

*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

July, 2008

Prepared by:

Kenneth Klima, Research Director

Keith Everett, Senior Research Analyst

Hebert Research, Inc.
13629 NE Bel-Red Road
Bellevue, WA 98005
(425) 643-1337

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Hebert Research

Kenneth Klima, *Research Director*
Keith Everett, *Senior Research Analyst*

Goal

Research Goal:

The goal of this research is to measure the knowledge and practices regarding stormwater and pollution of the public, including businesses, in the Longview/Kelso area using a telephone survey. Following this baseline survey, the Permittees will engage in an education campaign to improve the knowledge and actions of the public related to improving stormwater quality. A second survey will be held in 2010 to assess improvements. Performing these telephone surveys is intended to satisfy some of the 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 to be covered 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" is defined as: Landscapers, Property Managers, Engineers, Developers, Contractors, Auto-Related businesses, and Carpet Cleaning businesses.

- ❖ 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 surveys were created, one for the general public and one for businesses. Survey questions were developed jointly by the PERMITTEES and Hebert Research. Questionnaires were designed to gather baseline information that can be compared to future results from a repeat administration of the survey. 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 fell into seven survey categories: auto-related, contractor, developer, engineer, landscaper, property manager, and carpet cleaner. A key aspect of surveying businesses is to assure, as much as possible, that the correct businesses were being included and irrelevant businesses were not being interviewed. It was discovered that business categories did not cleanly conform to the definitional survey categories of the Permit and it was necessary to screen and remove those that were unlikely to be directly involved with stormwater issues. To accomplish this, the following procedure was applied.

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 seven 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 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 we were interviewing respondents who faced key issues such as this, the combined list was then screened in the following way. A search of the company name 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 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 names were eliminated except Sharp Rentals.

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 questionnaire was read and a discussion was held regarding the objectives of the study, screening questions, skip patterns, and techniques for handling potential problems. Interviewers raised questions and provided their professional feedback regarding potential interviewing issues. All issues were resolved.

Pre-test the Survey

After the questionnaire was programmed in our CATI system, it was rigorously tested to assure skip patterns functioned properly and that data was accurately recorded. Thirteen surveys were conducted during the pretest. The programming was deemed to be valid.

Conduct Interviews

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

Monitoring

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

Internal Peer Review

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

Incidence and Response Rates, Margin of Error

General Public. A total of 390 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 88.0 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 40.7 percent. The maximum margin of error at 390 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 for each question.

Businesses. A total of 386 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 68.2 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. The maximum margin of error for 898 companies with 386 respondents is $\pm 3.8\%$. This margin of error means that if the survey were conducted 100 times, the resulting percents for each response would be within $\pm 3.8\%$ (the margin of error) in 95 out of the 100 cases for each question.

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 sample for the general public was representative of the population for the survey within the following critical parameters: gender and age.

Use of Findings

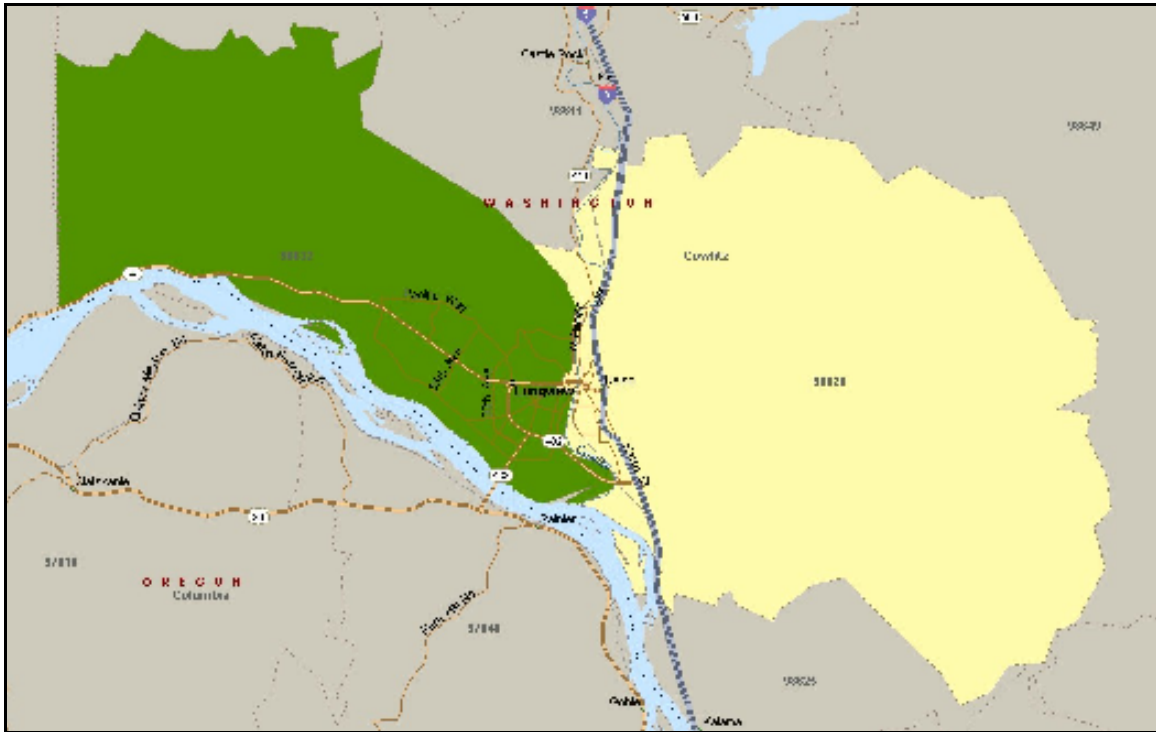
Hebert Research has made every effort to produce the highest quality research product within the agreed specifications, budget and schedule. The customer understands that Hebert Research uses those statistical techniques, which, in its opinion, are the most accurate possible. However, inherent in any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

the parameters of the project, and within the margin of error inherent in the techniques used.

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

Geographic Area Surveyed

The map below shows the geographic area covered by the Zip Codes (98632 for Longview and 98626 for Kelso) that defined the study population (colored in green and yellow).



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. 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. The percentages listed below are the weighted frequencies for all four demographics.

Residence	Percentage
House	91.8%
Apartment	7.3%
Condo	0.9%

Age	Percentage
18-24	11.9%
25 - 34	17.4%
35 - 44	20.4%
45 - 54	19.5%
55 - 64	12.3%
65 and Over	18.5%

Gender	Percentage
Male	48.6%
Female	51.4%

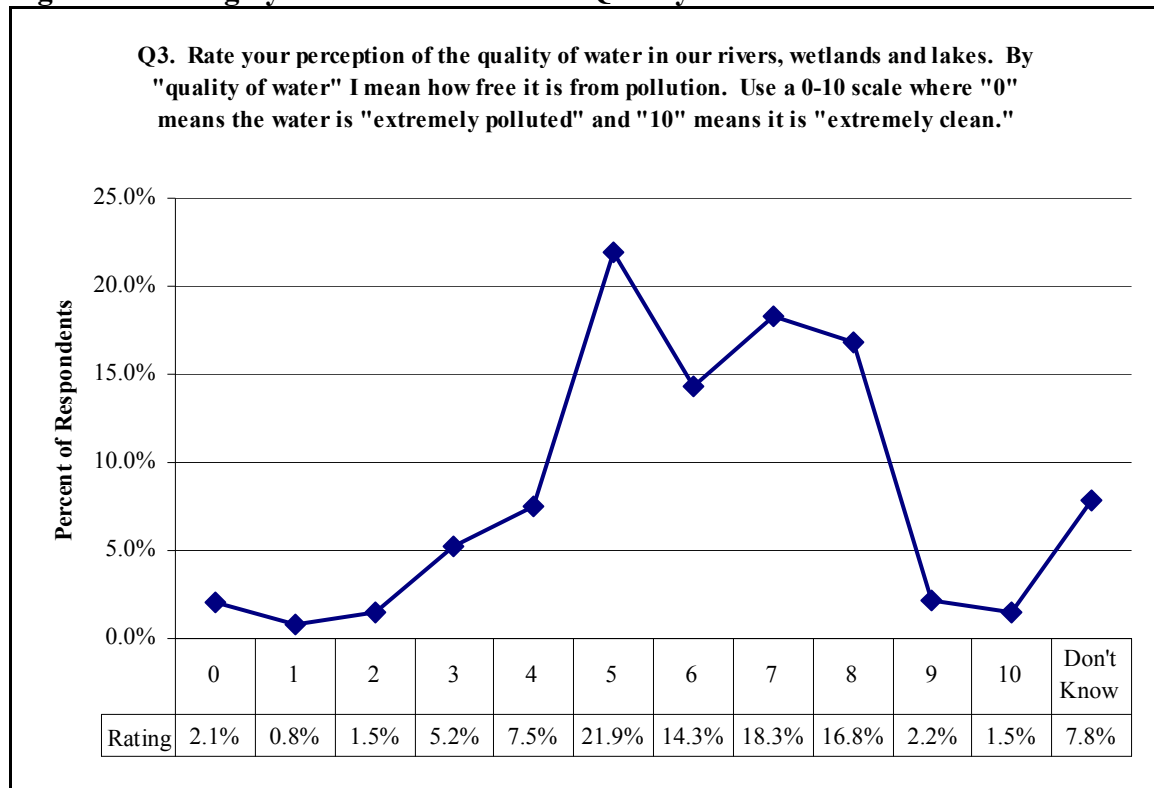
Residence - Zip Code	Percentage
98632	70.3%
98626	29.7%

Highly Variable Assessment of Water Quality in the Environment

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 leans toward seeing these waters as being clean, but on a very low level, or is uncertain regarding how polluted the waters are due to a mix of both positive and negative information they have been exposed to. The average rating of 5.89 is on the upper end of the middle range (5-6), a range that is between “polluted” and “clean.” The shape of the curve suggests a classic normal distribution of scores which is skewed to the right. 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.

