City of Tukwila

2013 Assessment of Citizen and Business Understanding and Adoption of Targeted Stormwater Behaviors

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Research Goal and Objectives

Research Goal:

The goal of this research was to measure the public's knowledge and practices regarding stormwater in the city of Tukwila. In addition, the research assessed Tukwila businesses' stormwater practices and behaviors. 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. Each permittee (City of Tukwila) is required to measure the understanding and adoption of target behaviors of its citizens and property managers/businesses. The research results can be used as a measurement to direct the application of education and outreach resources in the most effective manner.

Furthermore, this research compared the 2013 Tukwila storm water survey findings to those in 2011 and 2012 to analyze any statistical differences. This longitudinal analysis was used to identify trends and patterns that are occurring in the public's knowledge and practices of stormwater.

Research Objectives:

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

1) Determined the overall public perception of the quality of surface water in Tukwila and compared it with the previous year's ratings.

2) Identified Priority I, Priority II, and Priority III issues for Tukwila 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 I, Priority II, and Priority III issues that occurred from 2012 to 2013.

4) Determined the public's knowledge of which agency to report an illicit discharge to and compared it with the research conducted in 2012.

5) Identified Priority I, Priority II, and Priority III issues for restaurants, automotive businesses, and property owners/managers.

Research Methodology

Sampling Frame

A list of Tukwila phone numbers was acquired from a reputable vender and 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.

Similar to the previous research project, Hebert Research sampled 103 residents of Tukwila, which were weighted back to the 2010 U. S. Census data by age and gender. The following table represents the sample sizes for years 2011 and 2012.

Sample Totals	
Year	**Sample Size**
2011	100
2012	100
2013	103
Total	303

Questionnaire

The residential survey was created to be administered to the general public within the city of Tukwila. The survey questions were identical to those composed in consultation with the City of Tukwila for use in the 2011 and 2012 studies. 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. In addition, a business survey was conducted using the same questions developed by Hebert Research in collaboration with the city in 2012. Survey questions were comprised of stormwater knowledge and behavior in relation to the type of business. For the city of Tukwila, the focus was on three types of businesses, which included restauarants, property owners/managers, automotive. Hebert Research completed all interviews using the same interactive voice (telephone) survey methodology that was utilized in the 2011 and 2012 assessments of Tukwila.

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. Business were called in the afternoon prior to 5:00 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 108 surveys were completed by adults living within the city limits of Tukwila. At the 95% confidence level, the maximum margin of error for a sample size of 103 respondents is ±9.43%. 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 ±9.43% (the margin of error) in 95 out of 100 cases for each question.

23 Business were included in the sampling frame. The *incidence rate*, which represents the percent of business we spoke to who were qualified to take the survey, meaning they spoke English and reported being located within the city, was 95.83. The *response rate*, which represents the percent of qualified businesses who agreed to participate

was 92.31%, a very high rate reflecting the willingness of business to participate in this sort of research.

The incidence rate for the survey of individuals was 42.12% out of a sampling frame of 2,436. The response rate was 53.39%. Response rates above 50.0% are high compared to other community-wide surveys and serve to increase confidence in the survey's validity and reliability.

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. 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.

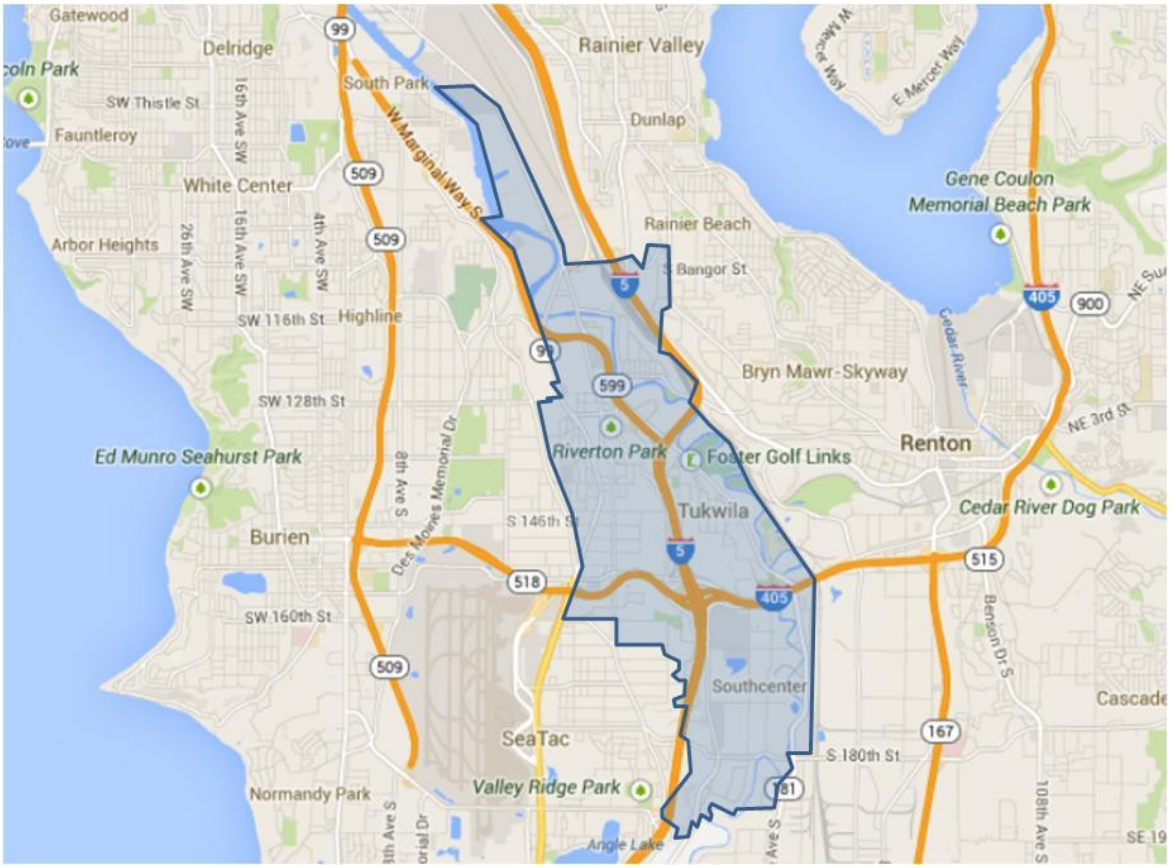
Use of Findings

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 from which the sample was drawn. Only respondents of the city of Tukwila were asked to take the survey.



