

*Cowlitz County, the Cities of Kelso and Longview and the  
Consolidated Diking Improvement District #1*

**GENERAL PUBLIC AND KEY BUSINESSES**

**STORMWATER MARKET RESEARCH**

# **Stormwater Market Research Report**

## **December 2010**

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## ***Thank You!***

Hebert Research wishes to express its appreciation for the excellent information, insights, and guidance given to us throughout the course of this project by the following individuals (the PERMITTEES). Your help has been invaluable.

Josh Johnson, PE, Stormwater Manager, City of Longview  
Bill Burton, PE, Cowlitz County Public Works, Cowlitz County  
Van McKay, PE, Senior Engineer and Stormwater Manager, City of Kelso  
Judi Strayer, District Manager, Consolidated Diking Improvement District #1  
Lisa Vertrees, Stormwater Customer Service Technician, City of Longview

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## *Goal*

### **Research Goal:**

The goal of this research is to determine improvements in the knowledge and practices of the public and key businesses in 2010 compared to baseline data collected in 2008 that occurred as a result of the public education campaign carried out by the City of Kelso, the City of Longview, Cowlitz County and the Consolidated Diking Improvement District #1. This evaluation is intended to satisfy the program evaluation requirements set forth in the permittees' Western Washington Phase II Municipal Stormwater Permit (Permit).

### **Content Areas for the Survey of the General Public:**

The "general public" is defined as: adults (18 years of age and older) who speak an acceptable language and live in the zip codes 98632 (Longview) and 98626 (Kelso). The subjects covered in both the public and business questionnaires are identical to the 2008 survey for each group. Subjects for the public survey include:

- ❖ General impacts of stormwater flows into surface waters.
- ❖ Impacts from impervious surfaces.
- ❖ Source control BMPs and environmental stewardship actions and opportunities in the areas of pet waste, vehicle maintenance, landscaping and buffers.
- ❖ BMPs for use and storage of automotive chemicals, hazardous cleaning supplies, carwash soaps and other hazardous materials.
- ❖ Impacts of illicit discharges and how to report them.
- ❖ Yard care techniques protective of water quality.
- ❖ BMPs for use and storage of pesticides and fertilizers.
- ❖ BMPs for carpet cleaning and auto repair and maintenance.
- ❖ Low Impact Development techniques, including site design, pervious paving, retention of forests and mature trees.
- ❖ Stormwater pond maintenance.

### **Content Areas for the Survey of Businesses:**

"Businesses" are defined as: Landscapers, Property Managers, Engineers, Developers, Contractors, Auto-Related businesses, and Carpet Cleaning businesses. These businesses were selected because of their potential impact on stormwater quality. Subjects for the business survey include:

- ❖ BMPs for use and storage of automotive chemicals, hazardous cleaning supplies, carwash soaps and other hazardous materials.
- ❖ Impacts of illicit discharges and how to report them.
- ❖ Yard care techniques protective of water quality.
- ❖ BMPs for use and storage of pesticides and fertilizers.
- ❖ BMPs for carpet cleaning and auto repair and maintenance.
- ❖ Low Impact Development techniques, including site design, pervious paving, retention of forests and mature trees.
- ❖ Stormwater pond [facility] maintenance.
- ❖ Stormwater treatment and flow control BMPs.

## *Methodology*

Two unique surveys were employed, one for the general public and one for businesses. The questionnaires were substantively identical to those developed jointly by the PERMITTEES and Hebert Research for the 2008 research. The public survey consisted of 36 questions and the business survey consisted of 43 questions. A copy of each survey is included at the end of this report.

### *Sample*

#### **General Public**

A list of telephone numbers was purchased from a reputable commercial list company. The list company maintains a record of all telephone numbers appearing in all phone books in the United States cross-referenced by zip code. Using the zip codes covering the study area, the list company drew a random sample of phone numbers. The random draw of these phone numbers assures proper proportionate sampling. 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 as required during the interviewing process. Each phone number was called at least 5 times at different times during the day and evening before being replaced by a new number. This helped to assure that the survey is administered to both those who are easy to reach and those who are more difficult to contact.

#### **Businesses**

Businesses of interest in this study, as in 2008, fell into eight survey categories: auto-related, contractor, developer, engineer, landscaper, property manager, carpet cleaner and other.

A key aspect of surveying businesses is to assure, as much as possible, that the appropriate businesses that could more directly impact stormwater quality were being included and irrelevant businesses were not being interviewed. Reviewing the businesses registered to do business in Longview and Kelso, it was discovered that each city's business categories did not cleanly conform to the definitional survey categories mentioned in the Phase II permit and it was necessary to screen and remove businesses that were unlikely to be directly involved with stormwater issues. To accomplish this, the following procedure was applied in 2008 to create the business call list.

#### *City of Kelso*

The City of Kelso filtered their list of businesses registered with the city using the following search terms.

Survey Category	Search Term ("Business Type")
Auto-Related	AUTO-EQUIP/SALES/REPAIR/SERV TOWING/STORAGE TRUCKING - LONG HAUL TRUCKING - MISCELLANEOUS
Contractor/Developer:	CONTRACT – GENERAL CONTRACTOR- PAVING/CONCRETE CONTRACTORS-EXCAVATION/SEPTIC
Engineer	ENGINEERING/CONSULTING
Carpet Cleaner	JANITOR-REPAIR/MAINT/CLEANING
Landscaper	LAWN/LANDSCAPE/TREES-MAIN/INST
Property Management	PROPERTY MGMT & MAINTENANCE

### *City of Longview*

The City of Longview list was developed by using the key words in the eight survey categories to search through the business description. Companies that included key words were added to the list in each of the survey categories.

### *Editing*

The lists from both cities were again combined into one list. It was apparent that the list of contractors contained businesses that had little to do with key stormwater issues for this group. For example, contractors dealing with flooring and interiors would not necessarily need to know information regarding low impact development since it did not involve their work. To be assured respondents who faced key issues were being interviewed, the combined list was then screened in the following way. A search of the company names was conducted and any company with a word in their title from the following list was eliminated from the call list. This procedure served to eliminate companies who do not deal directly with stormwater issues. While some survey questions could be answered by each of these companies, the aim was to contact those companies most intimately involved with stormwater volume and quality: (each entry was reviewed and if the word “construction” appeared in the name, the business was retained on the call list).

- Plumbing
- Mechanical
- Air
- Heating/HVAC
- Flooring
- Insulation
- Windshield repair
- Handyman
- Sheet Metal
- Carpenter
- Interiors
- Roofing (unless it had Construction in the title)
- Painting (unless it had Construction in the title)

- Cabinetry
- Gutters
- Glass
- Boiler
- Refrigeration
- Control
- Tile

The yellow pages of the USWest DEX phone book were also once again consulted to make sure no obvious companies were left out. The names were further screened to eliminate companies who were more administrative rather than hands-on (such as leasing companies). For Kelso, all property management businesses were eliminated except Sharp Rentals.

The “Other” category was added in 2008 when it became apparent the survey would not reach its target of 385 completed interviews. The “Other” category was also added to the 2010 survey. This category included the following types of businesses: Laundry - Dry Cleaners; Eating-Drinking; Florists/Nursery; Gas Stations; Manufacturing; Trucking; Pest Control; Funeral Home/Cemeteries; Design/Blueprint; Restaurant/Tavern-Gambling; Janitor-Repair/Maint/Cleaning; Pets-Services/Supplies; Painting; and Pools/Spa-Retail/Service.

### ***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 that were employed in this study include the following:

### ***Interviewer Training***

All interviewers participated in a special training session for this study. During this training session, the questionnaires were 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. All issues were resolved.

### ***Pre-test the Survey***

After the questionnaires were programmed in Hebert Research’s CATI system, they were rigorously tested to assure skip patterns functioned properly and that data was accurately recorded. The programming was deemed to be valid.

### ***Conduct Interviews***

Telephone interviews were conducted using Ci3 CATI software from Sawtooth Software, a recognized leader in computer-aided interviewing. Potential respondents were called 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. Throughout this process, several analysts reviewed the statistical findings and offered critical feedback designed to increase the utility of the research and produce a clear and insightful report.

### ***Incidence and Response Rates, Margin of Error***

*General Public.* A total of 388 surveys were completed with adults living within the zip codes for Longview and Kelso, WA. The overall incidence rate, which represents the proportion of the population qualified to participate in the full survey, was 84.3 percent (the incidence rate was not 100% due to some respondents being unable to communicate in English). The response rate, which represents the number of completed interviews as a percent of all eligible respondents, was 52.2 percent. The maximum margin of error at 388 respondents is  $\pm 4.9\%$  at the 95% confidence level. This margin of error means that if the survey were conducted 100 times, the resulting percents for each response would be within  $\pm 4.9\%$  (the margin of error) in 95 out of the 100 cases.

*Businesses.* A total of 362 surveys were completed with businesses in the Longview and Kelso, WA, area. The response rate, which represents the number of completed interviews as a percent of all eligible respondents, was 76.9% percent. The call list represented the population of businesses to be called. Removing non-working numbers, wrong numbers, and companies out of state, the number of viable companies in the sample frame totaled 898 in 2008. The same call list was used in 2010 with all non-working and non-business numbers removed due to businesses having closed or numbers being reassigned to residences or irrelevant businesses. New businesses were added to the list but constituted less than 1.0% of the completed interviews. The total number of viable businesses on the call list amounted to 671. The maximum margin of error for the total sample list of 671 companies with 362 completed interviews is  $\pm 3.5\%$ . This margin of error means that if the survey were conducted 100 times, the resulting percents for each response would be within  $\pm 3.5\%$  (the margin of error) in 95 out of the 100 cases for each question. The margin of error will change depending on the size of the sample for a question (indicated by *n* in the tables). With a smaller population in a category, the margin of error will also require fewer cases to reach the .05 standard. For the business survey, the following table shows the margin of error for the specific business categories:

<b>Business Category</b>	<b>n</b>	<b>Available Sample</b>	<b>Margin of Error</b>
Landscape, Property Manager	30	68	13.5%
Engineer, Developer, Contractor	142	281	5.8%
Auto	60	93	7.5%
Carpet Cleaner	8	15	24.5%
Other	122	214	5.9%
<b>Total</b>	<b>362</b>	<b>671</b>	<b>3.5%</b>

### ***Statistical Weighting***

Statistical weighting is a technique that is commonly used in survey research to correct for sampling error. During the process of data collection, demographic data from the U.S. Census was obtained in order to identify population parameters for the zip codes involved in the survey of the general public. Sample demographics were compared with population parameters. To compensate for potential sampling bias, weights were calculated and applied to the survey sample to ensure that various demographic sub-groups were represented in the proper proportion according to census statistics for the geographic area of the survey. In the final weighting analysis, it was concluded that the current sample for the general public was representative of the population for the survey within the critical parameters of age and gender. The business sample was not weighted.

### ***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.

## Geographic Area Surveyed

The map below shows the geographic area covered by the Zip Codes that defined the study population for the general public: 98632 for Longview, shown in purple and 98626 for Kelso, shown in orange.



## *Explanation of Multivariate Analysis*

The data for the general public survey were analyzed using the chi square statistic to examine differences between respondents according to gender. Additionally, the aggregate responses for both business and the general public were compared to the 2008 research findings to determine whether knowledge about stormwater-quality issues has changed significantly over the last two years.

Responses for the knowledge questions were first categorized into one of two categories: correct response or 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.” After applying this 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 first eliminated from the group. 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 with 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 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. In cases where responses were overwhelmingly the same across all respondents, a statistical test to examine differences was not carried out.

In addition to measures of significance in which differences have been determined at the 0.05 level, a measurement of association is also reported. This measure shows the strength of association or dependency between the variables being tested such as the response to a question and gender. A measurement of 0 indicates there is no association between the two. It represents a null relationship. A measurement of 1 indicates perfect association or, to continue the example, gender is completely predictive of the response to the question. This measure of association is called Cramer’s V.

# General Public Survey

## ***Public: Respondent Profile***

The following tables describe the demographic profile of the general public sample. As indicated in the methodology section, the sample was statistically weighted to match the population by gender and age for both 2008 and 2010. The percentages listed below are the weighted frequencies for age and gender.