The implication of this finding for education is that the public needs to be informed regarding the current levels of pollution in rivers, wetlands and lakes. Educational efforts should communicate 1) the current nature and severity of water pollution, 2) the vision of clean water in the future, 3) the many positive outcomes that will result from constructive public action, and 4) the helpful practices individuals can adopt to prevent polluting stormwater. The more real the public sees the problems and the benefits, the greater the response will be.

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



Related Multivariate Analysis Findings

Men rate the quality of water in our rivers, wetlands and lakes significantly higher than women ($p < .001$, Cramer's $V = .336$). [See blue-shaded area below.]

Gender	Rating										
	0	1	2	3	4	5	6	7	8	9	10
Male	2.8%	0.6%	1.1%	2.8%	4.0%	19.8%	13.0%	22.6%	27.1%	3.4%	2.8%
Female	1.6%	1.1%	1.6%	8.8%	12.6%	28.0%	18.1%	17.0%	9.3%	1.1%	0.5%

Areas of Greatest Educational Need

The main intent of the survey of the public is to establish a baseline of the public's knowledge and practices regarding stormwater and pollution. The survey tested the public's knowledge and practices regarding 32 key issues and the resulting data provides baseline data points against which to assess future improvement as a result of educational programming.

The percent of correct answers or practices regarding these issues spanned a very wide range from a low of 15.9% (the erroneous belief that biodegradable soap is safe in stormwater drains) to a high of 97.6% (for the practice of storing outdoor chemicals in a covered area). About a third of the questions were incorrectly answered by half of the respondents interviewed. This level of incorrect information and practice among respondents reinforces the need for education to improve the public's understanding and knowledge of their role in raising the quality of stormwater in the environment.

The priorities for education resulting from this research are divided into three levels based on the percent of the respondents who provided a correct answer—the lower the percent of correct answers given, the higher the priority for education.

- Priority 1: Less than 50% correct answers (Table 1, 11 issues)
- Priority 2: From 50 to 80% correct answers (Table 2, 11 issues)
- Priority 3: Over 80% correct answers (Table 3, 10 issues)

Priority 1 Issues: 50% or Less Correct Answers

Soap

The public shows the least awareness of correct practices involving soap of all the issues tested. Issues involving soap have the greatest potential for demonstrating improved community knowledge as a result of educational programming. Of the three questions involving soap in this category, two questions had the lowest number of correct responses. Educational programming should convey the following messages:

- *Biodegradable soap is not a safe addition to stormwater drains and should be kept from entering the stormwater drainage system.*
- *To best protect the environment, soapy water from washing 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.*
- *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.*

Related Multivariate Analysis Findings

Q19. *While both men and women show a very low level of awareness that biodegradable soap is not safe in stormwater drains, men show significantly less awareness than women ($p = .014$, Cramer's $V = .125$).*

Gender	Correct	Incorrect
Male	11.2%	88.8%
Female	20.3%	79.7%

Knowledge of the Stormwater Drainage System and Pollution Sources

Following “soap,” the next four lowest scoring issues dealt with the role of stormwater in polluting rivers, wetlands and lakes. Two out of three respondents (66.5%) were not aware that stormwater drains are not connected to the sanitary sewer system. Nearly six out of ten respondents (56.6%) did not know that the water in stormwater drains is not treated before being released into the environment. Six out of ten respondents (64.2%) did not know that stormwater runoff is the leading cause of water pollution and about six out of ten respondents (59.2%) did not know that individual human activity, not industrial dumping, is the primary cause of pollution in rivers, wetlands, and lakes.

Knowledge of how rivers, wetlands, and lakes become polluted by stormwater is an essential precursor to improving understanding, raising the desire to act responsibly, and bringing about behavioral change. Educational programming should convey the following messages:

- *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.*
- *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.*

Table 1. Priority 1 Issues for Public Education

Rank for Education	Question	n*	Correct	Incorrect		
				Incorrect	Need More Information	Don't Know
1	19. Biodegradable soap for washing cars is safe in stormwater drains.	390	15.9%	58.7%	15.6%	9.7%
2	20. When I wash a motor vehicle at home, the soapy water ends up in the street or in a ditch.**	390	26.7%	56.9%	0.5%	15.9%
3	5. Drains on city streets for stormwater are connected to the same sanitary sewer system used for treating human waste.	391	33.5%	28.4%	23.8%	14.3%
4	6. Stormwater runoff is the leading cause of pollution in rivers, wetlands or lakes.	391	35.8%	44.5%	14.3%	5.4%
5	9. Pollution in rivers, wetlands, or lakes is more the result of industrial dumping than individual human activity.	390	40.8%	37.9%	14.1%	7.2%
6	7. The water in street stormwater drains is treated before being discharged into the environment.	389	43.4%	21.3%	22.6%	12.6%
7	34. Flagstone or pavers offer no advantage over standard concrete or asphalt for reducing runoff.	388	43.6%	21.4%	22.7%	12.4%
8	23. Sediment in stormwater is natural and not regarded as pollution.	391	45.0%	18.2%	21.2%	15.6%
9	21. Grass clippings and leaves are not regarded as harmful in stormwater.	390	45.9%	32.8%	15.4%	5.9%
10	32. The best place to clean paint brushes is in a sink, not outdoors.	390	46.4%	31.5%	12.6%	9.5%
11	31. Carpet cleaning wastewater composed of only soap and dirt can be safely added to a stormwater drain.	391	49.4%	30.4%	12.3%	7.9%

*A sample size (n) over or under 390 resulted from the weighting process.

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

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.

Related Multivariate Analysis Findings

Q5. *Compared to women, men are significantly more aware that stormwater drains are not connected to the sanitary sewer system ($p < .001$, Cramer's $V = .292$).*

Gender	Correct	Incorrect
Male	47.9%	52.1%
Female	20.3%	79.7%

Q9. Men are significantly more aware than women that pollution in rivers, wetlands and lakes is more the result of individual human activity than industrial dumping ($p < .001$, Cramer's $V = .213$).

Gender	Correct	Incorrect
Male	51.6%	48.4%
Female	30.7%	69.3%

Q7. Men are significantly more aware than women that the water in street stormwater drains is not treated before being discharged into the environment ($p < .001$, Cramer's $V = .198$).

Gender	Correct	Incorrect
Male	55.3%	44.7%
Female	35.6%	64.4%

Actions to Prevent Polluting Stormwater

Issues regarding pavers, sediment, grass clippings, and paint brushes also showed relatively low awareness and a need for 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.*
- *The best place to clean paint brushes is in a sink that drains into the sanitary sewer system, not outdoors.*

Related Multivariate Analysis Findings

Q34. Compared to women, men are significantly more aware that flagstone or pavers offer advantages over standard concrete or asphalt for reducing runoff ($p = .007$, Cramer's $V = .137$).

Gender	Correct	Incorrect
Male	50.5%	49.5%
Female	37.1%	62.9%

Q23. Men are significantly more aware than women that sediment in stormwater is pollution ($p = .029$, Cramer's $V = .11$).

Gender	Correct	Incorrect
Male	51.6%	48.4%
Female	40.6%	59.4%

Priority 2 Issues: From 50-80% Correct Answers

While not as important as Priority 1 messages, improvement in Priority 2 areas retain importance in their ability to significantly reduce water pollution. One issue in this group—knowledge of what constitutes an *illicit discharge*—likely should be included in the Priority 1 category as a *key precursor* to responsible action. Almost half of the respondents (44.6%) did not know the correct definition of an *illicit discharge*. As a beginning point for positive action, knowing this definition will help individuals make better decisions regarding how to act when facing new decisions where stormwater is involved.

All Priority 2 questions are shown in Table 2 below. In order of importance, the following messages should be included in educational programming:

- *An illicit or illegal discharge is anything that enters a storm drain system that is not made up entirely of stormwater.*
- *A mulching lawnmower reduces the need for using fertilizer and, hence, represents a valuable method for eliminating fertilizer pollution in stormwater.*
- *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.*
- *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.*
- *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.*
- *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.*
- *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.*
- *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.*
- *Avoid over-watering a lawn or other landscaping to the point of creating runoff which can carry pollutants into the stormwater drainage system.*

Table 2. Priority 2 Issues for Public Education

Rank for Education	Question	n*	Correct	Incorrect		
				Incorrect	Need More Information	Don't Know
12	26. Using a mulching lawnmower does not reduce the need for fertilizers.	390	51.3%	24.6%	15.9%	8.2%
13	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.	390	55.4%	17.4%	14.6%	12.6%
14	22. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	389	59.1%	13.6%	17.0%	10.3%
15	24. When considering adding new plants on my property, I select plants that need less water, less fertilizer or less pesticide.**	325	67.7%	26.2%	3.4%	2.8%
16	8. Hard surfaces such as roads and driveways are not significant sources of pollution in stormwater.	389	69.2%	20.6%	6.2%	4.1%
17	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	69.7%	20.8%	6.7%	2.8%
18	33. At my home, water from my downspouts is directed to an area where it is absorbed by the ground.	280	70.0%	22.5%	4.3%	3.2%
19	12. Trees do little to reduce runoff into the stormwater drainage system.	389	71.2%	13.9%	7.5%	7.5%
20	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	71.5%	14.9%	5.6%	7.9%
21	25. Vegetation reduces stormwater pollution.	390	73.6%	10.5%	10.0%	5.9%
22	27. Runoff from overwatering a lawn can carry pollutants to a stormwater drain.	389	74.3%	16.7%	5.7%	3.3%

*An n over or under 390 resulted from the weighting process.