Explanation of Multivariate Analysis

The data for the surveys were analyzed using the chi square statistic to examine differences between respondents 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 square 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-square 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-square 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.

Cramer's *V* is a statistical test that measures the degree of association between two categorical variables. For statistical tests that reach significance using chi-square, Cramer'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.

Residential Research Results

Respondent Profile

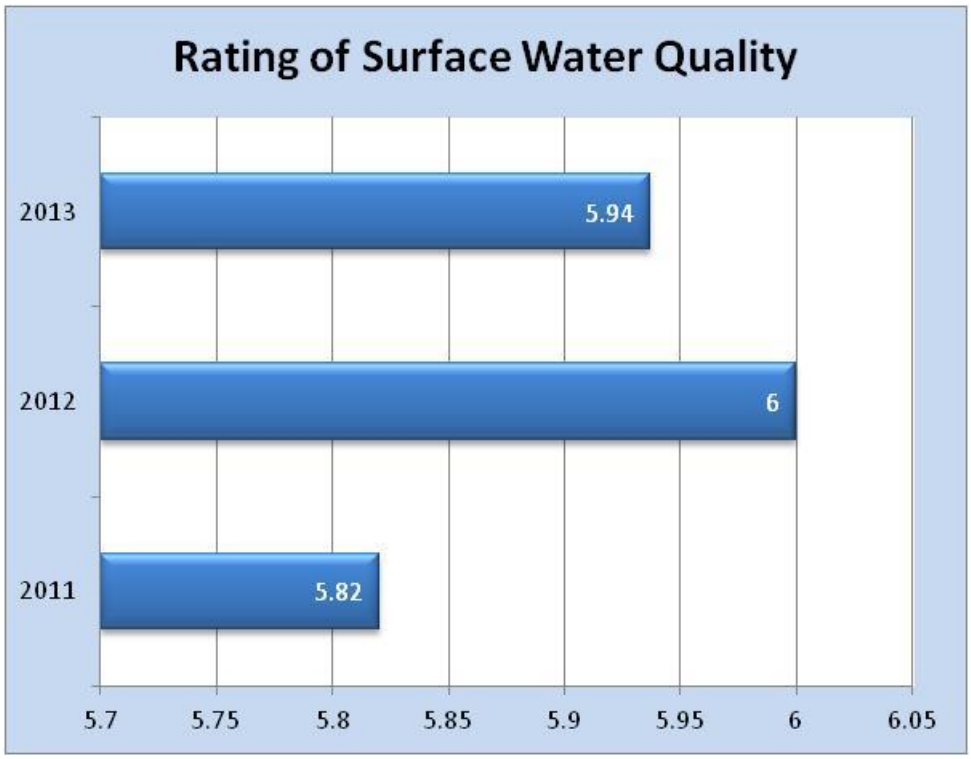
The following tables describe the demographic profile of the sample for Tukwila residents by age and gender. As indicated in the methodology section, the sample was statistically weighted to match the population by gender and age. The percentages listed below are the weighted sample frequencies for age and gender according to 2010 U.S. Census data. Un-weighted percentages have been included for comparison.

2013 Weighted Sample - Gender		
Gender	**Actual**	**Weighted**
Male	49.5%	49.5%
Female	50.5%	50.5%

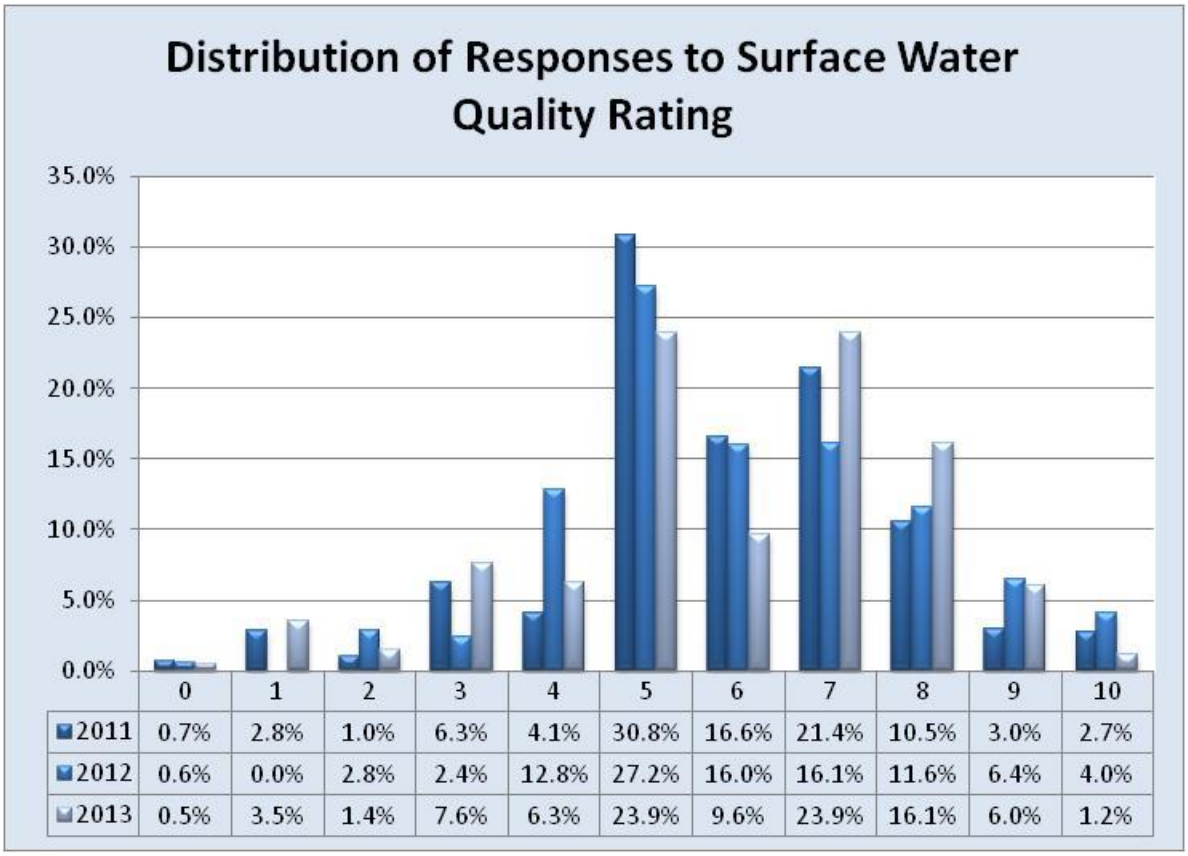
2013 Weighted Sample - Age		
Age Group	**Actual**	**Weighted**
18-24	2.22%	9.42%
25-34	5.56%	25.52%
35-44	7.78%	21.90%
45-54	15.56%	16.58%
55-64	21.11%	16.04%
65+	23.33%	10.54%

Assessment of Water Quality in the Environment

Respondents rated the quality of water in Tukwila'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 slightly lower in 2013, although still higher than it was in 2011. The rating decreased to 5.94 in 2013 from 6.00 in 2012. This decrease was not statistically significant. The chart below illustrates the mean rating of respondents by survey year.



