, nearly 83% of respondents indicated they have "never" gone hunting or trapping, 78.2% indicated they "never" had kayaked or canoed, 60.5% had "never" gone motorboating, and 56.4% indicated they had "never" gone swimming in rivers or lakes. And, although fishing was the second most popular activity, still 44.8% of respondents indicated they had "never" fished.

- **The high level of concern about water quality is generally matched by a somewhat high level of willingness to get involved in water resource issues.** Nearly 80% of respondents indicated they would "very likely" become involved if they were directly impacted by water quality. However, for the other four items, the proportion of respondents indicating they would "very likely" get involved was substantially lower than if they were directly impacted: if they knew local government could save money by taking actions to improve water quality (47.4% said "very likely"), if the local media ran positive stories taken by local residents to improve water quality (38.7%), the local media ran stories on local water pollution problems (37.5%), and if they had more information about water quality issues in the area (30.3%).

- **Respondents use a variety of media for receiving local and regional information and news.** Respondents were asked to choose the three primary ways that they receive local and regional information and news. By far, the most popular source of information and news was television evening news broadcasts, with slightly more than 85% of respondents indicated that they received their news through this source. Slightly more than 55% indicated they listened to the morning news for local and regional information. Local newspapers were the third most important source of information for respondents: 47.6% of respondents indicated this as one of their three primary sources of news. Regional newspapers were one of the top three choices for 24.2% of respondents. Billboards and posters and events/workshops were the least frequently mentioned source of news: 5.7% and 3.0% indicated these sources as one of their three primary sources of news, respectively. In response to a separate question, nearly 69% of respondents indicated they used the Internet to get their local and regional news.

- **There is a low level of awareness among respondents about local organizations that seek to improve water quality.** Nearly 88% of respondents indicated they had never heard of Carolina Clear. However, 11.5% indicated they had heard of Carolina Clear, but were not aware of its programs; less than 1% indicated they were aware of both Carolina Clear and its programs. Respondents had a similar level of awareness of the Lexington County Stormwater Consortium: just over 90% of respondents indicated they had not heard of the consortium, while just over 8% indicated they had heard of the consortium, but were not familiar with its programs. A small proportion (1.4%) indicated they were aware of both the Consortium and its programs.

- **Respondents were somewhat aware of county ordinances that are in place to protect water quality.** Nearly 11% of respondents were "very familiar" and slightly more than 15% of respondents were "somewhat familiar" with their county's ordinances that are designed to protect water quality. However, nearly 3/4 (73.7%) of those surveyed indicated they were not at all aware of these local regulations and ordinances.

Project Goals

In May 2009, Carolina Clear of the Clemson University Restoration Institute contracted with researchers from Clemson University's Department of Sociology and Anthropology (Dr. Catherine Mobley and Dr. James Witte) and the School of Computing (Dr. Roy Pargas) to conduct a telephone survey of residents of the Midlands region of South Carolina.

The main goal of this project was to obtain information about stakeholders' knowledge, attitudes, and behaviors as they relate to a variety of environmental issues. Some more specific objectives were to:

- Determine the overall level of concern about water quality;
- Ascertain stakeholder knowledge of environmental concepts and issues;
- Gain an accurate understanding of individual behaviors and actions that are relevant to water quality;
- Learn more about residents' level of participation in outdoor recreational activities;
- Identify openings and barriers to participation in water quality improvement efforts; and
- Ascertain the willingness of the public to become involved in water quality issues.

The results can serve as a baseline for measuring the success of future environmental and stormwater education efforts. The information collected about the various subgroups (and reported in the cross-tabulation analyses) can assist staff in targeting educational efforts by sociodemographic characteristics. Rather than being evaluative in nature, the results serve as a baseline for measuring the success of future environmental education efforts.

Methodology

This research effort consisted of a telephone survey of residents of the Midlands region. The survey instrument was developed with input from Carolina Clear staff. A copy of the final survey instrument can be found in Appendix A. Survey questions were organized into the following categories (1) environmental concern; (2) environmental knowledge about environmental concepts and practices and the causes and impacts of pollution; (3) participation in recreational activities; (4) participation in environmentally positive and negative behaviors; (5) willingness to get involved in efforts to improve water quality; and (6) familiarity with environmental organizations, such as Carolina Clear and the Lexington County Stormwater Education Consortium.

The survey was conducted using Computer Assisted Telephone Interviewing (CATI) methods. Approval for conducting research with human subjects was obtained through Clemson University's Institutional Review Board. All interviews were conducted from the Telephone Survey Lab, located in the Department of Sociology and Anthropology at Clemson University.

The population of the Midlands region is such that a sample of 385-400 respondents would permit estimates of the survey results with a margin of error of ± 5% at a 95% confidence level. Data were collected from residents from the following 28 zip code areas in the Midlands region:

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Respondents were selected using a random list of phone numbers purchased from Scientific Telephone Samples, a national vendor of telephone samples. The majority of calls were made during evening hours, weekdays between 5:00 p.m. and 9:00 p.m. Limited daytime and weekend calling was also conducted so as not to exclude potential respondents who are regularly not home during the early evening hours or during the week. On average, the interviews were fifteen minutes in length.

The telephone survey was pre-tested in early May 2009 and actual data collection occurred from mid-July to early August 2009. A total of 403 Midlands residents was surveyed, for a margin of error of plus or minus 5%, with a 95% confidence level.

Just over 28,000 phone calls were made to complete the survey. The completed response rate for the survey was 9.7%. This response rate, which was calculated using standard methods used by the American Association of Public Opinion Researchers, is quite low for a telephone survey similar in length and content to the Midlands region survey. The low response rate could be attributed to a number of factors including the timing of the survey (during summer months when fewer permanent residents are available to complete the survey). For example, 19.1% of the total number of phone calls resulted in incomplete surveys due to ineligible respondents (i.e., a person being a non-resident of the household or of the region or because no eligible person was present at the household to complete the survey) or due to incorrect or non-working phone numbers (i.e., a phone number belonging to a non-household entity, a phone line being disconnected or non-working, always busy, never answered, or always picked up by an answering machine).

Another measure of response rates is the "survey cooperation rate" which includes both partial and complete interviews in the calculation. This measure reflects the willingness of individuals to complete the survey. In some cases, however, respondents were not able to do so, despite their willingness to participate. For example, a respondent may have had to end the interview because of an interruption or because a respondent ran out of time to complete the survey. Or, in some cases, respondents would complete a part of the interview before it was determined that they were ineligible (e.g., because they were not a resident of one of the 28 zip code areas surveyed). The cooperation rate for this survey of Midlands residents 14.3%.

Data Analysis

To provide an overview of research results, frequencies were generated for the sociodemographic questions (see Appendix C) and the substantive survey questions (see Appendix D).

Pearson chi-square analyses were conducted to determine if a relationship existed between the main research variables and the main sociodemographic characteristics of sex, race, education, age, and home ownership status (i.e., renters vs. owners). A summary of the results of these crosstabulation analyses is presented in Table B-1. Appendix E through Appendix I provide cross-tabulation results for the relationships between all of the major research variables and the five main demographic variables. Note that for some tables, due to rounding, the rows and columns may not add up to exactly 100.0%.