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

Related Multivariate Analysis Findings

Q26. Men are significantly more aware than women that a mulching lawnmower reduces the need for fertilizer ($p = .001$, Cramer's $V = .170$).

Gender	Correct	Incorrect
Male	64.2%	35.8%
Female	47.3%	52.7%

Q35. Men are significantly more aware than women that an illicit or unlawful discharge is primarily defined as anything that enters a storm drain system that is not made up entirely of stormwater ($p < .001$, Cramer's $V = .166$).

Gender	Correct	Incorrect
Male	67.0%	33.0%
Female	51.0%	49.0%

Q24. Compared to men, significantly more women select plants that need less water, less fertilizer or less pesticide ($p = .041$, Cramer's $V = .113$).

Gender	Correct	Incorrect
Male	62.3%	37.7%
Female	72.9%	27.1%

Q25. Both men and women are highly aware that vegetation reduces stormwater pollution, but men are significantly more aware than women ($p = .05$, Cramer's $V = .100$).

Gender	Correct	Incorrect
Male	78.2%	21.8%
Female	69.8%	30.2%

Priority 3 Issues: Higher than 80% Correct Answers

Of the ten questions in Priority 3, seven questions asked respondents about their practices and three questions concerned their knowledge. All questions in this level are shown in Table 3.

Knowledge

Of the knowledge questions, the following showed the highest percent of respondents giving the correct answer of all knowledge questions asked. Hence, the need for education in these knowledge areas is, overall, the lowest relative to all the knowledge issues tested. Two out of ten respondents were unaware of the following:

- *Hard surfaces generate more runoff than natural areas.* This issue can be addressed when presenting information regarding one Priority 1 issue (use of flagstone or pavers) and one Priority 2 issue (hard surfaces are significant sources of pollution). Educational messages specific to this issue alone are not recommended.
- *Stormwater runoff ends up in rivers, wetlands and lakes.* While most respondents know where stormwater eventually ends up, many still believe it is treated or may be treated in some way even though they do not know how. Introducing the points that 1) stormwater becomes our rivers, wetlands, and lakes, 2) stormwater is not treated and 3) individual human activity is the major source of stormwater pollution will help people to understand the need for their active help if water pollution is to be reduced.
- *Pet waste is a source of bacteria in stormwater.* This is an important point in educational messages. More than two out of every three respondents (67.4%) indicated this question applied to their life (meaning they took their pet outside) and of that group, two out of ten were not aware of the pollution threat posed by pet waste. This amounts to 11.8% of the population as a whole who are unaware that pet waste left outdoors is a source of bacteria in stormwater.

Table 3. Priority 3 Issues for Public Education

Rank for Education	Question	n*	Correct	Incorrect		
				Incorrect	Need More Information	Don't Know
23	18. My household recycles all used motor oil.**	334	80.5%	15.9%	1.8%	1.8%
24	10. Hard surfaces generate significantly more stormwater runoff than natural areas.	391	80.8%	6.1%	7.9%	5.1%
25	4. Stormwater runoff ends up in rivers, wetlands or lakes.	390	81.3%	6.9%	6.9%	4.9%
26	13. Pet waste is not a source of bacteria in stormwater runoff.	390	81.5%	9.0%	5.4%	4.1%
27	11. When I am outside with my pet, I always pick up my pet's waste.	263	82.5%	15.6%	1.1%	0.8%
28	30. In the last 12 months, I applied a pesticide or a herbicide in quantities that may have exceeded the manufacturer's recommendation.	346	86.7%	10.7%	0.9%	1.7%
29	16. If my car or truck is dripping oil, I make sure the leak is fixed within three weeks.	360	86.9%	11.7%	0.6%	0.8%
30	17. My household's auto or truck parts with oil or grease on them are stored under a roof or cover.	315	89.5%	8.6%	0.6%	1.3%
31	29. When I apply fertilizer, I strictly follow the label directions for how often and how much to apply.	307	92.5%	5.5%	0.3%	1.6%
32	28. My household stores all outdoor chemicals inside a building or in a covered area out of the rain.	372	97.6%	1.6%	0.8%	0.0%

*An n over or under 390 resulted from the weighting process.

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

Related Multivariate Analysis Findings

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 ($p = .006$, Cramer's $V = .14$).

Gender	Correct	Incorrect
Male	86.7%	13.3%
Female	75.7%	24.3%

Practices

A relatively high percent of respondents (over 80%) gave the correct responses to seven questions in this category regarding their practices. This suggests that high compliance with recommended action is already taking place. Given the nature of the items tested, however, improvement in these practices is still desirable and should remain a goal in the following areas:

- Recycling used motor oil.
- Picking up pet waste when outside.
- Applying pesticides or herbicides at recommended rates.

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

The one area where full compliance may be claimed (97.5% compliance) and improvement will be difficult is:

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

Related Multivariate Analysis Findings

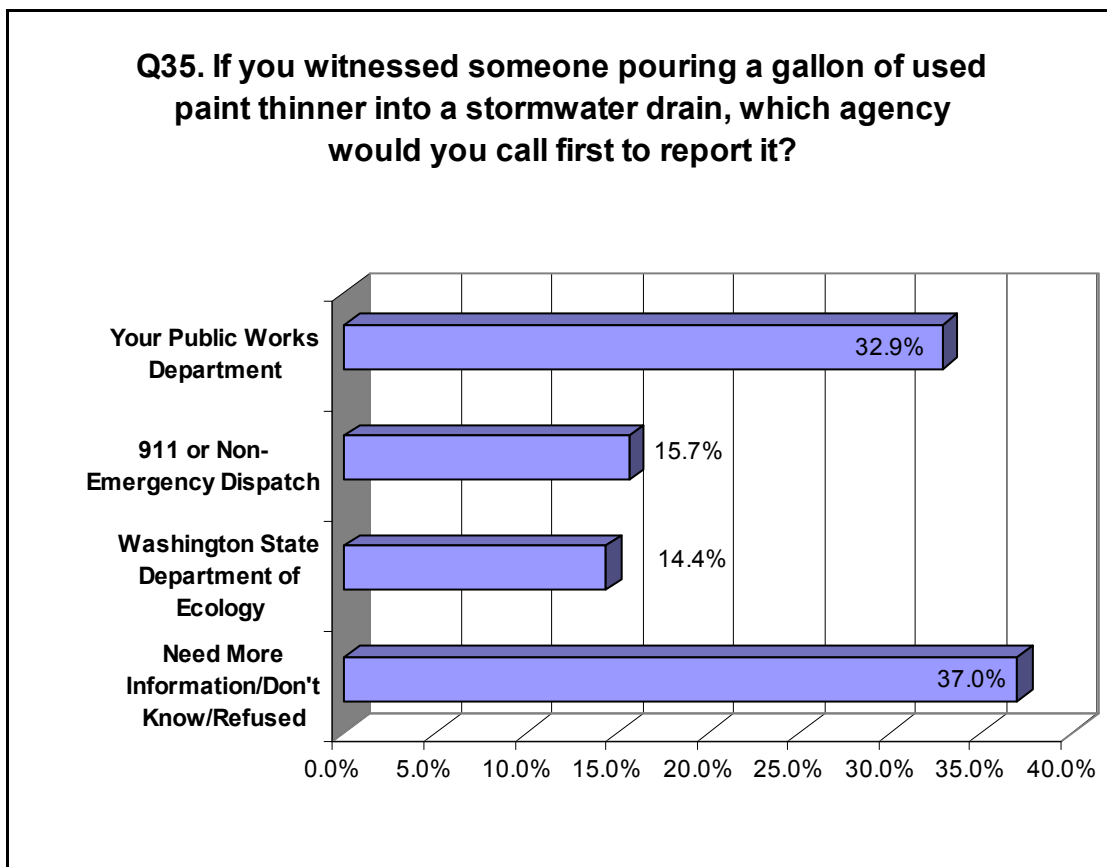
Q11. *Both men and women pick up pet waste to a high degree when outside, but significantly more women than men always pick up pet waste ($p = .02$, Cramer's $V = .141$).*

Gender	Correct	Incorrect
Male	77.0%	23.0%
Female	87.7%	12.3%

Reporting an Illicit Discharge

To report an illicit discharge, the respondents would call a variety of agencies with most respondents calling their Public Works Department (32.9%). With this dispersion of responses and the fact that nearly four out of ten respondents (37.0%) said they needed more information or did not know who to call, it is apparent that a good deal of public education is needed if illicit discharges are to be reported to the proper agency.

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



Key Businesses Survey

Businesses: Respondent Profile

The following tables describe the demographic profile of the business sample.