<b>Residence</b>	<b>2008 Percentage</b>	<b>2010 Percentage</b>
House	91.8%	86.8%
Apartment	7.3%	11.5%
Condo	0.9%	1.7%

<b>Age</b>	<b>2008 Percentage</b>	<b>2010 Percentage</b>
18-24	11.9%	11.6%
25 - 34	17.4%	19.2%
35 - 44	20.4%	16.8%
45 - 54	19.5%	18.1%
55 - 64	12.3%	15.7%
65 and Over	18.5%	18.6%

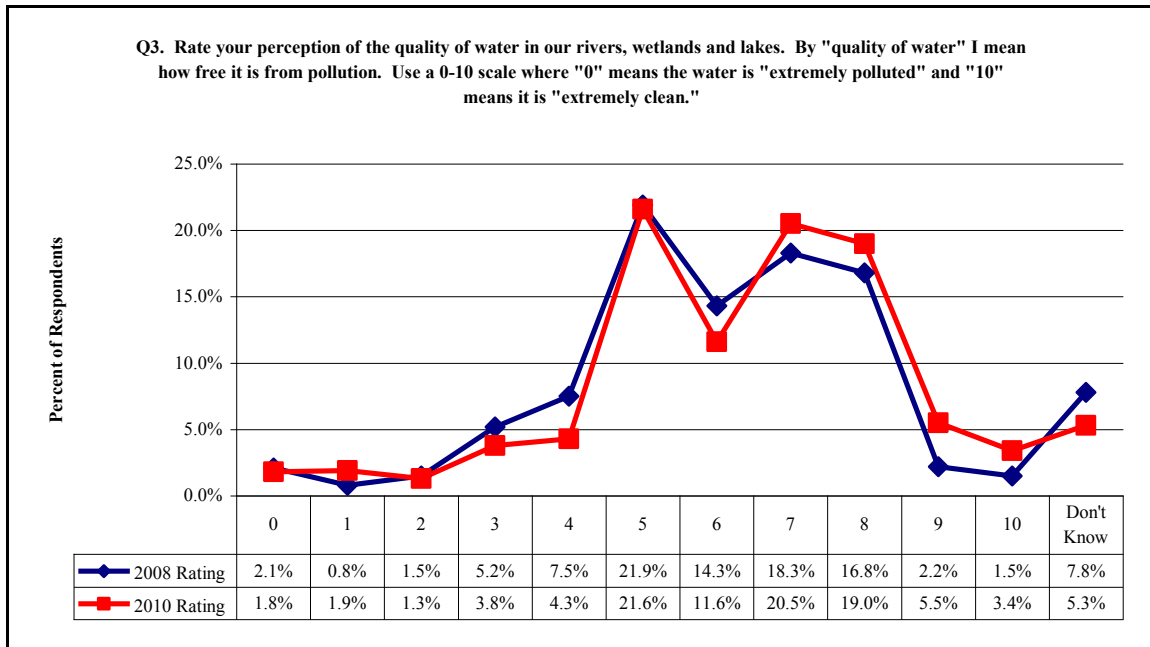
<b>Gender</b>	<b>2008 Percentage</b>	<b>2010 Percentage</b>
Male	48.6%	48.9%
Female	51.4%	51.1%

<b>Residence - Zip Code</b>	<b>2008 Percentage</b>	<b>2010 Percentage</b>
98632	70.3%	66.9%
98626	29.7%	33.1%

## *Highly Variable Assessment of Water Quality in the Environment*

Over the last two years, the public’s assessment of the quality of the water in the region has risen from 5.89 to 6.23 which is a statistically significant amount ( $p = 0.03$ ). As shown in Figure 1 below, the distribution of ratings for the 2010 findings follows a similar pattern seen in 2008. Respondents did not regard the water in rivers, watersheds and lakes as “extremely clean” (meaning free from pollution) nor “extremely polluted.” The distribution of opinions suggests the general public continues to lean toward seeing these waters as being somewhat clean or is uncertain regarding how polluted the waters are due to being exposed to a mix of both positive and negative information. The shape of the 2010 curve continues to suggest a classic normal distribution of scores which is shifted to the right (negatively skewed). A classic normal distribution would result if 1) the information available to the public were an even mix of good and bad or 2) respondents possessed little or no knowledge and guessed at an answer.

**Figure 1. Rating by General Public of the Quality of Water in the Environment**



The fact that the public perceives water to be cleaner now than in 2008 is a curious finding. This may be an unintended consequence of the public education campaign and a product of the public’s increased awareness of stormwater issues due to public education or due to some other, unknown cause. While this indicates the public perceives the water in the environment is cleaner today than in 2008, the interpretation of the 2010 findings remains effectively the same as in 2008 in regard to the need for continuing education.

As the perception of environmental water quality goes up, the public's motivation to take action to improve it will likely decline since the situation is perceived as improving. The more real the public sees the problems and the benefits of clean surface waters, the greater the response will be.

**Related Multivariate Analysis Findings for 2010**

*Men rate the quality of water in our rivers, wetlands and lakes significantly higher than women ( $p < .01$ ).*

Gender	Mean Rating
Male	6.55
Female	5.91



## *Areas of Greatest Educational Need*

The main intent of the 2010 survey of the public is to compare the findings to the 2008 baseline survey results to assess progress made as a result of the public education program waged by the cities of Kelso and Longview along with Cowlitz County and the Consolidated Diking Improvement District #1. The 32 issues tested were again divided according to the percent of correct answers given. The issues with the lowest percent of correct responses for 2010 are presented as priority issues in tables according to the following scheme:

- Priority 1: Less than 50% correct answers (Table 1, 9 issues, down from 11 in 2008)
- Priority 2: From 50 to 80% correct answers (Table 2, 14 issues, up from 11 in 2008)
- Priority 3: Over 80% correct answers (Table 3, 9 issues, down from 10 in 2008)

### **Level of Significance**

Additionally, when significant differences in the number of correct responses between 2008 and 2010 occur, the level of significance will be highlighted in each table to make the significant findings more apparent. Among the 32 items tested, one item showed a relatively high increase in knowledge but the increase did not reach the established level of significance of .05. The observed increase was significant at the .06 level which, for this evaluation, we consider to be an acceptable level of significance to indicate real change (see Table 3).

Level of Significance
<b>&lt; 0.05</b>
<b>&gt; 0.05 and ≤ 0.10</b>

## *Priority 1 Issues: 50% or Less Correct Answers*

### Significant Improvements

In 2010, two issues moved off the Priority 1 list and onto the Priority 2 list which shrank the number of Priority 1 issues from eleven to nine issues. Also, three issues showed significant improvement in the public knowledge over 2008 levels as indicated in bright green under *Level of Significance* in Table 1 below:

- Q19. Biodegradable soap for washing cars is safe in stormwater drains. (Correct Answer: Disagree)
- Q5. Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste. (Correct Answer: Disagree)
- Q6. Stormwater runoff is the leading cause of pollution in rivers, wetlands or lakes. (Correct Answer: Agree)

The public's knowledge in these areas showed statistically significant improvement in the time period from August, 2008, to November, 2010.

**Table 1. Priority 1 Issues for Public Education**

Rank for Education	Question	n		% Correct		% Change from 2008	Level of Significance
		2008	2010*	2008	2010		
1	19. Biodegradable soap for washing cars is safe in stormwater drains.	390	388	15.9%	25.3%	9.4%	$< 0.01$
2	20. When I wash a motor vehicle at home, the soapy water ends up in the street or in a ditch.**	332	304	31.3%	29.3%	-2.0%	0.57
3	9. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	390	387	40.8%	36.2%	-4.6%	0.19
4	34. Flagstone or pavers offer no advantage over standard concrete or asphalt for reducing runoff.	390	388	43.3%	39.4%	-3.9%	0.27
5	23. Sediment in stormwater is natural and not regarded as pollution.	390	388	45.9%	41.2%	-4.7%	0.19
6	5. Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste.	390	388	33.6%	41.8%	8.2%	0.02
7	6. Stormwater runoff is the leading cause of pollution in rivers, wetlands or lakes.	390	388	35.9%	45.9%	10.0%	$\leq 0.01$
8	21. Grass clippings and leaves are not regarded as harmful in stormwater.	390	388	46.4%	46.9%	0.5%	0.89
9	7. The water in street stormwater drains is treated before being discharged into the environment.	390	388	45.1%	48.7%	3.6%	0.32

\*A number of respondents over or under 388 resulted from the weighting process.

\*\*Blue indicates this question dealt with what respondents actually do.

**Table Note:** All "Does not Apply" responses were lumped into the "Don't Know" response category for the knowledge questions since all knowledge questions apply to everyone. This rule applies to all tables in this report.

The remaining six issues on the Priority 1 list show no significant change in knowledge or practice. The research did not identify a shift in the public's knowledge or practices regarding these issues.

### ***Issues Regarding Soap Remain Areas of the Lowest Public Knowledge***

In 2010, as in 2008, the public shows the least awareness of correct practices involving soap. Of the three questions involving soap in this category, two questions had the lowest number of correct responses. Educational programming should continue to convey the following messages:

- *To best protect the environment, soapy water from washing the car is best handled by allowing it to be absorbed by a lawn. It should not be allowed to flow into the street or into a drainage ditch.*
- *Biodegradable soap is not a safe addition to stormwater drains and should be kept from entering the stormwater drainage system.*

### ***Knowledge of the Stormwater Drainage System and Pollution Sources Still Needs Improvement***

Following "soap," five out of six of the next lowest scoring issues dealt with the role of stormwater in polluting rivers, wetlands and lakes. In 2010, 36.1% were not aware that pollution in rivers, wetlands, and lakes is more the result of individual human activity and not industrial dumping. Educational programming should continue to convey the following message:

- *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.*

Approximately four out ten respondents (41.8%) were aware that drains on city streets for stormwater are not connected to the same sanitary sewer system used for treating human waste. This was a significant improvement from 2008, where only 33.6% of respondents answered correctly. Additionally, there was a significant improvement in the percentage of respondents who correctly answered that stormwater runoff is the leading cause of pollution in rivers, wetlands or lakes. There were 45.9% of respondents who answered correctly, an increase of 10.0% in 2010, up from 35.9% in 2008. Although significant improvements have been made in these areas, more than 50% of the public still did not respond correctly. Knowledge of how rivers, wetlands, and lakes become polluted by stormwater continues to be an essential precursor to improving understanding, raising the desire to act responsibly, and bringing about behavioral change. Therefore it is important that the following educational messages continue to be conveyed:

- *The water in stormwater drains is not connected to the sanitary sewer system nor is it treated in any way 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.*
- *Stormwater runoff is the leading cause of pollution in rivers, wetlands and lakes. Therefore, to reduce environmental pollution, the challenge to the community is to help keep stormwater runoff pollution-free.*

### Related Multivariate Analysis Findings for 2010

Q5. Compared to women, men are significantly more aware that stormwater drains are not connected to the sanitary sewer system ( $p < .02$ , Cramer's  $V = .207$ ).

Gender	Correct	Incorrect
Male	50.5%	49.5%
Female	33.7%	64.3%

Q7. Men are significantly more aware than women that the water in street stormwater drains is not treated before being discharged into the environment ( $p < .01$ , Cramer's  $V = .167$ ).

Gender	Correct	Incorrect
Male	52.9%	47.1%
Female	44.7%	55.3%

### Actions to Prevent Polluting Stormwater

Issues regarding pavers, sediment, and grass clippings also showed relatively low awareness and a need for continuing public education. The following messages should be conveyed:

- *Flagstone or pavers help to reduce the volume of stormwater runoff and, therefore, help to reduce stormwater pollution in the environment.*
- *Sediment is pollution and should be prevented from entering the stormwater drainage system.*
- *Grass clippings and leaves in stormwater are regarded as pollution and should be kept out of the stormwater drainage system.*

### Related Multivariate Analysis Findings for 2010

Q23. Men are significantly less aware than women that sediment in stormwater is pollution ( $p < .01$ , Cramer's  $V = .237$ ).

Gender	Correct	Incorrect
Male	38.6%	61.4%
Female	43.7%	56.3%

## ***Priority 2 Issues: From 50-80% Correct Answers***

### **Significant Improvements**

Significant improvement in the public knowledge over 2008 levels on Priority 2 issues occurred in five questions ranging as high as a 11.7% increase. These issues are shown in Table 2 with the level of significance highlighted in bright green. The issues showing significant improvement in the public's knowledge and practice include:

- Q31. Carpet cleaning wastewater composed of only soap and dirt can be safely added to a stormwater drain. (Correct Answer: Disagree)
- Q35. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. (Correct Answer: Agree)
- Q24. When considering adding new plants on my property, I select plants that need less water, less fertilizer or less pesticide. (Correct Answer: Agree)
- Q14. The best way to clean up spilled oil is to fully absorb it using kitty litter or paper towels and deposit this waste in a garbage can. (Correct Answer: Agree)
- Q25. Vegetation reduces stormwater pollution. (Correct Answer: Agree)

The 2008 report pointed out one issue—knowledge of what constitutes an *illicit discharge*—as being of particular importance since it served as a beginning point which would help individuals make better decisions regarding stormwater when facing new situations. The 2010 results show the largest gain in public knowledge for this question, 11.7%. Currently, seven out of ten members of the public are aware of the definition of an illicit discharge, compared to only five out of ten in 2008. This is a significant step in the direction of a more responsible public regarding stormwater issues.

The remaining nine issues on the Priority 2 list show no significant change in knowledge or practice. The research did not identify a shift in the public's knowledge or practices regarding these issues.

