South Carolina Residents' Awareness of and Attitudes Toward Stormwater Pollution



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Conducted for Clemson Extension's Carolina Clear Program

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SOUTH CAROLINA RESIDENTS' AWARENESS OF AND ATTITUDES TOWARD STORMWATER POLLUTION

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Responsive Management National Office

Mark Damian Duda, Executive Director Martin Jones, Senior Research Associate Tom Beppler, Senior Research Associate Steven J. Bissell, Ph.D., Qualitative Research Associate Amanda Center, Research Associate Andrea Criscione, Senior Research Associate Patrick Doherty, Research Associate Gregory L. Hughes, P.E., Research Associate Caroline Gerken, Survey Center Manager Alison Lanier, Business Manager

> 130 Franklin Street Harrisonburg, VA 22801 540/432-1888 E-mail: mark@responsivemanagement.com www.responsivemanagement.com

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EXECUTIVE SUMMARY

INTRODUCTION AND METHODOLOGY

This study was conducted for the Clemson Extension's Carolina Clear program (Clemson) to determine South Carolina residents' awareness of and attitudes toward stormwater pollution in the state, to measure the success of the program's stormwater outreach efforts, and to guide future programming. The study entailed a scientific telephone survey of residents, age 18 or older, within five regions across South Carolina that partner with the Carolina Clear program. The five regions are:

- Region 1 (Pickens Area): Pickens and Anderson Counties
- Region 2 (Pee Dee Area): Florence, Darlington, and Sumter Counties
- Region 3 (Beaufort Area): Beaufort County
- Region 4 (Charleston Area): Charleston, Berkeley, and Dorchester Counties
- Region 5 (Myrtle Beach Area): Horry and Georgetown Counties

The telephone survey questionnaire was primarily based on similar surveys conducted for Clemson in 2009 and 2013. The sample of adult South Carolina residents was obtained from Marketing Systems Group. The survey was conducted in August and September 2019, and Responsive Management obtained 2,003 completed interviews.

The software used for data collection was Questionnaire Programming Language. The analysis of data was performed using IBM SPSS Statistics as well as proprietary software developed by Responsive Management. The results were weighted by age and gender within each region so that the data were representative of the demographic characteristics of the total population of that region, then the regions were weighted to represent their proper proportions within the five regions as a whole.

AWARENESS OF AND ATTITUDES REGARDING LOCAL WATERWAYS

- Survey respondents were first asked about their participation in a series of recreational activities, most of them water-based.
 - Among the listed activities, visiting the beach was the most common, with 65% of residents who *often* or *sometimes* do this. This was followed by visiting natural areas for hiking, walking, or hunting (53% of residents do this *often* or *sometimes*).
 - A second tier of activities includes using community walking paths, also known as greenways (46% of residents do this *often* or *sometimes*), fishing (40%), and boating (40%).
- Virtually all residents (99%) consider clean water to be important to South Carolina's economy and tourism; 94% feel it to be *very* important.
- Most residents (87%) are concerned with pollution in their local waterways; 57% are very concerned.
 - The degree of concern is markedly lower in Region 1, compared to the other regions.
- Residents were asked, in an open-ended question, how they think pollution from the land is able to enter local waterways. The intent of the question was to determine if they knew that this could happen from stormwater running across land directly into waterways and/or from stormwater running through storm drains and pipes and then into waterways. Therefore, interviewers indicated if respondents knew of one or both of these ways, or if they indicated stormwater in general (i.e., without specifying across land or through storm drains), or if they gave any other response.
 - A little more than a quarter of residents (28%) responded with stormwater across land, while 16% said stormwater through drains, and 29% indicated stormwater but did not specify (i.e., stormwater in general). The primary "other" way that was commonly mentioned was that pollution was put directly in the water by humans (e.g., factories, boaters).

- About a quarter of residents (26%) think that water that flows into storm drains is treated at a wastewater treatment plant before it reaches waterways, while over a third (34%) did not know what happens to the water.
 - Region 1 residents are more likely than those in other regions to think that stormwater is treated at a wastewater treatment plant.
- The survey asked residents to say where water flows after entering a storm drain, in an open-ended question. Residents most often said they do not know (37%); otherwise, the top responses are that water flows directly into local waterways (35%), water is collected and sent to a wastewater treatment plant (11%), and water is diverted to a neighborhood stormwater pond, structure, or system (10%). It cannot be determined if respondents were correct regarding their neighborhood, other than those who incorrectly indicated that the stormwater is sent to a wastewater treatment plant—South Carolina does not have any municipalities with combined sewer and stormwater systems, so no stormwater is sent to a treatment plant in the state. It is also worth noting that 26% of residents thought that stormwater is treated at a wastewater treatment plant when it was presented as a yes/no question, but 11% stated that stormwater is sent to a wastewater treatment plant when it was presented as this open-ended question.

BEHAVIORS THAT MAY IMPACT STORMWATER POLLUTION Personal Activities

- ➢ Over a third of residents (41%) had dumped or disposed of anything down a storm drain.
 - In follow-up, they were asked what they had dumped or disposed of down a storm drain, and they were also asked (if they had not already said so) if they had washed a car where the soapy water drained into a storm drain. The overwhelming majority (88%) had dumped or disposed of soapy water down a storm drain. No other items were named by more than 4% of these residents.
 - Note that the survey asked residents if they had ever dumped or disposed of anything down a storm drain, and then the follow-up question asked them to say what they had dumped or disposed of down a storm drain. The survey developers wanted to include washing a car where the water drained into a storm drain as dumping/disposing of anything down a storm drain. Pre-tests of the survey showed, however, that there were

people who washed their car where the soapy water would flow into the storm drain but who did not consider this "dumping or disposing" down a storm drain. Therefore, a third question in this section was included that was asked of those who had not indicated that they had dumped/disposed of soapy water from washing a car or who had said that they had not dumped or disposed of anything down a storm drain—the question asked directly if they had washed a car where the soapy water flowed into a storm drain. Interestingly, 39% of these people had washed their car where the soapy water flowed into a storm drain, so the numbers above were adjusted to include these people.