The following chart shows the distribution of respondent ratings for 2011 and the 2012 results at each point along the rating scale.



	0	1	2	3	4	5	6	7	8	9	10
2011	0.7%	2.8%	1.0%	6.3%	4.1%	30.8%	16.6%	21.4%	10.5%	3.0%	2.7%
2012	0.6%	0.0%	2.8%	2.4%	12.8%	27.2%	16.0%	16.1%	11.6%	6.4%	4.0%
2013	0.5%	3.5%	1.4%	7.6%	6.3%	23.9%	9.6%	23.9%	16.1%	6.0%	1.2%

Opportunities for Expansion and Focus of Educational Programs

The two main purposes of this survey were to assess the public's storm water knowledge compare that knowledge to responses from 2011 to 2012. 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 "**D Adopt**," then, means the question deals with behavior and the desired response is **D** for "Disagree." 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 2011, 2012 and 2013.

Priority One Issues (Based on 2013 Report)			
Question	% Correct		
	2011	2012	2013
The runoff from washing a car with biodegradable soap is safe in stormwater drains. D	30.20%	31.00%	38.81%
Pollution in our rivers, wetlands and lakes and in Puget Sound is more the result of industrial dumping practices than individual human activity. D	35.00%	43.60%	45.86%
Bricks or pavers offer no advantage for reducing runoff over concrete or asphalt pavement. D	38.50%	42.10%	45.91%
When I wash a motor vehicle at home, the soapy water ends up in a ditch or on the street. D Adopt	51.20%	45.80%	46.47%
Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste D	54.80%	46.50%	47.30%
Sediment or dirt in stormwater is natural and not regarded as pollution. D	48.00%	53.30%	48.72%

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

Related Multivariate Analysis Findings

Statistically Significant Differences by Gender

For two of the three priority one questions with statistically significant differences between genders, Males showed a higher likelihood to give the correct answer. Males were more likely to know that storm drains were not connected to the sewer system and that biodegradable soap (like that used for washing cars) was not safe for stormwater drains. Females were more likely to identify individuals as the primary driver of wastewater pollution.

Storm Drains Connected to Sewer (D)		
Gender	Correct	Incorrect
Male	66.67%	33.33%
Female	25.93%	74.07%
Cramer's V: 0.407 P-value: 0.002		

Pollution Largely the Result of Industry (D)		
Gender	Correct	Incorrect
Male	26.19%	73.81%
Female	70.59%	29.41%
Cramer's V: 0.443 P-value: 0.000		

Biodegradable Soap is Safe for Stormwater Drains (D)		
Gender	Correct	Incorrect
Male	61.54%	38.46%
Female	15.38%	84.62%
Cramer's V: 0.474 P-value: 0.000		

Statistically Significant Differences by Age Group

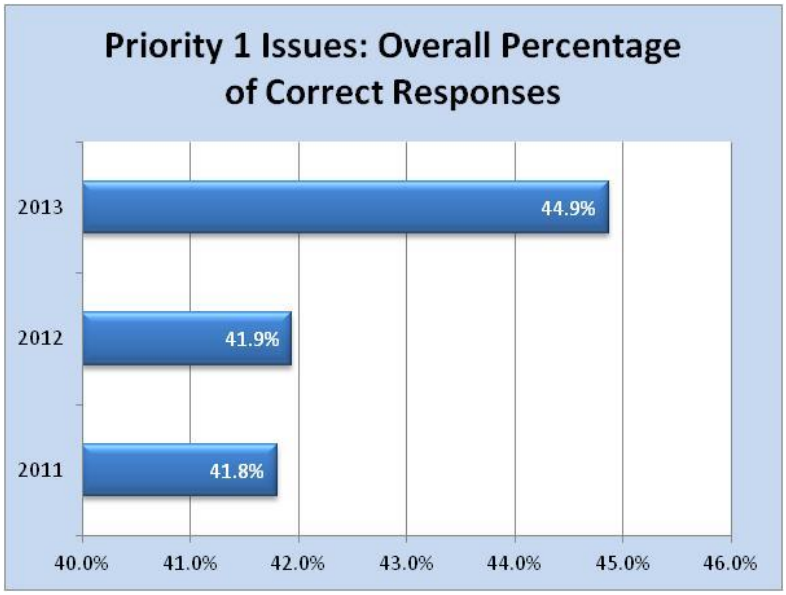
Older individuals were more likely to give the correct answer for if storm drains are connected to the sewer and if sediment/dirt is pollution or not.

Storm Drains Connected to Sewer (D)		
Age	Correct	Incorrect
18-24	33.33%	66.67%
25-34	0.00%	100.00%
35-44	33.33%	66.67%
45-54	75.00%	25.00%
55-64	75.00%	25.00%
65+	85.71%	14.29%
Cramer's V: 0.635 P-value: 0.000		

Sediment/Dirt is not Pollution (D)		
Age	Correct	Incorrect
18-24	25.00%	75.00%
25-34	15.79%	84.21%
35-44	73.33%	26.67%
45-54	60.00%	40.00%
55-64	58.33%	41.67%
65+	62.50%	37.50%
Cramer's V: 0.449 P-value: 0.008		

Topics for Public Education: Priority 1

Tukwila residents have become more likely to give the correct answer for questions that were priority 1 issues in 2011. Almost half (44.9%) answered those questions correctly compared with just over 40% in both 2012 and 2011.



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.*
- *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 2011, 2012 and 2013.

