2013-15 ECOSS Pollution Prevention Evaluation Report

Date: 2/6/2015

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Summary

The Environmental Coalition of South Seattle (ECOSS) received a Model Stewardship Grant from the Puget Sound Partnership in 2013 to significantly expand its spill kit program for small to medium size businesses. Through this grant, ECOSS expanded their existing outreach program on stormwater pollution prevention, to reach new businesses throughout the Puget Sound Region. The goal of the program is to increase businesses' awareness of their effect on regional environmental issues, and change behaviors that impact regional water quality. The audience would represent the variety of diverse businesses to provide them with a spill kit, spill plan, on-site signage, and a drainage map tailored to their property. The program supports the framework identified in the Puget Sound 2012 Action Agenda's "Prevent Pollution from Urban Stormwater" strategic initiative by providing both education and a mechanism for controlling sources of pollution.

A thorough evaluation of the project shows both a significant increase in awareness and understanding of stormwater, and an increase in the number pollution prevention practices being implemented. For example, ECOSS found that only **7%** of the businesses served had written spill clean-up procedures developed before the initial outreach. All the businesses received spill plans through this project, bringing that to 100%. Additionally, approximately **83%** of the businesses adopted at least some of the spill prevention practices recommended through the program. These included relocating operations indoors, replacing leaky containers and conducting spill training after the visit.

Evaluation

During the initial visit, a baseline survey was conducted to develop an understanding of the level of awareness on the part of businesses owners or staff. This survey helped paint a picture of what businesses' beliefs were regarding liability and responsibility before the interaction as well as awareness level. Later, a representative sample of **1021 (36%)** of the businesses served were re-contacted for a follow-up survey. The purpose was to assess the level of understanding of the issue that was retained since the first interaction.

Approximately **85%** of participating businesses **(2,477)** were willing to answer all of the questions in the Baseline Survey, and **36%** of participating businesses **(1021)** responded to the follow-up survey. Additionally, we developed a series of more involved questions for those willing to take part in a longer and more in-depth interview to discuss details of onsite spills and their impressions of the program. Of the businesses served, **11.3%** (111) had an outdoor spill since the interaction and used the kit to clean up that spill. A breakdown of the spilled materials can be found in Figure 11. Out of the total number of businesses that had spills, six businesses also took the time take part in the in-depth interview that was developed.

The survey questions and full set of results are shown in Appendix I. The following charts highlight the most relevant results and indicate the levels of knowledge of participating businesses.