**Table 2. Priority 2 Issues for Public Education**

Rank for Education	Question	n		% Correct		% Change from 2008	Level of Significance
		2008	2010*	2008	2010		
10	32. The best place to clean paint brushes is in a sink, not outdoors.	390	388	49.5%	51.0%	1.5%	0.67
11	26. Using a mulching lawnmower does not reduce the need for fertilizers.	390	388	55.4%	55.4%	0.0%	0.99
12	31. Carpet cleaning wastewater composed of only soap and dirt can be safely added to a stormwater drain.	390	388	51.3%	62.4%	11.1%	< 0.01
13	22. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	390	387	65.9%	64.6%	-1.3%	0.70
14	8. Hard surfaces such as roads and driveways are not significant sources of pollution in stormwater.	390	388	69.0%	66.2%	-2.8%	0.42
15	15. Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff.	390	388	71.5%	69.8%	-1.7%	0.60
16	35. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater.	389	387	59.1%	70.8%	11.7%	< 0.01
17	12. Trees do little to reduce runoff into the stormwater drainage system.	390	388	71.0%	74.2%	3.2%	0.32
18	24. When considering adding new plants on my property, I select plants that need less water, less fertilizer or less pesticide.**	324	328	67.9%	75.6%	7.7%	0.03
19	27. Runoff from overwatering a lawn can carry pollutants to a stormwater drain.	389	388	74.3%	76.8%	2.5%	0.42
20	33. At my home, water from my downspouts is directed to an area where it is absorbed by the ground.**	379	381	78.1%	77.7%	-0.4%	0.89
21	11. When I am outside with my pet, I always pick up my pet's waste.**	263	258	82.5%	78.7%	-3.8%	0.27
22	14. The best way to clean up spilled oil is to fully absorb it using kitty litter or paper towels and deposit this waste in a garbage can.	390	388	69.7%	79.4%	9.7%	< 0.01
23	25. Vegetation reduces stormwater pollution.	390	388	73.6%	79.6%	6.0%	0.05

\*A number of respondents over or under 388 resulted from the weighting process.

\*\*Blue indicates this question dealt with what respondents actually do.

**Table Note:** All "Does not Apply" responses were lumped into the "Don't Know" response category for the knowledge questions since all knowledge questions apply to everyone. This rule applies to all tables in this report.

According to the results of the 2010 survey, in order of importance, the following messages should be included in future educational programming:

- *The best place to clean paint brushes is in a sink that drains into the sanitary sewer system, not outdoors.*
- *A mulching lawnmower reduces the need for using fertilizer and, hence, represents a valuable method for eliminating fertilizer pollution in stormwater.*
- *Carpet cleaning wastewater composed of soap and dirt should be kept out of the stormwater drainage system and disposed of in the sanitary sewer system.*
- *The residue from chemical treatments that kill moss is a source of 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.*
- *Oil and grease spots on outdoor concrete or asphalt should be cleaned up with soap and the residue absorbed using kitty litter or paper towels which should then be disposed of in the garbage can.*
- *An illicit or illegal discharge is anything that enters a storm drain system that is not made up entirely of stormwater.*
- *Plant trees to help reduce the runoff. Trees reduce the amount of rain hitting the ground and, by absorbing the water in the soil for their growth, help to improve water absorption.*
- *When considering adding new plants on your property, select plants that need less water, less fertilizer or less pesticide.*
- *Avoid over-watering a lawn or other landscaping to the point of creating runoff which can carry pollutants into the stormwater drainage system.*
- *Direct downspout runoff to a place on your property where it can be absorbed by the ground to keep it from running off and potentially adding pollution to the stormwater drainage system.*
- *Picking up pet waste when outside.*
- *The best way to clean up spilled oil is to absorb it using a material such as kitty litter or paper towels and then place this waste in a garbage can.*
- *Plant vegetation on bare ground to reduce the volume of stormwater runoff and keep it from washing sediment and other pollution into the stormwater drainage system.*

### **Related Multivariate Analysis Findings for 2010**

Q8. *Men are significantly more aware than women that hard surfaces such as roads and driveways are significant sources of pollution in stormwater ( $p = .03$ , Cramer's  $V = .169$ ).*

<b>Gender</b>	<b>Correct</b>	<b>Incorrect</b>
<b>Male</b>	70.5%	29.5%
<b>Female</b>	62.1%	37.9%

Q11. Both men and women pick up pet waste to a high degree when outside, but significantly more women than men always pick up pet waste ( $p < .01$ , Cramer's  $V = .211$ ).

Gender	Correct	Incorrect
Male	70.2%	29.8%
Female	86.8%	13.2%

Q14. While both men and women show a high level of awareness, men were significantly more aware than women that the best way to clean up spilled oil is to fully absorb it using kitty litter or paper towels and deposit it into a garbage can ( $p = .05$ , Cramer's  $V = .157$ ).

Gender	Correct	Incorrect
Male	82.0%	18.0%
Female	76.9%	23.1%

Q24. Compared to men, significantly more women select plants for their property that need less water, less fertilizer or less pesticide ( $p = .05$ , Cramer's  $V = .157$ ).

Gender	Correct	Incorrect
Male	70.7%	29.3%
Female	79.7%	20.3%

Q25. Both men and women are highly aware that vegetation reduces stormwater pollution, but men are significantly more aware than women ( $p = .01$ , Cramer's  $V = .166$ ).

Gender	Correct	Incorrect
Male	84.1%	15.9%
Female	75.9%	24.1%



## ***Priority 3 Issues: Higher than 80% Correct Answers***

### **Significant Improvements**

Because of the already high level of the public's knowledge and practices on Priority 3, issues, it was expected that improvement in these areas would be tougher to achieve. Still, improvement was achieved in two areas as shown in Table 3 below where the significance level is highlighted in either bright green or tan:

- Q4. Stormwater runoff ends up in rivers, wetlands or lakes. (Correct Answer: Agree)
- Q30. In the last 12 months, I applied a pesticide or a herbicide in quantities that may have exceeded the manufacturer's recommendation. (Correct Answer: Disagree)

The improvement in question four reached the .01 level of significance. The improvement for question thirty did not reach the .05 level of significance, but was significant at the .06 level which, for this evaluation, we consider to be an acceptable level of significance to indicate real change. The public's knowledge in these two areas showed statistically significant improvement in the time period from August, 2008, to November, 2010.

The remaining seven issues on the Priority 3 list showed no significant change in the public's knowledge or practices.

### ***Knowledge***

Of the knowledge questions, the following three items continued to show the highest percent of respondents giving the correct answer. Two questions showed little change from 2008 and one showed significant improvement.

- *Pet waste is a source of bacteria in stormwater.* The level of knowledge in the community regarding this issue in 2010 is essentially the same as in 2008.
- *Hard surfaces generate more runoff than natural areas.* The level of knowledge in the community regarding this issue in 2010 is essentially the same as in 2008.
- *Stormwater runoff ends up in rivers, wetlands and lakes.* Significant improvement was seen in the public's knowledge in 2010 compared to 2008.

**Table 3. Priority 3 Issues for Public Education**

Rank for Education	Question	n		% Correct		% Change from 2008	Level of Significance
		2008	2010*	2008	2010		
24	13. Pet waste is not a source of bacteria in stormwater runoff.	390	388	81.5%	81.2%	-0.3%	0.90
25	10. Hard surfaces generate significantly more stormwater runoff than natural areas.	390	388	81.0%	82.2%	1.2%	0.66
26	18. My household recycles all used motor oil.**	333	328	80.8%	83.8%	3.0%	0.30
27	4. Stormwater runoff ends up in rivers, wetlands or lakes.	390	388	81.3%	87.9%	6.6%	0.01
28	17. My household's auto or truck parts with oil or grease on them are stored under a roof or cover.**	315	299	89.5%	88.3%	-1.2%	0.63
29	16. If my car or truck is dripping oil, I make sure the leak is fixed within three weeks.**	360	350	86.9%	89.4%	2.5%	0.31
30	30. In the last 12 months, I applied a pesticide or a herbicide in quantities that may have exceeded the manufacturer's recommendation.**	345	328	87.0%	91.5%	4.5%	0.06
31	29. When I apply fertilizer, I strictly follow the label directions for how often and how much to apply.**	308	298	92.2%	93.3%	1.1%	0.61
32	28. My household stores all outdoor chemicals inside a building or in a covered area out of the rain.**	372	361	97.6%	98.3%	0.7%	0.47

\*A number of respondents over or under 388 resulted from the weighting process.

\*\*Blue indicates this question dealt with what respondents actually do.

**Related Multivariate Analysis Findings for 2010**

Q10. While both men and women are highly aware that hard surfaces generate significantly more stormwater runoff than natural areas, men show a significantly higher awareness compared to women ( $p = .04$ , Cramer's  $V = .162$ ).

Gender	Correct	Incorrect
Male	87.9%	12.1%
Female	76.4%	24.6%

**Practices**

A high percent of respondents gave the correct responses to seven questions in this category regarding their practices. This suggests that high compliance with recommended actions is continuing to take place in the following areas:

- *Recycling used motor oil.*
- *Storing auto or truck parts with grease or oil on them under a roof or cover.*
- *Fixing auto or truck oil leaks within three weeks.*
- *Applying pesticides or herbicides at recommended rates.*
- *Applying fertilizer at recommended rates.*

The one area where full compliance may be claimed in 2010 once again (98.3% compliance) and improvement would be extremely difficult is:

- *Store outdoor chemicals in a covered area out of the rain.*

### **Related Multivariate Analysis Findings**

Q16. *Although both men and women make sure that when their car or truck is dripping oil that they fix the leak within three weeks, women were significantly more likely to report they perform this action than were men ( $p = .02$ , Cramer's  $V = .155$ ).*

Gender	Correct	Incorrect
Male	86.2%	13.8%
Female	92.6%	7.4%

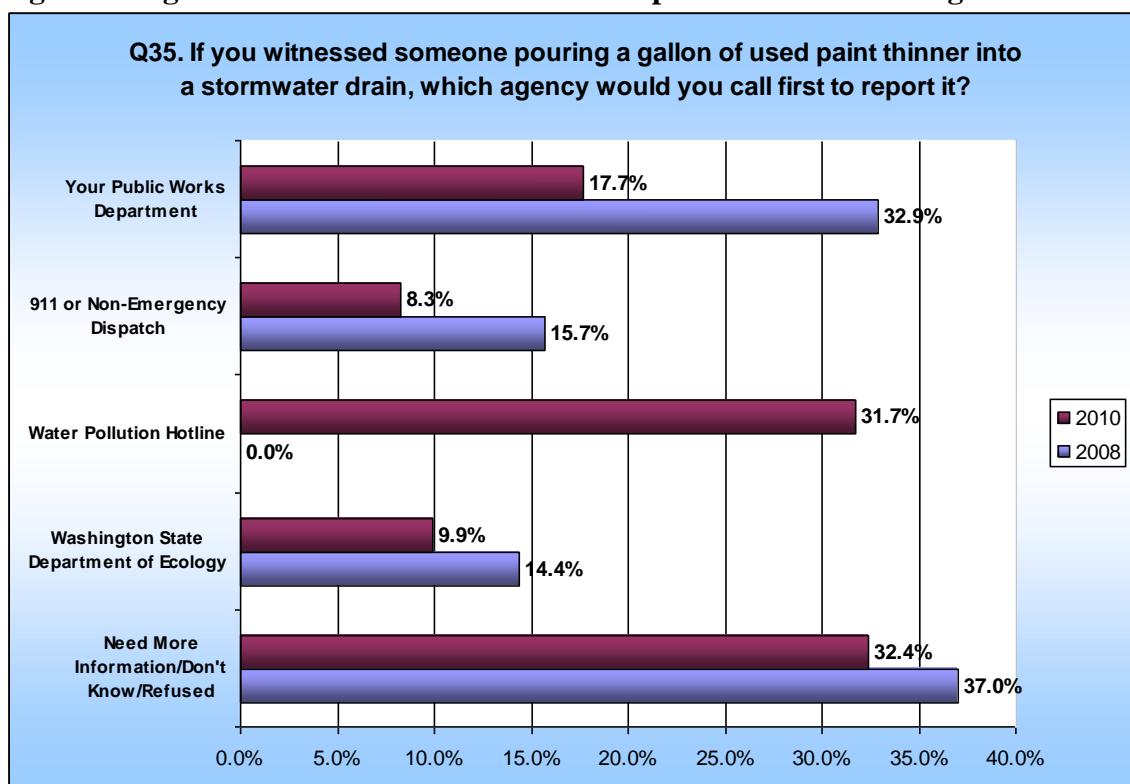
Q30. *While a high percentage of both women and men reported not applying pesticides or herbicides in amounts that exceeded the manufacturer's recommendations, significantly more women than men reported always applying the recommended amount ( $p = .02$ , Cramer's  $V = .178$ ).*

Gender	Correct	Incorrect
Male	87.2%	12.8%
Female	95.7%	4.3%

## Reporting an Illicit Discharge

To report an illicit discharge, respondents said they would call a variety of agencies (Note: In 2010, the *Water Pollution Hotline* was added). In 2010, the two correct responses were the Public Works Department and the Water Pollution Hotline. As seen in Figure 2 below, all wrong response categories declined from 2008 to 2010. In 2010, nearly half of the respondents (48.4%) gave the correct responses, up 15.5% from 2008 when only 32.9% of respondents selected the correct response, the Public Works Department. The fact that 31.7% of respondents changed their 2008 answer to the Water Pollution Hotline in 2010 indicates that the public education campaign to inform the public has effectively reached more than three out of ten adults in Kelso and Longview, a significant achievement.

