



City of Edmonds Assessment of Citizen and Commercial Understanding and Adoption of Targeted Stormwater Behaviors

Prepared By



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Research Goal and Objectives

Research Goal

The goal of this research was to measure public knowledge and practices regarding stormwater in the city of Edmonds. In addition, the research assessed Edmonds businesses' stormwater practices and behaviors. Ultimately, this research may be used for stormwater planning as well as educational outreach to improve the target audience's understanding of the problem and reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts. This is in partial compliance with Phase II municipal stormwater permit requirements in Washington State. The City of Edmonds is required to measure the understanding and adoption of target behaviors of its citizens, property managers, and businesses and to use measurement to direct the application of education and outreach resources in the most effective manner.

Furthermore, this research compared the findings in 2009 with the results in 2013 to analyze any statistical differences. This longitudinal analysis was used to identify trends and patterns that are occurring among the public's knowledge and practices of stormwater.

Research Objectives

The following objectives were completed during the course of this research project:

- 1) Determined the overall public perception of the quality of surface water in Edmonds and compared it with the previous year's ratings.
- 2) Identified Priority 1, Priority 2, and Priority 3 issues for Edmonds residents. This will help determine what perceptions, behaviors, and practices need the most attention as well as provide direction for an educational outreach program.
- 3) Identified shifts and trends in Priority 1, Priority 2, and Priority 3 issues that occurred from 2009 to 2013.
- 4) Determined the public's knowledge of which agency to report an illicit discharge and compared it with the research conducted in 2009.
- 5) Identified Priority 1, Priority 2, and Priority 3 issues for restaurants, automotive businesses, and property owners/managers.

Research Methodology

Hebert Research conducted a quantitative survey from April 10th, 2013 to April 13th, 2013. Over 200 interviews were completed with residents from Edmonds, a city in Washington State.

Sampling Frame

Hebert Research conducted a random probability survey for the stormwater research project. High-density areas have more phone numbers and, by randomly drawing from the list, the high- and low-density areas are properly proportioned. The resulting list was loaded into Hebert Research's CATI (Computer-Aided Telephone Interviewing) system, which randomly selects phone numbers from this list, as required during the interviewing process. Each phone number was called at least five times at different times during the day and evening before being replaced by a new number. This helped to minimize non-response error, meaning that those who were easy to reach and those who were more difficult to contact were equally represented. Hebert Research sampled 201 residents of Edmonds compared to the 102 sampled in 2009. The following table represents the sample sizes for years 2009 and 2013.

Sample Totals	
Year	Sample Size
2009	102
2013	201

Questionnaire

The survey was created for administration to the general public within the city of Edmonds. Survey questions were developed by Hebert Research with input from the city. The survey consisted of 30 questions, 27 of them relating directly to knowledge about stormwater issues and practices respondents had adopted, which protect the quality of stormwater. The remaining three questions dealt with an overall assessment of surface water quality, where illicit discharges should be reported, and the age of the respondent. Hebert Research completed all interviews using the same interactive voice (telephone) survey methodology that was utilized in the 2009 assessment for Edmonds.

In addition, a business survey was developed by Hebert Research with approval from the City. Survey questions were comprised of stormwater knowledge and behavior in relation to the type of business. For the city of Edmonds, the focus was on three types of businesses, which included:

- Restaurants
- Property Owners/Managers
- Automotive

Research Controls

Hebert Research applied a variety of controls to help ensure that the research and analysis reached the highest quality that can be provided. The primary research controls employed in this study included the following:

Interviewer Training

All interviewers participated in a special training session for this study. During this training session, the questionnaire was read and a discussion was held regarding the objectives of the study, screening questions, skip patterns, and techniques for handling potential problems. Interviewers raised questions and provided their professional feedback regarding potential interviewing issues.

Pre-test the Survey

After the questionnaire was programmed in our CATI system, it was rigorously tested to assure all questions were asked and that data was accurately recorded. Thirty surveys were conducted during the pretest. The programming was deemed to be valid.

Conduct Interviews

Following a successful pretest of the questionnaire, telephone interviews were conducted using Ci3 CATI software from Sawtooth Software, a recognized leader in computer-aided interviewing. Potential respondents were called on weekdays at various times throughout the afternoon and evening until 9:00 pm. An appointment and callback procedure was used when necessary to minimize refusals and allow respondents to complete the survey at a convenient time. Interviews were conducted in English.

Monitoring

Telephone interviews were regularly monitored by the data collection supervisor and were found to be properly conducted.

Internal Peer Review

Hebert Research uses an internal review process called “CERA” (create, edit, review, approve) which is similar to academic peer review to ensure that each study meets or exceeds rigorous quality control standards. Through this process, several analysts review the statistical findings and offer critical feedback designed to increase the utility of the research and produce a clear and insightful report.

Margin of Error, Incidence and Response Rates

A total of 201 surveys were completed by adults living within the zip codes of Edmonds. At the 95% confidence level, the maximum margin of error for a sample size of 201 respondents is $\pm 6.9\%$. This margin of error means that if the survey was repeated 100 times, the resulting percentages for each response for the city would be within $\pm 6.9\%$ (the margin of error) in 95 out of 100 cases for each question.

Over 3,000 phone numbers of residences in the city were included in the sampling frame. When a resident answered the phone and contact was made, we asked the respondent to participate in the survey. The *incidence rate* represents the percent of individuals we spoke to who were qualified to take the survey, meaning they spoke English and reported living within the city. The *response rate* represents the percent of qualified individuals we spoke to who agreed to participate and who completed an interview. Response rates above 50.0% are higher compared to other community-wide surveys and serve to increase confidence in the survey's validity and reliability. The incidence rate was 75.9% in the 2013 survey; the response rate was 62.5%.

Statistical Weighting

Statistical weighting is a technique that is commonly used in research to reduce sampling error. During the process of data collection, demographic data from the U.S. Census was obtained to identify population parameters for the survey. Sample demographics—specifically, age and gender—were compared with distributions in the population within each city. To compensate for potential sampling bias, weights were calculated and applied to the survey sample for the City in order to ensure that gender and age distributions were represented in the proper proportion according to census statistics. After being weighted by age and gender, the samples for the city were then weighted by population to assure a proper proportionate representation among the city. In the final weighting analysis, it was concluded that the sample was representative of the population for the city within the critical parameters of gender and age according to 2011 U.S. Census data.

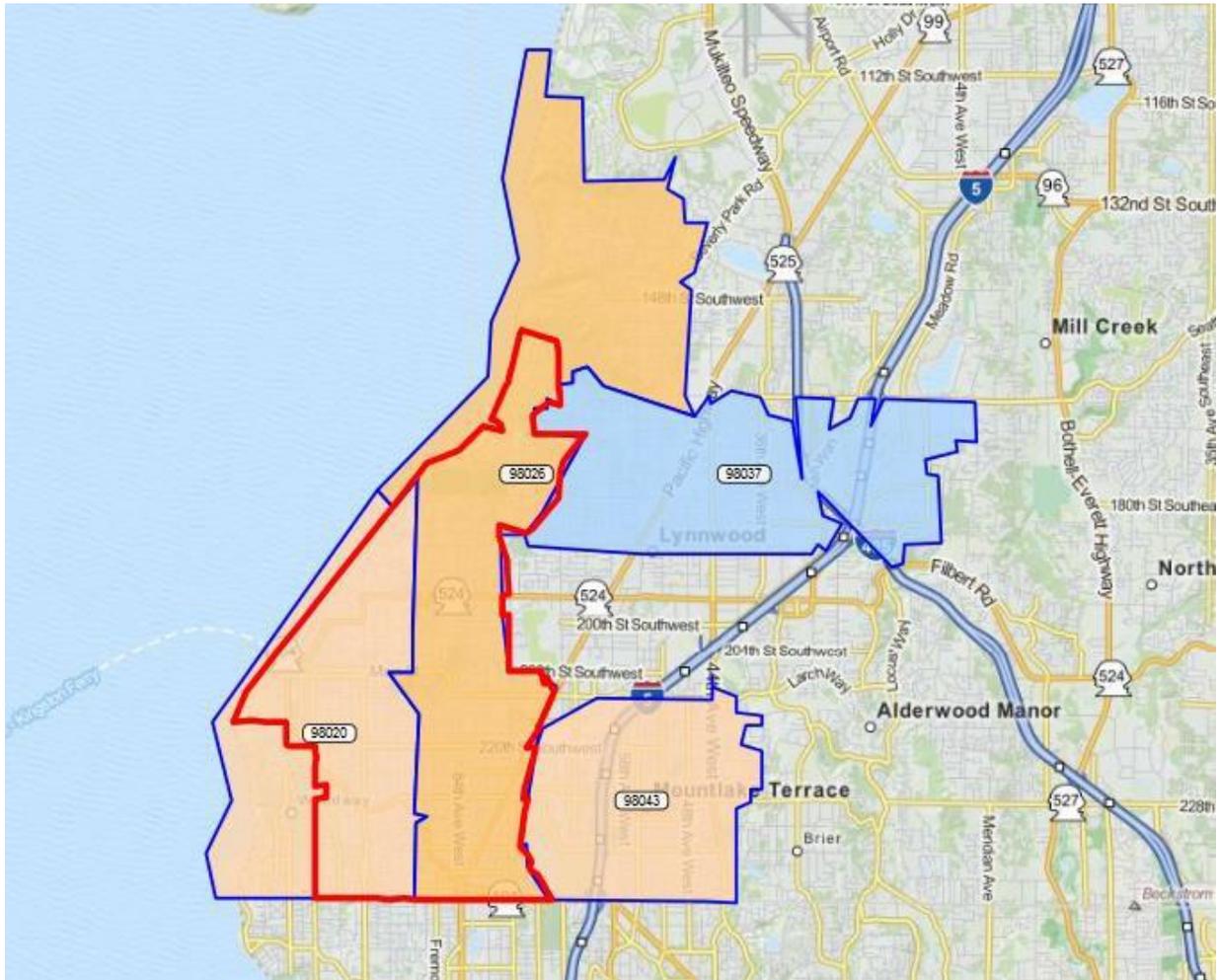
Use of Findings

Hebert Research has made every effort to produce the highest quality research product within the agreed specifications, budget and schedule. The customer understands that Hebert Research uses those statistical techniques, which, in its opinion, are the most accurate possible. However, inherent in any statistical process is a possibility of error, which must be taken into account in evaluating the results. Statistical research can reveal information regarding community perceptions only as of the time of the sampling, within the parameters of the project, and within the margin of error inherent in the techniques used.