- Residents were read a list of possible sources of water pollution and were asked to state how much impact each has on waterways in their area.
 - Fertilizers and chemicals that people use on their lawns or gardens was at the top of the list, with 81% of residents saying that it has a *great* impact or *some* impact on waterways (52% saying it has a *great* impact).
 - This is followed by a grouping of responses that had 66% to 73% of residents saying each had a *great* impact or *some* impact on waterways in their area: industrial sites, fuel and oil leaks from vehicles, sediment or dirt from construction sites, and farming operations.
 - Pet waste and runoff from people washing their cars were considered to be the least impactful to local waterways, among the pollution sources listed in the survey.
- A majority of residents (59%) wash their car at an off-site wash facility, while 23% wash it on asphalt or a paved driveway and 13% wash it on gravel or a lawn.
- Most residents (81%) do not own or did not wash a boat. Of the remainder, there is a nearly equal distribution among those who wash their boat on gravel or a lawn (7% of residents do this), off site at a wash location (7%), or on asphalt or a paved driveway (5%).

- Residents were asked about a series of personal actions over the past 2 years that could have impacted water quality: two of them are positive actions that help protect water quality and two of them are negative actions that harm water quality.
 - Most dog owners (81%) *always* or *sometimes* picked up after their dog; 67% *always* did so. At the other end of the scale, 15% *never* picked up after their dog.
 - Among residents who typically pick up their dog's waste, 77% dispose of it in the trash.
 - Among those who do *not* typically pick up their dog's waste, the top reason is that the dog is on the owner's property. Other common reasons are that the waste is biodegradable/fertilizer and the convenience of leaving it.
 - A majority of residents (61% of those to whom the question applied) *always* or sometimes considered the likelihood of rain before treating their lawn with pesticide or fertilizer; 44% *always* did so, compared to 29% who *never* did so.
 - Looking at the negative actions, virtually all residents (99% of those to whom the question applied) *never* disposed of oil, paint, or other chemicals down a storm drain over the past 2 years. Only 1% *always* or *sometimes* did so.
 - Finally in this series, 96% of residents with a lawn *never* dumped grass clippings or leaves down a storm drain or ditch over the past 2 years; under 0.5% *always* did so and 2% *sometimes* did so.

Chemicals and Grease

- In an open-ended question, residents were asked how they currently remove or dispose of household chemicals such as paint, paint thinners, cleaners, or pesticides. By far the top response was taking them to the dump, landfill, or collection center on appointed days (61% gave this response). This was distantly followed by responses stating that they do not use these products (16%) and that they put them in the trash (14%).
- In a similar open-ended question, residents were asked how they currently dispose of their kitchen grease. Over a third of residents (35%) let the grease cool and solidify, then put it in the trash. Other responses, given by 13% of residents or less, are that they save and reuse it,

then later dispose of it in the trash; they pour it down a sink or toilet; they pour it in the trash when warm/liquid; and they do not cook or accumulate grease.

Litter

- Most residents (93%) think litter is a problem in their county, with 52% saying it is a *major* problem.
 - Two-thirds of residents (66%) think that the main reason people litter is laziness; otherwise, residents suggested that litterers do not care about or understand the effects of litter.
- The survey presented a series of four types of littering and asked respondents how often they have done each.
 - The most common type of the four is leaving food or trash on the ground because they believe it to be biodegradable: 29% *often, sometimes*, or *rarely* do this, compared to 71% who *never* do this. No more than 10% of residents ever do the other types of littering, which are throwing litter out of the car while driving, throwing cigarette butts on the ground, and leaving litter on the ground at a crowded event, such as a concert or festival.

HOME MAINTENANCE AND STORMWATER RUNOFF

Septic Tanks

- About a third of residents (34%) own a septic tank.
 - Septic tank ownership is much more common in Regions 1 and 2 than the other regions.
 - Of those who own a septic tank, a majority (61%) have the tank inspected and maintained by someone else, 21% personally inspect and maintain the tank, 10% do both, and 7% do not inspect or maintain the tank at all and do not have it done for them.
 - Those who have their septic tank serviced or maintained most often said that they have their tank maintained through pumping (47% of this group gave this response), followed by having a general inspection or visual check (27%) and through additives (20%).

Lawns and Landscaping

- A majority of residents (56%) either do all of their landscaping themselves or have a household member take care of their landscaping. This compares to 21% who hire someone to maintain their lawn and garden, 14% who do both, and 9% who do not have a lawn or garden at all.
 - Among those who have a lawn or garden, a slight majority (52%) typically look for plants or shrubbery that are native to South Carolina.
 - Of those who do *not* consider whether the plants that they purchase are local, the most common reasons are that they do not think about it, that the plants are already in place or they do not purchase plants, and that aesthetics or attractive plants are a more important consideration.
 - Among those who have a lawn or garden, 6% have a rain garden in their yard.
- A majority of those with a lawn or garden (56%) have experienced flooding on their property, compared to 42% who never have: 21% are flooded multiple times a year, 14% are flooded about once a year, and the remainder of those who have been flooded are flooded less frequently than once a year.
 - Region 1 residents are the least likely to be flooded, compared to those in other regions.
- > A small percentage of residents (7%) currently own a rain barrel.
 - Of those who own a rain barrel, most (79%) currently have it installed and working on their property.
 - Most of those with a working rain barrel (87%) use the collected water to water their plants, garden, and/or lawn.

ACTIONS TO PROTECT WATER QUALITY

A slight majority of residents (54%) have participated in a litter clean-up event, with 24% having done so during the past 2 years.

- A tenth of residents (10%) have volunteered for a conservation or environmental organization in the past 2 years.
 - Volunteers most often contributed to litter and trash pick-ups along waterways, trash pick-ups along roadways or non-water areas, wildlife management, water bank management or improvement, and non-profit group support such as lobbying or protests.