Priority Two Issues (Based on 2013 Report)			
Question	% Correct		
	2011	2012	2013
Grass clippings and leaves are not regarded as harmful in stormwater. D	42.80%	50.00%	51.41%
All water going into stormwater drains on the street is treated before being discharged into the environment D	55.70%	59.10%	58.67%
An illicit or unlawful stormwater discharge is primarily defined as anything that enters a storm drain system that is not composed entirely of stormwater. A	64.30%	58.50%	65.46%
Hard surfaces such as roads and driveways are not significant sources of pollution in stormwater. D	71.60%	71.90%	71.47%
Stormwater runoff is the leading cause of pollution in rivers, wetlands and lakes. A	62.30%	60.70%	73.08%
Washing a vehicle at a commercial car wash causes less pollution than washing a vehicle on the street using a biodegradable soap. A	67.40%	62.50%	73.67%
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	83.40%	67.20%	76.44%
Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. D	63.20%	61.50%	77.05%
The best place to dispose of water from cleaning a Latex paint brush is in a sink inside, not outdoors. A	60.30%	64.00%	77.35%

**This table of Priority 2 issues is based on 2013 results. Thus, percentages for other years may not fall between 50% and 80%.*

Related Multivariate Analysis Findings

Statistically Significant Differences by Gender

Males were more likely to know that stormwater is not treated before discharge and that commercial car washes cause less pollution than washing a car at home. Females were more likely to correctly respond that hard surfaces are a significant source of pollution, that soap and water is not a good way to clean oil and grease spots outside, and that chemical moss treatments are damaging to the environment. In these five areas with statistically significant differences between the genders the correlation between gender and response (Cramer's V) ranged from 24.2% to 39.2%.

All Stormwater is Treated before Discharge (D)		
Gender	**Correct**	**Incorrect**
Male	71.43%	28.57%
Female	47.50%	52.50%
Cramer's V: 0.242 P-value: 0.036		

Hard Surfaces Are Not Significant Pollution Sources (D)		
Gender	**Correct**	**Incorrect**
Male	37.50%	80.77%
Female	62.50%	19.23%
Cramer's V: .392 P-value: .000		

Soap and Water is a Good Way to Clean Oil and Grease Outside (D)		
Gender	**Correct**	**Incorrect**
Male	65.85%	34.15%
Female	87.18%	12.82%
Cramer's V: 0.25 P-value: 0.025		

Commercial Car Washes Cause Less Pollution (A)		
Gender	**Correct**	**Incorrect**
Male	93.10%	6.90%
Female	60.00%	40.00%
Cramer's V: 0.372 P-value: 0.002		

Chemical Treatments to Kill Moss Pose Little Pollution Risk (D)		
Gender	**Correct**	**Incorrect**
Male	67.50%	32.50%
Female	88.89%	11.11%
Cramer's V: 0.256 P-value: 0.025		

Statistically Significant Differences by Age Group

Respondents aged 35-44 where most likely to know that storm runoff is a leading cause of pollution with 100% giving the correct response compared with only 33% for those aged 18-24. Differences in age accounted for 47.7% of the difference in response to this question.

Storm Runoff is Leading Cause of Pollution (A)		
Age	Correct	Incorrect
18-24	33.33%	66.67%
25-34	50.00%	50.00%
35-44	100.00%	0.00%
45-54	85.71%	14.29%
55-64	68.75%	31.25%
65+	66.67%	33.33%
Cramer's V: 0.477 P-value: 0.001		

Older respondents were more likely to know that hard surfaces are significant pollution sources, with the highest percentage of correct answers (92.3%) coming from those aged 55-64. The Cramer's V for this question indicates that 38.5% of the differences can be explained by age, although the change is not linear; those aged 45-54 were less likely to answer correctly than those older or younger than them.

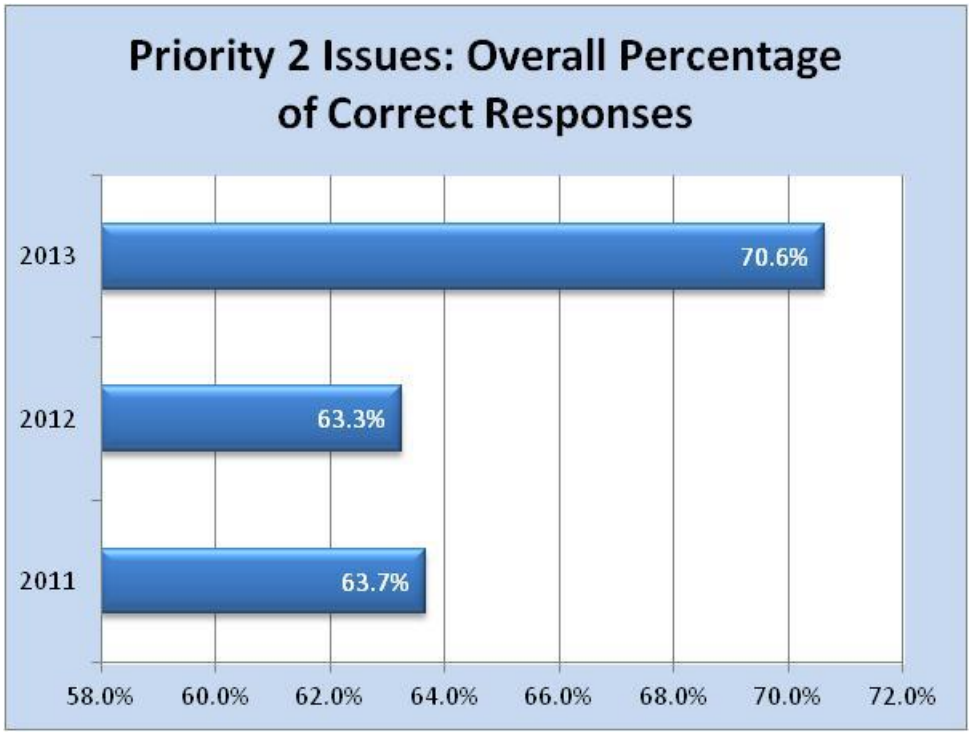
Hard Surfaces Are Not Significant Pollution Sources (D)		
Age	Correct	Incorrect
18-24	25.00%	75.00%
25-34	74.07%	25.93%
35-44	78.95%	21.05%
45-54	57.14%	42.86%
55-64	92.31%	7.69%
65+	77.78%	22.22%
Cramer's V: 0.385 P-value: 0.02		

Most age groups understood that illicit stormwater discharge was anything that was not stormwater, with all but those between 18-24 years old giving a correct response more than 80% of the time. The youngest group only answered correctly 50% of the time.