Aside from determining if there was a relationship between the main research variables and sociodemographic characteristics, it was also important to determine whether the relationship was substantively important. Therefore, along with the chi-square results we have included a measure of association to calculate the strength of the relationship between the sociodemographic variables and dependent variables of interest. Cramer's V was used to test the strength of the relationships between nominal variables or between nominal and ordinal variables. Gamma was used to test the strength of the measure of association in those cases when both variables were ordinal.

There are a variety of standards for interpreting measures of association. In this report, a Cramer's V or gamma value of .10 or less indicates a weak relationship between variables, a value between .10 and .30 designates a moderate relationship between variables. A Cramer's V or gamma value of greater than .30 indicates a strong relationship between the variables in question. This report will highlight those relationships with measures of association of .10 or above (and where the chi-square p-value is less than .05).

It should be noted that if one or more cells of the cross-tabulation tables had an expected count less than 5, the significance calculation for Cramer's V and gamma will be invalid; in these cases, a note appears at the bottom of the table in question. To reduce the number of invalid tables, the response categories for many of the main research questions were combined (e.g., the separate categories of "strongly agree" and "agree" were combined into one category of "strongly agree/agree"). While the findings for all crosstabulation analyses are presented, whether they indicated statistically significant subgroup differences or not, the reader should exercise caution when drawing conclusions from those tables that were not statistically significant or that did not have enough expected counts in a particular category or cell.

Respondents were also able to provide an open-ended response to several survey items. This allowed respondents to provide more extensive and elaborate answers to these questions. A sampling of these responses appears in Appendix J. In most cases, the respondents' original words are provided in order to gain greater insight into how respondents conceptualize and talk about a variety of environmental issues. In some instances, respondents indicated they did not want their comments shared. Thus, not all of the open-ended responses are included in Appendix J.

Sociodemographic Characteristics of Respondents

Table C-1 provides a summary of the demographic characteristics of survey respondents. When compared to the general population of the Midlands region as reflected in Census 2000 data, the Midlands region survey sample was disproportionately female (63.3% of the sample vs. 51.7% of the actual population in the 28 zip code areas, as reported by the U.S. Bureau of the Census) and better educated than the general population (with 52.4% of the sample earning a bachelor's degree or higher vs. 28.5% of the general population). With respect to race, 74.7% of the sample was white as compared to 61.0% of the general population. There were also some differences in the age profiles, with the survey comprised of a greater proportion of individuals 55 and older than found in the general population (46.3% vs. 24.0%, respectively) and a lower proportion of 18-24 year olds (5.3% of the phone survey vs. 15.8% of the general population). Approximately 88.5% of respondents indicated they were homeowners (as compared to 2/3 (66.0%) of the general population).

Research has demonstrated that some of these segments of the population (e.g., higher-educated females) are more likely to participate in surveys. Thus, we adjusted for the demographic differences between the telephone sample and Census data by using standard statistical weighting procedures. The resulting weighted data are a closer approximation of Census population figures and are thus a better representation of the Midlands residents' views on the issues covered in this survey.

The weighted data and only those results that were statistically significant at the .05 level or below are discussed in this report. The raw data (i.e., the unweighted data) are presented in Appendix D as a comparison point. It is strongly recommended that, when reporting on the survey results, the adjusted (weighted) results be used. These weighted data are a more accurate representation of the environmental views of Midlands residents in general (in the zip code areas surveyed). It is also important to report the percentages, versus just reporting the numbers, of respondents providing a particular response. Focusing on percentages allows for more useful comparisons across time (i.e., if a follow-up survey is conducted to measure any changes in environmental attitude, knowledge, and behaviors) and across space (i.e., if decision makers want to compare the responses of Midlands residents with the responses of residents from other areas of the state, or even, other regions of the country).

(Note: For the frequency tables (Appendix D), the sample size reported in the tables is the unweighted sample size to give a sense of the number of respondents, out of the total sample of 399 respondents, who actually provided a response for a particular question.)

Main Findings

The remainder of the report summarizes the findings from the survey. Findings are grouped into several categories that are important for any environmental education effort: environmental concern, environmental knowledge, awareness of environmental impacts, environmental behaviors and environmental intentions. Each section below begins with an overview of results from the telephone survey, providing information about overall frequencies for the main survey items (as reported in Appendix D) and then proceeds to a discussion of the subgroup differences for the main research variables (presented in Appendix E through Appendix I). When relevant, supporting evidence from the open-ended responses (Appendix J) is provided.

Environmental Concern

To provide some context for respondents' level of environmental concern, respondents were first asked if they lived adjacent to a local body of water: "Do you live next to a creek, stream, river, lake or pond. That is, does your property adjoin some body of water?" Slightly more than 41% of respondents indicated they lived next to a creek, stream, river, pond or other water body (Table D-1). Males were more likely than females (Cramer's V = .112; Table E-1) and whites were more likely than minorities (Cramer's V = .127; Table F-1) to indicate they lived near a waterbody.

Concern about water quality was measured through the following question: "I'd like to know how concerned you are with pollution and environmental quality in your local streams and waterways: Would you say you are very concerned, somewhat concerned, not very concerned, or not at all concerned?"

Respondents expressed a high level of concern about the water quality of local streams and rivers (Table D-2). Slightly more than 82% of respondents indicated they were "very concerned" or "somewhat concerned" about pollution and the environmental quality of local waterways. This level of concern is comparable to the extent of concern found in other regions of the country (see Center for Watershed Protection, 1999).

There were no statistically significant subgroup differences in level of concern about pollution and environmental quality in local streams and waterways. Midlands residents, regardless of sex, race, education level, age or homeownership status, were equally concerned about pollution and water quality.

Respondents were asked to indicate to what extent they thought people's actions affected water quality. Nearly 63% of respondents indicated that people's actions had "a great deal" of impact on water quality; 8.9% indicated "do not know" in response to this question (Table D-3). As with the previous question on level of concern about the environment, there were no statistically significant subgroup differences for this survey item. Regardless of sex, race, education level, age or homeownership status, Midlands residents were equally likely to indicate that what people did on the land affected the quality of local streams and waterways.

Concern about the environment is often measured by asking residents to what extent they value certain environmental assets and resources in the community. As a measure of the extent to which Midlands residents valued certain environmental features of the community, respondents were asked to indicate to what extent they believed greenways are valuable assets to the community. Slightly more than 4/5 of respondents (80.9%) agreed that greenways are valuable assets to the community, while another 11.4% indicated that greenways are "somewhat" valuable assets. Nearly 8% of respondents indicated that greenways are of little value to the community (Table D-24).

Concerning subgroup differences, there were sex and race differences in the valuing of greenways. While males and females were equally likely to indicate that greenways were valuable assets to the community, females were far more likely to indicate that they felt that greenways were of "little value" to the community (Cramer's V = .185; Table E-50). Whites were more likely than minorities to indicate that greenways are valuable assets to the community, while minorities were more likely than whites to indicate that greenways were "somewhat" valuable assets to the community (Cramer's V = .227; Table F-50).