Respondents by Gender	
Male	74.4%
Female	25.6%
Total	100.0%

Respondents by Location	
Longview	59.3%
Kelso	34.2%
Other	6.5%
Total	100.0%

Respondents by Business	
Landscaper	4.4%
Property Manager	2.8%
Engineer	6.2%
Developer	0.5%
Contractor	30.6%
Auto	17.4%
Carpet Cleaning	0.8%
Other	37.3%
Total	100.0%

Zip Codes
97053
97210
97220
97282
98401
98591
98612
98626
98629
98632
98684

Respondents by Title	
Owner	46.1%
Manager	10.7%
President	8.6%
Office Manager	4.2%
Co-Owner	3.4%
Vice President	2.6%
General Manager	2.4%
Project Manager	1.8%
Service Advisor / Manager	1.3%
Assistant Manager	1.0%
Secretary	0.8%
Administrative Assistant	0.5%
Director of Operations	0.5%
Engineer	0.5%
Environmental Manager	0.5%
Former Owner	0.5%
HR Manager	0.5%
Operations Manager	0.5%
Plant Manager	0.5%
Project Engineer	0.5%
Branch Manager	0.3%
Business Manager	0.3%
Buyer	0.3%
CEO	0.3%
Construction Manager	0.3%
Controller	0.3%
Courier	0.3%
Director of Environmental Engineering	0.3%
Director of Human Resources	0.3%
Director of Marketing	0.3%
Dispatcher	0.3%
EHS Manager	0.3%
Environmental Coordinator	0.3%
Environmental Director	0.3%

Environmental Program Manager	0.3%
Environmental Supervisor	0.3%
Executive Assistant	0.3%
Executive Director	0.3%
Fleet Manager	0.3%
Founder	0.3%
Installer	0.3%
Job Superintendent	0.3%
Kitchen Employee	0.3%
Landscaper	0.3%
Landscaping Maintenance	0.3%
Lead Cook	0.3%
Loss Control Manager	0.3%
Owner's Wife	0.3%
Partner	0.3%
Personnel Director	0.3%
Principal in Charge of Engineering	0.3%
Production Team Leader	0.3%
Program Manager	0.3%
Project Coordinator	0.3%
Property Manager	0.3%
Quality Control	0.3%
Restaurant Manager	0.3%
Safety Director	0.3%
Shop Superintendant.	0.3%
Store Manager	0.3%
Team Leader	0.3%
Technical Services Supervisor	0.3%
Terminal Manager	0.3%
Treasurer	0.3%
Waitress	0.3%
Water Resources Engineer	0.3%
Yard Worker	0.3%
Total	100.0%

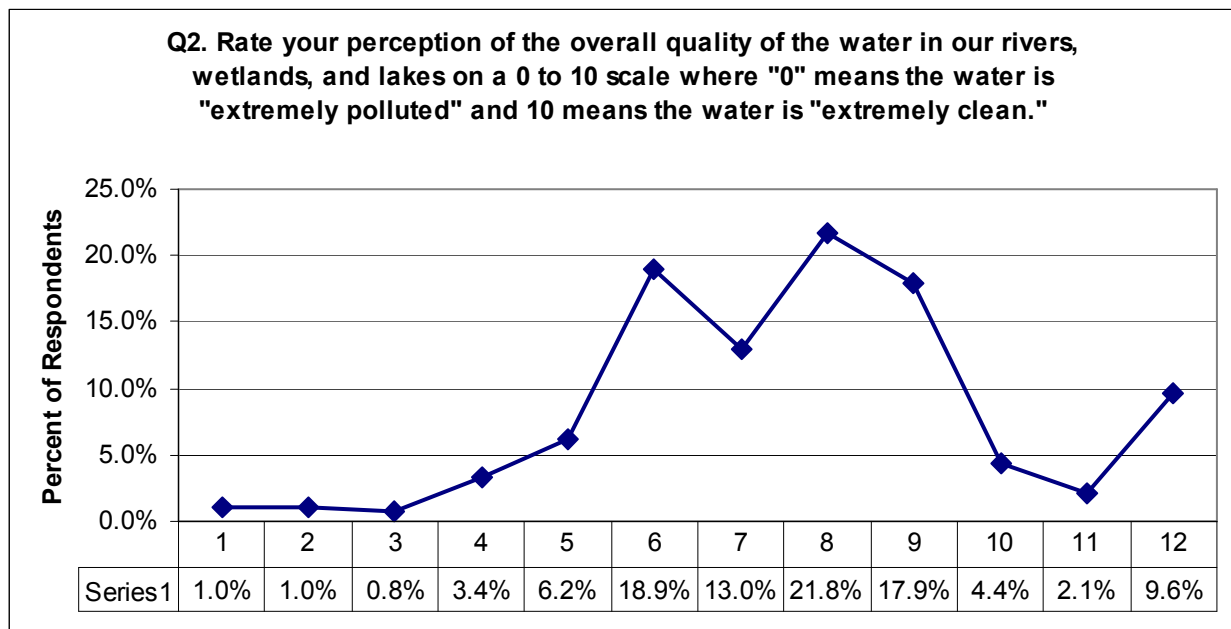
Businesses: Variable Assessment of Water Quality in the Area

All Respondents

Similar to the results for the general public, respondents did not regard the water in rivers, watersheds and lakes as “extremely clean” (meaning free from pollution) nor “extremely polluted.” The average rating of 6.7 is a high moderate rating which is nearly one point higher the rating given by the public (5.89). Businesses see water quality as higher than the public sees it. The overall shape of the curve suggests the classic normal distribution of scores which is skewed even more to the right than for the general public. This finding suggests that businesses possess a mix of good and bad information or that respondents guessed at an answer but guessed more positively.

As in the case of the general public, businesses also need to be informed regarding 1) the current nature and severity of water pollution, 2) the vision of clean water in the future, 3) the myriad positive outcomes that will be realized from constructive action, and 4) the helpful practices each business can implement to prevent polluting stormwater.

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



Businesses: 50% or Less Correct Answers

All business categories shared a general consistency in their lack of knowledge and detrimental practices. Table 4 shows ten issues where 50% or fewer respondents provided the correct answer. The table is color coded to reveal which questions showed the lowest percent of correct answers in each business category. A cell in bright green means, the category gave the least correct responses, steel blue the second least and yellow under 50% correct. Questions in blue are “practice” questions. The table shows a similar pattern of low correct answers across all business categories receiving a question. The same educational programming is applicable to all relevant businesses.

**Color Scheme
for % Correct
Answers**

Lowest
2nd Lowest
≤50% Correct

Table 4: Priority 1 Issues for Business Education

Rank for Educ.	Question	n*	% Correct Answers by Business Category					Total
			Landscaper, Property Manager	Engineer, Developer, Contractor	Auto	Carpet Cleaner	Other	
			n = 28	n = 144	n = 67	n = 3	n = 144	
1	30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	172	17.9%	25.0%				23.8%
2	32. Flagstone and pavers are not effective methods for Low Impact Development.	172	28.6%	35.4%				34.3%
3	7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	352	32.0%	29.8%	33.8%	33.3%	41.5%	35.2%
4	8. We always wash our company vehicles in a car wash.	299	50.0%	34.4%	36.1%	0.0%	47.2%	39.5%
5	4. The water in street stormwater drains is treated before being discharged into the environment.	386	25.0%	43.1%	34.3%	33.3%	41.7%	39.6%
6	18. Sediment in stormwater is natural and not regarded as pollution.	381	46.4%	45.8%	25.4%	0.0%	41.0%	40.2%
7	10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	381	53.6%	46.5%	38.8%	66.7%	37.5%	42.5%
8	22. My business tests the soil to determine if any fertilizer is needed before applying it.	16	43.8%					43.8%
9	5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	386	46.4%	47.9%	34.3%	66.7%	46.5%	45.1%
10	13. Grass clippings and leaves are not regarded as harmful in stormwater.	386	71.4%	49.3%	37.3%	33.3%	44.4%	46.9%

*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;*
- *The need to prevent wash or wastewater from flowing into a parking lot, alley, street or ditch;*
- *The value of washing vehicles in a car wash as a way of reducing pollution;*
- *The fact that stormwater is not treated before being discharged into the environment;*
- *The detrimental effects in stormwater from sediment, soap, grass and leaves;*
- *The importance of testing the soil before adding fertilizer;*
- *The reality that human activity is the main source of pollution in rivers, wetlands and lakes.*

Businesses: From 50-80% Correct Answers

Eighteen of the 35 issues tested are included in this category. Priority 2 issues show a moderate to a high level of the desired knowledge and practice across target businesses. Table 5 summarizes the findings and provides some useful insights into the knowledge possessed by businesses and their practices and where education is needed:

- Less than half of the Landscapers and Property Managers interviewed knew the value of pervious concrete and asphalt or understood how best to clean up spilled oil. Also, less than half have amended the soil on a project in the last 24 months to improve infiltration. About half did not know that trees help to reduce runoff.

Table 5: Priority 2 Issues for Business Education

Rank for Educ.	Question	n*	% Correct Answers by Business Category					Total
			Landscaper, Property Manager	Engineer, Developer, Contractor	Auto	Carpet Cleaner	Other	
			n = 28	n = 144	n = 67	n = 3	n = 144	
11	31. Pervious concrete and asphalt can significantly reduce runoff from a site.	172	46.4%	52.1%				51.2%
12	39. Which one of the following three methods is generally most desirable for controlling stormwater?	144		51.4%				51.4%
13	40. An erosion control permit is often unnecessary for construction projects which disturb over 5,000 square feet of land.	144		52.1%				52.1%
14	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		52.8%				52.8%
15	41. My company rarely uses bio-infiltration strategies for handling runoff.	91		56.0%				56.0%
16	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	46.4%	57.6%	59.7%	33.3%	62.5%	58.8%
17	35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.	95	47.1%	62.8%				60.0%
18	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	53.6%	62.5%	59.7%	100%	63.9%	62.2%

*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.