Illicit Stormwater Discharge is Anything but Stormwater (A)		
Age	Correct	Incorrect
18-24	50.00%	50.00%
25-34	84.21%	15.79%
35-44	100.00%	0.00%
45-54	100.00%	0.00%
55-64	91.67%	8.33%
65+	100.00%	0.00%
Cramer's V: 0.44 P-value: 0.015		

Topics for Public Education: Priority 2

The average percentage of respondents who answered correctly for the 2011 Priority 2 issues was calculated for the 2011, 2012 and 2013 surveys. The overall percent in 2013 of 70.6% was several percentage points higher than the responses in 2012 and 2011.



That 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.*
- *Hard surfaces, such as roads and driveways, are a significant source of stormwater pollution.*
- *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.*

- *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 downspouts at homes should convey the water to an area where it is absorbed by the ground, not by stormwater drains.*

- *The residue from chemical treatments that kill moss is a source of pollution.*

- *An illicit or illegal discharge is anything that enters a storm drain system that is not made up entirely of stormwater.*

- *Scrubbing oil and grease spots on outdoor concrete or asphalt with soap and hosing it off is not a good way to prevent polluting stormwater runoff.*

- *Sediment and dirt are pollution and should be prevented from entering the stormwater drainage system.*

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 2013 Priority 3 issues in 2011, 2012 and 2013.

Priority Three Issues (Based on 2013 Report)			
Question	% Correct		
	2011	2012	2013
The downspouts at my house convey the water to an area where it is absorbed by the ground. A Adopt	79.90%	85.60%	78.29%
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	76.40%	81.80%	82.01%
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	83.50%	91.10%	84.05%
Using a mulching lawnmower reduces the need to fertilize a lawn. A	64.50%	78.00%	86.08%
In the past 12 months, I may have used more fertilizer or applied it more frequently than the label directions require. D Adopt	90.00%	93.20%	86.46%
If my car or truck is dripping oil, I make sure the leak is fixed within three weeks. A Adopt	81.50%	85.50%	87.04%
Carpet shampoo wastewater can be safely added to a stormwater drain. D	75.60%	77.40%	88.16%
My household recycles all used motor oil. A Adopt	87.90%	80.30%	92.25%
When I am outside with my pet, I always pick up my pet's waste. A Adopt	80.70%	85.40%	92.45%
My household stores all yard fertilizers and pesticides inside a building or in a covered area out of the rain. A	98.60%	98.20%	93.12%
All of my family's auto or truck parts with oil or grease on them are stored under a roof or cover. A Adopt	71.80%	82.00%	95.48%
My family stores all containers holding oil or antifreeze under a roof or cover. A	92.60%	93.20%	97.92%

**This table of Priority 3 issues is based on 2013 results. Thus, percentages for other years may be below 80%.*

Related Multivariate Analysis Findings

Statistically Significant Differences by Gender

There were six areas of knowledge within the priority three group that showed statistically significant differences between genders. Women were more likely to say that they always picked up their pets' waste, that they fix oil leaks within three weeks, that they store pesticides and fertilizers in a covered area and that mulching lawnmowers decrease the need for fertilizer. Men were more likely to say that their household recycles all of its used motor oil and to deny using too much insecticide or weed killer in the last year. In each of these categories, gender accounted for between 22.5% and 30.8% of the differences in answers, as shown by the Cramer's V in each table.

I Always Pick up my Pet's Waste (A)		
Gender	**Correct**	**Incorrect**
Male	87.10%	12.90%
Female	100.00%	0.00%
Cramer's V: 0.261 P-value: 0.042		

I Fix Oil Leaks Within Three Weeks (A)		
Gender	**Correct**	**Incorrect**
Male	80.77%	19.23%
Female	97.37%	2.63%
Cramer's V: 0.25 P-value: 0.018		

My Household Recycles All Used Motor Oil (A)		
Gender	**Correct**	**Incorrect**
Male	97.73%	2.27%
Female	85.71%	14.29%
Cramer's V: 0.225 P-value: 0.045		

Mulching Lawnmower Helps Fertilize (A)		
Gender	**Correct**	**Incorrect**
Male	75.00%	25.00%
Female	95.65%	4.35%
Cramer's V: 0.297 P-value: 0.006		

I Store All Pesticides/Fertilizers in a Covered Area (A)		
Gender	**Correct**	**Incorrect**
Male	88.37%	11.63%
Female	100.00%	0.00%
Cramer's V: 0.238 P-value: 0.035		

In Last 12 Years, I Might Have Used Too much Insecticide or Weed Killer (D)		
Gender	**Correct**	**Incorrect**
Male	95.12%	4.88%
Female	72.50%	27.50%
Cramer's V: 0.308 P-value: 0.006		

Statistically Significant Differences by Age

In the all three areas with statistically significant differences in answer by age group, those aged 35-64 gave the highest answers. While age was associated with more accurate knowledge in all three responses, the two oldest groups (55-64 and 65+) were less likely than middle aged respondents to say that they always pick up their pet's waste and that mulching lawnmowers help fertilize lawns.

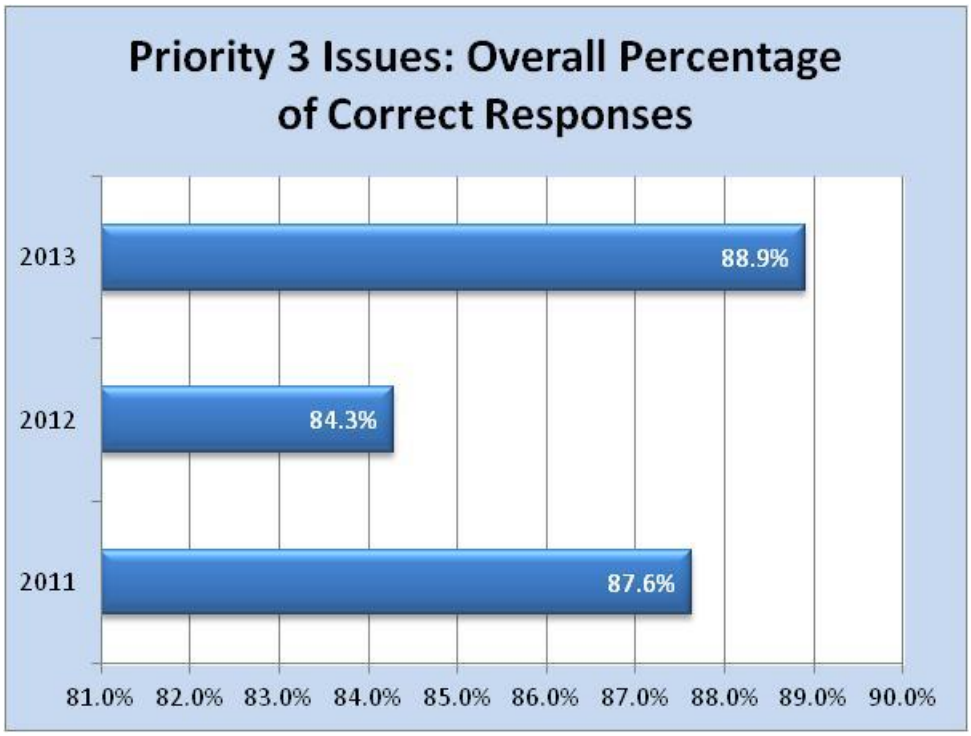
I Always Pick up my Pet's Waste (A)		
Age	**Correct**	**Incorrect**
18-24	66.67%	33.33%
25-34	100.00%	0.00%
35-44	100.00%	0.00%
45-54	100.00%	0.00%
55-64	75.00%	25.00%
65+	83.33%	16.67%
Cramer's V: 0.449 P-value: 0.031		