QUESTIONS SPECIFIC TO THE CHARLESTON REGION

- This survey included questions that were specific to residents of the Charleston area (Region 4 – Charleston, Berkeley, and Dorchester Counties).
 - In an open-ended question, Charleston area residents say the best ways to get them information on local water resource issues are through email (28% stated this) or direct mail (21%). Other outlets with at least 10% of Charleston region residents mentioning them are social media, TV, websites, and print newspapers.
 - In follow-up, those who mentioned TV said the type of TV program that can best get them information on local water issues are the evening news, the morning news, or just TV in general.
- Charleston area residents are slightly more likely to *always* or *sometimes* eat fish that they catch (29% gave one of those responses) than to *rarely* or *never* eat it (27%), whereas 44% do not fish.
 - A majority of Charleston area residents (77%) eat locally caught seafood at least several times a year. At the other end of the spectrum, 11% do not eat seafood and 4% are not sure what seafood is local.
 - Most Charleston area residents (80%) are *very* or *somewhat* concerned that shellfish can be polluted by failing septic systems, wildlife and pets, and other sources. This is in contrast with 16% who are *not very* or *not at all* concerned.

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INTRODUCTION AND METHODOLOGY

This study was conducted for the Clemson Extension's Carolina Clear program (Clemson) to determine South Carolina residents' awareness of and attitudes toward stormwater pollution in the state, to measure the success of the program's stormwater outreach efforts, and to guide future programming. The study entailed a scientific telephone survey of residents, age 18 or older, within five regions across South Carolina that partner with the Carolina Clear program. Specific aspects of the research methodology are discussed below.

USE OF TELEPHONES FOR THE SURVEY

For the survey, telephones were selected as the preferred sampling medium because of the almost universal ownership of telephones among South Carolina residents (both landlines and wireless phones were called). Additionally, telephone surveys have better representation of the sample than mail or Internet surveys because those types of surveys systematically exclude those who are not literate enough to complete the surveys or who would be intimidated by having to complete a survey that they have to read to themselves—by an estimate of the U.S. Department of Education's National Institute of Literacy (2016), up to 43% of the general population read no higher than a "basic level," suggesting that they would be reticent to complete a survey that they have to read to themselves also have fewer negative effects on the environment than do mail surveys because of reduced use of paper and reduced energy consumption for delivering and returning the questionnaires.

QUESTIONNAIRE DESIGN

The telephone survey questionnaire was primarily based on similar surveys conducted for Clemson in 2009 and 2013 as well as the research team's familiarity with environmental and natural resource issues. Responsive Management conducted pre-tests of the questionnaire to ensure proper wording, flow, and logic in the survey.

SURVEY SAMPLE

The sample of adult South Carolina residents was obtained from Marketing Systems Group, a firm that specializes in providing scientifically valid samples for survey research. The sample included both landlines and wireless phones in their proper proportions. The sample consisted of

residents within five regions across the state that partner with the Carolina Clear program to provide their compliance-based stormwater outreach and education. The five regions are:

- Region 1 (Pickens Area): Pickens and Anderson Counties
- Region 2 (Pee Dee Area): Florence, Darlington, and Sumter Counties
- Region 3 (Beaufort Area): Beaufort County
- Region 4 (Charleston Area): Charleston, Berkeley, and Dorchester Counties
- Region 5 (Myrtle Beach Area): Horry and Georgetown Counties



Regions for Study

The sample used a probability-based selection process that ensured that within each region each eligible resident had an equal chance of being selected for the survey. This process ensured that the sample was valid because every resident had a known chance of participating in the survey.

TELEPHONE INTERVIEWING FACILITIES

A central polling site at the Responsive Management office allowed for rigorous quality control over the interviews and data collection. Responsive Management maintains its own in-house telephone interviewing facilities. These facilities are staffed by interviewers with experience conducting computer-assisted telephone interviews on the subjects of outdoor recreation and natural resources.

To ensure the integrity of the telephone survey data, Responsive Management has interviewers who have been trained according to the standards established by the Council of American Survey Research Organizations. Methods of instruction included lecture and role-playing. The Survey Center Managers and other professional staff conducted a project briefing with the interviewers prior to the administration of this survey. Interviewers were instructed on type of study, study goals and objectives, handling of survey questions, interview length, termination points and qualifiers for participation, interviewer instructions within the survey questionnaire, reading of the survey questions, skip patterns, and probing and clarifying techniques necessary for specific questions on the survey questionnaire.

INTERVIEWING DATES AND TIMES

Telephone surveying times are Monday through Friday from 10:00 a.m. to 9:00 p.m., Saturday from noon to 5:00 p.m., and Sunday from 5:00 p.m. to 9:00 p.m., local time. A five-callback design was used to maintain the representativeness of the sample, to avoid bias toward people easy to reach by telephone, and to provide an equal opportunity for all to participate. When a respondent could not be reached on the first call, subsequent calls were placed on different days of the week and at different times of the day. The survey was conducted in August and September 2019.

TELEPHONE SURVEY DATA COLLECTION AND QUALITY CONTROL

The software used for data collection was Questionnaire Programming Language (QPL). The survey data were entered into the computer as each interview was being conducted, eliminating manual data entry after the completion of the survey and the concomitant data entry errors that may occur with manual data entry. The survey questionnaire was programmed so that QPL

branched, coded, and substituted phrases in the survey based on previous responses to ensure the integrity and consistency of the data collection.

The Survey Center Managers and statisticians monitored the data collection, including monitoring of the actual telephone interviews without the interviewers' knowledge, to evaluate the performance of each interviewer and ensure the integrity of the data. The survey questionnaire itself contained error checkers and computation statements to ensure quality and consistent data. After the surveys were obtained by the interviewers, the Survey Center Managers and/or statisticians checked each completed survey to ensure clarity and completeness. Responsive Management obtained a total of 2,003 completed interviews.

DATA ANALYSIS

The analysis of data was performed using IBM SPSS Statistics as well as proprietary software developed by Responsive Management. The results were weighted by age and gender within each region so that the data were representative of the demographic characteristics of the total population of that region, then the regions were weighted to represent their proper proportions within the five regions as a whole. Note that age, gender, and regional weights were based on U.S. Census data.