Evaluations and interpretations of statistical research findings and decisions based on them are solely the responsibility of the customer and not Hebert Research. The conclusions, summaries and interpretations provided by Hebert Research are based strictly on the analysis of the data gathered, and are not to be construed as recommendations; therefore, Hebert Research neither warrants their viability nor assumes responsibility for the success or failure of any customer actions subsequently taken.

Geographical Map of Surveyed Area

The map below shows the geographic area covered by ZIP codes 98020 and 98026 for the City of Edmonds. Only the respondents living in the city were asked to take the survey. The City of Edmonds is outlined in red.



Explanation of Multivariate Analysis

The data for the surveys were analyzed using the chi squared statistic to examine differences between respondents on a regional basis according to age and gender. Responses for the knowledge questions were first categorized as being either a correct response or an incorrect response. The incorrect response category was made up of wrong answers plus responses classified as “need more information,” “don’t know/refused,” and “not applicable.” Following classification, the chi squared test was executed. For the questions dealing with the actions of the respondents, those who said the action did not apply to them were eliminated from the data set. Following their removal, the categories were classified as being “correct” or “incorrect” with the “incorrect” classification consisting of the collapsed categories as described above. The statistical test was run using these two categories.

Hypotheses were tested using the 0.05 level of significance as the criterion value for the chi-squared analysis. When differences between groups reached this value, the finding is reported along with its level of significance which is stated as a p-value (e.g., $p = 0.04$). Chi-squared test results that reach the 0.05 level of significance indicate there is at least a 19-out-of-20 likelihood that the finding is true. This is a generally accepted level of reliability for public surveys. Findings of no significance are also reported to provide the basis for conclusions regarding the uniformity of opinion across the sample.

Cramér’s V is a statistical test that measures the degree of association between two categorical variables. For statistical tests that reach significance using chi-squared, Cramér’s V values are provided to describe the strength of the association between the variables. This measurement ranges between 0.0 and 1.0. The higher the level of association, the greater is the probability that the independent variable is causing an effect on the dependent variable. A measurement of 0 indicates there is no association between the two, meaning it is likely the independent variable has no systematic effect on the dependent variable. A measurement of 1.0 indicates that variations in the independent variable completely match variations in the dependent variable.

Eta^2 is a measure of the effect one variable has on another. The measurement ranges from 0.0 to 1.0. Eta^2 reflects the percentage of the dependent variable variance explained by the independent variables’ variance in the sample data. This statistic is related to the concept of ANOVA, or analysis of variance.



Residential Research

Respondent Profile

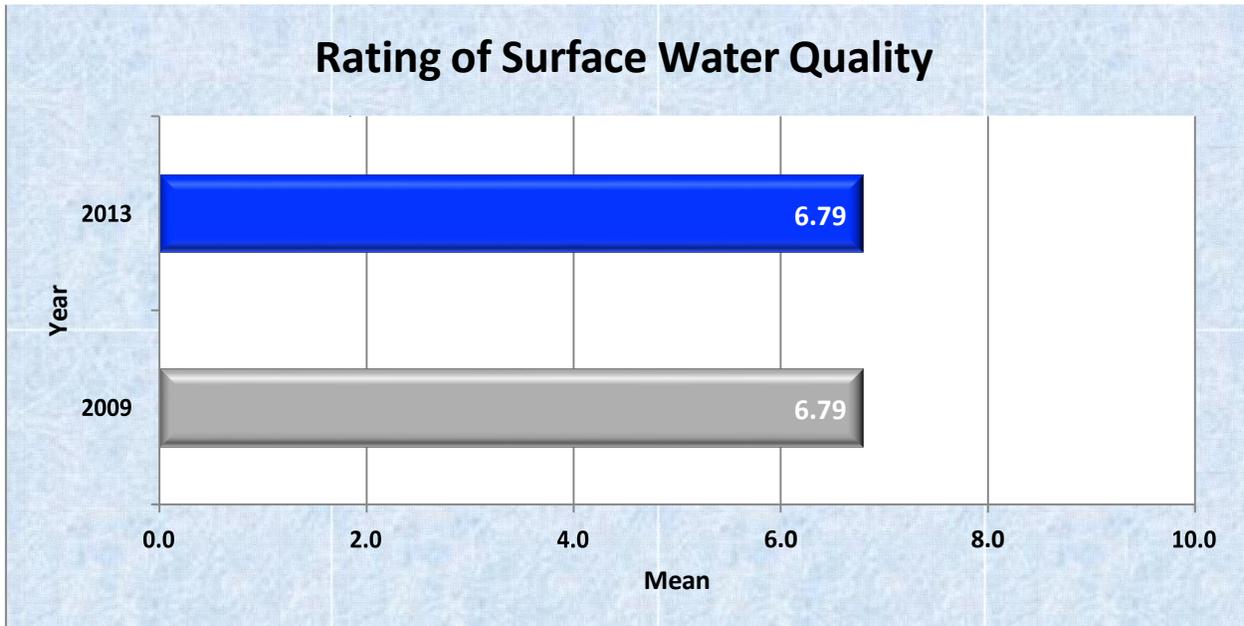
The following tables describe the demographic profile of the sample for Edmonds by age and gender. As indicated in the methodology section, the sample was statistically weighted to match the population by gender and age. The percentages listed below are the weighted sample frequencies for age and gender according to 2011 U.S. Census data. Un-weighted (sample) percentages have been included for comparison.

2013 Weighted Sample - Gender		
Gender	Sample	Weighted
Male	39.8%	47.6%
Female	60.2%	52.4%

2013 Weighted Sample - Age		
Age Group	Sample	Weighted
18-24	3.0%	8.1%
25-34	5.5%	14.1%
35-44	6.0%	14.8%
45-54	14.4%	20.4%
55-64	20.4%	20.1%
65+	50.7%	22.7%

Assessment of Water Quality in the Environment

Respondents rated the quality of water in Edmonds’s rivers, wetlands, and lakes on a 0-10 numeric scale where 0 meant “extremely polluted” and 10 meant “extremely clean.” The average rating for surface water quality was identical in both the 2013 and 2009 surveys. In both survey years, respondents rated the quality of the surface water a 6.79.



$\sigma = 1.764$ in 2009; $\sigma = 1.530$ in 2013

Statistically Significant Differences by Gender

There was a statistically significant difference in responses by gender to the rating:

- Male respondents were significantly more likely to give a higher rating. (p-value = 0.016, $\eta^2 = 0.031$)

Multivariate Analysis - Gender		
Rating	Male	Female
Mean	7.07	6.53

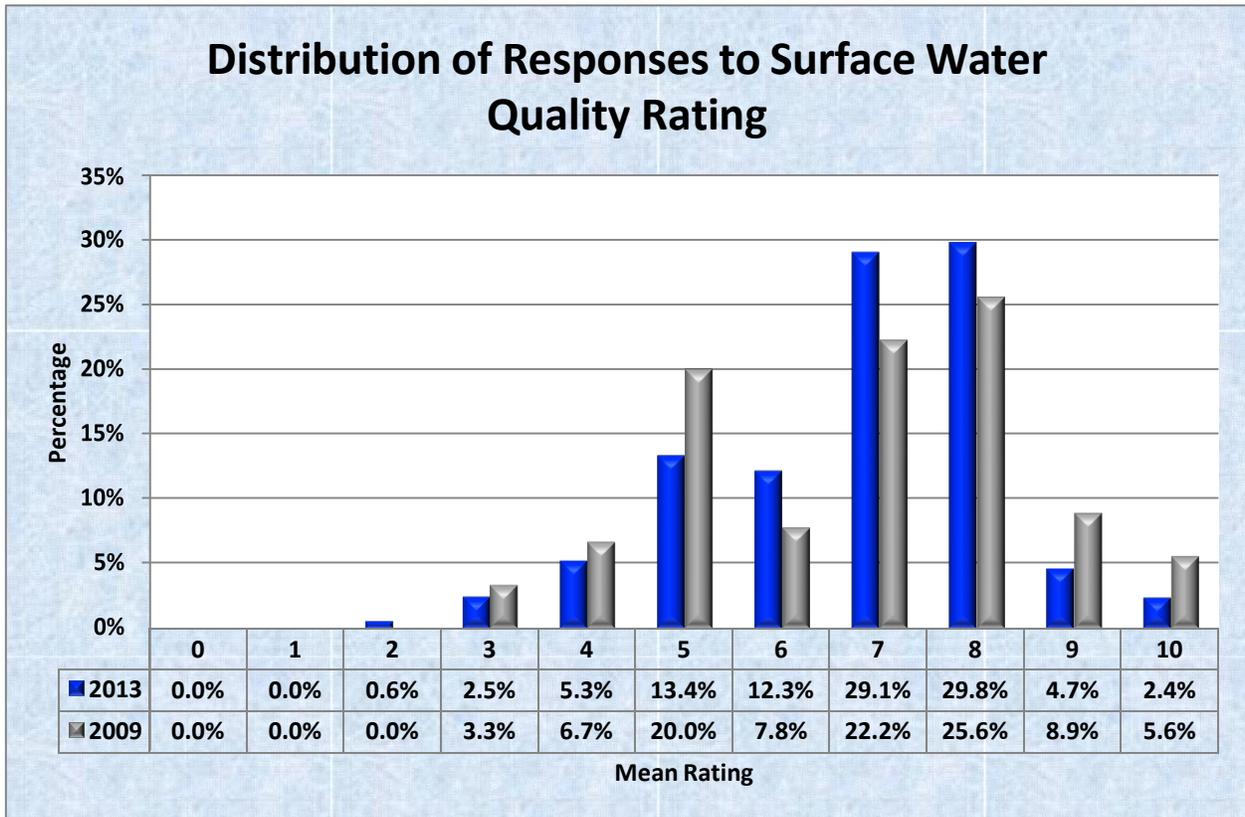
Statistically Significant Differences by Age Group