**Figure 2. Agencies the Public Would Call to Report an Illicit Discharge**



# Survey of Key Businesses

## *Businesses: Respondent Profile*

The following tables describe the demographic profile of respondents for the business survey.

<b>Respondents by Gender</b>		
	<b>2008</b>	<b>2010</b>
Male	74.4%	76.5%
Female	25.6%	23.5%
Total	100.0%	100%

<b>Respondents by Location</b>		
	<b>2008</b>	<b>2010</b>
Longview	59.3%	44.0%
Kelso	34.2%	34.1%
Not Defined in Sample	6.5%	21.9%
Total	100.0%	100.0%

<b>Respondents by Business</b>				
	<b>n</b>		<b>%</b>	
	<b>2008</b>	<b>2010</b>	<b>2008</b>	<b>2010</b>
Landscaper	17	16	4.4%	4.4%
Property Manager	11	14	2.8%	3.9%
Engineer	24	21	6.2%	5.8%
Developer	2	2	0.5%	0.6%
Contractor	118	119	30.6%	32.9%
Auto	67	60	17.4%	16.6%
Carpet Cleaning	3	8	0.8%	2.1%
Other	144	122	37.3%	33.7%
Total	386	362	100.0%	100.0%

<b>Zip Codes</b>
97053
97210
97220
97282
98401
98591
98612
98626
98629
98632
98684

Respondents by Title	
Owner	38.8%
Manager	10.4%
President	10.4%
Vice President	3.9%
General Manager	3.4%
Office Manager	3.4%
Co-Owner	2.8%
Project Manager	2.0%
Environmental and Project Manager	1.4%
Superintendent	1.1%
Admin Asst.	0.8%
Assistant Manager	0.8%
CEO	0.8%
Facilities Manager	0.8%
Safety & Environmental Manager	0.8%
Secretary Treasurer	0.8%
Supervisor	0.8%
Architect	0.6%
Bookkeeper	0.6%
Operations Manager	0.6%
Production manager	0.6%
Store Manager	0.6%
Technical Service Supervisor	0.6%
Treasurer	0.6%
Accountant	0.3%
Area Manager	0.3%
Assistant General Manager	0.3%
Associate Engineer	0.3%
Basic Landscaping	0.3%
Biologist	0.3%
Branch Manager	0.3%
Building Designer/Owner	0.3%
Business Development	0.3%
Business Manager	0.3%

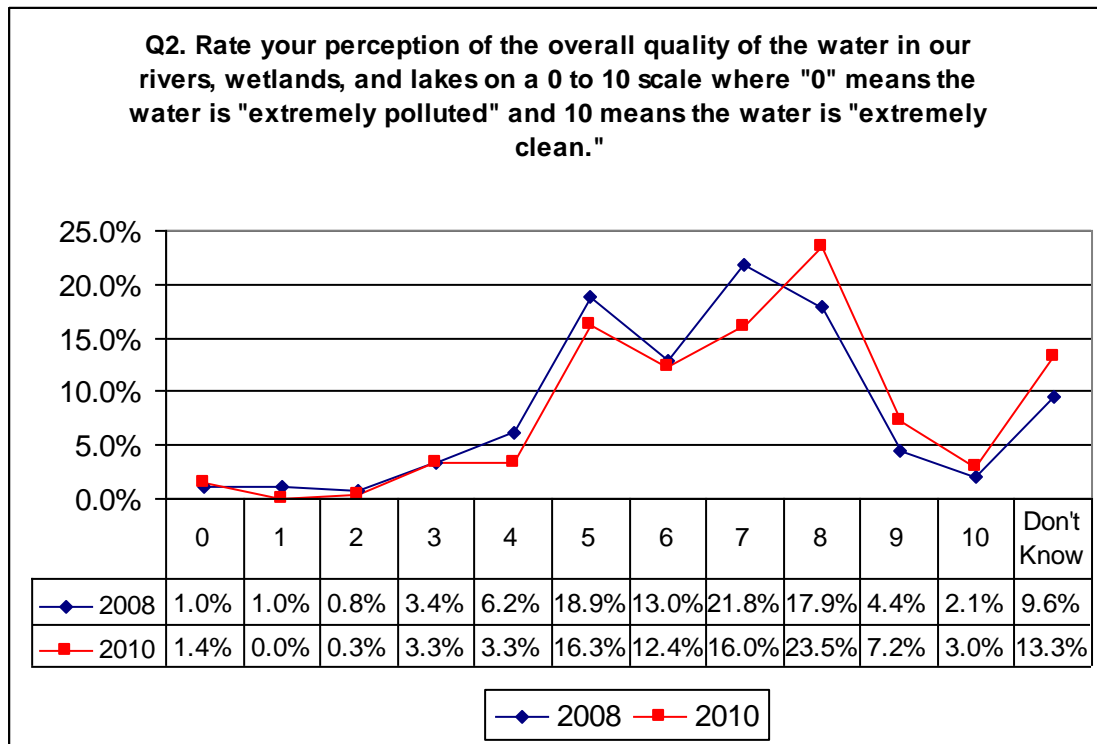
Business Operator	0.3%
Chief Financial Officer	0.3%
Contractor	0.3%
Controller	0.3%
Counterperson	0.3%
Director of Human Services	0.3%
Disaster Restoration Manager	0.3%
Dispatcher	0.3%
Driver-manager	0.3%
Environmental Coordinator	0.3%
Hourly Manager	0.3%
Human Resources	0.3%
Loss Prevention and Control Manager	0.3%
Market Sales Specialist	0.3%
OEM Sales Account Mgr	0.3%
Office	0.3%
Plant Manager	0.3%
Principal Architect	0.3%
Principal Engineer	0.3%
Program Manager	0.3%
Project Coordinator	0.3%
Property Manager	0.3%
Repair man	0.3%
Risk Manager	0.3%
Sale and Estimating	0.3%
Sales Operations Administrator	0.3%
Salesman	0.3%
Senior Engineer	0.3%
Senior Operations Coordinator	0.3%
Septic Designer	0.3%
Shift Manager	0.3%
Shipping and Receiving	0.3%
Sole Proprietor contractor	0.3%
Stormwater Engineer	0.3%
Taxpayer	0.3%

## *Businesses: Variable Assessment of Water Quality in the Area* All Respondents

Businesses rated the quality of the water in rivers, watersheds, and lakes significantly higher in 2010 compared to 2008 with an average rating of 7.21 compared to 6.71 in 2008 ( $p = .03$ ). Businesses continue to see water quality as higher than the public sees it. The overall shape of the curve is similar to that of 2008. It roughly approximates the classic normal distribution of scores which is weighted more on the upper end of the scale (negatively skewed) which is similar to the findings for the general public. The fact that both businesses and the public perceive water to be cleaner now than in 2008 is a very curious finding. It is difficult to know the cause of this shift in this perception. Apparently, public education has produced this result for businesses.

As with the public, a perception among businesses that surface waters have improved in quality will likely lead to a decline in the motivation to take further action to improve it. The more businesses recognize the continuing problems and threats to surface water quality, what they can do to help and the benefits of high quality water in the environment, the greater will be their response.

**Figure 3. Rating by Businesses of the Quality of Water in the Environment**





## ***Businesses: 50% or Less Correct Answers***

As in the survey of the public, the issues for businesses are presented according to the percent of correct answers received from each business group. Priority 1 issues for education are those where 50% or less of the businesses interviewed provided a correct answer. Priority 2 issues are those where more than 50% to 80% of respondents provided the correct answer and Priority 3 includes the issues where over 80% of respondents

Level of Significance
≤.05
> .05 and ≤ .10
Too few cases

provided the correct response. When significant differences in knowledge or practices were identified from 2008 to 2010, the cell showing the level of significance in the table presenting the findings is color coded to allow for the easier identification of significant changes. The color codes appear in the table to the left. A gray color indicates that too small a number of interviews were completed to conduct a valid statistical test. When a significant decline in correct responses occurred, the table cell showing the difference is highlighted in red.

Results show that significant improvements in practices and knowledge occurred in two Priority 1 areas and declines occurred in three.

### **Significant Improvements**

Significant improvements were seen in correct responses to the following Priority 1 issues:

- Q7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. (Correct Response: Disagree)
- Q10. Non-toxic, biodegradable soaps do not pollute stormwater runoff. (Correct Response: Disagree)

The knowledge and practices for the businesses surveyed showed statistically significant improvement in these areas in the time period from August, 2008 to November, 2010.

### **Significant Declines**

Significant declines (highlighted in red) occurred in correct responses to three issues:

- Q30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains. (Correct Response: Disagree)
- Q41. My company rarely uses bio-infiltration strategies for handling runoff. (Correct Response: Disagree)
- Q38. Do you agree or disagree with the following statement: Developments in Kelso and Longview adding over 5,000 square feet of new, impervious surface are required by law to implement stormwater flow and quality controls. (Correct Response: Agree)

As a group, the business representatives completing the survey were not as informed in 2010 as in 2008 regarding these issues. The information regarding these issues was apparently not shared with employees internally in these companies or the respondents did not benefit from stormwater public education efforts. Additional education is needed

to assure that businesses are both aware of proper knowledge and practices and that they educate their employees regarding these issues.

**Table 4: Priority 1 Issues for Business Education**

Rank for Educ.	Question	All Businesses					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
1	30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	172	172	23.8%	16.3%	-7.5%	0.08
2	32. Flagstone and pavers are not effective methods for Low Impact Development.	172	171	34.3%	38.6%	4.3%	0.41
3	5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	385	360	45.2%	40.3%	-4.9%	0.18
4	18. Sediment in stormwater is natural and not regarded as pollution.	385	361	40.3%	41.3%	1.0%	0.78
5	41. My company rarely uses bio-infiltration strategies for handling runoff.**	91	96	56.0%	41.7%	-14.3%	0.05
6	38. Developments in Kelso and Longview adding over 5,000 square feet of new, impervious surface are required by law to implement stormwater flow and quality controls.	135	141	56.3%	42.6%	-13.7%	0.02
7	7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.**	352	325	35.2%	43.1%	7.9%	0.04
8	10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	386	360	42.5%	49.4%	6.9%	0.06

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

Results in Table 4 indicate that educational programming should focus on the following information to each relevant business category:

- *The actual meaning of Low Impact Development is to promote infiltration and that a variety of methods for accomplishing it are available including the use of flagstone and pavers.*
- *Human activity is the main source of pollution in rivers, wetlands and lakes.*
- *Sediment is not natural in stormwater and is regarded as pollution.*
- *The detrimental effects in stormwater from sediment, soap, grass and leaves.*
- *Developments in Kelso and Longview adding over 5,000 square feet of new, impervious surface are required by law to implement stormwater flow and quality controls.*
- *Wash or wastewater should be prevented from flowing into a parking lot, alley, street or ditch.*

## *Businesses: From 50-80% Correct Answers*

### Significant Improvements

Significant improvement in the business community's knowledge over 2008 levels on Priority 2 issues occurred in four questions ranging as high as a 14.2% increase in correct responses. These issues are shown in table five with the level of significance highlighted in bright green. The issues showing significant improvement in the knowledge and practices among businesses include:

- Q4. The water in street stormwater drains is treated before being discharged into the environment. (Correct Response: Disagree)
- Q8. We always wash our company vehicles in a car wash. (Correct Response: Agree)
- Q14. Trees do little to reduce runoff into the stormwater drainage system. (Correct Response: Disagree)
- Q25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can. (Correct Response: Agree)

The knowledge and practices for the businesses surveyed showed statistically significant improvement in these areas in the time period from August, 2008 to November, 2010. Question 24 did not contain enough completed interviews to carry out a valid statistical test. The remaining questions showed no improvement from 2008 to 2010.

**Table 5: Priority 2 Issues for Business Education (Continued on next page)**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Total					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
9	22. My business tests the soil to determine if any fertilizer is needed before applying it.**	16	12	43.8%	50.0%	6.3%	0.74
10	13. Grass clippings and leaves are not regarded as harmful in stormwater.	385	362	47.0%	50.3%	3.3%	0.37
11	40. An erosion control permit is often unnecessary for construction projects which disturb over 5,000 square feet of land.	143	139	52.4%	50.4%	-2.0%	0.73
12	4. The water in street stormwater drains is treated before being discharged into the environment.	386	362	39.6%	50.6%	11.0%	<b>&lt; 0.01</b>
13	8. We always wash our company vehicles in a car wash.**	298	277	39.6%	53.8%	14.2%	<b>&lt; 0.01</b>
14	31. Pervious concrete and asphalt can significantly reduce runoff from a site.	172	173	51.2%	54.9%	3.7%	0.49
15	39. Which one of the following three methods is generally most desirable for controlling stormwater?	144	141	51.4%	58.9%	7.5%	0.21

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

**Table 5: Priority 2 Issues for Business Education Continued**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Total					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
16	35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.**	95	86	60.0%	61.6%	1.6%	0.82
17	25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can.	386	362	58.8%	64.6%	5.8%	0.10
18	24. My company disposes of all used carpet cleaning fluids in the sanitary sewer system or through an approved wastewater disposable facility.**	8	12	87.5%	66.7%	-20.8%	N/A
19	3. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain systems that is not made up entirely of stormwater.	386	362	62.2%	67.1%	4.9%	0.16
20	15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.**	79	85	73.4%	68.2%	-5.2%	0.47
21	23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	386	362	66.8%	70.4%	3.6%	0.29
22	17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	386	361	69.4%	71.7%	2.3%	0.49
23	14. Trees do little to reduce runoff into the stormwater drainage system.	386	362	65.5%	73.2%	7.7%	0.02
24	34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.**	94	84	71.3%	73.8%	2.5%	0.71
25	19. Vegetation reduces stormwater pollution.	386	362	78.2%	77.1%	-1.1%	0.70
26	36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	172	172	79.7%	78.5%	-1.2%	0.79

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Businesses: Higher than 80% Correct Answers*

Of the nine issues classified as Priority 3, eight involved practices and one concerned knowledge. No significant improvements were determined from 2008 to 2010.