- About a third to half of all business categories, except Carpet Cleaners, are unaware of the definition of an illicit discharge.
- About half of the Engineer, Developer and Contractor group do not know the value of pervious concrete and asphalt, that infiltration is the most desirable way to control stormwater, that erosion control permits are necessary when over 5,000 square feet of land is disturbed, that stormwater flow and quality controls are needed when adding over 5,000 square feet of impervious surface, nor the best way to clean up spilled oil. Additionally, about half reported rarely using bio-infiltration to handle runoff.
- Four out of ten Auto businesses did not know the best way to clean up spilled oil and allowed wash or wastewater to flow into a parking lot, alley, street or ditch.
- About half of the “Other” businesses interviewed also allowed wash or wastewater to flow into a parking lot, alley, street or ditch. About four out of every ten “Other” businesses did not understand how best to clean up spilled oil.

Table 5: Priority 2 Issues for Business Education Cont’d

Rank for Educ.	Question	n*	% Correct Answers by Business Category					Total
			Landscaper, Property Manager	Engineer, Developer, Contractor	Auto	Carpet Cleaner	Other	
			n = 28	n = 144	n = 67	n = 3	n = 144	
19	14. Trees do little to reduce runoff into the stormwater drainage system.	386	53.6%	73.6%	58.2%	100%	62.5%	65.5%
20	23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	386	78.6%	66.7%	53.7%	66.7%	70.8%	66.8%
21	17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	386	89.3%	70.1%	61.2%	66.7%	68.8%	69.4%
22	34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.	94	68.2%	72.2%				71.3%
23	15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.	79	78.9%	71.7% (Developer & Contractor)				73.4%
24	16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.	90	80.0%	72.9% (Developer & Contractor)				74.4%
25	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	85.7%	76.4%				77.9%
26	pollution.	386	67.9%	82.6%	74.6%	100%	77.1%	78.2%
27	36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	172	85.7%	78.5%				79.7%

*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 eight questions in Priority 3, seven involved practices and one concerned knowledge. While this suggests a relatively high compliance rate with desired practice, the goal remains full compliance.

The results in Table 6 reveal the following insights:

- About 20% of respondents were not checking stored equipment monthly for leaks, were not fixing vehicle oil leaks in a timely fashion, and were not storing potentially hazardous material in a covered area.
- About 20% of Landscapers, Property Managers, and Auto businesses were unaware of the proper methods for cleaning oil and grease spots on concrete and asphalt.
- About 20% of Property Managers may be improperly disposing of used carpet cleaning fluids.

Table 6: Priority 3 Issues for Business Education

Rank for Educ.	Question	n*	% Correct Answers by Business Category					Total
			Landscaper, Property Manager	Engineer, Developer, Contractor	Auto	Carpet Cleaner	Other	
			n = 28	n = 144	n = 67	n = 3	n = 144	
28	29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.**	247	94.4%	80.2%	83.3%	100%	77.3%	81.4%
29	27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	306	91.7%	82.3%	78.3%	100%	81.1%	82.0%
30	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	78.6%		83.6%			82.1%
31	28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	203	92.3%	85.4%	90.4%		83.9%	86.7%
32	24. My company disposes of all used carpet cleaning fluids in the sanitary sewer system or through an approved wastewater	8	80.0% (PM Only)			100%		87.5%
33	9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	343	95.5%	96.7%	100%	100%	96.2%	97.1%
34	20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application.	18	100%					100%
35	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	100%					100%

*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: Stormwater Facility Inspections

All Respondents

Eliminating businesses who did not have a stormwater pond, catch basin or similar facility, a little less than half of the remaining respondents (45.7%, n = 90 out of 197 respondents) knew their facility had been inspected within the last 12 months. The high majority of businesses (81.9%) knew enough about this type of facility to provide a clear answer regarding its existence or its record of inspection. About one in every five businesses (18.1%) knew nothing about this type of facility.

Table 7. Yearly Inspection of Retention Pond or Similar Facility

Question	n*	% Desired Answers by Business Category					Total
		Landscaper, Property Manager	Engineer, Developer, Contractor	Auto	Carpet Cleaner	Other	
		n = 28	n = 144	n = 67	n = 3	n = 144	
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?***	386	16.7%	39.0%	54.5%	0.0%	50.6%	45.7%
Yes		2	23	24		41	90
No		3	15	7	1	11	37
Do not know what these facilities are		2	4	6		13	25
Do not have such a facility at the business		16	85	23	2	63	189
Don't Know/Refused		5	17	7		16	45
Total		28	144	67	3	144	386

*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 (32.9% of all respondents, n = 127), less than half (45.7%, n = 58) knew that written maintenance plan existed for their facility.

Table 8. Existence of a Maintenance Plan for Stormwater Facilities

Question	n*	% "Yes" Answers by Business Category					
		Landscaper, Property Manager	Engineer, Developer, Contractor	Auto	Carpet Cleaner	Other	Total
		n = 28	n = 144	n = 67	n = 3	n = 144	
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?***	127	0.0%	39.5%	38.7%	0.0%	59.6%	45.7%
Yes		0	15	12		31	58
No		3	14	10	1	10	38
Don't Know/Refused		2	9	9		11	31
Total		5	38	31	1	52	127

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

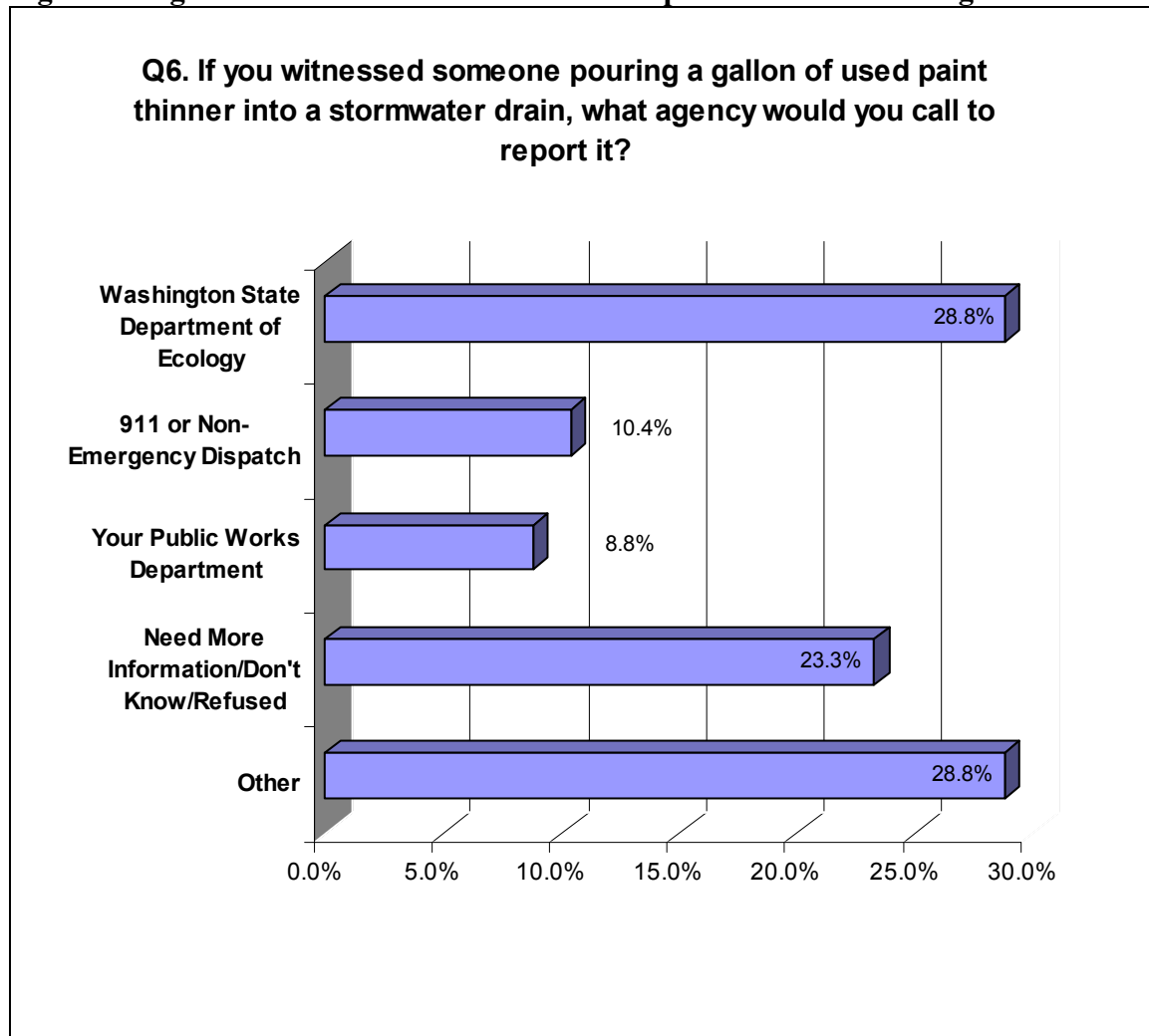
***Businesses that said their facility was or was not inspected received this question. All other respondents did not receive the question.

Businesses: Reporting an Illicit Discharge

All Respondents

To report an illicit discharge, businesses would contact a variety of agencies with most respondents calling the Washington State Department of Ecology (28.8%). No respondents mentioned the PCS Hotline (the intended future recipient of calls). As in the findings for the general public, education with businesses is greatly needed if illicit discharges are to be reported to the proper agency.