There was a statistically significant difference in responses by age group to the rating:

- Respondents in the 25 to 34 age group was significantly more likely to rate the quality of the surface water lower than any other age group. (p-value < 0.001, $\eta^2 = 0.122$)

Multivariate Analysis – Age Group						
Rating	18-24	25-34	35-44	45-54	55-64	65+
Mean	6.74	5.56	7.31	7.24	6.58	6.87

The following chart shows the distribution of respondent ratings for 2009 and the 2013 results at each point along the rating scale



$\sigma = 1.764$ in 2009; $\sigma = 1.530$ in 2013

Opportunities for Expansion and Focus of Educational Programs

The main purpose of this survey was to assess changes in the public's stormwater knowledge and related behavior from 2009 to 2013. These comparisons are needed because of the City's educational program and to develop priorities for future stormwater public education and outreach.

As in the baseline study, the results are organized by the percent of the respondents who provided a correct answer for the current survey—the lower the percent of correct answers given by the sample, the higher the priority for education:

- Priority 1 Issues: Less than 50% correct answers
- Priority 2 Issues: From 50 to 80% correct answers
- Priority 3 Issues: Over 80% correct answers

In administering the questionnaire, respondents were presented with statements that were either true or false and were asked if they agreed or disagreed with the statement. Each of the statements in the tables appearing below include a letter indicating the correct answer for that statement, an **A** for "Agree" and a **D** for "Disagree." When the word "**Adopt**" appears, it means the statement deals with whether respondents have "adopted" the desirable behavior mentioned in the statement. The combination of "**A Adopt**," then, means the question deals with behavior and the desired response is **A** for "Agree." This response equates to the respondent saying that he or she engages in the desired behavior mentioned in the statement.

Priority 1 Issues

Priority 1 issues represent areas of knowledge and behavior where less than half of the respondents provided the correct or desired response. The following table shows the percent of correct answers for Priority 1 issues in 2009 and 2013.

Priority 1 Issues (According to 2009 Results)		
Questions	% Correct	
	2013	2009*
Q15. The runoff from washing a car with biodegradable soap is safe in stormwater drains. D	27.4%	31.8%
Q16. When I wash a motor vehicle at home, the soapy water ends up in a ditch or on the street. D Adopt	48.6%	37.1%
Q28. Bricks or pavers offer no advantage for reducing runoff over concrete or asphalt pavement. D	46.3%	40.8%
Q19. Grass clippings and leaves are not regarded as harmful in stormwater. D	42.3%	43.3%
Q5. Pollution in our rivers, wetlands and lakes is more the result of industrial dumping practices than individual human activity. D	45.3%	43.8%

*This table of Priority 1 issues is based on 2009 results. Thus, 2013 percentages may exceed 50%.

Related Multivariate Analysis Findings

Statistically Significant Differences by Age Group

There were statistically significant differences in responses by age group to the following priority 1 statements:

- Respondents in the 45 to 54 age group were more likely to give the correct response to the statement, "Pollution in our rivers, wetlands and lakes is more the result of industrial dumping practices than individual human activity." (p-value < 0.001, Cramer's V = 0.394)

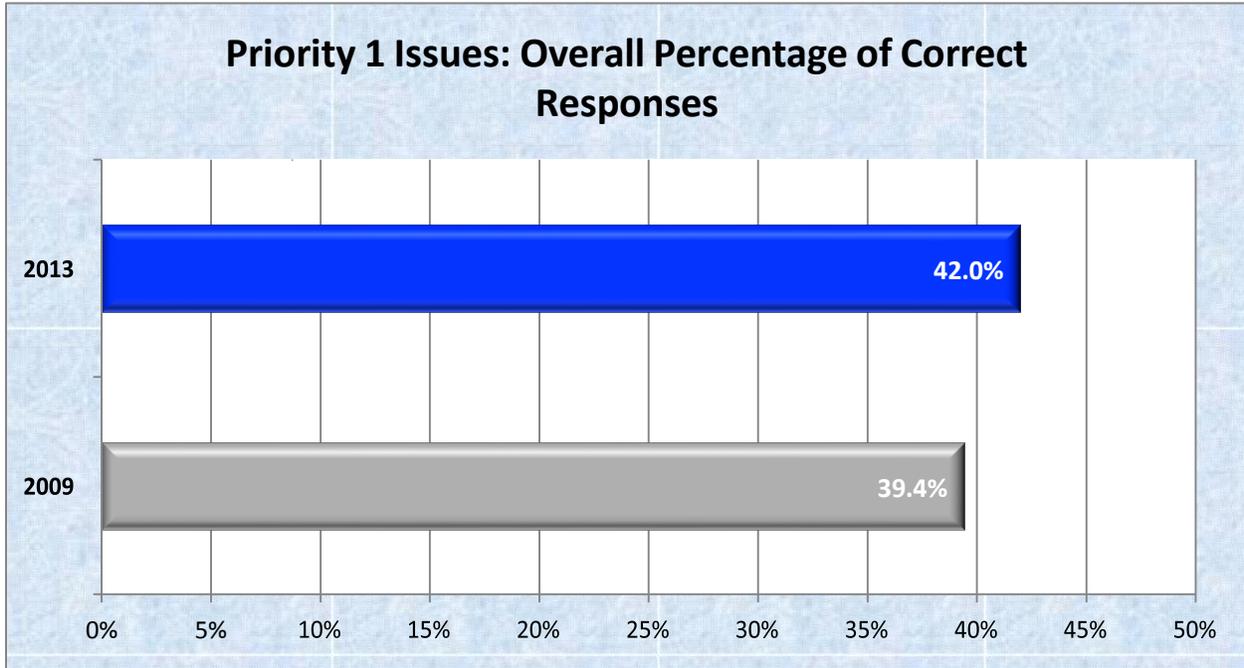
Multivariate Analysis – Age Group						
Response	18-24	25-34	35-44	45-54	55-64	65+
Correct	25.0%	46.4%	23.3%	77.5%	56.1%	30.4%

- Respondents in the 35 to 44 age group were more likely to give the correct response to the statement, "Bricks or pavers offer no advantage for reducing runoff over concrete or asphalt pavement." (p-value = 0.021, Cramer's V = 0.257)

Multivariate Analysis – Age Group						
Response	18-24	25-34	35-44	45-54	55-64	65+
Correct	50.0%	53.6%	66.7%	53.7%	30.0%	34.8%

Topics for Public Education: Priority 1

The overall percentage of respondents who answered correctly for the 2009 Priority I issues was calculated from the 2009 and 2013 surveys. The overall percent in 2009 of 39.4% increased to 42.0% in 2013.



$\sigma = 4.99\%$ in 2009; $\sigma = 8.47\%$ in 2013

Knowledge of how rivers, wetlands, lakes and the marine waters of Puget Sound become polluted by stormwater is an essential precursor to improving understanding, raising the desire to act responsibly, and bringing about behavioral change. Priority 1 educational programming and marketing campaigns should convey the following messages:

- The water in stormwater drains is not connected to the sanitary sewer system nor is all stormwater treated to remove pollutants before being released into the environment. Therefore, the quality of stormwater going into the drainage system is what determines the level of pollution in surface water.
- The primary cause of pollution in stormwater runoff is individual human activity, not industrial dumping. Success in reducing environmental pollution depends upon everyone's participation in helping to make a difference.
- Biodegradable soap is not a safe addition to stormwater drains and should be kept from entering the stormwater drainage system.

- To best protect the environment, soapy water from washing a motor vehicle is best handled by allowing it to be absorbed by a lawn or the ground. It should not be allowed to flow into the street or into a drainage ditch.
- Grass clippings and leaves in stormwater are regarded as pollution and should be kept out of the stormwater drainage system.
- Sediment and dirt are pollution and should be prevented from entering the stormwater drainage system.
- Bricks or pavers help to reduce the volume of stormwater runoff and, therefore, help to reduce stormwater pollution in the environment.

Priority 2 Issues

Priority 2 issues represent areas of knowledge and behavior where 50% to 80% of the respondents provided the correct response. The table below shows the percent of correct answers for Priority 2 issues in 2009 and 2013.