SAMPLING ERROR

Throughout this report, findings of the telephone survey are reported at a 95% confidence interval. For the entire sample of adult South Carolina residents within the five study regions, the sampling error is at most plus or minus 2.19 percentage points. This means that if the survey were conducted 100 times on different samples that were selected in the same way, the findings of 95 out of the 100 surveys would fall within plus or minus 2.19 percentage points of each other. Sampling error was calculated using the formula described on the following page, with a sample size of 2,003 and a population size of 1,508,280. The sampling error for each region is shown.

Sampling Error Equation



Derived from formula: p. 206 in Dillman, D. A. 2000. Mail and Internet Surveys. John Wiley & Sons, NY.

Note: This is a simplified version of the formula that calculates the <u>maximum</u> sampling error using a 50:50 split (the most conservative calculation because a 50:50 split would give maximum variation).

| Region | Sample | Population | Sampling error |
|-------------------------|--------|------------|----------------|
| Region 1 (Pickens) | 402 | 246,894 | 4.88 |
| Region 2 (Pee Dee) | 401 | 238,375 | 4.89 |
| Region 3 (Beaufort) | 400 | 144,108 | 4.89 |
| Region 4 (Charleston) | 400 | 578,579 | 4.90 |
| Region 5 (Myrtle Beach) | 400 | 300,324 | 4.90 |
| Study Area Total | 2,003 | 1,508,280 | 2.19 |

Regional Sampling Errors

ADDITIONAL INFORMATION ABOUT THE PRESENTATION OF RESULTS IN THE REPORT

In examining the results, it is important to be aware that the questionnaire included several types of questions:

- Open-ended questions are those in which no answer set is read to the respondents; rather, they can respond with anything that comes to mind from the question.
- Closed-ended questions have an answer set from which to choose.
- Single or multiple response questions: Some questions allow only a single response, while other questions allow respondents to give more than one response or choose all that apply. Those that allow more than a single response are indicated on the graphs with the label, "Multiple Responses Allowed."
- Scaled questions: Many closed-ended questions (but not all) are in a scale, such as often-sometimes-rarely-never.

• Series questions: Many questions are part of a series, and the results are primarily intended to be examined relative to the other questions in that series (although results of the questions individually can also be valuable). Typically, results of all questions in a series are shown together.

Most graphs show results rounded to the nearest integer; however, all data are stored in decimal format, and all calculations are performed on unrounded numbers. For this reason, some results may not sum to exactly 100% because of this rounding on the graphs. Additionally, rounding may cause apparent discrepancies of 1 percentage point between the graphs and the reported results of combined responses (e.g., when "very important" and "somewhat important" are summed to determine the total percentage of importance).

The results of each question are presented in the following order:

- Overall (all regions combined)
- Regional (5-bar graphs)
- Omnigraph (for selected questions; this type of graph is described further below)
- Trends (for identical questions)

As indicated earlier, this is the third iteration of this survey, which was previously conducted for Clemson in 2009 and 2013. Trends graphs are included for identical questions between the surveys, and they show the results side-by-side for comparison. (There are similar questions between the surveys that were omitted from trends due to differences in question wording or response options that may have influenced the results.) Note that 2009 and 2013 results were available at the regional level but not for overall results. Four of the five regions (the Pickens, Pee Dee, Charleston, and Myrtle Beach areas) will have trends shown, whereas the Beaufort area is new to the survey (the 2009 and 2013 surveys included the Midlands area instead). Also note that the Pickens area was not included in the 2009 survey, so trends for that region will just have a comparison of 2013 and 2019 results.

Another type of graph included in this report is called an "omnigraph" because it includes many demographic and other characteristics on a single graph. These omnigraphs show the

characteristics of respondents who have certain opinions or practice certain behaviors. Those groups above the total bar have a higher likelihood to hold the belief or practice the behavior, while those groups below the total bar have a lower likelihood to do so.

The example on the following page shows the percentages of various groups who own a septic tank. Among respondents as a whole, 34% own a septic tank, as shown by the patterned total bar. Those groups above the total bar have a higher percentage who own a septic tank, compared to respondents overall, whereas those groups below the total bar have a lower likelihood of owning a septic tank. Generally, when one group is above the total bar (in this example, males), its counterpart group will be below the total bar (in this example, females).

Finally, although the study area is limited to the five regions within South Carolina as previously discussed, this report will typically refer to survey respondents as "residents" for simplification.

Percent of each of the following groups who own a septic tank:



AWARENESS OF AND ATTITUDES REGARDING LOCAL WATERWAYS

- Survey respondents were first asked about their participation in a series of recreational activities, most of them water-based.
 - Among the listed activities, visiting the beach was the most common, with 65% of residents who *often* or *sometimes* do this. This was followed by visiting natural areas for hiking, walking, or hunting (53% of residents do this *often* or *sometimes*).
 - A second tier of activities includes using community walking paths, also known as greenways (46% of residents do this *often* or *sometimes*), fishing (40%), and boating (40%).
- Virtually all residents (99%) consider clean water to be important to South Carolina's economy and tourism; 94% feel it is *very* important.
- Most residents (87%) are concerned with pollution in their local waterways; 57% are very concerned.
 - The degree of concern is markedly lower in Region 1, compared to the other regions.
 - Those most associated with being *very* concerned are African American residents, female residents, and those who live in a large city or urban area, compared to other groups.
- Residents were asked, in an open-ended question, how they think pollution from the land is able to enter local waterways. The intent of the question was to determine if they knew that this could happen from stormwater running across land directly into waterways and/or from stormwater running through storm drains and pipes and then into waterways. Therefore, interviewers indicated if respondents knew of one or both of these ways, or if they indicated stormwater in general (i.e., without specifying across land or through storm drains), or if they gave any other response.
 - A little more than a quarter of residents (28%) responded with stormwater across land, while 16% said stormwater through drains, and 29% indicated stormwater but did not specify (i.e., stormwater in general). The primary "other" way that was commonly

mentioned was that pollution was put directly in the water by humans (e.g., factories, boaters).