Mulching Lawnmower Helps Fertilize (A)		
Age	**Correct**	**Incorrect**
18-24	75.00%	25.00%
25-34	65.00%	35.00%
35-44	100.00%	0.00%
45-54	100.00%	0.00%
55-64	87.50%	12.50%
65+	80.00%	20.00%
Cramer's V: 0.387 P-value: 0.023		

I Store All Pesticides/Fertilizers in a Covered Area (A)		
Age	**Correct**	**Incorrect**
18-24	66.67%	33.33%
25-34	88.46%	11.54%
35-44	100.00%	0.00%
45-54	100.00%	0.00%
55-64	100.00%	0.00%
65+	100.00%	0.00%
Cramer's V: 0.386 P-value: 0.038		

Topics for Public Education: Priority 3

The average percentage of respondents who answered correctly for the 2011 Priority 3 issues was calculated for both 2011, 2012 and 2013 surveys. The overall percent in 2013 was 88.9%, higher than in both 2011 and 2012, although just barely.



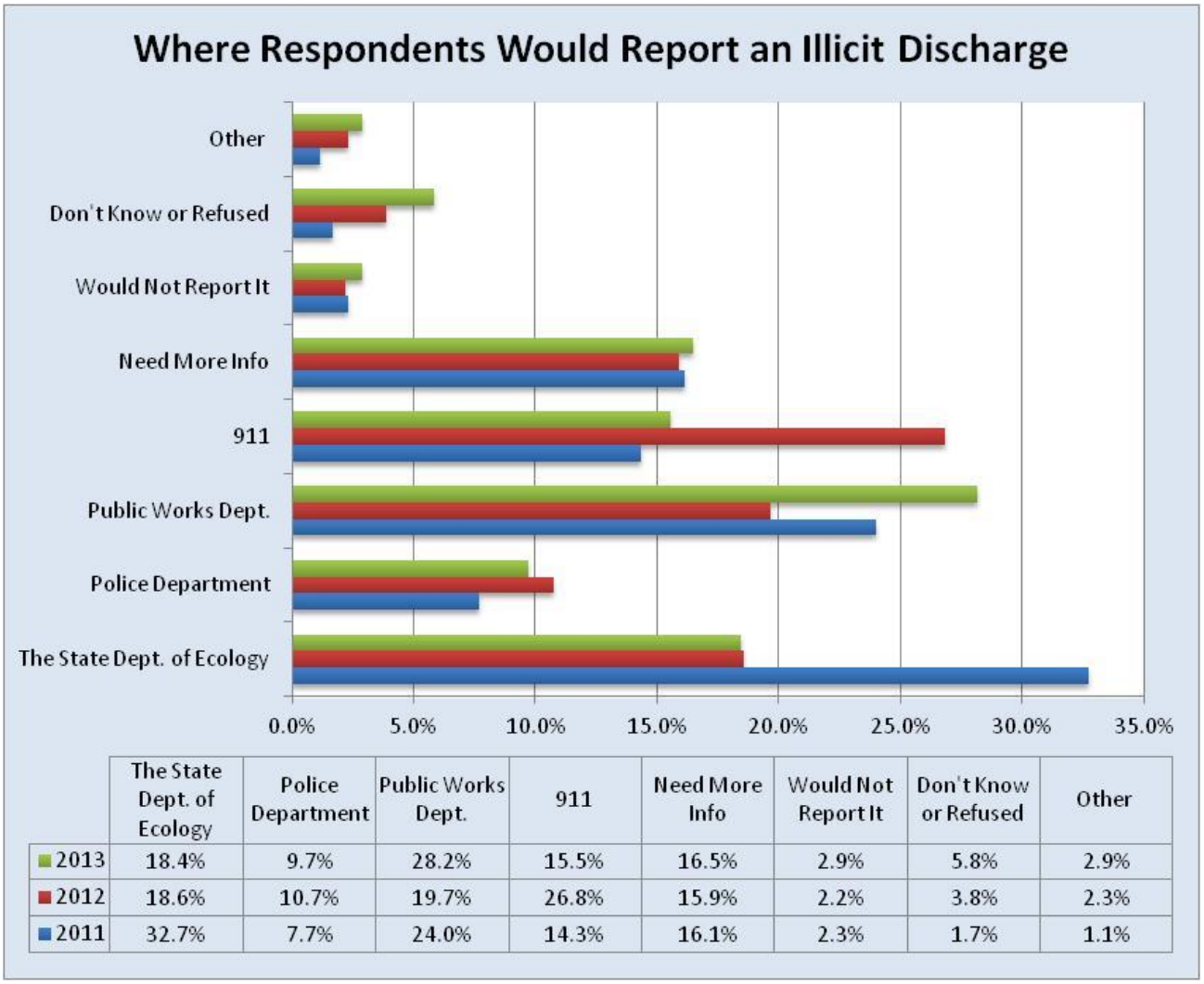
The relatively high percent of respondents who gave the correct responses in this category suggests that high behavioral compliance continues to take place. At minimum, it can be said that respondents knew the right thing to do and answered accordingly. To maintain and increase positive behaviors, it 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.*
- *Carpet shampoo wastewater cannot be safely disposed of at the stormwater drain.*
- *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.*
- *Using a mulching lawnmower helps to fertilize your lawn.*

Reporting an Illicit Discharge

The percentage of respondents who chose the Public Works Department (the correct choice) as the agency they would call if they saw an illicit discharge was 28.2% in 2013, higher than in either of the previous two studies.