Priority 2 Issues (According to 2009 Results)		
Questions	% Correct	
	2013	2009*
Q21. Sediment or dirt in stormwater is natural and not regarded as pollution. D	42.8%	52.6%
Q3. Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste. D	49.3%	55.1%
Q18. The best place to dispose of water from cleaning a Latex paint brush is in a sink inside, not outdoors. A	59.2%	59.2%
Q4. Stormwater runoff is the leading cause of pollution in rivers, wetlands and lakes. A	60.2%	59.6%
Q29. An <i>illicit or unlawful stormwater discharge</i> is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. A	51.7%	60.8%
Q6. All water going into stormwater drains on the street is treated before being discharged into the environment. D	71.6%	61.2%
Q9. The best way to clean up spilled oil on the driveway is to fully absorb it using kitty litter or paper towels and deposit this waste in a garbage can. A	86.6%	69.7%
Q22. The downspouts at my house convey the water to an area where it is absorbed by the ground. A Adopt	79.8%	72.3%
Q17. Washing a vehicle at a commercial car wash causes less pollution than washing a vehicle on the street using a biodegradable soap. A	62.7%	72.8%
Q20. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. D	61.7%	74.1%
Q13. My household recycles all used motor oil. A Adopt	93.2%	76.1%
Q27. Carpet shampoo wastewater can be safely added to a stormwater drain. D	67.7%	76.2%
Q12. All of my family's auto or truck parts with oil or grease on them are stored under a roof or cover. A Adopt	93.4%	77.9%
Q10. Scrubbing oil and grease spots on outdoor concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff. D	72.1%	79.2%
Q23. Using a mulching lawnmower reduces the need to fertilize a lawn. A	70.6%	79.3%

*This table of Priority 2 issues is based on 2009 results. Thus, 2013 percentages may fall out of the Priority 2 range between 50% and 80%.

Related Multivariate Analysis Findings

Statistically Significant Differences by Survey Year

There were statistically significant differences in responses between survey years to the following Priority 2 statements:

- “The best way to clean up spilled oil on the driveway is to fully absorb it using kitty litter or paper towels and deposit this waste in a garbage can.” The percent of correct responses *increased* from 69.7% in 2009 to 86.6% 2013. (p-value < 0.001, Cramer's V = 0.201)
- “Using a mulching lawnmower reduces the need to fertilize a lawn.” The percent of correct responses *decreased* from 79.3% in 2009 to 70.6% 2013. (p-value < 0.001, Cramer's V = 0.241)
- “Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.” The percent of correct responses *decreased* from 74.1% in 2009 to 61.7% 2013. (p-value = 0.035, Cramer's V = 0.121)
- “All of my family’s auto or truck parts with oil or grease on them are stored under a roof or cover.” The percent of correct responses *increased* from 77.9% in 2009 to 93.4% 2013. (p-value < 0.001, Cramer's V = 0.228)
- “My household recycles all used motor oil.” The percent of correct responses *increased* from 76.1% in 2009 to 93.2% in 2013. (p-value < 0.001, Cramer's V = 0.246)

Statistically Significant Differences by Gender

There were statistically significant differences in responses by gender to the following Priority 2 statements:

- Female respondents were significantly more likely to give the correct response to the statement, “Stormwater runoff is the leading cause of pollution in rivers, wetlands and lakes.” (p-value = 0.031, Cramer's V = 0.152)

Multivariate Analysis - Gender		
Response	Male	Female
Correct	52.1%	67.0%

- Female respondents were significantly more likely to give the correct response than male respondents to the statement, “An illicit or unlawful stormwater discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater.” (p-value = 0.043, Cramer's V = 0.143)

Multivariate Analysis - Gender		
Response	Male	Female
Correct	44.2%	58.5%

- Male respondents were significantly more likely to give the correct response to the statement, *“Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste.”* (p-value < 0.001, Cramer's V = 0.247)

Multivariate Analysis - Gender		
Response	Male	Female
Correct	62.5%	37.7%

- Female respondents were significantly more likely to give the correct response to the statement, *“Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.”* (p-value < 0.001, Cramer's V = 0.287)

Multivariate Analysis - Gender		
Response	Male	Female
Correct	47.4%	75.2%

Statistically Significant Differences by Age Group

There were statistically significant differences in responses by age group to the following Priority 2 statements:

- The youngest age group, ages 18 to 24, were significantly more likely to give the incorrect response to the statement, *“The best place to dispose of water from cleaning a Latex paint brush is in a sink inside, not outdoors.”* (p-value < 0.001, Cramer's V = 0.411)

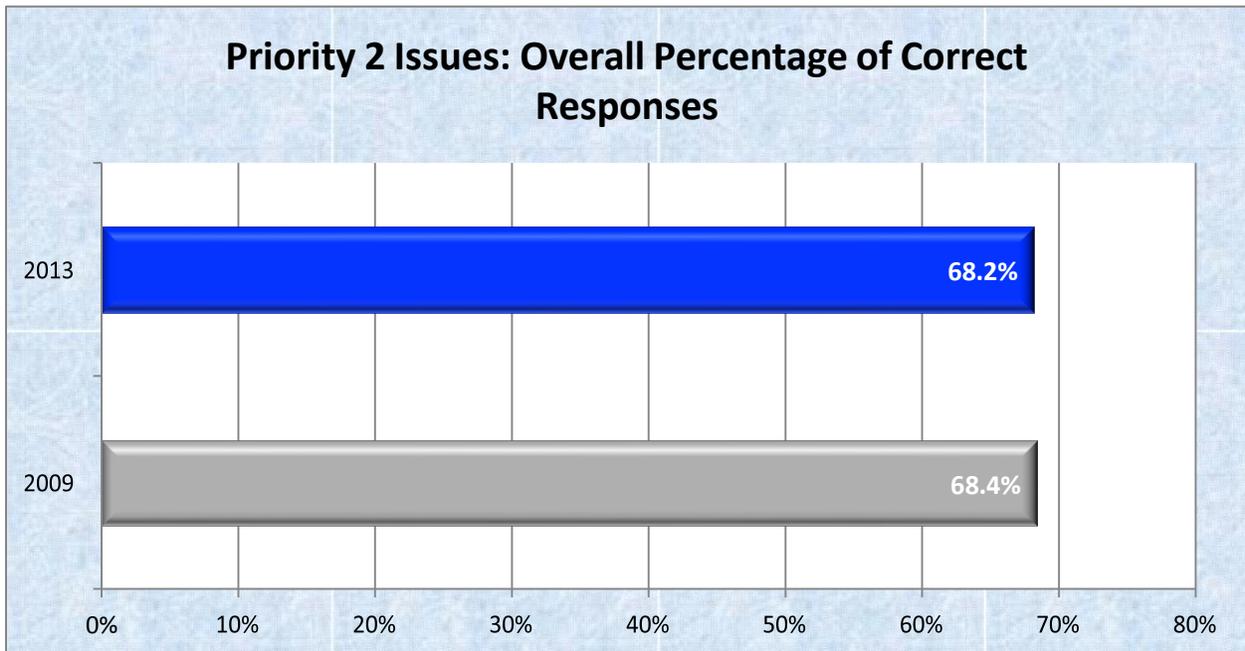
Multivariate Analysis – Age Group						
Response	18-24	25-34	35-44	45-54	55-64	65+
Correct	0.0%	72.4%	46.7%	78.0%	65.0%	57.8%

- Respondents in the 35 to 44 age group were significantly more likely to give the incorrect response to the statement, *“An illicit or unlawful stormwater discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater”.* (p-value = 0.003, Cramer's V = 0.300)

Multivariate Analysis – Age Group						
Response	18-24	25-34	35-44	45-54	55-64	65+
Correct	75.0%	64.3%	23.3%	41.5%	57.5%	58.7%

Topics for Public Education: Priority 2

The average percentage of respondents who answered correctly for the 2009 Priority 2 issues was calculated for both the 2009 and 2013 surveys. The overall percent in 2009 of 68.4% decreased slightly to 68.2% in 2013.



$\sigma = 9.24\%$ in 2009; $\sigma = 15.26\%$ in 2013

While more than half of the public responded correctly to these issues represents a desirable level of public knowledge, the goal remains to achieve a fully informed public. Consequently, Priority 2 issues continue to represent real opportunities for further public education and social marketing. Future educational and marketing campaigns addressing Priority 2 issues should contain the following messages:

- Stormwater runoff is the leading cause of pollution in rivers, wetlands and lakes.
- All water going into stormwater drains is not treated before being discharged into the environment.
- Vehicles should be washed at commercial facilities, not at homes where runoff is allowed to drain into the streets.
- The best place to clean paint brushes is in a sink that drains into the sanitary sewer system, not outdoors.
- The residue from chemical treatments that kill moss is a source of pollution.

- Proper disposal of used cleaning supplies, including carpet shampoo should be disposed of properly in the sanitary system.
- An illicit or illegal discharge is anything that enters a storm drain system that is not made up entirely of stormwater.
- Fix house downspouts to dispense the water to an area where it can be absorbed by the ground.
- A mulching lawnmower reduces the need for using fertilizer and, hence, represents a valuable method for eliminating fertilizer pollution in stormwater.

Priority 3 Issues

Priority 3 issues represent areas of knowledge or behavior where more than 80% of the respondents provided the correct response. The following table shows the percentage of correct answers for Priority 3 issues in 2009 and 2013.