- About a quarter of residents (26%) think that water that flows into storm drains is treated at a wastewater treatment plant before it reaches waterways, while over a third (34%) did not know what happens to the water.
 - Region 1 residents are more likely than those in other regions to think that stormwater is treated at a wastewater treatment plant.
- The survey asked residents to say where water flows after entering a storm drain, in an open-ended question. Residents most often said they do not know (37%); otherwise, the top responses are that water flows directly into local waterways (35%), water is collected and sent to a wastewater treatment plant (11%), and water is diverted to a neighborhood stormwater pond, structure, or system (10%). It cannot be determined if respondents were correct regarding their neighborhood, other than those who incorrectly indicated that the stormwater is sent to a wastewater treatment plant—South Carolina does not have any municipalities with combined sewer and stormwater systems, so no stormwater is sent to a treatment plant in the state. It is also worth noting that 26% of residents thought that stormwater is treated at a wastewater treatment plant when it was presented as a yes/no question, but 11% stated that stormwater is sent to a wastewater treatment plant when it was presented as this open-ended question.

Percent who participate in the following activities [frequency]:



Q15. Kayaking or canoeing. (Please tell me whether you do this activity often, sometimes, rarely, or never.)























Q21. Visiting natural areas for hiking, walking, or hunting.

(Please tell me whether you do this activity often, sometimes, rarely, or never.)



Q22. Using community walking paths, also known as greenways. (Please tell me whether you do this activity often,

sometimes, rarely, or never.)





Q23. How important do you feel clean water is to South Carolina's state economy and tourism?



Q23. How important do you feel clean water is to South Carolina's state economy and tourism?

Q24. How concerned would you say you are with pollution in your local waterways? By waterways, I mean any channel for water, such as a river, stream, or tidal creek. Would you say you are very concerned, somewhat concerned, not very concerned, or not at all concerned?



Q24. How concerned would you say you are with pollution in your local waterways? By waterways, I mean any channel for water, such as a river, stream, or tidal creek. Would you say you are very concerned, somewhat concerned, not very concerned, or not at all concerned?



Percent of each of the following groups who are very concerned about pollution in their local waterways:



Refer to page 8 for an explanation of how to interpret this map.










Q27. In a few words, how do you think pollution from the land is able to enter local waterways?



Q27. In a few words, how do you think pollution from the land is able to enter local waterways?

Q29. To the best of your knowledge, is water that flows into storm drains treated at a wastewater treatment plant before it reaches waterways?



Q29. To the best of your knowledge, is water that flows into storm drains treated at a wastewater treatment plant before it reaches waterways?



Percent of each of the following groups who think that water that flows into storm drains is treated at a wastewater treatment plant before it reaches waterways:



Percent of each of the following groups who do not think that water that flows into storm drains is treated at a wastewater treatment plant before it reaches waterways:



to interpret this map.



Q36. Can you tell me where water flows after entering a storm drain?



Q36. Can you tell me where water flows after entering a storm drain?

BEHAVIORS THAT MAY IMPACT STORMWATER POLLUTION PERSONAL ACTIVITIES

> Over a third of residents (41%) had dumped or disposed of anything down a storm drain.

- In follow-up, they were asked what they had dumped or disposed of down a storm drain, and they were also asked (if they had not already said so) if they had washed a car where the soapy water drained into a storm drain. The overwhelming majority (88%) had dumped or disposed of soapy water down a storm drain. No other items were named by more than 4% of these residents.
 - Note that the survey asked residents if they had ever dumped or disposed of anything down a storm drain, and then the follow-up question asked them to say what they had dumped or disposed of down a storm drain. The survey developers wanted to include washing a car where the water drained into a storm drain as dumping/disposing of anything down a storm drain. Pre-tests of the survey showed, however, that there were people who washed their car where the soapy water would flow into the storm drain but who did not consider this "dumping or disposing" down a storm drain. Therefore, a third question in this section was included that was asked of those who had not indicated that they had dumped/disposed of soapy water from washing a car or who had said that they had not dumped or disposed of anything down a storm drain. Therestingly, 39% of these people had washed their car where the soapy water flowed into a storm drain, so the numbers above were adjusted to include these people.
- Residents were read a list of possible sources of water pollution, and were asked to state how much impact each has on waterways in their area.
 - Fertilizers and chemicals that people use on their lawns or gardens was at the top of the list, with 81% of residents saying that it has a *great* impact or *some* impact on waterways (52% say it has a *great* impact).
 - This is followed by a grouping of responses that had 66% to 73% of residents saying each had a *great* impact or *some* impact on waterways in their area: industrial sites, fuel and oil leaks from vehicles, sediment or dirt from construction sites, and farming operations.
 - Pet waste and runoff from people washing their cars were considered to be the least impactful to local waterways, among the pollution sources listed in the survey.

- A majority of residents (59%) wash their car at an off-site wash facility, while 23% wash it on asphalt or a paved driveway and 13% wash it on gravel or a lawn.
- Most residents (81%) do not own or did not wash a boat. Of the remainder, there is a nearly equal distribution among those who wash their boat on gravel or a lawn (7% of residents do this), off site at a wash location (7%), or on asphalt or a paved driveway (5%).
- Residents were asked about a series of personal actions over the past 2 years that could have impacted water quality: two of them are positive actions that help protect water quality and two of them are negative actions that harm water quality. Note that "does not apply" was a response option for each question in the series (for example, those who do not own a dog would select that option regarding dog waste); however, the graphs and percentages are shown out of those for whom each question *does* apply in order to get a better measure of residents' voluntary actions. Each question is discussed below.
 - Most dog owners (81%) *always* or *sometimes* picked up after their dog; 67% *always* did so.
 At the other end of the scale, 15% *never* picked up after their dog.
 - Among residents who typically pick up their dog's waste, 77% dispose of it in the trash.
 - Among those who do *not* typically pick up their dog's waste, the top reason is that the dog is on the owner's property. Other common reasons are that the waste is biodegradable/fertilizer and the convenience of leaving it.
 - A majority of residents (61% of those to whom the question applied) *always* or *sometimes* considered the likelihood of rain before treating their lawn with pesticide or fertilizer; 44% *always* did so, compared to 29% who *never* did so.
 - Looking at the negative actions, virtually all residents (99% of those to whom the question applied) *never* disposed of oil, paint, or other chemicals down a storm drain over the past 2 years. Only 1% *always* or *sometimes* did so.
 - Finally in this series, 96% of residents with a lawn *never* dumped grass clippings or leaves down a storm drain or ditch over the past 2 years; under 0.5% *always* did so and 2% *sometimes* did so.