	The State Dept. of Ecology	Police Department	Public Works Dept.	911	Need More Info	Would Not Report It	Don't Know or Refused	Other
2013	18.4%	9.7%	28.2%	15.5%	16.5%	2.9%	5.8%	2.9%
2012	18.6%	10.7%	19.7%	26.8%	15.9%	2.2%	3.8%	2.3%
2011	32.7%	7.7%	24.0%	14.3%	16.1%	2.3%	1.7%	1.1%

There were no statistically significant differences in responses by age, gender, or survey year.

Business Research Results

Business Profile

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

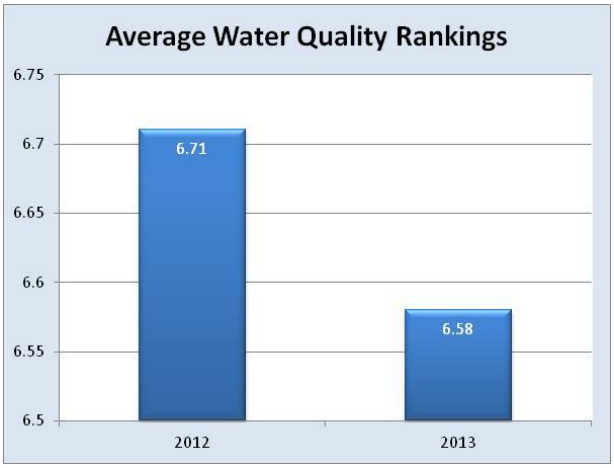
Business Survey Sample		
Business Type	**Count**	**Percentage**
Automotive	8	34.78%
Property	7	30.43%
Restaurant	8	34.78%
Total	**23**	**100%**

Of the business respondents administered the survey, the majority of business representatives completing the survey were males (56.5%). Below is a table that describes the business sample by gender.

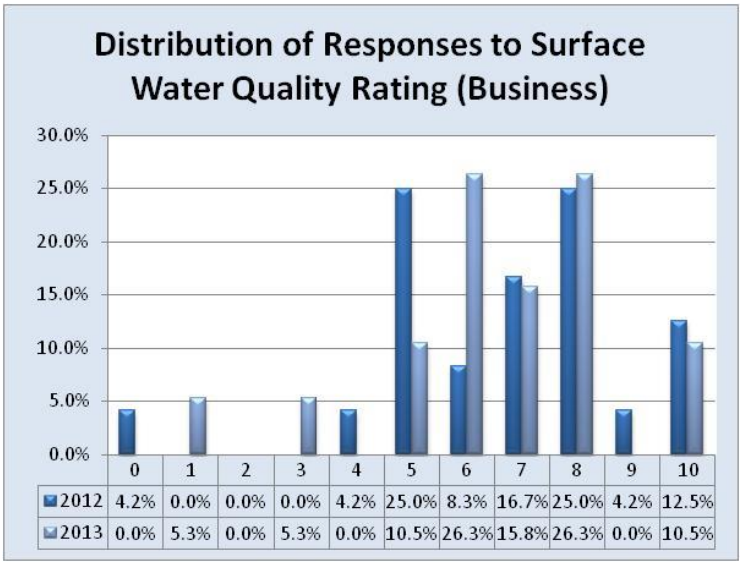
Business Demographic - Gender	
Gender	**Percentage**
Male	56.5%
Female	43.5%

Business Assessment of Water Quality in the Environment

Business Respondents were asked to rate the quality of water in Tukwila'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 slightly lower rating in 2013 than in 2012, although the difference was not statistically significant. Ratings for each year can be seen in the chart below. The difference in mean ratings for each business type was not statistically significant.



The following chart shows the distribution of business respondent ratings at each point along the rating scale. The distribution was similar to in 2012, and what differences there were were not statistically significant.



	0	1	2	3	4	5	6	7	8	9	10
2012	4.2%	0.0%	0.0%	0.0%	4.2%	25.0%	8.3%	16.7%	25.0%	4.2%	12.5%
2013	0.0%	5.3%	0.0%	5.3%	0.0%	10.5%	26.3%	15.8%	26.3%	0.0%	10.5%

General 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 (2013)				
General Questions	**Restaurant**	**Property Owner or Manager**	**Automotive**	**Combined Average**
Sediment in stormwater is natural and not regarded as pollution. **D**	0.0%	20.0%	80.0%	29.4%
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**	66.7%	100.0%	100.0%	91.7%
Non-toxic, biodegradable soaps do not pollute stormwater runoff. **D**	75.0%	75.0%	85.7%	80.0%
A key principle for effective stormwater management is to reduce the amount of stormwater runoff. **A**	83.3%	66.7%	71.4%	75.0%
My business has spill kits readily available in case of a hazardous spill. **A Adopt**	100.0%	57.1%	87.5%	81.8%
Vegetation reduces stormwater pollution. **A**	80.0%	80.0%	85.7%	82.4%
Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. **D Adopt**	12.5%	16.7%	14.3%	14.3%
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%	85.7%	100.0%	95.5%
My employees have been trained properly on how to clean up hazardous spills. **A Adopt**	100.0%	100.0%	100.0%	100.00%
The trash container area outside is in a contained area and does not leak. **A Adopt**	100.0%	100.0%	100.0%	100.00%

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 based on the 2012 responses.

Restaurants		
Question	**% Correct (2012)**	**% Correct (2013)**
Priority 1 Issues		
Sediment in stormwater is natural and not regarded as pollution. **D**	0.00%	0.00%
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**	40.00%	40.00%
Non-toxic, biodegradable soaps do not pollute stormwater runoff. **D**	40.00%	40.00%
A key principle for effective stormwater management is to reduce the amount of stormwater runoff. **A**	40.00%	40.00%
External washwater disposal is an illicit discharge. **A**	40.00%	66.67%
Priority 2 Issues		
Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. **D Adopt**	70.00%	70.00%
Vegetation reduces stormwater pollution. **A**	80.00%	80.00%
A proper way of disposing cooking oil and grease is through the stormwater system. **D**	80.00%	87.50%

Priority 3 Issues		
My employees have been trained properly on how to clean up hazardous spills. **A Adopt**	88.90%	#N/A
My business has spill kits readily available in case of a hazardous spill. **A Adopt**	88.90%	#N/A
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**	90.00%	#N/A
Wet mops are properly cleaned and stored. **A**	90.00%	100.00%
The trash container area outside is in a contained area and does not leak. **A Adopt**	100%	#N/A
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%	100.00%
The dumpster at my restaurant is always closed after use. **A**	100%	100.00%

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 based on 2012 responses.