Priority 3 Issues (According to 2009 Results)		
Questions	% Correct	
	2013	2009*
Q7. Hard surfaces such as roads and driveways are not significant sources of pollution in stormwater. D	80.1%	80.3%
Q11. If my car or truck is dripping oil, I make sure the leak is fixed within three weeks. A Adopt	91.6%	89.4%
Q8. When I am outside with my pet, I always pick up my pet's waste. A Adopt	97.2%	89.6%
Q25. In the past 12 months, I may have applied a higher dose of insecticide or weed killer around my house than the directions say to use. D Adopt	90.6%	90.1%
Q26. In the past 12 months, I may have used more fertilizer or applied it more frequently than the label directions require. D Adopt	92.8%	91.8%
Q14. My family stores all containers holding oil or antifreeze under a roof or cover. A Adopt	98.2%	93.1%
Q24. My household stores all yard fertilizers and pesticides inside a building or in a covered area out of the rain. A Adopt	98.3%	93.8%

*This table of Priority 3 issues is based on 2009 results. Thus, 2013 percentages may fall below 80%.

Related Multivariate Analysis Findings

Statistically Significant Differences by Survey Year

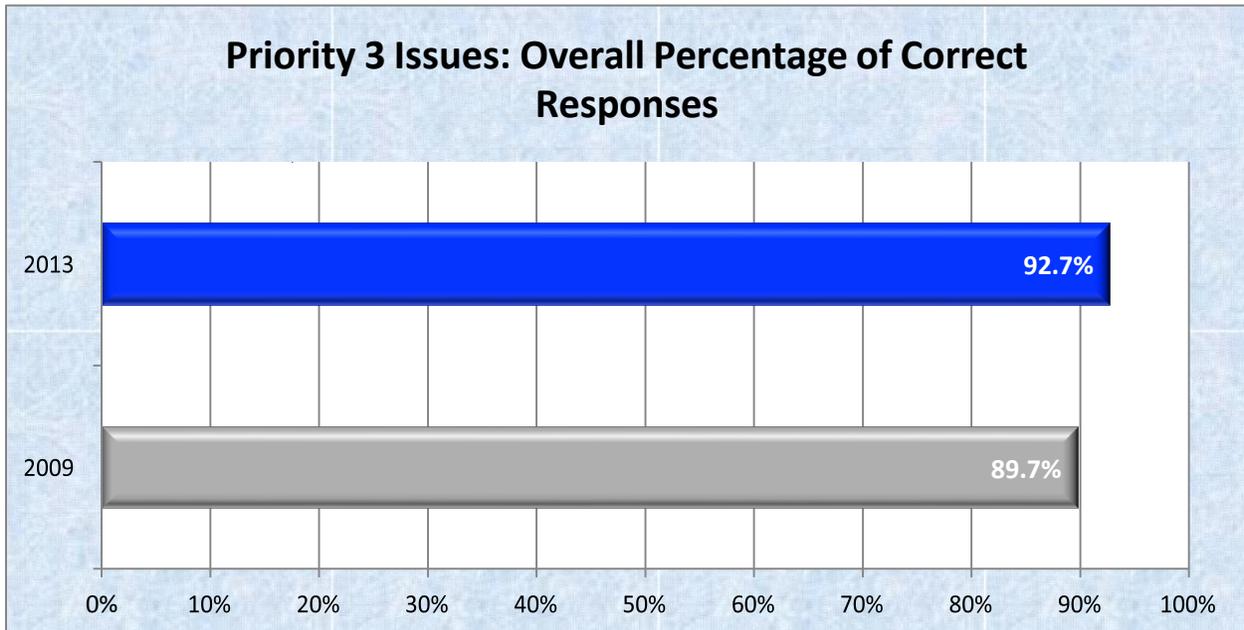
There were statistically significant differences in responses between survey years to the following priority 3 statement:

- “When I am outside with my pet, I always pick up my pet’s waste.” The percent of correct responses *increased* from 89.6% in 2009 to 97.2% 2013. (p-value = 0.045, Cramer's V = 0.162)
- “My family stores all containers holding oil or antifreeze under a roof or cover.” The percent of correct responses *increased* from 93.1% in 2009 to 98.2% 2013. (p-value = 0.045, Cramer's V = 0.124)

- *“My household stores all yard fertilizers and pesticides inside a building or in a covered area out of the rain.”* The percent of correct responses *increased* from 93.8% in 2009 to 98.3% 2013. (p-value = 0.033, Cramer's V = 0.129)

Topics for Public Education: Priority 3

The average percentage of respondents who answered correctly for the Priority 3 issues was calculated for both the 2009 and 2013 surveys. The overall percentage in 2009 of 89.7% increased by three percentage points to 92.7% in 2013.



$\sigma = 4.4\%$ in 2009; $\sigma = 6.41\%$ in 2013

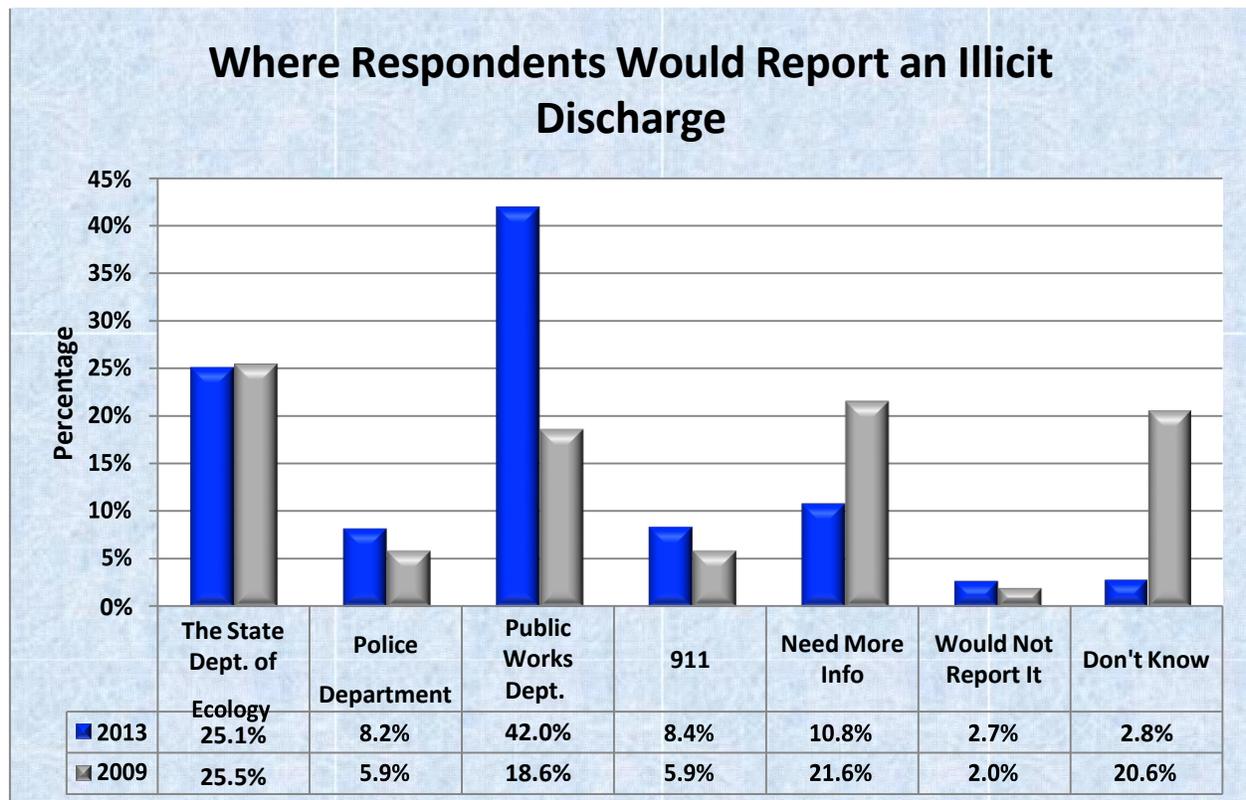
The relatively high percentage of respondents who gave the correct responses in this category suggests that high behavioral compliance continues to take place. At minimum, it can be said that respondents knew the right thing to do and answered accordingly. To maintain and increase positive behaviors, it remains advisable to continue educating the public on these issues. Because of the already high level of knowledge/compliance for Priority 3 issues, the degree of emphasis on these issues may be lower compared to Priority 1 and Priority 2 issues. If Priority 3 issues are addressed during educational and marketing campaigns, the following messages should be included:

- Proper methods for cleaning up oil and grease spills, such as using kitty litter and paper towels.
- Hard surfaces are significant contributors to pollution in stormwater runoff. Hence, it is important to keep hard surfaces clean using acceptable cleaning techniques and, where possible, use pervious surfaces.
- Store auto or truck parts with oil or grease on them under a roof or cover, store containers holding oil or antifreeze under a roof or cover.

- Pick up all pet waste when outside.
- Apply fertilizer, insecticides or weed killer at recommended rates
- Fix auto or truck oil leaks within three weeks.
- Recycle all used motor oil.
- Store all yard fertilizers and pesticides inside a building or in a covered area out of the rain.

Reporting an Illicit Discharge

Respondents were asked the following question: “If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call first to report it?” A variety of options were given as choices. The largest percentage of residents (42.0%) chose the correct choice, calling their City Public Works Department. This finding represents a 23.4% increase from the 18.6% correct responses in 2009. The smallest percentage at 2.7% stated they would not report it. The results indicate that more and more residents in Edmonds are becoming aware of the proper agency to call in order to report an illicit discharge.