Q30. Have you ever dumped or disposed of anything down a storm drain?



Q30. Have you ever dumped or disposed of anything down a storm drain?

Q33. What have you dumped or disposed of down a storm drain? (Asked of those who dumped something down a storm drain.)



Q33. What have you dumped or disposed of down a storm drain? (Asked of those who dumped something down a storm drain.)



Percent who think that the following possible sources of pollution have [degree of] impact on waterways in their area:

| ■Great impact ■So | me impact | □ Very little | e impact | □ No ir | npact | Don't know | |
|--|------------------|---------------|--|----------|-------|------------|----------|
| Percentages shown below bars are "great impact" and "some impact" combined. | | | *Apparent discrepancy is due to rounding of numbers on graph; calculation is made on unrounded numbers. | | | | |
| Q40. Fertilizers and chemicals that people use on their lawns and gardens | | | | | | | |
| | 52 | | | 30 | | 11 4 3 | |
| | | | 81%* | | | | |
| Q44. Industrial sites | | 50 | | 23 | 13 | 7 | |
| - | | | 73% | | - T | | <u></u> |
| Q41. Fuel and oil leaks from vehicles | | 10 | | <u> </u> | 10 | | |
| | | +∠ | 71% | 9 | | 0 | 4 |
| - | | | , . | | | | |
| Q45. Farm operations | 35 | 0.00 | 31 | | 18 | 9 | |
| - | | 66% | | | | | |
| Q46. Sedimant or dirt from construction sites | 32 | | 37 | | 20 | 7 | 4 |
| - | | 69% | | | | <u> </u> | <u></u> |
| Q42. Pet waste | 18 | 34 | | 31 | | 11 | 5: |
| | 52% | | | | | | <u> </u> |
| Q43. Runoff from people washing their cars | | | | | | | |
| | 17 | 37 | | 3 | 3 | 9 | 4 |
| - | | | 0 | 60 | | | 100 |
| | Percent (n=2003) | | | | | | |

Q40. Fertilizers and chemicals that people use on their lawns and gardens.
(Please tell me if this has a great impact, some impact, very little impact, or no impact on waterways in your area.)











Q41. Fuel and oil leaks from vehicles. (Please tell me if this has a great impact, some impact, very little impact, or no impact on waterways in your area.)























Q43. Runoff from people washing their cars. (Please tell me if this has a great impact, some impact, very little impact, or no impact on waterways in your area.)











Q44. Industrial sites. (Please tell me if this has a great impact, some impact, very little impact, or no impact on waterways in your area.)























Q46. Sediment or dirt from construction sites. (Please tell me if this has a great impact, some impact, very little impact, or no impact on waterways in your area.)












Q97. Where do you wash your car?



Q97. Where do you wash your car?

Percent of each of the following groups who wash their car on gravel or a lawn:





Percent of each of the following groups who wash their car on asphalt or a paved location:











Q98. Where do you wash your boat?



Q98. Where do you wash your boat?























Q79. Picked up after your dog. (Percentages calculated with "does not apply" responses removed.)

Q80. Disposed of oil, paint, or other chemicals down storm drains. (How often have you done this in the past 2 years?) (Percentages are calculated with "does not apply" responses removed.)



Q80. Disposed of oil, paint, or other chemicals down storm drains. (Percentages calculated with "does not apply" responses removed.)



Q81. Dumped grass clippings or leaves down storm drains or in drainage ditches. (How often have you done this in the past 2 years?) (Percentages are calculated with "does not apply" responses removed.)



Q81. Dumped grass clippings or leaves down storm drains or in drainage ditches. (Percentages calculated with "does not apply" responses removed.)







Q83. You indicated that you always or nearly always pick up your dog's waste or poop. How do you typically dispose of it? (Asked of those who pick up after their dog.)



Q87. You indicated that you hardly ever or never pick up your dog's waste or poop. What are the main reasons you do not pick it up? (Asked of those who do not pick up after their dog.)



Q87. You indicated that you hardly ever or never pick up your dog's waste or poop. What are the main reasons you do not pick it up? (Asked of those who do not pick up after their dog.)



CHEMICALS AND GREASE

- In an open-ended question, residents were asked how they currently remove or dispose of household chemicals such as paint, paint thinners, cleaners, or pesticides. By far the top response was taking them to the dump, landfill, or collection center on appointed days (61% gave this response). This was distantly followed by responses stating that they do not use these products (16%) and that they put them in the trash (14%).
- In a similar open-ended question, residents were asked how they currently dispose of their kitchen grease. Over a third of residents (35%) let the grease cool and solidify, then put it in the trash. Other responses, given by 13% of residents or less, are that they save and reuse it, then later dispose of it in the trash; they pour it down a sink or toilet; they pour it in the trash when warm/liquid; and they do not cook or accumulate grease.



Q91. Generally, how do you currently remove or dispose of household chemicals, such as paint, paint thinners, cleaners, or pesticides?

Q91. Generally, how do you currently remove or dispose of household chemicals, such as paint, paint thinners, cleaners, or pesticides?













Q95. Generally, how do you currently dispose of your kitchen grease?



Q95. Generally, how do you currently dispose of your kitchen grease?

LITTER

- Most residents (93%) think litter is a problem in their county, with 52% saying it is a *major* problem.
 - Two-thirds of residents (66%) think that the main reason people litter is laziness; otherwise, residents suggested that litterers do not care about or understand the effects of litter.
- The survey presented a series of four types of littering, and asked respondents how often they have done each. "Does not apply" was a response option, but the graphs and percentages are shown with those responses omitted; this mostly affects the question about cigarette butts, as a majority of residents are nonsmokers.
 - The most common type of the four is leaving food or trash on the ground because they believe it to be biodegradable: 29% *often, sometimes*, or *rarely* do this, compared to 71% who *never* do this. No more than 10% of residents ever do the other types of littering, which are throwing litter out of the car while driving, throwing cigarette butts on the ground, and leaving litter on the ground at a crowded event, such as a concert or festival.