### Significant Decline

A significant decline occurred in the number of correct responses to one question:

- Q21. In the last 12 months, my business has found it necessary to apply a pesticide or herbicide in quantities that may have exceeded the manufacturer's recommendation. (Correct Response: Disagree)

**Table 6: Priority 3 Issues for Business Education**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Total					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
27	26. Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff.	95	91	82.1%	80.2%	-1.9%	0.74
28	33. My business designs, builds, or maintains so that water from downspouts is frequently directed to an area where it is absorbed by the ground.**	131	115	77.9%	81.7%	3.8%	0.45
29	16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.**	89	89	75.3%	82.0%	6.7%	0.27
30	29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.**	246	238	81.7%	83.6%	1.9%	0.58
31	21. In the last 12 months, my business has found it necessary to apply a pesticide or herbicide in quantities that may have exceeded the manufacturer's recommendation?***	18	20	100%	85.0%	-15.0%	0.09
32	27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.**	305	289	82.3%	85.8%	3.5%	0.24
33	20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application.**	18	16	100%	87.5%	-12.5%	0.12
34	28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.**	202	194	87.1%	89.2%	2.1%	0.53
35	9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.**	343	323	97.1%	98.1%	1.0%	0.37

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

Given the high percent of correct responses to Priority 3 issues, it is not surprising to find no significant improvement. To realize a significant improvement, educational activities would have had to impact a comparatively small group of people which would have required a significant expense. The one significant decline may be due to the fact that, as mentioned previously, businesses are not educating their own employees regarding these issues. Additional education is needed to assure that businesses are both aware of proper knowledge and practices and that they educate their employees regarding these issues.

***Businesses: Stormwater Facility Inspections***  
***All Respondents***

Eliminating businesses that did not have a stormwater pond, catch basin or similar facility, nearly two-thirds of the remaining respondents in 2010 (64.6%) knew their facility had been inspected within the last 12 months. This was a significant improvement from 2008 where less than half of all businesses (45.7%) were aware of inspections in their facilities. Respondents in 2010 also appeared to be much more aware of the nature of these facilities.

**Table 7. Yearly Inspection of Retention Pond or Similar Facility**

Question	%		% Change	Sig.
	2008	2010		
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?***	45.7%	64.6%	18.9%	< 0.01
<b>Response Category</b>	<b>n*</b>			
Yes	90	97		
No	37	23		
Do not know what these facilities are	25	6		
Do not have such a facility at the business	189	212		
Don't Know/Refused	45	24		
Total	386	362		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Businesses that did not have such a facility were eliminated from the calculation of the percent.

***Businesses: Stormwater Facility Maintenance Plan  
Respondents who Said their Stormwater Facility Was or Was Not Inspected***

Among those businesses who said their facility was or was not inspected at least once in the last twelve months, slightly more than half (52.9%) were aware that a written maintenance plan existed for their facility in 2010. Although this represents an increase from 2008 and a movement in the right direction, the change was not statistically significant.

**Table 8. Existence of a Maintenance Plan for Stormwater Facilities**

Question	%		% Change	Sig.
	2008	2010		
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?***	46.0%	52.9%	6.9%	0.28
<b>Response Category</b>	<b>n*</b>			
Yes	58	63		
No	38	29		
Don't Know/Refused	30	27		
Total	126	120		

\*The letter **n** indicates the number of respondents who answered the question.

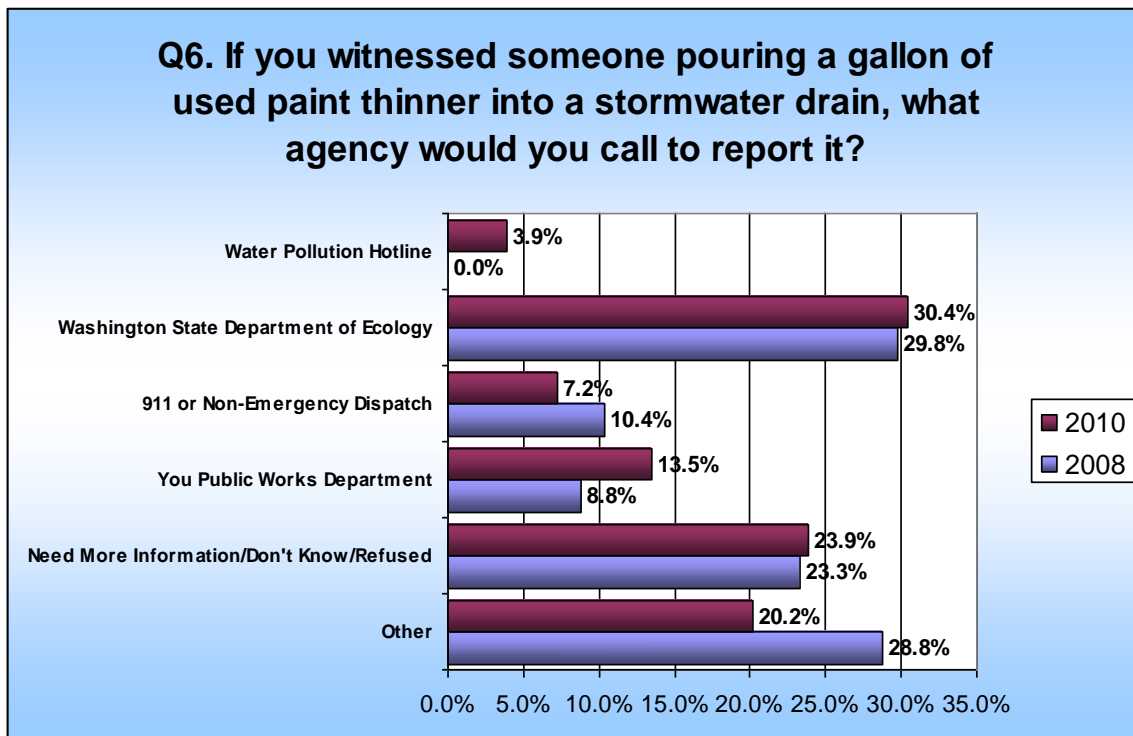
\*\*\*Businesses that said their facility was or was not inspected received this question. All other respondents did not receive the question.



## ***Businesses: Reporting an Illicit Discharge*** ***All Respondents***

To report an illicit discharge, business respondents would call a variety of agencies. The number of businesses who would call the correct numbers, the Water Pollution Hotline or the Public Works Department, amounted to only 3.9% and 13.5% respectively. These two correct alternatives account for only 17.4% of all business respondents. The remaining 82.6% of respondents would call the wrong agency, primarily the Department of Ecology, which is a result similar to the 2008 findings. It appears that the public education campaign regarding where to report an illicit discharge has not yet been able to realize a significant improvement among businesses in this area.

**Figure 4. Agencies Businesses Would Call to Report an Illicit Discharge**



## **“Other” Responses**

- *EPA. (22)*
- *Police. (13)*
- *City of Longview or Kelso. (8)*
- *DEQ. (2)*
- *Abatement- city department.*
- *Beacon Hill Sewer District.*
- *City services office.*
- *City switchboard.*
- *County or city.*
- *Cowlitz code enforcement.*
- *Department of Natural Resources or Fisheries.*
- *I would talk to the offender first.*
- *I wouldn't call anybody. I'd handle it myself.*
- *I'd call the guy who's in charge of that stuff in the city.*
- *I'd call the Sheriff's Department.*
- *In the city, I would call the city.*
- *My sister works for the Dept of Natural Resources*
- *One of our Ecology agents in Longview.*
- *Stormwater drain manager.*
- *Stormwater Control for Pollution.*
- *Stormwater pollution control authority.*
- *The 800 number on the storm drain with a little picture of a fish.*
- *The Fire Department.*
- *The Health Department.*
- *Health Department.*
- *The Longview Water Department.*
- *The Washington State Stormwater Department.*
- *The Water and Sewer Department.*
- *Waste Control with Cowlitz County.*
- *Waste Treatment Center.*
- *City of Longview Water Works.*
- *OSHA.*

***Businesses: Number of Erosion Control Inspectors  
Contractors, Engineers, and Developers***

Of the 131 contractors, engineers and developers that took part in the 2010 survey, 22.9% reported having from one to twenty certified erosion inspectors on staff. This finding is virtually identical to the 2008 results where 22.2% reported having at least one inspector employed. Table 9 shows the percent of contractors, engineers and developers surveyed who have inspectors as well as the number of inspectors employed.

**Table 9. Erosion Control Inspectors Employed**

<b>Contractors, Engineers, Developers</b>					
<b>Number of Inspectors Employed</b>	<b>n*</b>		<b>%</b>		<b>% Change from 2008</b>
	<b>2008</b>	<b>2010</b>	<b>2008</b>	<b>2010</b>	
Have at least one inspector	32	30	22.2%	22.9%	0.7%
1	15	12	10.4%	9.2%	-1.3%
2	6	8	4.2%	6.1%	1.9%
3	3	2	2.1%	1.5%	-0.6%
4	1	1	0.7%	0.8%	0.1%
5	2	1	1.4%	0.8%	-0.6%
6	3	2	2.1%	1.5%	-0.6%
8	0	1	0.0%	0.8%	0.8%
12	1	1	0.7%	0.8%	0.1%
15	0	1	0.0%	0.8%	0.8%
20	1	1	0.7%	0.8%	0.1%
<b>Total</b>	<b>144</b>	<b>131</b>			

\*The letter **n** indicates the number of respondents who answered the question.

## *Conclusions and Recommendations*

A surprising result of the survey is the finding that both the public and businesses perceive surface waters as being less polluted in 2010 than in 2008. This may be a side effect of the public education program, although the cause of this more positive assessment remains unclear.

### ***General Public***

Survey results for the general public in 2010 show a statistically significant increase in the number of correct answers given for 10 of the 32 stormwater issues tested, indicating that the public education programs undertaken by Cowlitz County, the City of Kelso, the City of Longview and the Consolidated Diking Improvement District #1 have successfully improved the public's knowledge and behaviors in these areas.

The public education campaign has also successfully increased the public's awareness of the new Water Pollution Hotline with 31.7% of the respondents recognizing this as a correct number to call to report an illicit discharge.

Overall, improvement in the public's knowledge and practices in about one in three of the issues tested is a very positive and successful outcome demonstrating genuine movement in the desired direction of increasing the public's knowledge and practices. The fact that nine issues still remain on the Priority 1 list for public education and fourteen issues on the Priority 2 list demonstrates that educational efforts and social marketing must continue. If the goal is a well informed public that universally engages in practices that are highly protective of the quality of water entering the stormwater drainage system, additional and more powerful methods of raising the public's knowledge and motivating the desired behavior must be implemented. The recommendations for action mentioned in this report and in the baseline 2008 report for the public must remain operational for the foreseeable future.

### ***Businesses***

Survey results for 2010 show a statistically significant increase in correct answers given for seven stormwater issues tested with relevant businesses indicating that the public education programs undertaken by Cowlitz County, the City of Kelso, the City of Longview and the Consolidated Diking Improvement District #1 has successfully improved the knowledge and behaviors within businesses in these areas.

Awareness of issues that affect the proper treatment of stormwater is also up. Business respondents were significantly more aware in 2010 compared to 2008 that the stormwater retention pond, catch basin or similar facility at their business had been inspected at least once in the last 12 months.

Businesses showed only slight awareness (3.9%) that the Water Pollution Hotline as a correct number to call to report an illicit discharge. Most businesses would still contact the same erroneous agencies as in 2008.

Similar to the public, businesses showed improvement in knowledge and practices in a number of areas tested which is a very positive and successful outcome. Unlike the results for the public where no significant decline in knowledge or practices was seen, declines were found in the correct responses by businesses on four questions. This suggests that today's employees do not possess the same level of knowledge regarding stormwater issues as employees did in 2008. While the cause of these declines is not known, the finding suggests that continuing education is needed if knowledge and practices protective of stormwater are to be maintained and advanced in the business community on an ongoing basis. New staff joining a business may need to be targeted in future educational efforts.