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



“Other” Responses:

- *EPA (27)*
- *Police Department (16)*
- *Health Department (8)*

- *City of Longview or Kelso (6)*
- *The City or City Hall (6)*
- *County Agency (5)*
- *Sheriff (3)*
- *Fire Department (3)*
- *Department of Natural Resources (2)*
- *I'd look up Water Quality Board or something in the yellow pages.*
- *Local environmental agency*
- *The city department for my water bill.*
- *The Department of Ecology.*
- *Waste control.*
- *Cowlitz County Environmental Health.*
- *Department of Stormwater and Sewer.*
- *I would consider calling all of them.*
- *I would report the incident to the municipal corporation that administers the system.*
- *City Nuisance Abatement Officer.*
- *Department of Environmental Quality.*
- *Environmental agency - don't know the name of it.*
- *Poison control or waste control.*
- *Southwest Air Pollution people.*
- *The Abatement Office of Longview.*
- *Water resources.*
- *Environmental agency or health department.*
- *Maybe the environmental. I would imagine someplace within the city limits.*
- *Water treatment department.*
- *A pollution control number in the phonebook.*
- *City Stormwater.*
- *Department of Environmental Quality.*
- *EPA or local or statewide environmental protection.*
- *Property owner or the city.*
- *The "clean air agency".*
- *Water treatment plant.*
- *Wouldn't report.*

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

Of the 118 contractors that took part in the survey, 28 reported having from one to twenty certified erosion inspectors on staff. Of the 24 engineering businesses that participated in the survey, only four of the firms reported having between two and five certified erosion inspectors on staff. Table 9 shows the percent of businesses surveyed (e.g., contractors) who have inspectors and the number inspectors employed by these firms (in parenthesis).

Table 9. Erosion Control Inspectors by Business Category

Business Category	n	Have at Least One Inspector	Number of Inspectors Employed							
			1	2	3	4	5	6	12	20
Contractors	118	23.7% (28)	12.7% (15)	4.2% (5)	1.7% (2)	0.9% (1)		2.5% (3)	0.9% (1)	0.9% (1)
Engineers	24	16.7% (4)		4.2% (1)	4.2% (1)		8.3% (2)			
Developers	2	0% (0)								

Conclusions and Recommendations

General Public

It is clear that the public does not regard the water in rivers, watersheds and lakes as “extremely clean” (meaning free from pollution) nor “extremely polluted.” The distribution of opinions suggests either a tendency to think of these waters as being clean (at a very low level), or uncertainty regarding how polluted they are due to a mix of both positive and negative information.

The public shows a highly variable level of knowledge regarding key issues for controlling stormwater pollution which substantiates the need for public education programming.

The public needs to be better informed regarding the current levels of pollution in rivers, wetlands and lakes. Educational programming should first highlight the critical nature of pollution in these waters and their negative or destructive outcomes to raise the public’s consciousness and motivate action. Second, programming should help to establish a common vision of pollution-free rivers, wetlands and lakes which is the goal to be achieved. Third, the direct and indirect positive outcomes of maintaining pristine rivers, wetlands and lakes should be highlighted—these are all the good things that will result. Fourth, the means of achieving these outcomes—meaning the helpful practices individuals can implement—need to be presented in a way that is interesting, immediately understandable and memorable.

The public is least aware of the correct response to Priority 1 issues. Therefore, these issues represent the greatest need for educational programming and the areas where success in improving the public’s knowledge and subsequent action can be most directly documented.

Following an elucidation and establishment of the problem, and to lay a foundation for responsible public action, educational messaging should communicate the following Priority 1 issues:

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

These messages should be included in virtually all educational messaging to help establish the concept that everyone is responsible for reducing pollution in rivers, wetlands and lakes.

The remaining Priority 1 issues that should receive major emphasis in educational activities include soap, pervious surfaces, sediment, grass clippings and leaves, and the cleaning of paint brushes.

Priority 2 issues should receive the second highest emphasis in educational messaging which emphasizes proper action and the reason why the action represents responsible behavior. State Priority 2 behaviors as examples of the four foundation issues mentioned above.

The public shows the highest level of correct knowledge regarding Priority 3 issues and is already correctly engaging in the activities tested to a high degree which helps to prevent polluting stormwater. Still, these issues represent pollution threats and should be included in educational programming. As points of emphasis, issues dealing with used motor oil, auto and truck parts, the application of pesticides or herbicides and the proper disposal of pet waste should be highlighted since these involve potentially high frequency behaviors and, therefore, have the potential of contributing substantially to decreasing pollution.

Businesses

Similar to the results for the general public, businesses do not regard the water in rivers, watersheds and lakes as either “extremely clean” nor “extremely polluted” but found it to be cleaner than the general public. The distribution of ratings suggests that businesses see water quality in a way similar to the public but with a view that the quality is a little higher.

Businesses showed highly variable levels of correct information and desirable practices which, as in the case of the general public, substantiates the need for education.

The top ten (Priority 1) issues, about which businesses as a whole possessed the least correct information or engaged in the lowest level of desirable practices, represent the key areas for education. Given the fact that a similar need was shown for the same issues for most of the businesses, the same educational programming regarding these issues should prove to be equally valuable for many if not all businesses. While Landscapers, Property Managers, Engineers, Developers and Contractors showed a very high understanding that improving infiltration is a key principle for reducing runoff, they showed very low recognition of this practice in relation to the term *Low Impact Development*.

Among the Priority 2 issues for education, the top six with the greatest need directly involve the construction industry and three of these issues concern knowledge and practices regarding infiltration. Information regarding the importance and methods for

improving infiltration should be emphasized in educational programming. This same information should be focused on Landscapers and Property Managers.

The Priority 3 issues of greatest importance involve where vehicles are being stored, how frequently they are checked for leakage and having oil leaks promptly fixed plus the safe process of cleaning up oil and grease spots on concrete and asphalt. Even though these topics are in the lowest priority category, they represent a particularly troublesome set of issues. A level of 20% non-compliance is too high and education should focus on reducing it.

Of the companies that knew a stormwater facility existed at their business, only half reported that the facility was checked for maintenance needs within the last 12 months. Only half of that subgroup knew that a written maintenance plan existed for the facility. Clearly, more education is needed to assure the maintenance on these facilities is kept up-to-date.

A small percent of businesses in the Contractor, Developer and Engineer business category employ erosion control inspectors with only 11.8% employing more than one.

Overall

The survey results provide a valid assessment of the knowledge about stormwater issues and the degree to which desirable practices were being engaged in by the general public and key businesses in the Longview/Kelso area. This data will serve well as a guide to prioritizing educational programming and as baseline information which can be compared to a second administration of the surveys in 2010 to assess progress in efforts to reduce stormwater pollution.

Responses by Industry Category

Summary of Responses: Landscapers	
Overall Water Quality Rating	
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.”	5.8
Right / Wrong Questions	%Correct
30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	5.9%
4. The water in street stormwater drains is treated before being discharged into the environment.	17.6%
32. Flagstone and pavers are not effective methods for Low Impact Development.	29.4%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	35.3%
31. Pervious concrete and asphalt can significantly reduce runoff from a site.	35.3%
18. Sediment in stormwater is natural and not regarded as pollution.	41.2%
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.	41.2%
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	43.8%
8. We always wash our company vehicles in a car wash.	50.0%
22. My business tests the soil to determine if any fertilizer is needed before applying it.	50.0%
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.	52.9%
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	52.9%
14. Trees do little to reduce runoff into the stormwater drainage system.	52.9%
34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.	64.3%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	64.7%
19. Vegetation reduces stormwater pollution.	64.7%
35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.	66.7%
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.	78.6%

23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	82.4%
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.	82.4%
36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	82.3%
15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.	83.3%
16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.	84.6%
28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	90.0%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	93.3%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	93.3%
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	94.1%
20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application.	100%
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?	100%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	100%
Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	3
Your Public Works Department	
911 or Non-Emergency Dispatch, (360) 577-3098	3
NMI	
Other [Specify]	5
Don't Know	6
Refused	
Total	17

11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	
No	3
Do not know what these facilities are	2
Do not have such a facility at the business	10
Don't Know	2
Refused	
Total	17
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	
No	3
Don't Know	
Total	3
37. How many certified erosion inspectors are employed by your business?	

Summary of Responses: Property Management	
Overall Water Quality Rating	
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.”	5.8
Right / Wrong Questions	%Correct
35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.	0.0%
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	11.1%
22. My business tests the soil to determine if any fertilizer is needed before applying it.	25.0%
32. Flagstone and pavers are not effective methods for Low Impact Development.	27.3%
4. The water in street stormwater drains is treated before being discharged into the environment.	36.4%
30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	36.4%
8. We always wash our company vehicles in a car wash.	50.0%
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.	54.5%
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	54.5%
14. Trees do little to reduce runoff into the stormwater drainage system.	54.5%
18. Sediment in stormwater is natural and not regarded as pollution.	54.5%
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.	54.5%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	63.6%
31. Pervious concrete and asphalt can significantly reduce runoff from a site.	63.6%
15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.	71.4%
16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.	71.4%
19. Vegetation reduces stormwater pollution.	72.7%
23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	72.7%
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.	72.7%

34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.	75.0%
24. My company disposes of all used carpet cleaning fluids in the sanitary sewer system or through an approved wastewater disposal facility.	80.0%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	81.8%
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	81.8%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	83.3%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	88.9%
36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	90.9%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	100%
20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application.	100%
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?	100%
28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	100%
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.	100%
Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	2
Your Public Works Department	3
911 or Non-Emergency Dispatch, (360) 577-3098	
NMI	
Other [Specify]	5
Don't Know	1
Refused	
Total	11

11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	2
No	
Do not know what these facilities are	
Do not have such a facility at the business	6
Don't Know	3
Refused	
Total	11
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	
No	
Don't Know	2
Total	2
37. How many certified erosion inspectors are employed by your business?	