Property Owner/Manager		
Questions	**% Correct in 2012**	**% Correct in 2013**
Priority 1 Issues		
Sediment in stormwater is natural and not regarded as pollution. **D**	20.00%	20.00%
My complex has a designated area for residential car washing. **A**	20.00%	16.67%
Non-toxic, biodegradable soaps do not pollute stormwater runoff. **D**	30.00%	75.00%
My business has spill kits readily available in case of a hazardous spill. **A Adopt**	33.30%	57.14%
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**	40.00%	100.00%
Which one of the following three methods is generally most desirable for controlling stormwater: Option 3 - Infiltration, landscaping, and/or reduction of impervious surfaces **A**	40.00%	14.3%
Priority 2 Issues		
In the last 12 months, my complex has implemented landscaping techniques to improve the absorption of rainwater. **A Adopt**	50.00%	33.33%
Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. **D**	50.00%	100.00%
A key principle for effective stormwater management is to reduce the amount of stormwater runoff. **A**	60.00%	66.67%
Vegetation reduces stormwater pollution. **A**	70.00%	80.00%

Priority 3 Issues		
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**	88.90%	85.71%
Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. **D Adopt**	88.90%	16.67%
Resident car washings are discouraged on site and suggested alternatives are provided. **A Adopt**	90.00%	100.00%
My employees have been trained properly on how to clean up hazardous spills. **A Adopt**	100.00%	100.00%
The trash container area outside is in a contained area and does not leak. **A Adopt**	100.00%	100.00%

Automotive Priority Issues

The table below includes correct response results for all automotive questions in 2012 and 2013. The table has been segmented into Priority 1, Priority 2, and Priority 3 issues.

Automotive		
Questions	**% Correct in 2012**	**% Correct in 2013**
Priority 1 Issues		
Sediment in stormwater is natural and not regarded as pollution. **D**	0.00%	80.00%
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**	33.30%	62.50%
A key principle for effective stormwater management is to reduce the amount of stormwater runoff. **A**	33.30%	71.43%
Priority 2 Issues		
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**	50.00%	100.00%
Non-toxic, biodegradable soaps do not pollute stormwater runoff. **D**	66.70%	85.71%
Vegetation reduces stormwater pollution. **A**	66.70%	85.71%
Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. **D Adopt**	66.70%	14.29%
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**	66.70%	85.71%
When cleaning a vehicle, rinse water, having little soap and dirt, can be safely added to a stormwater drain. **D**	80.00%	100.00%

Priority 3 Issues		
My Company disposes of all oils, chemicals, and other fluids through an approved disposal facility. **A Adopt**	83.30%	100.00%
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**	83.30%	100.00%
All vehicles, mechanical parts and equipment stored outside are checked for leaks at least once a month. **A Adopt**	83.30%	100.00%
The trash container area outside is in a contained area and does not leak. **A Adopt**	83.30%	100.00%
My employees have been trained properly on how to clean up hazardous spills. **A Adopt**	100.00%	100.00%
My business has spill kits readily available in case of a hazardous spill. **A Adopt**	100.00%	87.50%
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**	100.00%	100.00%
All mechanic work is done indoors and under cover. **A Adopt**	100.00%	100.00%
The area where my business washes vehicles allows the rinse water to flow to the proper sanitary sewer system. **A Adopt**	100.00%	80.00%
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**	100.00%	100.00%
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**	100.00%	100.00%

Conclusions

1) The public perception in Tukwila is that the surface water is relatively clean and free of pollutants and up a statistically insignificant amount since 2011. Respondents are indicating that the perception of surface water is, at the very least, moderately clean.

2) Since 2012, two statements shifted their priority status, in both cases moving to a lower level. One moved from priority to one to priority two while the other moved from priority two to priority three. The following are the statements described above:
   - *Grass clippings and leaves are not regarded as harmful in stormwater.* (Moved from priority one to priority two)
   - *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.* (Moved from priority two to priority one)

   While no other statements shifted priority statuses entirely, many of the statements saw an increased number of correct responses within the same category. The average percentage giving the correct answer within priority one and priority two increased by 3 and 6 percentage points, respectively. This is an encouraging sign that progress is being made in the effort to increase public understanding of stormwater issues.

4. The percentage of Tukwila residents who know to call the Department of Public Works in the event of an illicit discharge went up somewhat to 28.2%. Compared with the 19.7% who answered correctly in 2012, this is a positive sign. Still, the percentage is relatively low and communications on this topic should continue to be a priority.

5. Priority 1, 2, and 3 issues are presented in the tables under the business survey results section. The Priority issues are segmented by business type.

Appendix A: Tukwila Community Survey

The City of Tukwila

STORMWATER COMMUNITY SURVEY

QUESTIONNAIRE – JULY, 2013

Hello, my name is _____ and I am a researcher at Hebert Research conducting research on behalf of the City of Tukwila.

[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 a research assistant at Hebert Research conducting research on behalf of the City of Tukwila. 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?

A. Tukwila
B. Other Municipality **[THANK AND POLITELY DICONTINUE]**
C. Don't Know **[THANK AND POLITELY DICONTINUE]**
D. Refused **[THANK AND POLITELY DICONTINUE]**

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 and in Puget Sound. 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:

A. Agree
B. Disagree
C. Need more information
D. Uncertain, Don't Know
E. Refused
F. Doesn't Apply

NOTE: *Following each statement, you will see the correct answer indicated by an "A" for Agree or a "D" for Disagree. When the word "Adopt" appears, it means the statement addresses whether or not the respondent has "Adopted the correct behavior."Do not read the answer when conducting the survey.*

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 and in Puget Sound 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 composed 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/Refused
    8. Other **[SPECIFY]**

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: Tukwila Business Survey

BUSINESS STORMWATER MARKET RESEARCH

TUKWILA

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 conducting research on behalf of the city of Tukwila. 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 Tukwila. 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. **A**

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, rinse water, 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 rinse water 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 Tukwila, 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: _____