A total of twenty-six issues still remain on the Priority 1 and Priority 2 lists demonstrating that educational efforts and social marketing using well thought out messaging must continue. The recommendations for action mentioned in this report and in the baseline 2008 report for businesses must remain operational for the foreseeable future.

### **Overall**

The survey results provide a valid assessment of changes from 2008 to 2010 in the knowledge about stormwater issues and the degree to which desirable practices were being engaged in by the general public and by key businesses in the Longview/Kelso area. The results serve well as a guide to prioritizing continuing educational programming and social marketing. They also provide a continuing measure of progress in the effort to achieve high quality surface waters in and around the cities of Kelso and Longview and throughout Cowlitz County.

The following pages present the findings for each business category.  
The issues divided into Priority 1, 2 or 3 by business.



## *Landscapers and Property Managers: 50% or Less Correct Answers*

### Significant Findings

No significant improvement in the knowledge of Landscapers and Property managers in 2010 over 2008 levels were found for Priority 1 issues. The knowledge and practices of these businesses in 2010 is statistically identical to 2008.

**Table 10. Priority 1 Issues for Landscapers and Property Managers**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Landscaper, Property Manager				% Change from 2008	Sig.
		n*		% Correct			
2008	2010	2008	2010				
1	30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	28	30	17.9%	6.7%	-11.2%	0.19
2	5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	28	30	46.4%	30.0%	-16.4%	0.20
3	7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	25	28	32.0%	39.3%	7.3%	0.58
4	32. Flagstone and pavers are not effective methods for Low Impact Development.	28	30	28.6%	40.0%	11.4%	0.36
5	10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	28	29	53.6%	41.4%	-12.2%	0.36
6	18. Sediment in stormwater is natural and not regarded as pollution.	28	30	46.4%	43.3%	-3.1%	0.81
7	31. Pervious concrete and asphalt can significantly reduce runoff from a site.	28	30	46.4%	43.3%	-3.1%	0.81

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Landscapers and Property Managers: From 50-80% Correct Answers*

### Significant Findings

Significant improvement in correct responses was seen in the responses of Landscapers and Property Managers from 2008 to 2010 in the following:

- Q4. The water in street stormwater drains is treated before being discharged into the environment. (Correct Response: Disagree)

Significant decline in correct responses was seen in the responses of Landscapers and Property Managers from 2008 to 2010 in the following:

- Q17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. (Correct Response: Disagree)

**Table 11. Priority 2 Issues for Landscapers and Property Managers**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Landscaper, Property Manager					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
8	4. The water in street stormwater drains is treated before being discharged into the environment.	28	30	25.0%	50.0%	25.0%	0.05
9	22. My business tests the soil to determine if any fertilizer is needed before applying it.**	16	12	43.8%	50.0%	6.3%	0.74
10	35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.**	17	18	47.1%	50.0%	2.9%	0.86
11	25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can.	28	30	46.4%	53.3%	6.9%	0.60
12	34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.**	22	18	68.2%	55.6%	-12.6%	0.41
13	8. We always wash our company vehicles in a car wash.**	22	23	50.0%	56.5%	6.5%	0.66
14	13. Grass clippings and leaves are not regarded as harmful in stormwater.	28	30	71.4%	56.7%	-14.7%	0.24

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.



**Table 11. Priority 2 Issues for Landscapers and Property Managers Cont'd.**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Landscaper, Property Manager					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
15	24. My company disposes of all used carpet cleaning fluids in the sanitary sewer system or through an approved wastewater disposal facility.**	5	5	80% (PM Only)	60% (PM Only)	-20.0%	N/A
16	3. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain systems that is not made up entirely of stormwater.	28	30	53.6%	66.7%	13.1%	0.31
17	17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	28	30	89.3%	66.7%	-22.6%	0.04
18	26. Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff.	28	30	78.6%	66.7%	-11.9%	0.31
19	15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.**	19	17	78.9%	70.6%	-8.3%	0.42
20	23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	28	30	78.6%	73.3%	-5.3%	0.64
21	16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.**	19	19	84.2%	73.7%	-10.5%	0.43
22	19. Vegetation reduces stormwater pollution.	28	30	67.9%	76.7%	8.8%	0.45

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## ***Landscapers and Property Managers: Higher than 80% Correct Answers***

### **Significant Findings**

Significant improvement in correct responses was seen in the responses of Landscapers and Property Managers from 2008 to 2010 in the following:

- Q14. Trees do little to reduce runoff into the stormwater drainage system. (Correct Response: Disagree)

### **Significant Decline**

A significant decline in correct responses was seen in the responses of Landscapers and Property Managers in the following:

- Q21. In the last 12 months, my business has found it necessary to apply a pesticide or herbicide in quantities that may have exceeded the manufacturer's recommendation. (Correct Response: Disagree)

**(See Table 12 on the next page.)**

**Table 12. Priority 3 Issues for Landscapers and Property Managers**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Landscaper, Property Manager					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
23	33. My business designs, builds, or maintains so that water from downspouts is frequently directed to an area where it is absorbed by the ground.	21	22	85.7%	81.8%	-3.9%	0.73
24	29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.**	18	17	94.4%	82.4%	-12.0%	0.26
25	14. Trees do little to reduce runoff into the stormwater drainage system.	28	30	53.6%	83.3%	29.7%	0.01
26	21. In the last 12 months, my business has found it necessary to apply a pesticide or herbicide in quantities that may have exceeded the manufacturer's recommendation?***	18	19	100%	84.2%	-15.8%	0.08
27	36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	28	29	85.7%	86.2%	0.5%	0.96
28	20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application.**	18	16	100%	87.5%	-12.5%	0.12
29	27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	24	24	91.7%	95.8%	4.1%	0.55
30	9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	25	25	95.5%	96.0%	0.5%	0.93
31	28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.**	13	10	92.3%	100.0%	7.7%	0.37

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Landscapers and Property Managers: Additional Questions*

### Significant Findings

No significant differences were seen between 2008 and 2010 responses for the overall perception of the quality of environmental water and where to report an illicit discharge.

**Table 13. Rating by Landscapers and Property Managers of the Quality of Water in the Environment**

Q2. Rate your perception of the overall quality of the water in our rivers, wetlands, and lakes on a 0 to 10 scale where “0” means the water is “extremely polluted” and 10 means the water is “extremely clean.”	n*		Mean Value		Sig.
	2008	2010	2008	2010	
Landscaper, Property Manager	28	26	5.82	6.23	0.45

**Table 14. Agencies Landscapers and Property Managers Would Call to Report an Illicit Discharge**

Q6. If you witness someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call to report it?	n*		% Correct		% Change from 2008	Sig.
	2008	2010	2008	2010		
Landscaper, Property Manager	28	30	10.7%	10.0%	-0.7%	0.93

**Table 15. Yearly Inspection of Retention Pond or Similar Facility: Landscapers and Property Managers**

Question	% Desired Answers by Business Category			
	Landscaper, Property Manager		% Change	Sig.
	%			
	2008	2010		
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?***	16.7%	50.0%	33.3%	N/A
Response Category	n*			
Yes	2	4		
No	3	0		
Do not know what these facilities are	2	0		
Do not have such a facility at the business	16	22		
Don't Know/Refused	5	4		
Total	28	30		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*\*Businesses that did not have such a facility were eliminated from the calculation of the percent.

**Table 16. Existence of a Maintenance Plan for Stormwater Facilities: Landscapers and Property Managers**

Question	% Desired Answers by Business Category			
	Landscaper, Property Manager		% Change	Sig.
	%			
	2008	2010		
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?***	0.0%	50.0%	50.0%	N/A
Response Category	n*			
Yes	0	2		
No	3	1		
Don't Know/Refused	2	1		
Total	5	4		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*\*Businesses that said their facility was or was not inspected received this question. All other respondents receive the question.

## *Engineers, Developers and Contractors: 50% or Less Correct Answers*

### Significant Findings

Significant improvement in correct responses was seen in the responses of Engineers, Developers and Contractors from 2008 to 2010 in the following:

- Q8. We always wash our company vehicles in a car wash. (Correct Response: Agree)

### Significant Declines

Significant declines in correct responses were seen in the responses of Engineers, Developers and Contractors in the following Priority 1 issues:

- Q41. My company rarely uses bio-infiltration strategies for handling runoff. (Correct Response: Disagree)
- Q38. Do you agree or disagree with the following statement: Developments in Kelso and Longview adding over 5,000 square feet of new, impervious surface are required by law to implement stormwater flow and quality controls. (Correct Response: Agree)

**Table 17. Priority 1 Issues for Engineers, Developers and Contractors**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Engineer, Developer, Contractor					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
1	30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	144	142	25.0%	18.3%	-6.7%	0.17
2	7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.**	124	123	29.8%	37.4%	7.6%	0.21
3	32. Flagstone and pavers are not effective methods for Low Impact Development.	144	141	35.4%	38.3%	2.9%	0.61
4	41. My company rarely uses bio-infiltration strategies for handling runoff.**	91	96	56.0%	41.7%	-14.3%	0.05
5	38. Developments in Kelso and Longview adding over 5,000 square feet of new, impervious surface are required by law to implement stormwater flow and quality controls.	144	141	52.8%	42.6%	-10.2%	0.02
6	5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	143	141	47.9%	47.5%	-0.4%	0.90
7	8. We always wash our company vehicles in a car wash.**	125	118	34.4%	48.3%	13.9%	0.03

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Engineers, Developers and Contractors: From 50-80% Correct Answers*

### Significant Findings

No significant changes between 2008 and 2010 were found among Priority 2 issues for Engineers, Developers and Contractors.

**Table 18. Priority 2 Issues for Engineers, Developers and Contractors**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Engineer, Developer, Contractor					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
8	18. Sediment in stormwater is natural and not regarded as pollution.	144	141	45.8%	50.4%	4.6%	0.45
9	40. An erosion control permit is often unnecessary for construction projects which disturb over 5,000 square feet of land.	143	139	52.1%	50.4%	-1.7%	0.73
10	4. The water in street stormwater drains is treated before being discharged into the environment.	144	142	43.1%	52.1%	9.0%	0.13
11	13. Grass clippings and leaves are not regarded as harmful in stormwater.	144	142	49.3%	52.1%	2.8%	0.64
12	10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	144	142	46.5%	52.8%	6.3%	0.29
13	31. Pervious concrete and asphalt can significantly reduce runoff from a site.	144	142	52.1%	57.7%	5.6%	0.34
14	39. Which one of the following three methods is generally most desirable for controlling stormwater?	142	140	51.4%	59.3%	7.9%	0.21
15	25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can.	144	142	57.6%	60.6%	3.0%	0.62

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

**Table 18. Priority 2 Issues for Engineers, Developers and Contractors Continued.**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Engineer, Developer, Contractor					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
16	35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.**	78	68	62.8%	64.7%	1.9%	0.81
17	3. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain systems that is not made up entirely of stormwater.	144	142	62.5%	64.8%	2.3%	0.69
18	15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.**	60	68	71.7%	67.6%	-4.1%	0.62
19	23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	144	142	66.7%	69.7%	3.0%	0.58
20	17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	144	141	70.1%	74.5%	4.4%	0.41
21	36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	144	142	78.5%	76.8%	-1.7%	0.73
22	14. Trees do little to reduce runoff into the stormwater drainage system.	144	142	73.6%	77.5%	3.9%	0.45
23	34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.**	72	66	72.2%	78.8%	6.6%	0.37

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.



## *Engineers, Developers and Contractors: Higher than 80% Correct Answers*

### Significant Findings

Respondents in this group answered the following Priority 3 question in the desired way at a significantly higher level in 2010 compared to 2008:

- Q16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide. (Correct Response: Agree)

**Table 19. Priority 3 Issues for Engineers, Developers and Contractors**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Engineer, Developer, Contractor					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
24	33. My business designs, builds, or maintains so that water from downspouts is frequently directed to an area where it is absorbed by the ground.**	110	93	76.4%	81.7%	5.3%	0.35
25	27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.**	124	118	82.3%	83.1%	0.8%	0.87
27	16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.**	70	70	72.9%	84.3%	11.4%	0.10
27	28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.**	82	82	85.4%	85.4%	0.0%	1.00
28	29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.**	106	101	80.2%	86.1%	5.9%	0.25
29	19. Vegetation reduces stormwater pollution.	144	142	82.6%	87.3%	4.7%	0.27
30	9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.**	144	122	96.7%	98.4%	1.7%	0.40

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Engineers, Developers and Contractors: Additional Questions*

### Significant Findings

The stormwater retention pond, catch basin or similar facility has been inspected at least once in the last 12 months by a significantly higher percentage of respondents in 2010 (30.1% higher) compared to 2008.