Summary of Responses: Engineers	
Overall Water Quality Rating	
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.”	7.1
Right / Wrong Questions	% Correct
30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	41.7%
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	45.0%
35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.	47.1%
4. The water in street stormwater drains is treated before being discharged into the environment.	50.0%
32. Flagstone and pavers are not effective methods for Low Impact Development.	54.2%
40. An erosion control permit is often unnecessary for construction projects which disturb over 5,000 square feet of land.	54.2%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	62.5%
39. Which one of the following three methods is generally most desirable for controlling stormwater?	62.5%
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.	66.7%
31. Pervious concrete and asphalt can significantly reduce runoff from a site.	66.7%
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.	66.7%
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.	70.8%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	70.8%
41. My company rarely uses bio-infiltration strategies for handling runoff.	72.2%
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	75.0%
28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	75.0%
8. We always wash our company vehicles in a car wash.	76.9%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	78.6%
18. Sediment in stormwater is natural and not regarded as pollution.	79.2%

23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	79.2%
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.	79.2%
34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.	81.3%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	81.8%
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	83.3%
19. Vegetation reduces stormwater pollution.	87.5%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	88.9%
14. Trees do little to reduce runoff into the stormwater drainage system.	91.7%
36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	100%
Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	11
Your Public Works Department	3
911 or Non-Emergency Dispatch, (360) 577-3098	
NMI	2
Other [Specify]	5
Don't Know	3
Refused	
Total	24

11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	9
No	1
Do not know what these facilities are	1
Do not have such a facility at the business	11
Don't Know	2
Refused	
Total	24
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	4
No	2
Don't Know	4
Total	10
37. How many certified erosion inspectors are employed by your business?	0.625

Summary of Responses: Designers	
Overall Water Quality Rating	
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.”	7.5
Right / Wrong Questions	% Correct
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	0.0%
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.	0.0%
39. Which one of the following three methods is generally most desirable for controlling stormwater?	0.0%
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.	50.0%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	50.0%
8. We always wash our company vehicles in a car wash.	50.0%
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	50.0%
14. Trees do little to reduce runoff into the stormwater drainage system.	50.0%
16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.	50.0%
18. Sediment in stormwater is natural and not regarded as pollution.	50.0%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	50.0%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	50.0%
30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	50.0%
32. Flagstone and pavers are not effective methods for Low Impact Development.	50.0%
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.	50.0%
34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.	50.0%
40. An erosion control permit is often unnecessary for construction projects which disturb over 5,000 square feet of land.	50.0%
41. My company rarely uses bio-infiltration strategies for handling runoff.	50.0%

4. The water in street stormwater drains is treated before being discharged into the environment.	100.0%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	100.0%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	100.0%
15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.	100%
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	100%
19. Vegetation reduces stormwater pollution.	100%
23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	100%
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.	100%
28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	100.0%
31. Pervious concrete and asphalt can significantly reduce runoff from a site.	100%
35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.	100%
36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	100%
Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	
Your Public Works Department	
911 or Non-Emergency Dispatch, (360) 577-3098	
NMI	1
Other [Specify]	
Don't Know	1
Refused	
Total	2

11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	2
No	
Do not know what these facilities are	
Do not have such a facility at the business	
Don't Know	
Refused	
Total	2
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	2
No	
Don't Know	
Total	2
37. How many certified erosion inspectors are employed by your business?	

Summary of Responses: Contractors	
Overall Water Quality Rating	
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.”	6.9
Right / Wrong Questions	% Correct
30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains.	21.2%
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	27.5%
8. We always wash our company vehicles in a car wash.	29.1%
32. Flagstone and pavers are not effective methods for Low Impact Development.	31.4%
18. Sediment in stormwater is natural and not regarded as pollution.	39.0%
4. The water in street stormwater drains is treated before being discharged into the environment.	40.7%
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	40.7%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	44.1%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	44.9%
31. Pervious concrete and asphalt can significantly reduce runoff from a site.	48.3%
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.	48.3%
39. Which one of the following three methods is generally most desirable for controlling stormwater?	50.0%
40. An erosion control permit is often unnecessary for construction projects which disturb over 5,000 square feet of land.	51.7%
41. My company rarely uses bio-infiltration strategies for handling runoff.	52.1%
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.	55.1%
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.	61.0%
23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	63.6%
35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater.	66.1%

17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	66.9%
14. Trees do little to reduce runoff into the stormwater drainage system.	70.3%
34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff.	70.4%
15. In the last 12 months, my company has implemented landscaping techniques to improve the absorption of rainwater.	70.7%
16. When considering new plantings, I select plants that need less water, less fertilizer or less pesticide.	73.5%
36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff.	73.7%
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.	78.9%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	80.0%
19. Vegetation reduces stormwater pollution.	81.4%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	83.3%
28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	85.7%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	98.2%
20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application.	
Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	42
Your Public Works Department	11
911 or Non-Emergency Dispatch, (360) 577-3098	8
NMI	11
Other [Specify]	33
Don't Know	12
Refused	1
Total	118

11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	12
No	14
Do not know what these facilities are	3
Do not have such a facility at the business	74
Don't Know	14
Refused	1
Total	118
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	9
No	12
Don't Know	5
Total	26
37. How many certified erosion inspectors are employed by your business? (per business)	0.720

Summary of Responses: Auto	
Overall Water Quality Rating	
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.”	6.4
Right / Wrong Questions	% Correct
18. Sediment in stormwater is natural and not regarded as pollution.	25.4%
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	33.8%
4. The water in street stormwater drains is treated before being discharged into the environment.	34.3%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	34.3%
8. We always wash our company vehicles in a car wash.	36.1%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	37.3%
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	38.8%
23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	53.7%
14. Trees do little to reduce runoff into the stormwater drainage system.	58.2%
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.	59.7%
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.	59.7%
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	61.2%
19. Vegetation reduces stormwater pollution.	74.6%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	78.3%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	83.3%
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.	83.6%
28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	90.4%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	100%

Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	11
Your Public Works Department	4
911 or Non-Emergency Dispatch, (360) 577-3098	14
NMI	6
Other [Specify]	21
Don't Know	11
Refused	
Total	67
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	24
No	7
Do not know what these facilities are	6
Do not have such a facility at the business	23
Don't Know	7
Refused	
Total	67
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	12
No	10
Don't Know	9
Total	31
37. How many certified erosion inspectors are employed by your business?	

Summary of Responses: Carpet Cleaners	
Overall Water Quality Rating	
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.”	5.7
Right / Wrong Questions	% Correct
8. We always wash our company vehicles in a car wash.	0.0%
18. Sediment in stormwater is natural and not regarded as pollution.	0.0%
4. The water in street stormwater drains is treated before being discharged into the environment.	33.3%
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	33.3%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	33.3%
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.	33.3%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	66.7%
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	66.7%
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	66.7%
23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	66.7%
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.	100%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	100%
14. Trees do little to reduce runoff into the stormwater drainage system.	100%
19. Vegetation reduces stormwater pollution.	100%
24. My company disposes of all used carpet cleaning fluids in the sanitary sewer system or through an approved wastewater disposal facility.	100%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	100%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	100%

Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	1
Your Public Works Department	2
911 or Non-Emergency Dispatch, (360) 577-3098	
NMI	
Other [Specify]	
Don't Know	
Refused	
Total	3
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	
No	1
Do not know what these facilities are	
Do not have such a facility at the business	2
Don't Know	
Refused	
Total	3
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	
No	1
Don't Know	
Total	1
37. How many certified erosion inspectors are employed by your business?	

Summary of Responses: Other Businesses	
Overall Water Quality Rating	
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.”	6.9
Right / Wrong Questions	% Correct
10. Non-toxic, biodegradable soaps do not pollute stormwater runoff.	37.5%
18. Sediment in stormwater is natural and not regarded as pollution.	41.0%
7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch.	41.5%
4. The water in street stormwater drains is treated before being discharged into the environment.	41.7%
13. Grass clippings and leaves are not regarded as harmful in stormwater.	44.4%
5. Pollution in rivers, wetlands and lakes is more the result of industrial dumping than individual human activity.	46.5%
8. We always wash our company vehicles in a car wash.	47.2%
14. Trees do little to reduce runoff into the stormwater drainage system.	62.5%
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.	62.5%
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.	63.9%
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater.	68.8%
23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain.	70.8%
19. Vegetation reduces stormwater pollution.	77.1%
29. All vehicles, mechanical parts, and equipment stored outside are checked for leaks at least once a month.	77.3%
27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks.	81.1%
28. In my business, all waste and worn-out car parts are stored in a covered area until disposed of.	83.9%
9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area.	96.2%

Other Questions	
6. If you witnessed someone pouring a gallon of used paint thinner into a stormwater drain, what agency would you call to report it?	
The Washington State Department of Ecology	41
Your Public Works Department	11
911 or Non-Emergency Dispatch, (360) 577-3098	15
NMI	18
Other [Specify]	42
Don't Know	17
Refused	
Total	144
11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months?	
Yes	41
No	11
Do not know what these facilities are	13
Do not have such a facility at the business	63
Don't Know	15
Refused	1
Total	144
12. Do you know for certain that a written maintenance plan exists for the retention pond, catch basin, or similar facility?	
Yes	31
No	10
Don't Know	11
Total	52
37. How many certified erosion inspectors are employed by your business?	