Environmental Knowledge

Respondents' level of knowledge about water quality issues was measured in four ways: (1) through a series of questions about the respondent's knowledge about practices used to manage land along rivers, streams, and lakes; (2) two questions about the specific practices of inspection and pump out of septic tanks and the treatment of stormwater; (3) a question on the definition of the term "watershed"; and (4) a question regarding the flow of water after rainstorms.

Knowledge of Practices for Protecting Land Along Waterways

A common goal of many environmental education programs is to educate residents about practices that can help to improve water quality or mitigate the impact of erosion. In this survey, respondents were asked to indicate their level of knowledge by responding to the following question about the effectiveness of four practices in managing land along rivers and lakes: "River banks and lake fronts are obvious places to think about water quality issues. In your opinion, how effective are the following measures in managing land along a river or lake in an environmentally-friendly way?" The four practices were: allowing natural vegetation to grow wild; keeping grass or other vegetation mowed to the edge of the water; planting bushes or shrubs; and installing a retaining wall.

Overall, 85.8% of respondents correctly indicated that allowing natural vegetation to grow wild was "very" or "somewhat" effective at managing land along a river or lake in an environmentally-friendly way (Table D-8). And, 87.6% indicated that "installing a retaining wall" was a "very" or "somewhat" effective practice. Slightly more than 89% of respondents indicated that planting bushes and shrubs was a "very" or "somewhat" effective land management practice. Respondents were least likely to indicate that keeping vegetation mowed to the edge of the water was a "very" or "somewhat" effective practice for managing land along a river or lake in an environmentally-friendly way, although 76.5% indicated this was the case.

The percentage of respondents indicating they did not know about the effectiveness of two of the measures (or, did not respond to the two items question) was quite high: 15.6% for keeping vegetation mowed to the edge of the water, and 12.18% for installing a retaining wall.

Regarding subgroup differences, there were statistically significant differences by sex for keeping grass mowed to the edge of the water (Cramer's V = .171; Table E-17) and installing a retaining wall (Cramer's V = .187; Table E-19), with females more likely than males to rank these practices as "very effective" for maintaining land along a waterway.

There were racial differences for three of the four questions. For allowing natural vegetation to grow wild, minorities were far more likely than whites to indicate that this practice was "not at all effective" for managing land along local waterways (Cramer's V = .326; Table F-16). However, whites were twice as likely as minorities to rank the next item (keeping grass or other vegetation mowed to the edge of the water) as "not at all effective" (Cramer's V = .189; Table F-17). Whites were more likely than minorities to indicate that planting bushes and shrubs was a "very effective" practice for managing land in an environmentally-friendly way (Cramer's V = .253; Table F-18).

There were statistically significant education differences for these same three items. Individuals with a bachelor's degree or higher were most likely and individuals at the lowest educational attainment level were least likely to indicate that allowing natural vegetation to grow wild was "very effective" (gamma = -.175; Table G-16). Notably, only 7.8% of college graduates rated this practice as "not at all effective", as compared to 21.1% of those with a high school degree or less (Table G-16). Those with the least education were also more likely than those with higher educational attainment levels to rate keeping grass or other vegetation mowed to the edge of the water as a "very effective" land management strategy (gamma = .288; Table G-17). Individuals at the mid-level of educational attainment (some college or a two-year degree) were far more likely than other respondents to indicate that planting bushes and shrubs was "not at all effective" for managing land along a river or lake in an environmentally-friendly way" (gamma = -.177; Table G-18).

Regarding age differences, individuals age 35-54 were more likely than individuals in the other age groups to rate planting bushes and shrubs as "very" or "somewhat" effective for managing land along waterways (gamma = -.242; Table H-18).

Owners were far more likely than renters to rate two practices as "not at all" effective land management strategies: keeping grass or other vegetation mowed to the edge of the water (Cramer's V = .209; Table I-17) and installing a retaining wall (Cramer's V = .140; Table I-19). However, renters were more likely than owners to rate planting bushes and shrubs as "not at all" effective for managing land along waterways in an environmentally-friendly way (Cramer's V = .223; Table I-18).

In this section of the survey, respondents were also asked the following open-ended question: "In your opinion, are there any other effective measures that could be used to manage land along a river or lake?" Nearly 75 suggestions for managing land along the water's edge were provided (see Table J-1 for a list of some of these suggestions). Many of these responses were related to

pollution or litter control (e.g., "keep people from dumping waste into the rivers" and "police pollution better"). Other respondents suggested restricting development ("eliminate development near waterways," "stop building so many buildings," and "restrict development and expanding suburbs") and increasing monitoring ("monitor disposal from plant and monitory sewer discharge" and "more closely monitoring industrial discharges").

Knowledge of Additional Practices

Respondents were also asked about their knowledge concerning two additional practices: inspection and pump out of septic tanks and the treatment of stormwater.

Nearly 78% of respondents indicated they "strongly agreed" or "agreed" that "inspection and pump out of septic tanks protects water quality" (Table D-4). It should be noted, however, that 13% of respondents indicated "do not know" for this question.

Regarding subgroup differences for this question, there were no sex, education, age or homeownership differences. However, minorities were more likely than whites to "strongly agree" or "agree" with the statement on septic tanks (Cramer's V = .186; Table F-4).

To gauge knowledge about stormwater, respondents were asked whether they believed that stormwater is treated before reaching local lakes, streams, and beaches. Respondents were first provided with a basic definition of stormwater as "runoff from yards and roads during storm events or from irrigation; it drains to ditches and storm sewers along roadways." Respondents were then asked to indicate "yes" or "no" in response to the question "do you believe that this stormwater is treated before reaching our lakes, streams and beaches?"

Slightly more than 74% of respondents believed that stormwater is not treated, while 16% indicated that "yes, it is treated." Nearly 10% of respondents indicated "do not know" for this survey item (Table D-6).

There were no subgroup differences for this survey item. Across sociodemographic groups, respondents were equally likely to indicate that stormwater was (or was not) treated.

Definition of Watershed

To ascertain another dimension of environmental knowledge, survey respondents were asked the following multiple choice question: "Of the following, which best fits your definition of what a watershed is: Is it an area that retains water like a swamp or a marsh, all of the land area that drains into a specific river or lake, a reservoir that serves as a municipal water source, a small building where water is stored, or none of the things I've mentioned?" This question has been asked on a number of other environmental surveys, allowing for comparison of Midlands residents with residents from other areas.

When asked to choose the correct definition of the term "watershed," nearly 1/3 (33%) of respondents selected the correct answer ("area that drains into specific river or lake"). However, slightly more than 1/4 (25.3%) of respondents indicated they did not know the correct definition

(Table D-9). Relatively equal proportions of Midlands respondents selected either "an area that retains water like a swamp or marsh" (14.7%) or "a reservoir that serves as a municipal water source" (14.6%) as the correct definition of the term "watershed." Several other surveys on environmental issues document much higher levels of knowledge about the definition of a watershed. For example, in a survey of Chesapeake Bay watershed residents, nearly half (48%) of respondents chose the correct definition. In a 1997 Roper survey, 40% of respondents identified the correct definition of watershed (see McClafferty, 2002). Thus, the results of the current survey indicate that the watershed concept remains abstract and confusing for many Midlands residents.