**Table 20. Rating by Engineers, Developers and Contractors of the Quality of Water in the Environment**

Q2. Rate your perception of the overall quality of the water in our rivers, wetlands, and lakes on a 0 to 10 scale where “0” means the water is “extremely polluted” and 10 means the water is “extremely clean.”	n*		Mean Value		Sig.
	2008	2010	2008	2010	
Engineer, Developer, Contractor	134	125	6.61	6.91	0.15

**Table 21. Agencies Engineers, Developers and Contractors Would Call to Report an Illicit Discharge**

Q6. If you witnesses someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call to report it?	n*		% Correct		% Change from 2008	Sig.
	2008	2010	2008	2010		
Engineer, Developer, Contractor	144	142	9.7%	14.8%	5.1%	0.19

**Table 22. Yearly Inspection of Retention Pond or Similar Facility: Engineers, Developers and Contractors**

Question	% Desired Answers by Business Category			
	Engineer, Developer, Contractor		% Change	Sig.
	%			
	2008	2010		
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?***	39.0%	69.1%	30.1%	< 0.01
<b>Response Category</b>	<b>n*</b>			
Yes	23	38		
No	15	11		
Do not know what these facilities are	4	0		
Do not have such a facility at the business	85	87		
Don't Know/Refused	17	6		
Total	144	142		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*\*Businesses that did not have such a facility were eliminated from the calculation of the percent.

**Table 23. Existence of a Maintenance Plan for Stormwater Facilities: Engineers, Developers and Contractors**

Question	% Desired Answers by Business Category			
	Engineer, Developer, Contractor		% Change	Sig.
	%			
	2008	2010		
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?***	39.5%	49.0%	9.5%	0.38
<b>Response Category</b>	<b>n*</b>			
Yes	15	24		
No	14	14		
Don't Know/Refused	9	11		
Total	38	49		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*\*Businesses that said their facility was or was not inspected received this question. All other respondents receive the question.

## *Auto: 50% or Less Correct Answers*

### Significant Findings

No significant improvement in the knowledge in 2010 over 2008 levels were found for respondents in the Auto category for Priority 1 issues. The knowledge and practices of these businesses in 2010 is statistically identical to 2008.

**Table 24. Priority 1 Issues for Auto**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Auto					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
1	18. Sediment in stormwater is natural and not regarded as pollution.	67	60	25.4%	23.3%	-2.1%	0.79
2	5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	67	59	34.3%	37.3%	3.0%	0.73
3	13. Grass clippings and leaves are not regarded as harmful in stormwater.	67	60	37.3%	41.7%	4.4%	0.62
4	10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	67	59	38.8%	45.8%	7.0%	0.43
5	4. The water in street stormwater drains is treated before being discharged into the environment.	67	60	34.3%	46.7%	12.4%	0.16

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Auto: From 50-80% Correct Answers*

### Significant Findings

Significant improvement in correct responses was seen for respondents in the Auto category from 2008 to 2010 in the following Priority 2 issues:

- Q7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. (Correct Response: Disagree)
- Q23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain. (Correct Response: Disagree)
- Q14. Trees do little to reduce runoff into the stormwater drainage system. (Correct Response: Disagree)

**Table 25. Priority 2 Issues for Auto**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Auto					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
6	8. We always wash our company vehicles in a car wash.**	60	44	36.1%	52.3%	16.2%	0.11
7	7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.**	65	56	33.8%	53.6%	19.8%	0.03
8	25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can.	67	60	59.7%	63.3%	3.6%	0.68
9	3. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain systems that is not made up entirely of stormwater.	67	60	59.7%	70.0%	10.3%	0.23
10	17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	67	60	61.2%	70.0%	8.8%	0.30
11	23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	67	60	53.7%	70.0%	16.3%	0.06
12	19. Vegetation reduces stormwater pollution.	67	60	74.6%	71.7%	-2.9%	0.71
13	14. Trees do little to reduce runoff into the stormwater drainage system.	67	60	58.2%	76.7%	18.5%	0.03

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Auto: Higher than 80% Correct Answers*

### Significant Findings

No significant improvement in the knowledge of respondents in the Auto category in 2010 over 2008 levels were found for Priority 3 issues. The knowledge and practices of these businesses in 2010 is statistically identical to 2008.

**Table 26. Priority 3 Issues for Auto**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Auto					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
14	29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.**	54	45	83.3%	84.4%	1.1%	0.88
15	26. Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff.	67	60	83.6%	86.7%	3.1%	0.63
16	27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.**	60	49	78.3%	87.8%	9.5%	0.20
17	28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.**	52	49	90.4%	98.0%	7.6%	0.11
18	9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.**	64	59	100%	100.0%	0.0%	1.00

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## Auto: Additional Questions

**Table 27. Rating by Auto of the Quality of Water in the Environment**

Q2. Rate your perception of the overall quality of the water in our rivers, wetlands, and lakes on a 0 to 10 scale where “0” means the water is “extremely polluted” and 10 means the water is “extremely clean.”	n*		Mean Value		Sig.
	2008	2010	2008	2010	
Auto	61	50	5.90	6.42	0.23

**Table 28. Agencies Auto Would Call to Report an Illicit Discharge**

Q6. If you witness someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call to report it?	n*		% Correct		% Change from 2008	Sig.
	2008	2010	2008	2010		
Auto	144	142	9.7%	14.8%	5.1%	0.19

**Table 29. Yearly Inspection of Retention Pond or Similar Facility: Auto**

Question	% Desired Answers by Business Category			
	Auto		% Change	Sig.
	%			
	2008	2010		
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?***	54.5%	71.4%	16.9%	0.15
Response Category	n*			
Yes	24	20		
No	7	4		
Do not know what these facilities are	6	0		
Do not have such a facility at the business	23	32		
Don't Know/Refused	7	4		
Total	67	60		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Businesses that did not have such a facility were eliminated from the calculation of the percent.

**Table 30. Existence of a Maintenance Plan for Stormwater Facilities: Auto**

Question	% Desired Answers by Business Category			
	Auto		% Change	Sig.
	%			
2008	2010			
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?***	38.7%	54.2%	15.5%	0.25
<b>Response Category</b>	<b>n*</b>			
Yes	12	13		
No	10	6		
Don't Know/Refused	9	5		
Total	31	24		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*\*Businesses that said their facility was or was not inspected received this question. All other respondents receive the question.



## *Carpet Cleaners: 50% or Less Correct Answers*

### Significant Findings

Due to the low number of carpet cleaners in the Kelso and Longview sample, meaningful statistical comparisons cannot be carried out. Small sample sizes can lead to wild swings in percentages by adding just a few more respondents.

**Table 31. Priority 1 Issues for Carpet Cleaners**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Carpet Cleaner					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
1	8. We always wash our company vehicles in a car wash.**	2	8	0.0%	12.5%	12.5%	N/A
2	5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	3	8	66.7%	25.0%	-41.7%	N/A
3	13. Grass clippings and leaves are not regarded as harmful in stormwater.	3	8	33.3%	37.5%	4.2%	N/A
4	18. Sediment in stormwater is natural and not regarded as pollution.	3	8	0.0%	37.5%	37.5%	N/A

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Carpet Cleaners: From 50-80% Correct Answers*

**Table 32. Priority 2 Issues for Carpet Cleaners**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Carpet Cleaner					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
5	7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.**	3	8	33.3%	50.0%	16.7%	N/A
6	25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can.	3	8	33.3%	50.0%	16.7%	N/A
7	29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.**	3	6	100%	50.0%	-50.0%	N/A
8	3. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain systems that is not made up entirely of stormwater.	3	8	100%	62.5%	-37.5%	N/A
9	4. The water in street stormwater drains is treated before being discharged into the environment.	3	8	33.3%	62.5%	29.2%	N/A
10	10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	3	8	66.7%	62.5%	-4.2%	N/A
11	17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	3	8	66.7%	62.5%	-4.2%	N/A
12	24. My company disposes of all used carpet cleaning fluids in the sanitary sewer system or through an approved wastewater disposal facility.**	3	7	100%	71.4%	-28.6%	N/A
13	19. Vegetation reduces stormwater pollution.	3	8	100%	75.0%	-25.0%	N/A
14	23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	3	8	66.7%	75.0%	8.3%	N/A
15	27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.**	3	8	100%	75.0%	-25.0%	N/A

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Carpet Cleaners: Higher than 80% Correct Answers*

**Table 33. Priority 3 Issues for Carpet Cleaners**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Carpet Cleaner					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
16	14. Trees do little to reduce runoff into the stormwater drainage system.	3	8	100%	87.5%	-12.5%	N/A
17	9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.**	3	8	100%	100.0%	0.0%	N/A

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Carpet Cleaners: Additional Questions*

**Table 34. Rating by Carpet Cleaners of the Quality of Water in the Environment**

Q2. Rate your perception of the overall quality of the water in our rivers, wetlands, and lakes on a 0 to 10 scale where “0” means the water is “extremely polluted” and 10 means the water is “extremely clean.”	n*		Mean Value		Sig.
	2008	2010	2008	2010	
Carpet Cleaner	3	7	5.67	5.57	N/A

**Table 35. Agencies Carpet Cleaners Would Call to Report an Illicit Discharge**

Q6. If you witnesses someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call to report it?	n*		% Correct		% Change from 2008	Sig.
	2008	2010	2008	2010		
Carpet Cleaner	3	8	66.7%	12.5%	-54.2%	N/A

**Table 36. Yearly Inspection of Retention Pond or Similar Facility: Carpet Cleaners**

Question	% Desired Answers by Business Category			
	Carpet Cleaner		% Change	Sig.
	2008	2010		
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?***	0.0%	100.0%	100.0%	N/A
Response Category	n*			
Yes		1		
No	1			
Do not know what these facilities are				
Do not have such a facility at the business	2	7		
Don't Know/Refused				
Total	3	8		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*\*Businesses that did not have such a facility were eliminated from the calculation of the percent.

**Table 37. Existence of a Maintenance Plan for Stormwater Facilities: Carpet Cleaners**

Question	% Desired Answers by Business Category			
	Carpet Cleaner		% Change	Sig.
	%			
	2008	2010		
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?*	0.0%	0.0%	0.0%	N/A
Response Category	n*			
Yes				
No	1			
Don't Know/Refused		1		
Total	1	1		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Businesses that said their facility was or was not inspected received this question. All other respondents receive the question.

## *Other Businesses: 50% or Less Correct Answers*

### Significant Findings

Significant improvement in correct responses was seen in the responses of businesses in the Other category from 2008 to 2010 for the following Priority 1 question:

- Q10. Non-toxic, biodegradable soaps do not pollute stormwater runoff. (Correct Response: Disagree)

**Table 38. Priority 1 Issues for Other Businesses**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Other Businesses					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
1	5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	144	122	46.5%	36.9%	-9.6%	0.11
2	18. Sediment in stormwater is natural and not regarded as pollution.	143	122	41.0%	39.3%	-1.7%	0.75
3	7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.**	135	110	41.5%	44.5%	3.0%	0.63
4	10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	144	122	37.5%	48.4%	10.9%	0.07

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Other Businesses: From 50-80% Correct Answers*

### Significant Findings

Significant improvement in correct responses was seen in the responses of businesses in the Other category from 2008 to 2010 for the following Priority 2 issues:

- Q8. We always wash our company vehicles in a car wash. (Correct Response: Agree)
- Q25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can. (Correct Response: Agree)

### Significant Decline

A significant decline in correct responses in 2010 was seen in the responses of businesses in the Other category for the following issue:

- Q19. Vegetation reduces stormwater pollution. (Correct Response: Agree)

**Table 39. Priority 2 Issues for Other Businesses**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Other Businesses					
		n*		% Correct		% Change from 2008	Sig.
2008	2010	2008	2010				
5	4. The water in street stormwater drains is treated before being discharged into the environment.	144	122	41.7%	50.0%	8.3%	0.17
6	13. Grass clippings and leaves are not regarded as harmful in stormwater.	143	122	44.4%	51.6%	7.2%	0.26
7	14. Trees do little to reduce runoff into the stormwater drainage system.	144	122	62.5%	63.1%	0.6%	0.92
8	8. We always wash our company vehicles in a car wash.**	89	84	47.2%	65.5%	18.3%	0.02
9	19. Vegetation reduces stormwater pollution.	144	122	77.1%	68.0%	-9.1%	0.10
10	3. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain systems that is not made up entirely of stormwater.	144	122	63.9%	68.9%	5.0%	0.39
11	23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	144	122	70.8%	70.5%	-0.3%	0.95
12	17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	144	122	68.8%	71.3%	2.6%	0.65
13	25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can.	144	122	62.5%	73.8%	11.3%	0.05

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.

## *Other Businesses: Higher than 80% Correct Answers*

### Significant Findings

No significant improvement in the knowledge of businesses in the Other category in 2010 over 2008 levels were found for Priority 3 issues. The knowledge and practices of these businesses in 2010 is identical to 2008.

**Table 40. Priority 3 Issues for Other Businesses**

Rank for Educ.	Question	% Correct Answers by Business Category					
		Other Businesses					
		n*		% Correct		% Change from 2008	Sig.
		2008	2010	2008	2010		
14	29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.**	65	69	77.3%	82.6%	5.3%	0.54
15	28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.**	55	48	83.9%	85.4%	1.5%	0.90
16	27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.**	94	90	81.1%	86.7%	5.6%	0.38
17	9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.**	144	109	96.2%	97.2%	1.0%	0.66

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Blue indicates a question dealing with the respondent practices. Percents apply only to respondents who indicated the question applied to them which is the number in the **n** column.