Questionnaires

***Cowlitz County, the Cities of Kelso and Longview and the
Consolidated Diking Improvement District #1***
GENERAL PUBLIC STORMWATER MARKET RESEARCH
QUESTIONNAIRE – MAY, 2008

V6.6

Hello, my name is _____ and I am calling on behalf of Mayor David Futchter in Kelso, Mayor Kurt Anagnostou in Longview, the Consolidated Diking Improvement District No. 1 Board of Supervisors and the Cowlitz County Board of Commissioners.

[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 Mayor David Futchter in Kelso, Mayor Kurt Anagnostou in Longview, the Consolidated Diking Improvement District No. 1 Board of Supervisors and the Cowlitz County Board of Commissioners. We are asking citizens to answer some questions about an important environmental issue and we would like to include your opinions. All your answers are strictly confidential and will not be connected to your name. 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 DISCONTINUE]

5. Refused

[THANK AND POLITELY DISCONTINUE]

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. Some of these statements may be true, they all may be true or they all may be false. If you believe that a statement is true, please say "Agree." If you believe the statement is false, say "Disagree." If you are not certain about the statement and need more information, you can answer with "need more information." If the question does not apply to you or your

family, say “Doesn’t apply.” Here is the first one. Do you Agree, Disagree or need more information about the following statement:

Responses for each:

1. Agree
2. Disagree
3. Need more information
4. Uncertain, Don’t Know
5. Refused
6. Doesn’t Apply

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

[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. **A**
11. When I am outside with my pet, I always pick up my pet’s waste. **A Adopt**
12. Trees do little to reduce runoff into the stormwater drainage system. **D**
13. Pet waste is not a source of bacteria in stormwater runoff. **D**
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. **A**

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. **D**
16. If my car or truck is dripping oil, I make sure the leak is fixed within three weeks. **A Adopt**
17. My household's auto or truck parts with oil or grease on them are stored under a roof or cover. **A Adopt**
18. My household recycles all used motor oil. **A Adopt**
19. Biodegradable soap for washing cars is safe in stormwater drains. **D**
20. When I wash a motor vehicle at home, the soapy water ends up in the street or in a ditch. **D Adopt**
21. Grass clippings and leaves are not regarded as harmful in stormwater. **D**
22. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. **D**
23. Sediment in stormwater is natural and not regarded as pollution. **D**
24. When considering adding new plants on my property, I select plants that need less water, less fertilizer or less pesticide. **A Adopt**
25. Vegetation reduces stormwater pollution. **A**
26. Using a mulching lawnmower does not reduce the need for fertilizers. **D**
27. Runoff from over watering a lawn can carry pollutants to a stormwater drain. **A**
28. My household stores all outdoor chemicals inside a building or in a covered area out of the rain. **A Adopt**
29. When I apply fertilizer, I strictly follow the label directions for how often and how much to apply. **A Adopt**
30. In the last 12 months, I applied a pesticide or a herbicide in quantities that may have exceeded the manufacturer's recommendation. **D Adopt**
31. Carpet cleaning wastewater composed of only soap and dirt can be safely added to a stormwater drain. **D**
32. The best place to clean paint brushes is in a sink, not outdoors. **A**
33. At my home, water from my downspouts is directed to an area where it is absorbed by the ground. **A Adopt**

34. Flagstone or pavers offer no advantage over standard concrete or asphalt for reducing runoff. **D**

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. **A**

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 1-4] ACCEPT ONE RESPONSE ONLY**

1. The Washington State Department of Ecology
2. Your Public Works Department
3. 911 or Non-Emergency Dispatch **[DO NOT READ: (360) 577-3098 or 3090]**
4. Need more information
5. Don't Know
6. Refused

That concludes our survey. On behalf of Mayor Fletcher, Mayor Anagnostou, 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 – JULY, 2008

V8.0A

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 Mayor David Futchter in Kelso, Mayor Kurt Anagnostou in Longview, the Consolidated Diking Improvement District No. 1 Board of Supervisors and the Cowlitz County Board of Commissioners. We are asking businesses to provide input on an important environmental issue and would like to include your opinions. 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 Mayor David Futchter in Kelso, Mayor Kurt Anagnostou in Longview, the Consolidated Diking Improvement District No. 1 Board of Supervisors and the Cowlitz County Board of Commissioners. We are asking businesses to provide input on an important environmental issue and would like to include your opinions. 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. Some of these statements may be true, they all may be true or they all may be false. If you believe that a statement is true, please say "Agree." If you believe the statement is false, say "Disagree." If you are not certain about the statement and need more information, you can answer with "need more information." If the question does not apply to you or your 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

<i>2. Impacts of illicit discharges and how to report them.</i> <i>ALL CATEGORIES</i>
--

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

4. The water in street stormwater drains is treated before being discharged into the environment. **D**

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

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. PCS Hotline (360) 578-0900
5. Need more information
6. Other **[Specify]**
7. Don't Know
8. Refused

1. BMPs for use and storage of automotive chemicals, carwash soaps and other hazardous materials such as cleaning supplies

ALL CATEGORIES

7. Sometimes wash or wastewater from our business ends up in the parking lot, alley, street, or in a ditch. **D Adopt**

[INFO: Examples of 'wash' or 'wastewater' are the soapy runoff from washing a car, the rinse water from mopping a floor, the dirty water from washing the paint out of a paint brush, water used in a manufacturing process--generally, water that has something additional in it beyond plain water that you want to dispose of.]

8. We always wash our company vehicles in a car wash. **A Adopt**

9. My business stores all oils, soaps, chemicals, and other materials under a roof or cover or in a containment area. **A Adopt** **["Cover" means shielded from rain. A "containment area" is a space surrounded by a wall that is constructed to prevent any spilled fluid from passing beyond it.]**

10. Non-toxic, biodegradable soaps do not pollute stormwater runoff. **D**

8. Stormwater pond [facility] maintenance.

ALL CATEGORIES

11. Has the stormwater retention pond, catch basin or similar facility at your business been inspected at least once in the last 12 months? **Y Adopt**

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? **Y Adopt**
1. Yes
 2. No
 3. Don't Know
 4. Refused

3. Yard care techniques protective of water quality.
ALL CATEGORIES

13. Grass clippings and leaves are not regarded as harmful in stormwater. **D**
14. Trees do little to reduce runoff into the stormwater drainage system. **D**
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. **A Adopt**
16. **[SKIP IF Q1=3 OR Q1>5]** When considering new plantings, I select plants that need less water, less fertilizer or less pesticide. **A Adopt**
17. Chemical treatments to kill moss on roofs pose little risk for polluting stormwater. **D**
18. Sediment in stormwater is natural and not regarded as pollution. **D**
19. Vegetation reduces stormwater pollution. **A**

4. BMPs pesticides and fertilizers.
LANDSCAPER, PROPERTY MANAGER

[IF Q1>2 SKIP TO Q23] {Only ask these to landscapers and property managers}

20. When applying fertilizer, my business strictly follows the label directions for the quantity and frequency of application. **A Adopt**
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. **D Adopt**
22. My business tests the soil to determine if any fertilizer is needed before applying it. **A Adopt**

5. BMPs for carpet cleaning
ALL CATEGORIES

23. Carpet cleaning rinsewater, having little soap and dirt, can be safely added to a stormwater drain. **D**

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. **A Adopt**

6. BMPs for auto repair and maintenance
ALL CATEGORIES

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. **A**

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. **D**

27. If a car or truck in our business is dripping oil, the leak is always fixed within three weeks. **A Adopt**

28. In my business, all waste, such as the particle dust from sanding or grinding, and all worn out car parts, such as old transmissions, radiators or brake pads, are all stored in a covered area out of the rain until disposed of. **A Adopt**

29. All vehicles, mechanical parts and equipment stored outside are checked for leaks at least once a month. **A Adopt**

IF Q1>5 SKIP TO Q42

7. Low Impact Development techniques, including site design, pervious paving, retention of forests and mature trees.

LANDSCAPER, PROPERTY MANAGER, ENGINEER, DEVELOPER, CONTRACTOR

30. The main purpose of Low Impact Development is to collect and convey stormwater off the property to stormwater drains. **D**

31. Pervious concrete and asphalt can significantly reduce runoff from a site. **A**

32. Flagstone and pavers are not effective methods for Low Impact Development. **D**

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. **A Adopt**

34. My business retains mature trees or plants new trees on projects for the specific purpose of reducing stormwater runoff. **A Adopt**

35. Over the last 24 months, my company has amended the soil on a project to specifically improve infiltration of stormwater. **A Adopt**

36. A key principle for effective stormwater management is to reduce the amount of stormwater runoff. **A**

[IF Q1<3 OR Q1>5 SKIP TO Q42] {Only ask the remaining two categories of questions to Engineers, Developers, and Contractors}

**9. Technical standards for stormwater site and erosion control plans.
ENGINEER, DEVELOPER, CONTRACTOR**

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

**10. Stormwater treatment and flow control BMPs.
ENGINEER, DEVELOPER, CONTRACTOR**

38. 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. **A**

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 **A**
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.] D**

41. My company rarely uses bio-infiltration strategies for handling runoff. **D Adopt**

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 Mayor Fatcher, Mayor Anagnostou, 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: _____