Q99. In general, would you say litter is a major problem, a minor problem, or not a problem at all in your county?





Q99. In general, would you say litter is a major problem, a minor problem, or not a problem at all in your county?







Percent of each of the following groups who think litter is a minor problem:

Refer to page 8 for an explanation of how to interpret this map.
Percent of each of the following groups who think litter is not a problem at all:





Q102. In your opinion, what are the main reasons people litter?







Percent who [frequency] do each of the following:

Q106. Toss any trash or litter out of your car while driving, such as food, gum, or candy wrappers or drink containers. (Percentages calculated with "does not apply"





Percent of each of the following groups who often, sometimes, or rarely toss any trash or litter out of their car while driving:



Q107. Throw cigarette butts on the ground or out of your car or a window. (Percentages calculated with "does not apply" responses removed.)



Percent of each of the following groups who often, sometimes, or rarely throw cigarette butts on the ground or out of their car or a window:



Q108. Leave any trash or litter on the ground at an event with a large crowd, such as a concert or festival. (Percentages calculated with "does not apply" responses removed.)



Percent of each of the following groups who often, sometimes, or rarely leave any trash or litter on the ground at an event with a large crowd, such as a concert or festival:







Percent of each of the following groups who often, sometimes, or rarely leave food or other trash on the ground because they believe it to be biodegradable:



to interpret this map.

HOME MAINTENANCE AND STORMWATER RUNOFF SEPTIC TANKS

> About a third of residents (34%) own a septic tank.

- Septic tank ownership is much more common in Regions 1 and 2 than the other regions.
- Of those who own a septic tank, a majority (61%) have the tank inspected and maintained by someone else, 21% personally inspect and maintain the tank, 10% do both, and 7% do not inspect or maintain the tank at all and do not have it done for them.
 - Those who have their septic tank serviced or maintained most often said that they have their tank maintained through pumping (47% of this group gave this response), followed by having a general inspection or visual check (27%) and through additives (20%).



Q48. Do you own a septic tank?



Q48. Do you own a septic tank?

Percent of each of the following groups who own a septic tank:



Q49. Do you inspect or maintain the septic tank yourself or does someone else, such as a company or service person, do this for you? (Asked of those who own a septic tank.)



Q49. Do you inspect or maintain the septic tank yourself or does someone else, such as a company or service person, do this for you? (Asked of those who own a septic tank.)



Q50. How many times has your septic tank been inspected in the past 2 years? (Asked of those who own a septic tank.)







Q55. What is typically done to service or maintain your septic tank? (Asked of those who own a septic tank which is maintained or serviced in some way.)



Q55. What is typically done to service or maintain your septic tank? (Asked of those who own a septic tank which is maintained or serviced in some way.)



LAWNS AND LANDSCAPING

- A majority of residents (56%) either do all of their landscaping themselves or have a household member take care of their landscaping. This compares to 21% who hire someone to maintain their lawn and garden, 14% who do both, and 9% who do not have a lawn or garden at all.
 - Among those who have a lawn or garden, a slight majority (52%) typically look for plants or shrubbery that are native to South Carolina.
 - Of those who do *not* consider whether the plants that they purchase are local, the most common reasons are that they do not think about it, that the plants are already in place or they do not purchase plants, and that aesthetics or attractive plants are a more important consideration.
 - Among those who have a lawn or garden, 6% have a rain garden in their yard.
- A majority of those with a lawn or garden (56%) have experienced flooding on their property, compared to 42% who never have: 21% are flooded multiple times a year, 14% are flooded about once a year, and the remainder of those who have been flooded are flooded less frequently than once a year.
 - Region 1 residents are the least likely to be flooded, compared to those in other regions.
- ➤ A small percentage of residents (7%) currently own a rain barrel.
 - Of those who own a rain barrel, most (79%) currently have it installed and working on their property.
 - Most of those with a working rain barrel (87%) use the collected water to water their plants, garden, and/or lawn.

Q57. Do you or does anyone in your household take care of your lawn and garden, do you hire someone to care for your lawn and garden, a combination of both, or do you not have a lawn or garden at all?











Q58. When selecting plants or shrubbery for your yard or garden, do you typically look for or consider whether they are native to South Carolina? (Asked of those who have a lawn or garden.)



Q61. What are the main reasons you do not typically look for or consider whether plants or shrubbery for your yard or garden are native to South Carolina? (Asked of those who have a lawn or garden but do not consider whether their plants are local.)



Q61. What are the main reasons you do not typically look for or consider whether plants or shrubbery for your yard or garden are native to South Carolina? (Asked of those who have a lawn or garden but do not consider whether their plants are local.)





Q71. Do you have a rain garden in your yard? (Asked of those who have a lawn or garden.)



Q71. Do you have a rain garden in your yard? (Asked of those who have a lawn or garden.)





to interpret this map.

Q63. How often do you experience flooding in your yard or on your property? Would you say...? (Asked of those who have a lawn or garden.)



Q63. How often do you experience flooding in your yard or on your property? Would you say...? (Asked of those who have a lawn or garden.)





Q64. Do you currently own a rain barrel?



Q64. Do you currently own a rain barrel?
Percent of each of the following groups who currently own a rain barrel:













Q68. What do you typically use the rain barrel's collected water for? (Asked of those who have a rain barrel installed and working on their property.)





ACTIONS TO PROTECT WATER QUALITY

- A slight majority of residents (54%) have participated in a litter clean-up event, with 24% having done so during the past 2 years.
- A tenth of residents (10%) have volunteered for a conservation or environmental organization in the past 2 years.
 - Volunteers most often contributed to litter and trash pick-ups along waterways, trash pick-ups along roadways or non-water areas, wildlife management, water bank management or improvement, and non-profit group support such as lobbying or protests.