Related Multivariate Analysis Findings

Statistically Significant Differences by Survey Year

There was a statistically significant difference in response between survey years to the question regarding the correct agency to report an illicit discharge. The percent of correct responses increased from 18.6% in 2009 to 42.0% 2013. (p-value < 0.001, Cramer's V = 0.256)

Statistically Significant Differences by Gender

There was a statistically significant difference in responses by gender when reporting an illicit discharge:

- Female respondents were statistically more likely to give the correct response to the statement, “If you witnessed someone pouring a gallon of used paint thinner into a

stormwater drain, which agency would you call first to report it?" (p-value = 0.007, Cramer's V = 0.189)

Multivariate Analysis - Gender		
Response	Male	Female
Correct	32.3%	50.9%

Statistically Significant Differences by Age Group

There were statistically significant differences in responses by age group when reporting an illicit discharge:

- The 25 to 34 age group was significantly more likely to give the correct response to the statement, "If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call first to report it?" (p-value = 0.047, Cramer's V = 0.238)

Multivariate Analysis – Age Group						
Response	18-24	25-34	35-44	45-54	55-64	65+
Correct	25.0%	53.6%	23.3%	35.0%	52.5%	48.9%



Business Research

Business Profile

As described in the research methodology section, three different types of businesses were involved in the survey. The following table illustrates the types and the number of businesses that were included.

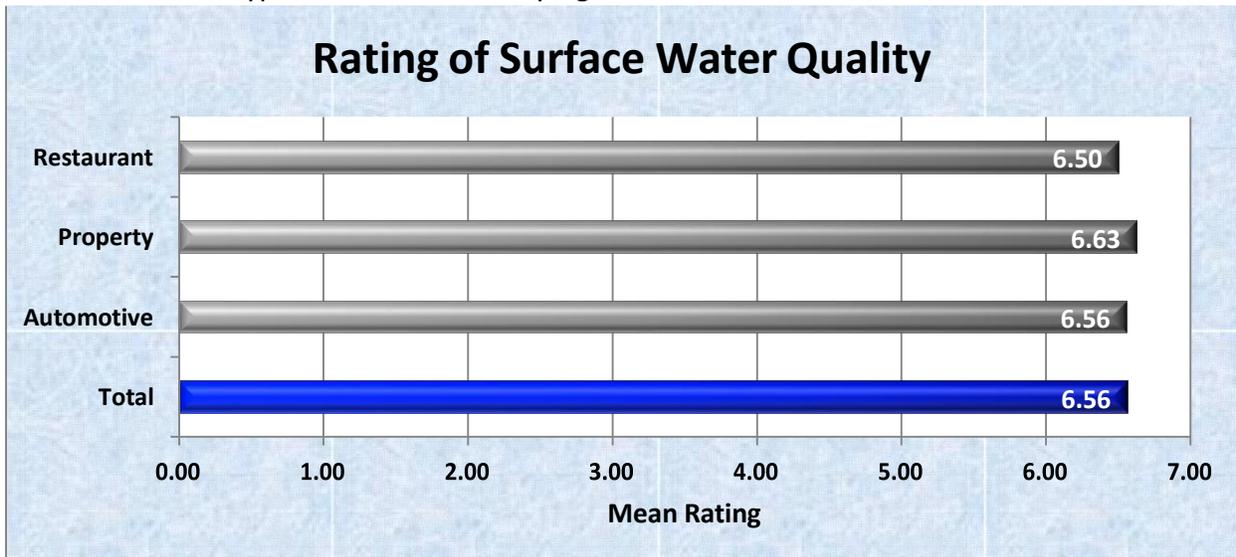
Business Survey Sample		
Business Type	Count	Percentage
Restaurant	8	32.0%
Property	8	32.0%
Automotive	9	36.0%
Total	25	100.0%

Of the business respondents administered the survey, the majority (64.0%) were males in the qualified position to participate. Below is a table that describes the business sample by gender.

Business Demographic - Gender	
Gender	Percentage
Male	64.0%
Female	36.0%

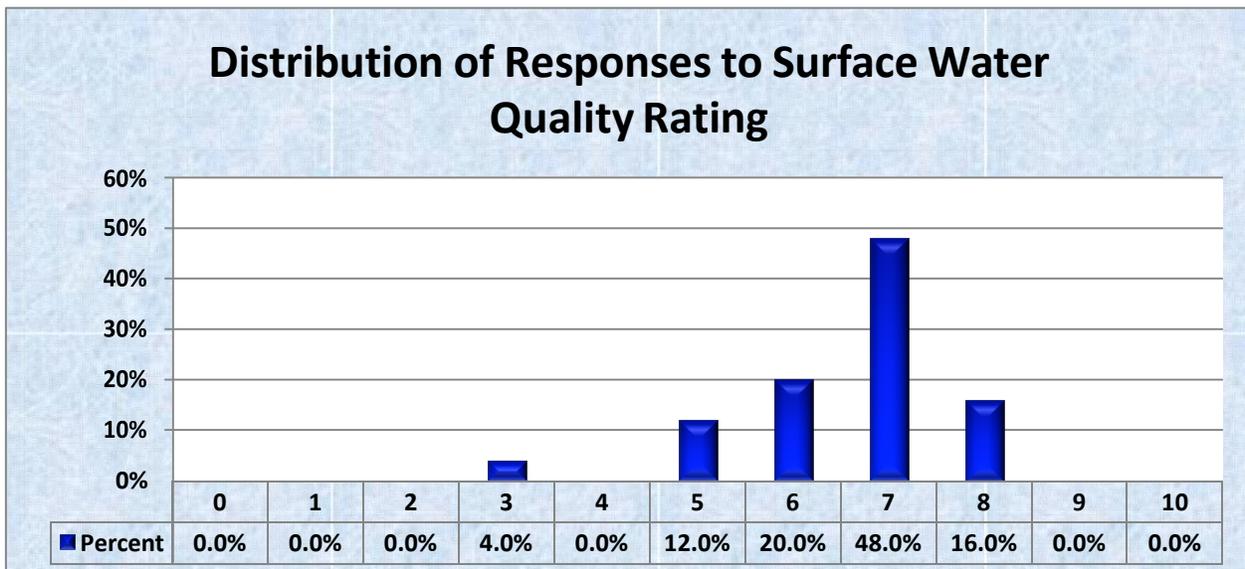
Business Assessment of Water Quality in the Environment

Business respondents were asked to rate the quality of water in Edmonds’s rivers, wetlands, and lakes on a 0-10 numeric scale where 0 meant “extremely polluted” and 10 meant “extremely clean.” As a whole, businesses gave a 6.56 average rating for surface water quality. Ratings for each business type can be seen in the chart below. The difference in mean ratings for each business type was not statistically significant.



$\sigma = 0.835$ for Restaurants; $\sigma = N/A$ for Property; $\sigma = 0.957$ Automotive; $\sigma = 0.870$ for total

The following chart shows the distribution of business respondent ratings at each point along the rating scale



$\sigma = 0.870$ for total

General Stormwater Questions

The survey consisted of ten questions that were considered general stormwater questions applicable to all business types. The following table describes the percent of correct responses by company type. In addition, the combined percentages are included to represent business stormwater knowledge and behavior as a whole.

Correct Responses to General Questions - By Business Type				
General Questions	Restaurant	Property Owner or Manager	Automotive	Combined Average
Q4: Non-toxic, biodegradable soaps do not pollute stormwater runoff. D	25.0%	37.5%	44.4%	36.0%
Q9: Sediment in stormwater is natural and not regarded as pollution. D	25.0%	62.5%	22.2%	36.0%
Q3: An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. A	50.0%	75.0%	44.4%	56.0%
Q6: My business has spill kits readily available in case of a hazardous spill. A Adopt	75.0%	14.3%	88.9%	62.5%
Q10. Vegetation reduces stormwater pollution. A	62.5%	75.0%	77.8%	72.0%
Q12: Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. D Adopt	75.0%	75.0%	87.5%	79.2%
Q7: Areas outside my business are swept regularly with a broom, vacuum or mechanical sweepers instead of pressure washing and letting the waste water go down a storm drain. A Adopt	100.0%	71.4%	75.0%	82.6%
Q8: The trash container area outside is in a contained area and does not leak. A Adopt	75.0%	100.0%	88.9%	88.0%
Q11: A key principle for effective stormwater management is to reduce the amount of stormwater runoff. A	75.0%	87.5%	100.0%	88.0%
Q5: My employees have been trained properly on how to clean up hazardous spills. A Adopt	87.5%	85.7%	100.0%	91.7%

Restaurant Priority Issues

The table below includes correct response results for all restaurant questions. The table has been segmented into Priority 1, Priority 2, and Priority 3 Issues.

Restaurants	
Question	% Correct
Priority 1 Issues	
Q4: Non-toxic, biodegradable soaps do not pollute stormwater runoff. D	25.0%
Q9: Sediment in stormwater is natural and not regarded as pollution. D	25.0%
Q17: External washwater disposal is an illicit discharge. A	25.0%
Priority 2 Issues	
Q3: An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. A	50.0%
Q10: Vegetation reduces stormwater pollution. A	62.5%
Q6: My business has spill kits readily available in case of a hazardous spill. A Adopt	75.0%
Q8: The trash container area outside is in a contained area and does not leak. A Adopt	75.0%
Q11: A key principle for effective stormwater management is to reduce the amount of stormwater runoff. A	75.0%
Q12: Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. D Adopt	75.0%
Priority 3 Issues	
Q5: My employees have been trained properly on how to clean up hazardous spills. A Adopt	87.5%
Q16: A proper way of disposing cooking oil and grease is through the stormwater system. D	87.5%
Q7: Areas outside my business are swept regularly with a broom, vacuum or mechanical sweepers instead of pressure washing and letting the waste water go down a storm drain. A Adopt	100.0%
Q13: Wash water is disposed of into an internal building drain connected to the sanitary sewer system and not into the exterior stormwater system A Adopt	100.0%
Q14: Wet mops are properly cleaned and stored. A	100.0%
Q15: The dumpster at my restaurant is always closed after use. A	100.0%

Property Owner/Manager Priority Issues

The table below includes correct response results for all property owner and manager questions. The table has been segmented into Priority 1, Priority 2, and Priority 3 Issues.