## *Other Businesses: Additional Questions*

### **Significant Findings**

Other businesses rated the overall quality of the water in rivers, wetlands, and lakes significantly higher in 2010 compared to 2008.

**Table 41. Rating by Other Businesses of the Quality of Water in the Environment**

Q2. Rate your perception of the overall quality of the water in our rivers, wetlands, and lakes on a 0 to 10 scale where “0” means the water is “extremely polluted” and 10 means the water is “extremely clean.”	n*		Mean Value		Sig.
	2008	2010	2008	2010	
Other Businesses	123	106	6.15	6.56	0.09

### **Significant Findings**

A significantly higher percentage of businesses in the Other category reported in 2010 that they would contact the correct agency (Water Pollution Hotline or Public Works Department) if they witnessed someone pouring a gallon of used paint thinner into a stormwater drain compared to responses for 2008. However, the percent in 2010 who gave the correct answer remains very low at about one in five businesses.

**Table 42. Agencies Other Businesses Would Call to Report an Illicit Discharge**

Q6. If you witness someone pouring a gallon of used paint thinner into a stormwater drain, which agency would you call to report it?	n*		% Correct		% Change from 2008	Sig.
	2008	2010	2008	2010		
Other Businesses	144	122	7.6%	22.1%	14.5%	< .01

**Table 43. Yearly Inspection of Retention Pond or Similar Facility: Other Businesses**

Question	% Desired Answers by Business Category			
	Other Businesses		% Change	Sig.
	%			
	2008	2010		
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?***	50.6%	58.6%	8.0%	0.35
<b>Response Category</b>	<b>n*</b>			
Yes	41	34		
No	11	8		
Do not know what these facilities are	13	6		
Do not have such a facility at the business	63	64		
Don't Know/Refused	16	10		
Total	144	122		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Businesses that did not have such a facility were eliminated from the calculation of the percent.

**Table 44. Existence of a Maintenance Plan for Stormwater Facilities: Other Businesses**

Question	% Desired Answers by Business Category			
	Other Businesses		% Change	Sig.
	%			
	2008	2010		
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?***	59.6%	57.1%	-2.5%	0.81
<b>Response Category</b>	<b>n*</b>			
Yes	31	24		
No	10	8		
Don't Know/Refused	11	10		
Total	52	42		

\*The letter **n** indicates the number of respondents who answered the question.

\*\*Businesses that said their facility was or was not inspected received this question. All other respondents receive the question.

***Cowlitz County, the Cities of Kelso and Longview and the  
Consolidated Diking Improvement District #1  
GENERAL PUBLIC STORMWATER MARKET RESEARCH  
QUESTIONNAIRE – NOVEMBER, 2010***

**RETEST V7.0**

Hello, my name is \_\_\_\_\_ and I am calling on behalf of the cities of Kelso, and Longview, the Consolidated Diking Improvement District No. 1 and Cowlitz County.

**[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 cities of Kelso, and Longview, the Consolidated Diking Improvement District No. 1 and Cowlitz County. We are asking citizens to answer some questions about important environmental issues and we would like to include your opinion. All your answers are strictly confidential and will not be connected to your name. May I ask you some questions?

1. Before we actually begin, may I ask if you live in a house, a condo or an apartment?

1. House
2. Condo
3. Apartment
4. Don't Know           **[THANK AND POLITELY DICONTINUE]**
5. Refused               **[THANK AND POLITELY DICONTINUE]**

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

3. 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. 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

4. Stormwater runoff ends up in rivers, wetlands or lakes. **(Correct Answer: Agree)**
5. Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste. **(Correct Answer: Disagree)**
6. Stormwater runoff is the leading cause of pollution in rivers, wetlands or lakes. **(Correct Answer: Agree)**
7. The water in street stormwater drains is treated before being discharged into the environment. **(Correct Answer: Disagree)**
8. Hard surfaces such as roads and driveways are not significant sources of pollution in stormwater. **(Correct Answer: Disagree)**
9. Pollution in rivers, wetlands, or lakes is more the result of industrial dumping than individual human activity. **(Correct Answer: Disagree)**

**[ROTATE Q10-Q34]**

**[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.]**

10. Hard surfaces generate significantly more stormwater runoff than natural areas. **(Correct Answer: Agree)**
11. When I am outside with my pet, I always pick up my pet's waste. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
12. Trees do little to reduce runoff into the stormwater drainage system. **(Correct Answer: Disagree)**
13. Pet waste is not a source of bacteria in stormwater runoff. **(Correct Answer: Disagree)**
14. The best way to clean up spilled oil is to fully absorb it using kitty litter or paper towels and deposit this waste in a garbage can. **(Correct Answer: Agree)**

15. Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff. **(Correct Answer: Disagree)**
16. If my car or truck is dripping oil, I make sure the leak is fixed within three weeks. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
17. My household's auto or truck parts with oil or grease on them are stored under a roof or cover. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
18. My household recycles all used motor oil. **(Correct Answer: Agree) Adopt**
19. Biodegradable soap for washing cars is safe in stormwater drains. **(Correct Answer: Disagree)**
20. When I wash motor vehicle at home, the soapy water ends up in the street or in a ditch. **(Correct Answer: Disagree) (Question is about the respondent's practices.)**
21. Grass clippings and leaves are not regarded as harmful in stormwater. **(Correct Answer: Disagree)**
22. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. **(Correct Answer: Disagree)**
23. Sediment in stormwater is natural and not regarded as pollution. **(Correct Answer: Disagree)**
24. When considering adding new plants on my property, I select plants that need less water, less fertilizer or less pesticide. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
25. Vegetation reduces stormwater pollution. **(Correct Answer: Agree)**
26. Using a mulching lawnmower does not reduce the need for fertilizers. **(Correct Answer: Disagree)**
27. Runoff from overwatering a lawn can carry pollutants to a stormwater drain. **(Correct Answer: Agree)**
28. My household stores all outdoor chemicals inside a building or in a covered area out of the rain. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
29. When I apply fertilizer, I strictly follow the label directions for how often and how much to apply. **(Correct Answer: Agree) (Question is about the respondent's practices.)**

30. In the last 12 months, I applied a pesticide or a herbicide in quantities that may have exceeded the manufacturer's recommendation. **(Correct Answer: Disagree)**  
**(Question is about the respondent's practices.)**
31. Carpet cleaning wastewater composed of only soap and dirt can be safely added to a stormwater drain. **(Correct Answer: Disagree)**
32. The best place to clean paint brushes is in a sink, not outdoors. **(Correct Answer: Agree)**
33. At my home, water from my downspouts is directed to an area where it is absorbed by the ground. **(Correct Answer: Agree)** **(Question is about the respondent's practices.)**
34. Flagstone or pavers offer no advantage over standard concrete or asphalt for reducing runoff. **(Correct Answer: Disagree)**
35. An illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater. **(Correct Answer: Agree)**
36. 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] ACCEPT ONE RESPONSE ONLY**
1. The Washington State Department of Ecology
  2. Your Public Works Department **[INFO: Correct for Kelso]**
  3. 911 or Non-Emergency Dispatch **[DO NOT READ: (360) 577-3098 or 3090]**
  4. Water Pollution Hotline: (360) 578-0900 **[INFO: Correct for Kelso and Longview]**
  5. Need more information
  6. Don't Know
  7. Refused

*That concludes our survey. On behalf of the cities of Kelso and Longview, Diking Improvement District No. 1 and Cowlitz County, 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: \_\_\_\_\_

***Cowlitz County, the Cities of Kelso and Longview and the  
Consolidated Diking Improvement District #1  
BUSINESS STORMWATER MARKET RESEARCH  
QUESTIONNAIRE – NOVEMBER 2010***

**RETEST V9.2**

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 cities of Kelso, and Longview, the Consolidated Diking Improvement District No. 1 and Cowlitz County. 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 Q1]**
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 cities of Kelso and Longview, the Consolidated Diking Improvement District No. 1 and Cowlitz County. 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. Landscaper
2. Property Manager
3. Engineer
4. Developer
5. Contractor
6. Auto
7. Carpet Cleaning
8. Other Related Businesses

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. Uncertain, Don't Know
5. Refused
6. Doesn't Apply

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. **(Correct Answer: Agree)**

4. The water in street stormwater drains is treated before being discharged into the environment. **(Correct Answer: Disagree)**

5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity. **(Correct Answer: Disagree)**

6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it? **[DO NOT READ] ACCEPT ONE RESPONSE**

1. The Washington State Department of Ecology
2. Your Public Works Department



3. 911 or Non-Emergency Dispatch, (360) 577-3098
  4. Water Pollution Hotline (360) 578-0900
  5. Need more information
  6. Other **[Specify]**
  7. Don't Know
  8. Refused
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. **(Correct Answer: Disagree) (Question is about the respondent's practices.)**  
**[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.]**
8. We always wash our company vehicles in a car wash. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area. **(Correct Answer: Agree) (Question is about the respondent's practices.)**  
**["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.]**
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff. **(Correct Answer: Disagree)**
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months? **(Correct Answer: Yes) (Question is about the respondent's practices.)**
1. Yes
  2. No
  3. Do not know what these facilities are
  4. Do not have such a facility at the business
  5. Don't Know
  6. Refused
12. **[IF Q12 <3, ASK]** Do you know for certain that a written maintenance plan exists for the retention pond, catch basin or similar facility? **(Correct Answer: Yes) (Question is about the respondent's practices.)**
1. Yes
  2. No
  3. Don't Know
  4. Refused

13. Grass clippings and leaves are not regarded as harmful in stormwater. **(Correct Answer: Disagree)**
14. Trees do little to reduce runoff into the stormwater drainage system. **(Correct Answer: Disagree)**
15. **[SKIP IF Q1=3 OR Q1>5]** In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
16. **[SKIP IF Q1=3 OR Q1>5]** When considering new plantings, I select plants that need less water, less fertilizer or less pesticide. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. **(Correct Answer: Disagree)**
18. Sediment in stormwater is natural and not regarded as pollution. **(Correct Answer: Disagree)**
19. Vegetation reduces stormwater pollution. **(Correct Answer: Agree)**

**[IF Q1>2 SKIP TO Q23]**

20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
21. In the last 12 months, my business has found it necessary to apply a pesticide or herbicide in quantities that may have exceeded the manufacturer's recommendation. **(Correct Answer: Disagree) (Question is about the respondent's practices.)**
22. My business tests the soil to determine if any fertilizer is needed before applying it. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain. **(Correct Answer: Disagree)**
24. **[ASK ONLY IF Q1=2 OR Q1=7]** My company disposes of all used carpet cleaning fluids in the sanitary sewer system or through an approved wastewater disposal facility. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
25. The best way to clean up spilled oil is to fully absorb it using kitty litter or absorbent pads and deposit this waste in a garbage can. **(Correct Answer: Agree)**

26. [ASK IF Q1<3 OR Q1=6] Scrubbing oil and grease spots on concrete or asphalt with soap and hosing it off is a good way to prevent polluting stormwater runoff. **(Correct Answer: Disagree)**
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
28. [ASK IF Q1<7 OR Q1>7] 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. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
29. All vehicles, mechanical parts and equipment stored outside are checked for leaks at least once a month. **(Correct Answer: Agree) (Question is about the respondent's practices.)**

**IF Q1>5 SKIP TO Q42**

30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains. **(Correct Answer: Disagree)**
31. Pervious concrete and asphalt can significantly reduce runoff from a site. **(Correct Answer: Agree)**
32. Flagstone and pavers are not effective methods for Low Impact Development. **(Correct Answer: Disagree)**
33. [ASK IF Q1<6] My business designs, builds, or maintains buildings so that water from downspouts is frequently directed to an area where it is absorbed by the ground. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
34. [ASK IF Q1<6] My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
35. [ASK IF Q1<6] Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater. **(Correct Answer: Agree) (Question is about the respondent's practices.)**
36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff. **(Correct Answer: Agree)**

**[IF Q1<3 OR Q1>5 SKIP TO Q42]**

37. How many certified erosion inspectors are employed by your business? **[RECORD NUMBER]**

38. Is the following statement True or False: Developments in Kelso and Longview adding over 5,000 square feet of new, impervious surface are required by law to implement stormwater flow and quality controls. **(Correct Answer: True)**

39. Which one of the following three methods is generally most desirable for controlling stormwater: **[READ 1-3] [ACCEPT ONLY ONE]**

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 **(Correct Answer: Agree)**
4. Need more information
5. Don't Know
6. Refused

40. An erosion control permit is often unnecessary for construction projects which disturb over 5,000 square feet of land. **[INFO: For construction projects in Kelso and Longview.] (Correct Answer: Disagree)**

41. My company rarely uses bio-infiltration strategies for handling runoff. **(Correct Answer: Disagree) (Question is about the respondent's practices.)**

#### **DEMOGRAPHICS**

42. What is your title?

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

*That concludes our survey. On behalf of the cities of Kelso and Longview, Diking Improvement District No. 1 and Cowlitz County, 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: \_\_\_\_\_