As indicated in Table J-2, some respondents have their own working definition of the term "watershed," one of which is closely related to the actual definition (e.g., "watershed is a natural terrain around the water we live in and flows toward the contours of land"). Other personal definitions did not seem to be related to the actual definition ("something you build for personal use for watering grass" and "place where water goes through to be purified"). Several respondents said that all of the definitions were correct.

Regarding subgroup differences in this basic knowledge about watersheds, males were more likely than females to choose the correct definition, with 44.1% of males choosing the correct definition as compared to 25.5% of females. Similarly, slightly more than 1/3 of females (34.5%) indicated they did not know the definition as compared to just 11.8% of males (Table E-20). The relationship between gender and knowledge was very strong (Cramer's V=.386).

While individuals at the various educational levels were relatively equally likely to select the correct definition for the term "watershed," individuals with a bachelor's degree or higher were much more likely to select "reservoir that serves as a municipal water source" and individuals at the lowest educational level were far more likely to indicate they did not know the definition (slightly more than 37% of individuals with a high school degree or less indicated they did not know the definition) (Cramer's V = .233; Table G-20).

Knowledge of Local Water Bodies

An additional question was included on the telephone survey to determine respondents' knowledge about local bodies of water and their familiarity with the basics of water flow. Respondents were asked "To the best of your understanding, when rain falls where you live which body of water most directly absorbs the runoff? Can you tell me the specific water body (e.g., creek, stream, or river) that directly absorbs the runoff from rain that falls where you live?" The possible responses to this question were: "Yes, I certainly can name the waterbody"; "Yes, I can, although I am not absolutely sure"; and "No, I do not know what body of water receives the runoff from rain that falls where I live." If they indicated they certainly could name the body of water or if they indicated that they might be able to name the body of water, respondents were asked to provide the name of that body of water.

Nearly 28% of respondents indicated that "yes, I certainly can name the body of water." A nearly equal percentage (28.7%) indicated that "yes, I think I know the name of the water body." However, 43.6% of respondents indicated that "no, I do not know the name of the water body"

(Table D-25). Those respondents who indicated some level of familiarity were given an opportunity to name that body of water. Table J-8 and Table J-9 provide the open-ended responses to this question.

There were sex, race and education differences in respondents' propensity to indicate they were familiar with the waterbody that most directly absorbed runoff from rain. Males were more likely than females to indicate that they could "certainly" name the waterbody, while females were far more likely than males to indicate they did not know (Cramer's V = .244; Table E-51). Whites were more likely than minorities to indicate that they could "certainly" name the waterbody, with minorities far more likely than whites to indicate they did not know the name of the waterbody (Cramer's V = .205; Table F-51). For education, individuals with a bachelor's degree or higher were likely to indicate the highest degree of certainty for this question, while individuals with some college or a two-year degree were most likely to indicate the mid-range of familiarity (they thought they could name the waterbody, although they weren't absolutely sure). Individuals at the lowest levels of educational attainment were most likely to indicate they did not know the water body that absorbed runoff after rain falls (Cramer's V = .175: Table G-51).

Beliefs about Sources of Water Pollution

To gauge respondents' knowledge about water pollution, respondents were asked to assess the extent to which the following nine practices impacted the quality of local streams and lakes: fertilizers and lawn chemicals that people use on their lawns and gardens; fuel and oil leaks from trucks, buses or automobiles; pet waste; waste from birds; runoff from people washing their cars; industrial sites; farm operations; sediment or dirt from construction sites; and parking lot runoff. One additional question ascertained the extent to which respondents believed that a more specific source (pet waste) contributed to bacteria pollution in lakes, rivers and streams.

Impact of Pollution on Local Streams and Lakes

Industrial sites were identified as having the greatest impact on water quality (Table D-7). Just over 62% of respondents indicated industrial sites had a "great" impact on water quality. The data also showed the following large percentages (in parenthesis) of respondents who indicated the other sources of pollution had a "great" impact on water quality: fuel and oil leaks from trucks, buses and automobiles (55.6%), fertilizer and lawn chemicals that people use on their lawn and garden (50.7%), farm operations (41.0%) and sediment or dirt from construction sites (36.7%). A relatively small proportion of respondents indicated that pet waste (20.2%), runoff from people washing their cars (16.0%) and waste from birds (14.2%) had a "great impact" on the water quality of local streams and lakes.

There were some important subgroup differences in the assessment of the impacts of these nine sources of water pollution. Females were more likely than males to indicate that three practices had a "great" or "some" impact on water quality: fuel and oil leaks from trucks, buses and automobiles (Cramer's V = .169; Table E-8), pet waste (Cramer's V = .109; Table E-9), and waste from birds (Cramer's V = .137; Table E-10)

Regarding the statistically significant racial differences, for two survey items, minorities were more likely than whites to indicate that the sources of pollution had a "great" or "some" impact on water quality of local waterways: pet waste (Cramer's V = .166; Table F-9) and waste from birds (Cramer's V = .106; Table F-10). Whites were more likely than minorities to indicate that fertilizers and lawn chemicals (Cramer's V = .110; Table F-7) and industrial sites (Cramer's V = .180; Table F-12) had a "great" or "some" impact on local streams or lakes.

Regarding education, as education level increased, respondents were more likely to indicate that fertilizers and lawn chemicals and industrial sites had a "great" or "some" impact on local streams and lakes. The relationship between education and assessment of the impact of these two sources of pollution were very strong, with gammas of -.386 and -.323, respectively (Tables G-7 and G-12, respectively). While individuals with the lowest and the highest levels of education were equally likely to indicate that runoff from people washing their cars had a "great" or "some" impact, individuals with the mid-range level of education were much more likely to indicate that this source had "very little" to "no" impact on water quality, although the relationship was weak (gamma = .096; Table G-11). The same educational pattern (with the low gamma values) was observed for farm operations and sediment or dirt from construction sites (gamma = .031; Table G-13 and gamma = -.036; Table G-14).

There were statistically significant differences between age groups in the assessment of three of the nine sources of pollution. Individuals in the youngest age group (18-34) were most likely to rate industrial sites as having "very little" to "no" impact on local streams and lakes (gamma = -.274; Table H-12). Individuals in this age group were also most likely to rate waste from birds as having a "great" or "some" impact on water quality (gamma = .246; Table H-10). For the survey item related to parking lot runoff, individuals age 35-54 were most likely to rank this item as having a "great" or "some" impact on water quality, although the relationship was weak (gamma = -.052; Table H-15).