Property Owner/Manager	
Questions	% Correct
Priority 1 Issues	
Q19: My complex has a designated area for residential car washing. A	12.5%
Q22: Which one of the following three methods is generally most desirable for controlling stormwater: Infiltration, landscaping, and/or reduction of impervious surfaces. A	12.5%
Q6: My business has spill kits readily available in case of a hazardous spill. A Adopt	14.3%
Q4: Non-toxic, biodegradable soaps do not pollute stormwater runoff. D	37.5%
Q20: In the last 12 months, my complex has implemented landscaping techniques to improve the absorption of rainwater. A Adopt	37.5%
Priority 2 Issues	
Q9: Sediment in stormwater is natural and not regarded as pollution. D	62.5%
Q21: Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. D	62.5%
Q7: Areas outside my business are swept regularly with a broom, vacuum or mechanical sweepers instead of pressure washing and letting the waste water go down a storm drain. A Adopt	71.4%
Q3: An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. A	75.0%
Q10: Vegetation reduces stormwater pollution. A	75.0%
Q12: Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. D Adopt	75.0%
Q18: Resident car washings are discouraged on site and suggested alternatives are provided. A Adopt	75.0%
Priority 3 Issues	
Q5: My employees have been trained properly on how to clean up hazardous spills. A Adopt	85.7%
Q11: A key principle for effective stormwater management is to reduce the amount of stormwater runoff. A	87.5%
Q8: The trash container area outside is in a contained area and does not leak. A Adopt	100.0%

Automotive Priority Issues

The table below includes correct response results for all automotive questions. The table has been segmented into Priority 1, Priority 2, and Priority 3 Issues.

Automotive	
Questions	% Correct
Priority 1 Issues	
Q9: Sediment in stormwater is natural and not regarded as pollution. D	22.2%
Q3: An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. A	44.4%
Q4: Non-toxic, biodegradable soaps do not pollute stormwater runoff. D	44.4%
Priority 2 Issues	
Q25: The best way to clean up small quantities of spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can. A	55.6%
Q27: Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff. D	55.6%
Q23: When cleaning a vehicle, rinsewater, having little soap and dirt, can be safely added to a stormwater drain. D	62.5%
Q28: The area where my business washes vehicles allows the rinsewater to flow to the proper sanitary sewer system. A Adopt	66.7%
Q31: In my business, all waste, such as the particle dust from sanding or grinding, and all worn out car parts, such as old transmissions, radiators or brake pads, are all stored in a covered area out of the rain until disposed of. A Adopt	66.7%
Q32: All vehicles, mechanical parts and equipment stored outside are checked for leaks at least once a month. A Adopt	66.7%
Q7: Areas outside my business are swept regularly with a broom, vacuum or mechanical sweepers instead of pressure washing and letting the waste water go down a storm drain. A Adopt	75.0%
Q10: Vegetation reduces stormwater pollution. A	77.8%
Q24: My Company disposes of all oils, chemicals, and other fluids through an approved disposal facility. A Adopt	77.8%
Q29: My business stores all oils, soaps, chemicals, and other materials (like batteries and car parts) under a roof or cover or in a containment area. A Adopt	77.8%
Priority 3 Issues	
Q12: Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. D Adopt	87.5%
Q6: My business has spill kits readily available in case of a hazardous spill. A Adopt	88.9%
Q8: The trash container area outside is in a contained area and does not leak. A Adopt	88.9%
Q26: All mechanic work is done indoors and under cover. A Adopt	88.9%
Q5: My employees have been trained properly on how to clean up hazardous spills. A Adopt	100.0%
Q11: A key principle for effective stormwater management is to reduce the amount of stormwater runoff. A	100.0%
Q30: If a car or truck in our business is dripping oil, the leak is always contained immediately and fixed in a timely manner. A Adopt	100.0%

Conclusions

- 1) The public perception in Edmonds is that the surface water is relatively clean and free of pollutants. In both survey years, the average rating was a 6.79. Since 2009, respondents are indicating that they perceive the surface water, at the very least, to be moderately clean.
- 2) As mentioned in the results section, in order to keep the analysis consistent, the questions involved in the priority 1 issues for 2013 were determined by the 2009 results. However, the 2013 data revealed shifts in Priority classifications from the 2009 results.
- 3) In 2013, two statements shifted from a Priority 2 issue to a Priority 1 issue. That is, responses to this particular statement in 2009 that were considered Priority 2 issues are now considered Priority 1 issues in 2013. The following are the statements that experienced these shifts:
 - *Sediment or dirt in stormwater is natural and not regarded as pollution.*
 - *Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste.*

Furthermore, the results showed shifts from Priority 2 issues in 2009 up to Priority 3 issues in 2013. The following are the statement shifts:

- *The best way to clean up spilled oil on the driveway is to fully absorb it using kitty litter or paper towels and deposit this waste in a garbage can.*
 - *My household recycles all used motor oil.*
 - *All of my family's auto or truck parts with oil or grease on them are stored under a roof or cover.*
- 4) The level of awareness of which agency to report an illicit discharge to showed significant improvement from 2009 to 2013. 2013 results have 42.0% of respondents giving the correct response compared to only 18.6% answering correctly in 2009. Although the awareness of the proper agency to contact has shown improvement, it is important to continue to educate residents, seeing as the majority of Edmonds residents do not know who to contact in regards to illicit stormwater discharges.
 - 5) Priority 1, 2, and 3 business issues are presented in the tables under the business survey results section. The Priority issues are segmented by business type.

Appendix A: Edmonds Community Survey

Edmonds Stormwater Community Survey Questionnaire - 2013

Hello, my name is _____ and I am calling on behalf of the city of _____ (Name of City)

[IF SPEAKING TO A CHILD] May I speak to someone who is at least 18 years of age? Thank you. **[RE-INTRODUCE YOURSELF]**

Hello, my name is _____ and I am calling on behalf of the city of _____ (Name of City) We are asking citizens about an important environmental issue and we would like to include your opinions. All your answers are strictly confidential and will not be connected to your name.

S1. **[SCREENING QUESTION]** Before we actually begin, I need to verify your city. What city do you live in?

1. Survey city (Name of City)
2. Other City **[THANK AND POLITELY DISCONTINUE]**
3. Don't Know **[THANK AND POLITELY DISCONTINUE]**
4. Refused **[THANK AND POLITELY DISCONTINUE]**

1. What is your age? **[RECORD NUMBER]**

2. Great, thank you. My first question is about the water in our area. I'd like you to rate your perception of the overall quality of the water in our rivers, wetlands and lakes. By "quality of water" I mean how free it is from pollution. Rate it on a 0 to 10 scale where "0" means the water is "extremely polluted" and 10 means the water is "extremely clean." **[RECORD NUMBER]**

[READ]

Now, I'm going to read a number of statements to you regarding stormwater. Some of these statements may be true, they all may be true or they all may be false. If you believe that a statement is true, please say "Agree." If you believe the statement is false, say "Disagree." If you are not certain about the statement and need more information, you can answer with "need more information." If the question does not apply to you or your family, say "Doesn't Apply." Here is the first one. Do you Agree, Disagree or need more information about the following statement:

Responses for each:

1. Agree
2. Disagree

3. Need more information
4. Uncertain, Don't Know
5. Refused
6. Doesn't Apply

NOTE: A letter follows each statement below indicating the correct answer for that statement, an **A** for “Agree” and a **D** for “Disagree.” When the word **Adopt** appears, it means the statement deals with whether respondents have “adopted” the desirable behavior mentioned in the statement. The combination of **A Adopt**, then, means the question deals with behavior and the desired response is **Agree**—which equates to the respondent saying that he or she engages in the desired behavior mentioned in the statement.

3. Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste. **D**

4. Stormwater runoff is the leading cause of pollution in rivers, wetlands and lakes. **A**

5. Pollution in our rivers, wetlands and lakes is more the result of industrial dumping practices than individual human activity. **D**

6. All water going into stormwater drains on the street is treated before being discharged into the environment. **D**

[ROTATE Q7-Q28] [NOTE: These questions will be asked in a random order to prevent sequencing bias.]

[AFTER ASKING THE NEXT NINE QUESTIONS, SAY: You are doing really well. We are halfway through and I'll try to get through this as quickly as I can. Here's the next one, do you Agree, Disagree or Need More Information about this statement.]