Q110. Have you ever participated in a litter clean-up event? What about in the past 2 years?





Q110. Have you ever participated in a litter clean-up event? What about in the past 2 years?





to interpret this map.



Q111. Have you volunteered for a conservation or environmental organization in the past 2 years?



Q111. Have you volunteered for a conservation or environmental organization in the past 2 years?

Percent of each of the following groups who have volunteered for a conservation or environmental organization in the past 2 years:











Q114. What conservation or environmental issue or topic did your volunteer efforts contribute to? (Asked of those who volunteered for a conservation or environmental organization in the past 2 years.)



Q114. What conservation or environmental issue or topic did your volunteer efforts contribute to? (Asked of those who volunteered for a conservation or environmental organization in the past 2 years.)



QUESTIONS SPECIFIC TO THE CHARLESTON REGION

- This survey included questions that were specific to residents of the Charleston area (Region 4 – Charleston, Berkeley, and Dorchester Counties).
 - In an open-ended question, Charleston area residents say the best ways to get them information on local water resource issues are through email (28% stated this) or direct mail (21%). Other outlets with at least 10% of Charleston region residents mentioning them are social media, TV, websites, and print newspapers.
 - In follow-up, those who mentioned TV said the types of TV programs that can best get them information on local water issues are the evening news, the morning news, or just TV in general. (Only four Charleston area residents mentioned radio in the initial question, so a follow-up question regarding types of radio programs is not shown.)
- Charleston area residents are slightly more likely to *always* or *sometimes* eat fish that they catch (29% gave one of those responses) than to *rarely* or *never* eat it (27%), whereas 44% do not fish.
 - A majority of Charleston area residents (77%) eat locally caught seafood at least several times a year. At the other end of the spectrum, 11% do not eat seafood and 4% are not sure what seafood is local.
 - Most Charleston area residents (80%) are *very* or *somewhat* concerned that shellfish can be polluted by failing septic systems, wildlife and pets, and other sources. This is in contrast with 16% who are *not very* or *not at all* concerned.





Q122. What type of TV or TV program is the best way to get you information on local water resource issues? (Asked of those who named TV as the best way to get them information on local water resource issues.) (Region 4)





Q128. If you fish, how often do you eat your catch? (Region 4)











DEMOGRAPHICS

> The following demographic data were collected:

- Type of residential area
- Education level
- Annual household income
- Race or ethnicity
- Age
- Gender

Q131. Do you consider your place of residence to be a large city or urban area, a suburban area, a small city or town, a rural area on a farm or ranch, or a rural area not on a farm or ranch?



Q131. Do you consider your place of residence to be a large city or urban area, a suburban area, a small city or town, a rural area on a farm or ranch, or a rural area not on a farm or ranch?





Q132. What is the highest level of education you have completed?











Q133. Which of these categories best describes your total household income before taxes last year?

for Study



Q136. What races or ethnic backgrounds do you consider yourself? Please mention all that apply.



Q136. What races or ethnic backgrounds do you consider yourself? Please mention all that apply.

Q140. May I ask your age?





Q140. May I ask your age?



Q147. Respondent's gender (observed by interviewer; not asked).



Q147. Respondent's gender (observed by interviewer; not asked).
ABOUT RESPONSIVE MANAGEMENT

Responsive Management is an internationally recognized survey research firm specializing in natural resource and outdoor recreation issues. Our mission is to help natural resource and outdoor recreation agencies, businesses, and organizations better understand and work with their constituents, customers, and the public.

Focusing only on natural resource and outdoor recreation issues, Responsive Management has conducted telephone, mail, and online surveys, as well as multi-modal surveys, on-site intercepts, focus groups, public meetings, personal interviews, needs assessments, program evaluations, marketing and communication plans, and other forms of human dimensions research measuring how people relate to the natural world for more than 30 years. Utilizing our in-house, full-service survey facilities with 75 professional interviewers, we have conducted studies in all 50 states and 15 countries worldwide, totaling more than 1,000 human dimensions projects and almost \$70 million in research *only* on natural resource and outdoor recreation issues.

Responsive Management has conducted research for every state fish and wildlife agency and every federal natural resource agency, including the U.S. Fish and Wildlife Service, the National Park Service, the U.S. Forest Service, Bureau of Land Management, U.S. Coast Guard, and the National Marine Fisheries Service. Additionally, we have also provided research for all the major conservation NGOs including the Archery Trade Association, the American Sportfishing Association, the Association of Fish and Wildlife Agencies, Dallas Safari Club, Ducks Unlimited, Environmental Defense Fund, the Izaak Walton League of America, the National Rifle Association, the National Shooting Sports Foundation, the National Wildlife Federation, the Recreational Boating and Fishing Foundation, the Rocky Mountain Elk Foundation, Safari Club International, the Sierra Club, Trout Unlimited, and the Wildlife Management Institute. Other nonprofit and NGO clients include the American Museum of Natural History, the BoatUS Foundation, the National Association of Conservation Law Enforcement Chiefs, the National Association of State Boating Law Administrators, and the Ocean Conservancy. As well, Responsive Management conducts market research and product testing for numerous outdoor recreation manufacturers and industry leaders, such as Winchester Ammunition, Vista Outdoor (whose brands include Federal Premium, CamelBak, Bushnell, Primos, and more), Trijicon, Yamaha, and others.

Responsive Management also provides data collection for the nation's top universities, including Auburn University, Clemson University, Colorado State University, Duke University, George Mason University, Michigan State University, Mississippi State University, North Carolina State University, Oregon State University, Penn State University, Rutgers University, Stanford University, Texas Tech, University of California-Davis, University of Florida, University of Montana, University of New Hampshire, University of Southern California, Virginia Tech, West Virginia University, Yale University and many more.

Our research has been upheld in U.S. Courts, used in peer-reviewed journals, and presented at major wildlife and natural resource conferences around the world. Responsive Management's research has also been featured in many of the nation's top media, including *Newsweek*, *The Wall Street Journal*, *The New York Times*, CNN, National Public Radio, and on the front pages of *The Washington Post* and *USA Today*.

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