Renters and owners differed significantly in their assessment of the impact of seven of the nine sources of pollution (see Tables I-7 through I-15). For all seven items, renters were more likely than owners to rate the item as having a "great" or "some" impact on local streams and lakes. The relationships between homeownership status and assessment of impacts were moderately strong, with Cramer's V values ranging from .108 (for sediment or dirt from construction sites) to .279 (for waste from birds).

Beliefs about the Impact of Pet Waste on Water Quality

Respondents were also asked to what extent they agreed that pet waste is a source of bacteria pollution in lakes, rivers or streams. Just over 79% of respondents indicated they "strongly agreed" or "agreed" with this statement (Table D-5). Just over 6% of respondents indicated they did not know if pet waste was a source of bacteria pollution in waterways.

Regarding subgroup differences for this survey item, there were only race differences in perceptions of pet waste as a source of bacteria: minorities were more likely than whites to "strongly agree" or "agree" that pet waste was a source of bacteria pollution in lakes, rivers and streams (Cramer's V = .195; Table F-5).

Environmental Behaviors

The survey measured environmental behaviors by asking respondents: (1) about their frequency of participation in outdoor recreational activities; (2) whether they engaged in several positive behaviors in the past two years; and (3) about their level of participation in a variety of household-related behaviors.

Participation in Outdoor Recreational Activities

Research has demonstrated a relationship between participation in outdoor activities and beliefs about and behaviors toward the environment. The results for this section of the survey can thus provide some insights into how connected Midlands residents are to outdoor hobbies and can help environmental organizations to target outreach activities. Respondents were asked about their frequency of participation in seven recreational activities: kayaking/canoeing, fishing, swimming in rivers or lakes, motorboating, visiting the beach, hiking/walking in parks or other protected land, and hunting/trapping.

As indicated in Table D-10, hiking, visiting the beach, and fishing were the three most popular recreational activities for respondents (with 50.5%, 30.6%, and 29.1% of respondents indicating they participated in these activities "often" or "sometimes", respectively). The lowest participation rates were recorded for hunting/trapping and kayaking/canoeing (7.8% and 6.0% of respondents indicating they participated in these activities "often" or "sometimes", respectively). Thus, the highest rates of "never" participating in an activity were recorded for hunting/trapping (82.7%) and kayaking/canoeing (78.2%).

The results indicate a number of subgroup differences in levels of participation in the various recreational activities. Gender differences were observed for only one activity: males were more likely than females to indicate they "often" or "sometimes" participated in motorboating (Cramer's V = .114; Table E-24). Otherwise, males and females were equally likely to participate (or, to not participate) in the six other activities.

Regarding race, whites were more likely than minorities to participate "often" or "sometimes" in kayaking/canoeing (Cramer's V = .232; Table F-21), swimming (Cramer's V = .290; Table F-23), motorboating (Cramer's V = .239; Table F-24), and hunting/trapping (Cramer's V = .210; Table F-27).

In terms of educational differences, individuals with a bachelor's degree or higher were most likely to indicate they "often" or "sometimes" swam in rivers or lakes, followed by those with a high school degree or less (gamma = -.138; Table G-23). These same two groups were equally likely to indicate they "often" or "sometimes" participated in hunting/trapping (with 10.2% indicating this level of participation). This was a significantly higher percentage of participants (2.5%) from the mid-level educational attainment group, although this relationship was weak (gamma = 075; Table G-27).

The relationships between age and recreational participation were statistically significant for four of the seven activities. The youngest respondents (age 18-24) were most likely to indicate they "often" or "sometimes" participated in fishing (Table H-22), visiting the beach (Table H-25), and hiking (Table H-26), while individuals age 35-54 had the highest participation rates for swimming (Table H-23). These relationships were statistically significant and moderately strong to very strong, with gammas ranging from .254 (for fishing) to .486 (for visiting the beach). However, this relationship was weak for participation in swimming.

Renters were more likely than owners to indicate they "often" or "sometimes" participated in four of the seven activities: kayaking/canoeing (Cramer's V = .146; Table I-21), motorboating (Cramer's V = .111; Table I-24), hiking/walking (Cramer's V = .117; Table I-26), and hunting/trapping (Cramer's V = .116; Table I-27).

Participation in More General Positive Behaviors

A major goal of many environmental education efforts is to promote environmentally-friendly behaviors among watershed residents. Midlands respondents were asked whether they had participated in each of four specific behaviors in the previous two years: reducing water usage out of concern for drought conditions; reducing water usage out of concern for water quality; participating in a lake, river, or roadside clean-up; and joining or volunteering for a conservation or environmental organization. It should be noted that when reporting on their own actions, individuals may feel compelled to provide the most socially acceptable response, even for telephone surveys. Thus, engagement in positive behaviors may be over-reported by survey respondents.

The results indicate that Midlands residents participated in a number of environmentally-friendly behaviors during the previous two years (Table D-11). The participation rates were highest for reducing water usage during times of drought (72.1% of respondents indicating "yes" to this question), followed by reducing water usage out of concern for water quality (40.8%), participating in a clean-up event (25.9%) and joining or volunteering for a conservation or environmental organization (15.0%). Regarding the latter item, Table J-3 indicates that respondents are involved in a broad variety of local organizations (Congaree Land Trust, Greater Pee Dee River Consortium, and Clean Columbia) and national organizations (Nature Conservancy and National Wildlife Foundation).

Regarding subgroup differences, there were significant differences between men and women for two of the four activities. Men were more likely than women to indicate they reduced water usage out of concern for drought conditions (Cramer's V = .104; Table E-28) and participated in a lake, river, or roadside clean-up event (Cramer's V = .212; Table E-30).

Statistically significant racial differences were observed for one activity: whites were more likely than minorities to reduce water usage out of concern for drought conditions (Cramer's V = .130; Table F-28).

Statistically significant educational differences in participation were observed for the two activities related to water usage. Individuals with the lowest levels of educational attainment (high school or less) were far more likely to indicate they had reduced water usage out of concern for water quantity (Cramer's V = .183, Table G-29). Individuals with the lowest and highest levels of education were equally likely to indicate they had participated in a clean-up event in the previous two years (30.5% and 28.7%, respectively); individuals with some college or a two-year degree were far less likely to participate in these events (17.4%) (Cramer's V = .132; Table G-30).

Participation in positive behaviors varied by age for three of the four activities. For two of these activities (participating in a clean-up event and volunteering or joining a conservation organization), age was inversely related to participation: the youngest respondents were most likely and the oldest respondents (age 65 and older) were least likely to indicate they participated in these two activities (Cramer's V = .156; Table H-30 and Cramer's V = .224; Table H-31, respectively). Individuals age 55-64 recorded the highest participation rates for reducing water usage out of concern for drought (Cramer's V = .195; Table H-28).

Renters were more likely than owners to participate in three of the four activities: reducing water usage out of concern for water quality (Cramer's V = .125; Table I-29), participating in a clean-up event (Cramer's V = .122; Table I-30), and joining or volunteering for an environmental organization (Cramer's V = .106; Table I-31).