7. Hard surfaces such as roads and driveways are not significant sources of pollution in stormwater. **D**

8. When I am outside with my pet, I always pick up my pet's waste. **A Adopt**

9. The best way to clean up spilled oil on the driveway is to fully absorb it using kitty litter or paper towels and deposit this waste in a garbage can. **A**

10. Scrubbing oil and grease spots on outdoor concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff. **D**

11. If my car or truck is dripping oil, I make sure the leak is fixed within three weeks. **A Adopt**

12. . All of my family's auto or truck parts with oil or grease on them are stored under a roof or cover. **A Adopt**
13. My household recycles all used motor oil. **A Adopt**
14. My family stores all containers holding oil or antifreeze under a roof or cover. **A Adopt**
15. The runoff from washing a car with biodegradable soap is safe in stormwater drains. **D**
16. When I wash a motor vehicle at home, the soapy water ends up in a ditch or on the street. **D Adopt**
17. Washing a vehicle at a commercial car wash causes less pollution than washing a vehicle on the street using a biodegradable soap. **A**
18. The best place to dispose of water from cleaning a Latex paint brush is in a sink inside, not outdoors. **A**
19. Grass clippings and leaves are not regarded as harmful in stormwater. **D**
20. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. **D**
21. Sediment or dirt in stormwater is natural and not regarded as pollution. **D**
22. The downspouts at my house convey the water to an area where it is absorbed by the ground. **A Adopt**
23. Using a mulching lawnmower reduces the need to fertilize a lawn. **A**
24. My household stores all yard fertilizers and pesticides inside a building or in a covered area out of the rain. **A Adopt**
25. In the past 12 months, I may have applied a higher dose of insecticide or weed killer around my house than the directions say to use. **D Adopt**
26. In the past 12 months, I may have used more fertilizer or applied it more frequently than the label directions require. **D Adopt**
27. Carpet shampoo wastewater can be safely added to a stormwater drain. **D**
28. Bricks or pavers offer no advantage for reducing runoff over concrete or asphalt pavement. **D**
-

29. An *illicit or unlawful stormwater discharge* is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. **A**

30. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call first to report it: **[READ 1-5]**

1. The Washington Department of Ecology
2. The police department
3. The city Public Works Department **A**
4. 911
5. Need more information
6. I would not report it
7. Don't Know
8. Refused

That concludes our survey. I want to thank you very much for your time and cooperation. You have been very helpful. Have a good day!

POSTCODE GENDER:

1. MALE
2. FEMALE

DATE: _____ INTERVIEWER: _____

Appendix B: Edmonds Business Survey

Business Stormwater Questionnaire Edmonds

Initial Target Quota Cells

#	Sample Category	Completes	# of Questions
1	Restaurants	7-9	TBD
2	Property Owners/ Managers	7-9	TBD
3	Automotive Companies	7-9	TBD
	TOTAL	21-27	TBD

Hello, may I speak to [INSERT NAME ON SAMPLE]?

IF NOT AVAILABLE, ARRANGE A CALLBACK.

Hello, my name is _____ and I am calling on behalf of the city of (name of city). We are asking businesses to provide input on important environmental issues and would like to include your opinion. We would like to speak to the individual in your business who is most knowledgeable about how your business deals with garbage, hazardous waste, and stormwater-related issues.

S1. Would that be you?

1. Yes **[SKIP TO S3]**
2. No
3. We do not deal with stormwater issues at all
4. Don't Know/Refused

S2. May I speak to this individual?

1. Yes
2. No **[SCHEDULE A CALLBACK]**
3. Don't Know/Refused **[SCHEDULE A CALLBACK]**

REPEAT INTRODUCTION WHEN SPEAKING TO CORRECT INDIVIDUAL

Hello, my name is _____ and I am calling on behalf of the city of (name of city). We are asking businesses to provide input on important environmental issues and would like to include your opinion. We would like to speak to the individual in your business who is most knowledgeable about how your business deals with garbage, hazardous waste and stormwater-related issues, so you are the person we need to talk to.

S3. May I ask you some questions?

- 1. Yes
- 2. No **[ASK TO BE REFERRED TO CORRECT INDIVIDUAL OR POLITELY DISCONTINUE]**
- 3. Don't Know/Refused **[ASK TO BE REFERRED TO CORRECT INDIVIDUAL OR POLITELY DISCONTINUE]**

1. Good! Your input is strictly confidential and will not be attached to your name or business.

[SHOW NAME OF BUSINESS CATEGORY ON SCREEN]

[ENTER NUMBER FOR BUSINESS CATEGORY] You will be in our category labeled:

- 1. Restaurant
- 2. Property Owner/Manager
- 3. Automotive Company

2. My first question is about the water in our area. I'd like you to rate your perception of the overall quality of the water in our rivers, wetlands, and lakes. By "quality of water" I mean how free it is from pollution. Rate it on a 0 to 10 scale where "0" means the water is "extremely polluted" and 10 means the water is "extremely clean."**[READ]**

What I am going to do is read a number of statements to you. If you believe that a statement is true, please say "Agree." If you believe the statement is false, say "Disagree." If you are not certain about the statement and need more information, you can answer with "need more information." If the question does not apply to you or your business, say "Doesn't Apply." Here is the first one. Do you Agree, Disagree or need more information about the following statement:

Responses for each:

1. Agree
 2. Disagree
 3. Need more information
 4. Doesn't Apply
 5. Don't Know/Refused
-
3. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. **A**
 4. Non-toxic, biodegradable soaps do not pollute stormwater runoff. **D**
 5. My employees have been trained properly on how to clean up hazardous spills. **A Adopt**
 6. My business has spill kits readily available in case of a hazardous spill. **A Adopt**
 7. Areas outside my business are swept regularly with a broom, vacuum or mechanical sweepers instead of pressure washing and letting the waste water go down a storm drain. **A Adopt**
 8. The trash container area outside is in a contained area and does not leak. **A Adopt**
 9. Sediment in stormwater is natural and not regarded as pollution. **D**
 10. Vegetation reduces stormwater pollution. **A**
 11. A key principle for effective stormwater management is to reduce the amount of stormwater runoff. **A**
 12. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. **D Adopt**
[INFO: Examples of 'wash' or 'wastewater' are the soapy runoff from washing a car, the rinse water from mopping a floor, the dirty water from washing the paint out of a paint brush, water used in a manufacturing process--generally, water that has something additional in it beyond plain water that you want to dispose of.]
 13. **[ASK ONLY IF RESTAURANT COMPANY]** Wash water is disposed of into an internal building drain connected to the sanitary sewer system and not into the exterior stormwater system **A Adopt**
 14. **[ASK ONLY IF RESTAURANT COMPANY]** Wet mops are properly cleaned and stored. **A**
-

15. **[ASK ONLY IF RESTAURANT COMPANY]** The dumpster at my restaurant is always closed after use.
16. **[ASK ONLY IF RESTAURANT COMPANY]** A proper way of disposing cooking oil and grease is through the stormwater system. **D**
17. **[ASK ONLY IF RESTAURANT COMPANY] [AFTER ANSWERING THIS QUESTION, SKIP TO Q 33]** External washwater disposal is an illicit discharge. **A**
18. **[ASK ONLY IF PROPERTY OWNER/MANAGER]** Resident car washings are discouraged on site and suggested alternatives are provided. **A Adopt**
19. **[ASK ONLY IF PROPERTY OWNER/MANAGER]** My complex has a designated area for residential car washing. **A**
20. **[ASK ONLY IF PROPERTY OWNER/MANAGER]** In the last 12 months, my complex has implemented landscaping techniques to improve the absorption of rainwater. **A Adopt**
21. **[ASK ONLY IF PROPERTY OWNER/MANAGER]** Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. **D**
22. **[ASK ONLY IF PROPERTY OWNER/MANAGER]** Which one of the following three methods is generally most desirable for controlling stormwater: **[READ 1-3] [ACCEPT ONLY ONE] [AFTER ANSWERING THIS QUESTION, SKIP TO Q 33]**
1. A detention pond facility
 2. Offsite management, for example in a ditch or larger storm sewer
 3. Infiltration, landscaping, and/or reduction of impervious surfaces **A**
 4. Need more information
 5. Don't Know
 6. Refused
23. **[ASK ONLY IF AUTOMOTIVE COMPANY]** When cleaning a vehicle, rinsewater, having little soap and dirt, can be safely added to a stormwater drain. **D**
24. **ASK ONLY IF AUTOMOTIVE COMPANY]** My Company disposes of all oils, chemicals, and other fluids through an approved disposal facility. **A Adopt**
25. **[ASK ONLY IF AUTOMOTIVE COMPANY]** The best way to clean up small quantities of spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can. **A**

26. **[ASK ONLY IF AUTOMOTIVE COMPANY]** All mechanic work is done indoors and under cover. **A Adopt**
27. **[ASK ONLY IF AUTOMOTIVE COMPANY]** Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff. **D**
28. **[ASK ONLY IF AUTOMOTIVE COMPANY]** The area where my business washes vehicles allows the rinsewater to flow to the proper sanitary sewer system. **A Adopt**
29. **[ASK ONLY IF AUTOMOTIVE COMPANY]** My business stores all oils, soaps, chemicals, and other materials (like batteries and car parts) under a roof or cover or in a containment area. **A Adopt** **["Cover" means shielded from rain. A "containment area" is a space surrounded by a wall that is constructed to prevent any spilled fluid from passing beyond it.]**
30. **[ASK ONLY IF AUTOMOTIVE COMPANY]** If a car or truck in our business is dripping oil, the leak is always contained immediately and fixed in a timely manner. **A Adopt**
31. **[ASK ONLY IF AUTOMOTIVE COMPANY]** In my business, all waste, such as the particle dust from sanding or grinding, and all worn out car parts, such as old transmissions, radiators or brake pads, are all stored in a covered area out of the rain until disposed of. **A Adopt**
32. **[ASK ONLY IF AUTOMOTIVE COMPANY]** All vehicles, mechanical parts and equipment stored outside are checked for leaks at least once a month. **A Adopt**

DEMOGRAPHICS

33. What is your title?

34. What is your first name? **[NAME IS CONFIDENTIAL AND NOT REPORTED WITH RESPONSES]**

That concludes our survey. On behalf of the city of (name of city), I want to thank you very much for your time and cooperation. You have been very helpful. Have a good day!

POSTCODE GENDER:

1. MALE

2. FEMALE

DATE: _____ INTERVIEWER: _____