Participation in Household-Level Environmental Behaviors and Practices

Respondents were asked to rate their level of participation, in the past two years, in seven household-based activities: considered the likelihood of rain before treating the lawn with fertilizer or pesticide; picked up after their pet while taking their pet for a walk; operated a vehicle with a motor oil leak; disposed of oil, paint, or other chemical down storm drains; washed their care on the lawn or gravel instead of pavement; dumped grass clippings or leaves down storm drains or backyard creeks; and stored fertilizers or pesticides in leaking containers.

Results for this section of the survey indicate that, at the household level, Midlands residents seemed to be participating in positive environmental behaviors and refraining from participating in negative household behaviors (Table D-15). Just over 2/3 of respondents (67.7%) indicated they "always" or "nearly always" picked up after their pet while taking them for a walk. Just over one-half (51.9%) of respondents indicated they considered the likelihood of a rain storm before treating their lawn with fertilizer and pesticide. Nearly all of the respondents indicated they "never" participated in potentially negative behaviors of disposing of oil, paint or other chemicals down storm drains (98.8% indicating "never"), dumping grass clippings or leaves down storm drains or in backyard creeks (98.4%) and storing fertilizers and pesticides in leaking containers (99.5%). A large proportion of respondents (81.7%) indicated they "never" operated a car with a motor oil leak. These figures are more positive than some national trends which indicate that between 1% and 5% of residents dump oil or water down storm drains (Center for Watershed Protection, 1999). It is noted, however, that only 21.1% of respondents indicated that they "always" or "nearly always" washed their car on the lawn or gravel instead of pavement.

There were several statistically significant subgroup differences in participation rates for these behaviors. Whites were far more likely than minorities to indicate they "always" or "nearly always" considered the likelihood of a rainstorm before treating their lawns with fertilizers or pesticides (Cramer's V = .338; Table F-34).

Regarding educational differences, individuals with the most education (bachelor's degree or higher) were most likely to indicate that they had "always" or "nearly always" considered the likelihood of a rainstorm before using pesticides or fertilizers (gamma = -.490; Table G-34); nearly 3/4 of those with a bachelor's degree or higher said they did this as compared to just over 1/3 (34%) of those with a high school degree or less.

Individuals with a high school education or less were much more likely than individuals with higher levels of education to indicate they "always" or "nearly always" operated a vehicle with a motor oil leak and this relationship was very strong with a gamma value of .576 (Table G-36). Individuals with a high school degree or less and those with some college or a two-year degree were equally likely to indicate they "always" or "nearly always" washed their car on the lawn or gravel instead of the pavement; only 12.7% of individuals with a bachelor's degree or more indicated they "always" or "nearly always" did this (gamma .175; Table G-38).

Individuals age 55-64 were more likely than individuals from other age groups to indicate they "always" or "nearly always" considered the likelihood of a rainstorm before treating their lawns, while individuals age 18-34 were least likely to do so (gamma = -.302; Table H-34). Individuals age 55-64 were most likely to indicate they "always" or "nearly always" washed their car on the lawn or gravel instead of pavement, while individuals 65 years of age and older were least likely to do so (gamma = .228; Table H-38).

Renters were far more likely than owners to clean up after their pets: 82.9% of renters vs. 59.9% of owners indicating they "always" or "nearly always" did so (Cramer's V = .200; Table I-35). Otherwise, owners and renters were equally likely to participate in (or, to not participate in) the other activities listed.

Information about Additional Household Practices

In the interest of developing more targeted environmental education efforts, respondents were asked several additional questions about household behaviors. Respondents provided information about who is responsible for two major household activities that could potentially impact the environment: mowing the lawn and fertilizing the lawn. Slightly more than 80% of respondents indicated that they, or another household member, were responsible for mowing the lawn while 12.9% indicated this task was taken care of by someone outside the household (Table D-12). Slightly more than 1/3 of respondents indicated (33.6%) that the task of fertilizing the lawn was handled "in-house"; 13.4% of respondents indicated this task was handled by someone outside the household (Table D-13). Importantly, more than 1/2 (53%) of respondents indicated that they did not use fertilizers.

Males were more likely than females to indicate that someone from the household mowed the lawn (Cramer's V = .210; Table E-32) and individuals with the lowest level of education were most likely to indicate that they or a household member mowed the lawn (Cramer's V = .187; Table G-32). Owners were far more likely than renters to indicate that they or a household member were responsible for fertilizing the lawn (Cramer's V = .220; Table I-33).

Those individuals who indicated they did use fertilizers or pesticides used a variety of techniques for determining how much fertilizer or pesticide to use (Table D-14). When looking at the top three responses, the most frequently cited source of information (selected by 20.7% of respondents) was by reading the product information and instructions on the bag or container. Much smaller proportions of respondents indicated they either used other methods (11.5%) or relied on lawn care company recommendations (3.1%).

Regarding the disposal of household chemicals such as paint or paint thinners, cleaners or pesticides, respondents were most likely to take them to the landfill on appointed days (40.3% of respondents) or to put them in the trash (14.6%) (Table D-17). Table J-4, which lists "other" ways of disposing of these materials, reveals a wide variety of practices and behaviors, including dropping them off at the recycling center, using them all up until they are gone, and using the Clemson University Extension Service website to obtain information about disposal of these products.

For those respondents with a septic tank, slightly more than 40% of respondents indicated they had never had their septic tanks inspected or pumped out over the previous five years; slightly more than 1/5 of respondents (20.1%) indicated they had had their septic tank inspected or pumped out once in the previous five years. Importantly, nearly 1/4 of respondents (24.8%) indicated "do not know" when asked this question (Table D-16).

Sources of Local and Regional Information and News

In the interest of learning more about how residents might obtain information about the environment and water quality issues, respondents were asked to list the three primary sources of local and regional news and information and whether they used the Internet to obtain regional and local information and news.

Table D-21 reveals respondents' top three primary sources of local and regional information and news. The three most frequently selected sources of information were TV evening news (85.1%), TV morning news (55.2%) and local newspapers (47.6%). General radio stations were also an important source of information, selected by 30.9% of respondents as one of their top three sources of local and regional news and information. Billboards and posters and events/workshops were the least likely to be selected as a source of information and news (selected by 5.7% and 3.0% of respondents, respectively).

When asked whether there was some other important source of information and news not mentioned in the list provided to them, respondents provided a variety of answers. Table J-7 indicates that respondents obtain regional and local news and information through several different channels, including government agencies, magazines, newsletters, and the water report from their local water company.

More than 2/3 of respondents (68.7%) indicated they used the Internet to get their local and regional and news (Table D-22). Obtaining local or regional information through the Internet was related to sex, education, and age. Males were more likely than females to indicate they used the Internet to obtain local and regional news (Cramer's V = .125; Table E-48) The higher the education level of a respondent, the more likely they were to indicate they used the Internet to obtain local and regional information and news (Cramer's V = .225; Table G-48). Just over 81% of college graduates indicated they used the Internet as compared to 56.9% of those with a high school degree or less. An overwhelming majority (91.0%) of 18-34 year olds used the Internet for regional information and news, as compared to just 26.8% of individuals 65 years of age and older (Cramer's V = .465; Table H-48).

Awareness of Environmental Organizations

Respondents were asked to what extent they were familiar with Carolina Clear and the Lexington County Stormwater Education Consortium. Overall, there is a low level of awareness of these two organizations. Only 12.3% of respondents indicated they had heard of Carolina Clear and were either familiar or not very familiar with the agency's programs; nearly 88% had not heard of Carolina Clear (Table D-19).

Regarding the Lexington County Stormwater Education Consortium (Table D-20), 9.5% of respondents indicated they had heard of the organization and were either familiar with or not very familiar with its programs; nearly 90.5% had not heard of the organization. For those respondents who had heard of either agency, Table J-5 and Table J-6 reveal that respondents had heard of these organizations, including family and friends who had a connection with Clemson University and local media sources. Local newspapers seemed to be an especially important source of information about the Lexington County Stormwater Education Consortium.

The data reveal that, with the exception of education (for Carolina Clear), there are no particular sociodemographic differences in awareness of either of these groups. That is, respondents, regardless of gender, race, education, age, and homeownership status, were equally familiar with (or, in this case, equally unfamiliar with) Carolina Clear and the Lexington County Stormwater Education Consortium. The one exception is that those with a bachelor's degree or more were most likely to indicate they were aware of Carolina Clear. However, just over 1/4 of individuals with some college or a two-year degree had heard of Carolina Clear, but were not familiar with its programs (as compared to 4.8% of those at the lowest educational attainment level and 6.4% of those at the highest educational attainment levels (Cramer's V = .214; Table G-46).

Awareness of Local Ordinances in Place to Protect Water Quality

When asked about their level of familiarity with county ordinances that were in place to protect water quality, nearly 3/4 of respondents (73.7%) indicated they were not at all aware of the county's ordinances. However, nearly 11% indicated they were very aware of the ordinances and 15.4% indicated a mid-level range of familiarity with the ordinances (Table D-23).
This level of knowledge varied by four of the five key sociodemographic characteristics. Males were more familiar with the ordinances than females (Cramer's V = .204; Table E-49); minorities were more likely to be very familiar with the ordinances than whites, while whites were more likely to be somewhat familiar (Cramer's V = .215; Table F-49), individuals with the least education were most familiar with the ordinances (Cramer's V = .152; Table G-49), and renters were more likely than owners to indicate that they were very familiar with the ordinances (owners were more likely than renters to say they were somewhat familiar with the ordinances) (Cramer's V = .294; Table I-49).

Likelihood of Future Involvement in Water Quality Issues

Survey respondents were asked to indicate the likelihood that they would get involved with water resource issues if five scenarios occurred: if they had more information about water quality issues in the area; if they knew the local government could save money in the long run by taking action to improve water quality; if local newspapers or television stations ran stories on local water pollution problems; if local newspapers or television stations ran stories on positive actions taken by local residents to improve water quality; and if they were being directly affected in some way by water pollution. As was the case for participation in positive behaviors, caution should be used in interpreting these results for respondents may have overstated their likelihood of participation in efforts to improve water quality. Nonetheless, some interesting findings emerge.

The high level of concern among Midlands residents about water quality is generally matched by a high level of willingness to become involved in water resource issues. The proportion of respondents who indicated they were "somewhat likely" or "very likely" to get involved exceeded 75 percent for each of the five scenarios (Table D-18). Respondents would be most likely to get involved if they were personally affected, with 93.0% of respondents indicating they would "very likely" or "somewhat likely" become involved if they were being directly impacted by water pollution. Respondents would also be especially motivated to become involved if they knew the local government could save money in the long run by taking action to improve water quality (82.1% indicating "very likely" or "somewhat likely" for this item), or if the local media ran stories on positive actions taken by local residents to improve water quality (78.0% indicating they would "very likely" or "somewhat likely" become involved if this were to happen).

Concerning demographic differences in likelihood of getting involved, males were more likely than females to become involved if they knew the local government could save money in the long run by taking action to improve water quality (Cramer's V = .115; Table E-42).

There were statistically significant differences between whites and minorities for four of the five scenarios described. For all four of these items, minorities were more likely than whites to become involved in water quality issues. The only item for which whites and minorities were equally likely to become involved was if the respondent was being directly affected in some way by water pollution. The relationship between race and likelihood of involvement was moderately strong, with Cramer's V values ranging from .130 (for "if local newspapers or television stations ran stories on local water pollution problems) to .185 (for "if local newspapers or television stations ran stories on positive actions taken by local residents to improve water quality").

Regarding education level, statistically significant relationships were found for two items. Individuals with a high school degree or less were most likely to indicate they would "very likely" or "somewhat likely" become involved if they had more information about water quality issues (gamma = -.213; Table G-41) or if local newspapers ran stories on local water pollution problems (gamma = .342; Table G-43). Individuals with a college degree or higher were least likely to become involved if the media featured such stories.

Significant differences and moderately strong relationships were found between age groups for all five items (see Tables H-41 through Tables H-45). For all five items, individuals age 65 and older were least likely to say they would become involved in water resource issues. Individuals in the youngest age group (18-34) were most likely to become involved in water resource issues for four of the five scenarios (all but the scenario for local government saving money – individuals age 35-54 were most likely to indicate that they would "very likely" or "somewhat likely" become involved). The relationships between age and likelihood of becoming involved in water resource issues were very strong, as indicated by the gamma values, ranging from .270 (for local government saving money) to .492 (if respondents had more information about local water quality issues). Individuals age 65 and older were least likely to indicate they would "very" or "somewhat" likely become involved in water quality issues.

For three of the five scenarios, renters and owners differed in their self-assessment of willingness to become involved in water resource issues. For all three items, renters were more likely than owners to indicate they would "very likely" or "somewhat likely" become involved: if they had more information on local water quality issues (Cramer's V = .113; Table I-41), if the local newspapers or television stations ran stories on local water pollution problems (Cramer's V = .160; Table I-43), and if local newspapers or television stations ran stories on positive actions taken by local residents to improve water quality (Cramer's V = .125; Table I-44).

Recommendations

The survey results provide rich information about the views and opinions of Midlands residents on environmental and water quality issues. This report has highlighted some of the key findings, as measured by the question frequencies and crosstabulation analyses. The survey results offer some initial guidance as to how such an education effort in the Midlands region could proceed. The results also have implications for how Carolina Clear and other environmental organizations can communicate with citizens about water quality issues. Below are some of the major recommendations that emerge from this survey effort.

General Observations and Recommendations

- A predominant theme in the research data was the importance of the water resources to local residents. There is a high level of concern about water quality on the part of the general public and residents value greenways very highly. This high level of concern provides an important starting point for environmental education and for nurturing a dedication to place that is so important for these kinds of efforts.
- Knowledge about watersheds provides a basis for the development of an "environmental consciousness" among local residents. Survey results suggest that education about the basics of watershed principles would go a long way toward developing this level of connection. While concern among Midlands residents was high and comparable to levels of concern in other watersheds, knowledge about watershed basics was quite low. The ability of Midlands residents to identify the correct definition of "watershed" was far below the level of knowledge recorded in other areas of the country. Clarification of the basics of watersheds will help residents to better understand how their practices impact watershed health, both upstream and downstream.
- Better education efforts regarding how water flows across the landscape and about the basics of watersheds could improve appreciation for the complexity of the water quality issues. Efforts such as watershed signs may help to better inform residents about the boundaries of the watershed and help to shape a "watershed identity." Additional measures should also be taken to inform residents about the localized nature of watersheds, in terms of the extent and nature of local streams and waterway in their own neighborhoods and how these tributaries connect to the watershed as a whole. Such knowledge could lead to more concern and action on the part of local citizens.
- Successful environmental education and integrated watershed management relies on the development of a common knowledge base and understanding about causes of water quality problems. The data reveal some disparities in respondent perceptions about the impacts of various sources of pollution. Local residents could benefit from additional information about the interrelatedness of the various causes of pollution. For example, survey results suggest that Midlands residents would benefit from more information about the impact on water quality of pet waste, waste from birds, and runoff from people washing their cars.
- An encouraging sign is the fact that Midlands residents are quite willing to get involved in efforts to improve water quality, when compared to individuals in other areas of the country (McClafferty, 2002). For example, slightly more than 30% of respondents indicated they would "very likely" become involved if they knew the government could save money, but a much greater proportion of respondents (84.7%) would become involved if they were directly impacted in some way by pollution. So, it is not only the "pocketbook issues" that will impact local residents and prompt them to translate concern into action. Environmental educational efforts that highlight how environmental degradation impacts individuals could be especially effective for promoting citizen involvement in water quality issues.

- Residents could benefit from additional information about the resources and information available through organizations and groups like Carolina Clear. This is especially the case given that a significant proportion of respondents indicated they would be willing to become involved in efforts to protect water quality, especially if they were provided with additional information about local water quality issues.
- When providing information to Midlands residents about environmental issues and opportunities for involvement, it would be advantageous to use various forms of media, especially television news (especially the evening news), local newspapers and general radio stations. Human interest stories, featuring stories about personal impacts on the environment, and the impact of water quality on residents of the Midlands region, could be especially effective.
- Given that a significant proportion of Midlands residents use the Internet to obtain local and regional information and news, Carolina Clear and other organizations could take advantage of the unique capabilities of the Internet to allow for creative visual images about the environment. For example, photos of local landmarks and valued environmental assets could be featured. And, given that respondents are likely to become involved if they are personally impacted, stories featuring residents stories' about these personal impacts could be effective.

Targeting Specific Subgroups

The crosstabulation analyses reveal some important subgroup differences for many of the survey items. It is important to note that some of these differences may be a reflection of sociodemographic and other variables not measured in this study. For example, in some cases, race or education differences may be a reflection of socioeconomic status, rather than race or education, per se. Or, age differences may be a reflection of inability to become involved (e.g., in the case of elderly individuals), rather than the result of an unwillingness to become involved.

Nonetheless, the crosstabulation analyses do suggest that while there is a need to expand environmental awareness across all groups, survey results suggest that a more targeted education strategy may be appropriate for certain issues. That is, several response trends indicate a need for "segmented" outreach to specific sociodemographic groups.

- In terms of gender, men and women were equally concerned about water quality issues and were equally likely to indicate that people's actions had a negative impact on water quality. However, women were more likely than men to feel that various sources of pollution had a "great" impact on water quality. Women were as equally likely as men to indicate a willingness to become involved in water quality issues. However, males were more likely than females to say they had participated in several environmentally-friendly behaviors, including reducing water usage out of concern for drought and participating in clean-up events.
- The findings on race differences in environmentalism were somewhat mixed. While whites were more concerned than minorities about water quality and whites were more likely than minorities to indicate that greenways were valuable community assets.

However, minorities expressed a greater willingness to become involved in water quality issues for four of the five scenarios presented. This willingness to get involved was higher than whites, despite minorities having lower rates of participation in outdoor activities.

- As documented in the literature on environmental injustice, minorities and low-income populations often disproportionately bear the brunt of environmental degradation (Bullard, 2000). Efforts to promote watershed identity and environmental stewardship need to include the unique views of minority groups. Such strategies would require going beyond the traditional conservation efforts. Such endeavors could emphasize how minority citizens can contribute to efforts to improve water quality. Given the low level of awareness among residents of Carolina Clear, such efforts would need to raise the visibility of this organization and other organizations.
- Regarding educational differences in environmentalism, the findings were particularly interesting with respect to individuals with the lowest levels of educational attainment. Individuals with a high school degree or less were more likely to rate several sources as having a "great" or "some" impact on water quality, were more likely than others to participate in some positive environmental activities, were more likely to indicate they would become involved in water quality issues, and were more familiar with county ordinances in place to protect water. These findings generally run counter to the literature on environmentalism, which frequently states that individuals at the highest level of educational attainment (i.e., bachelor's degree or higher) are generally more aware of environmental issues and more willing to become involved.
- Even though individuals of different ages expressed similar levels of concern about water quality, outreach efforts can also be segmented to individuals in different age groups. For example, although the youngest respondents (age 18-34) were most likely to indicate they would get involved in water quality issues for all five scenarios presented.
- Since individuals age 65 and older were least likely to participate in outdoor recreational activities and were least likely to indicate they would become involved in efforts to improve water quality for all five scenarios presented, environmental education efforts could focus on developing creative ways for nurturing an environmental ethic among members of this age group. For example, personal stories and memories about outdoor experiences and about local landmarks could be collected and shared with the community. By doing this, older residents could feel that their experiences are important for inspiring the involvement of other residents. Such stories could be shared through local media outlets and on the web pages of municipalities and local environmental organizations.
- Regarding home ownership status, renters and owners were equally concerned about pollution and water quality and placed an equal value on greenways as community assets. However, renters were more likely than owners to rate various activities as having a "great" or "some" impact on water quality. And, renters were much more likely to indicate they would become involved in water quality issues for three of the five scenarios presented. This suggests targeted efforts toward renters (e.g., apartment dwellers) would have some impact. For example, these residents could put pressure on landlords to offer opportunities for renters to engage in more environmentally-friendly behaviors (e.g., providing appropriate locations for washing cars). Given the fact that renters are already participating in some important positive behaviors (e.g., reducing

water usage, participating in clean-up events, and becoming involved in environmental organizations), those landlords who are more environmentally conscious could perhaps use "green marketing" to attract tenants. And, renters' greater propensity than owners to participate in outdoor recreational activities could be an important starting point for environmentally education efforts that are segmented by home ownership status.

Conclusion

The survey results provide a starting point for designing and implementing environmental education strategies for residents of the Midlands region of South Carolina. Environmental education has the potential to nurture residents' sense of place and place attachment and to broaden residents' perceptions about how they can make a difference in their local community. Midlands residents expressed a high level of concern about the quality of local waterways. An effective education effort can help to translate this concern into positive action on the part of residents. The survey results reported here can serve as a baseline for determining the ultimate success of such educational efforts.

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