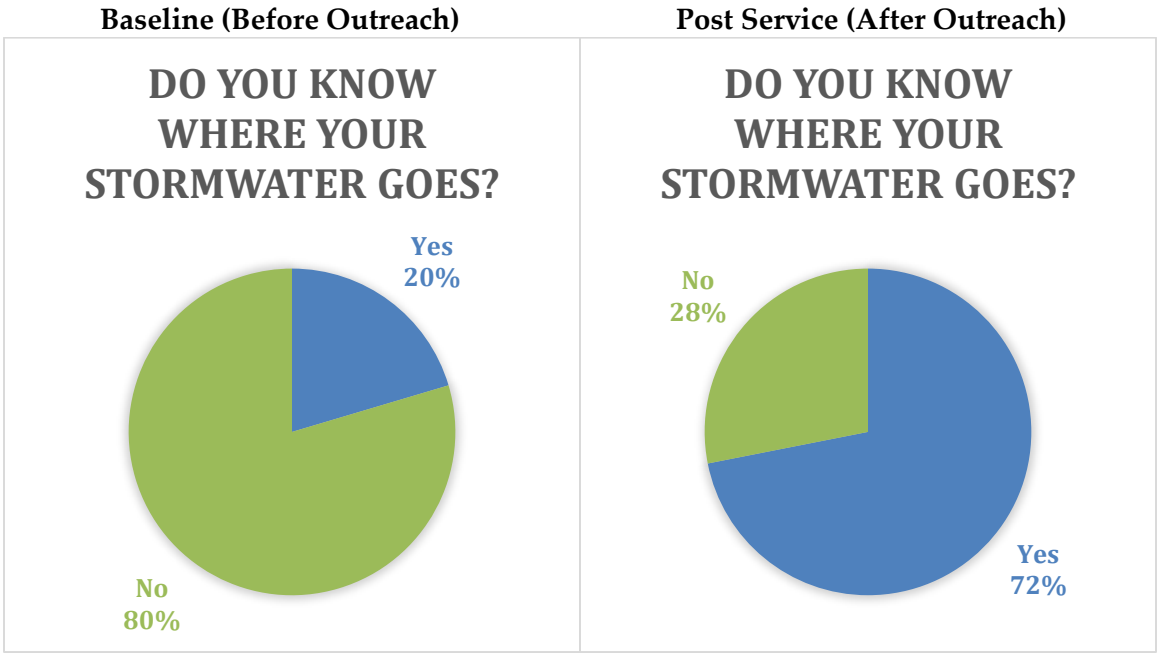

Figure 1. Baseline and Post-Service Question1a Result Comparison. n=952

Business managers and owners showed significant improvement on understanding where the stormwater runoff goes from their sites after the outreach, as 72% reported to know where their stormwater goes after the outreach, compared to 20% before the outreach (Figure 1). This can be attributed to onsite training and site-specified GIS maps provided by the outreach staff.

Figure 2. Baseline Question 2 Survey Result. n=2477

From the Baseline survey, the team found that only **65%** out of the businesses served think it is their responsibility to clean up outdoor spills (Figure2). In particular, it is not uncommon to see food service and some multicultural business that think it is not their responsibility to clean outdoor spills. (Appendix I)

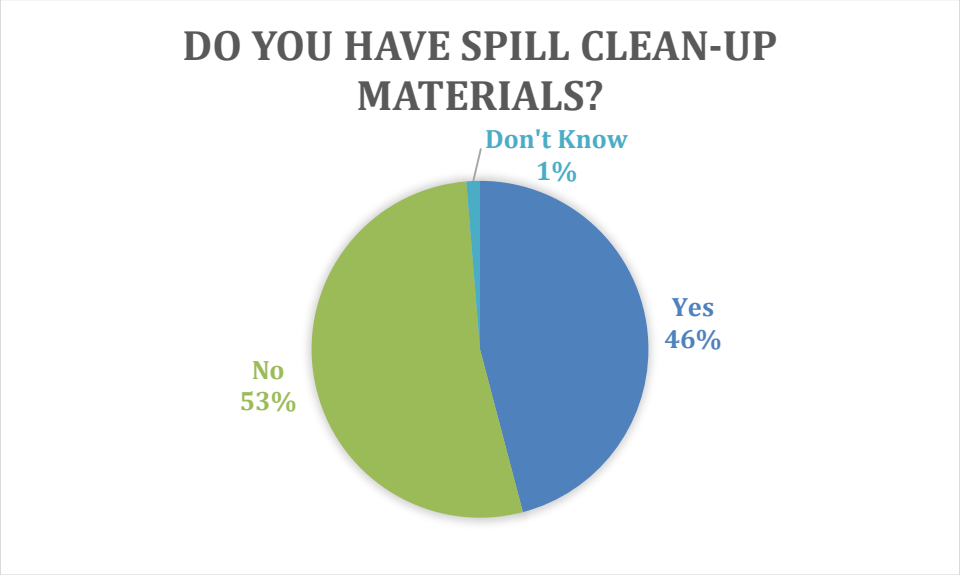

Figure 3. Baseline Question 3a survey result. n=2439

During the initial outreach, ECOSS' staff identified if the businesses had any spill clean-up materials (e.g. shop rags, sorbent pads/booms, sorbent powder, etc.) onsite. The team found about **46%** of the businesses had some materials to address spill incidents (Figure 3). In these circumstances, our staff would educate and assist the businesses to utilize all tools available to address outdoor spills.

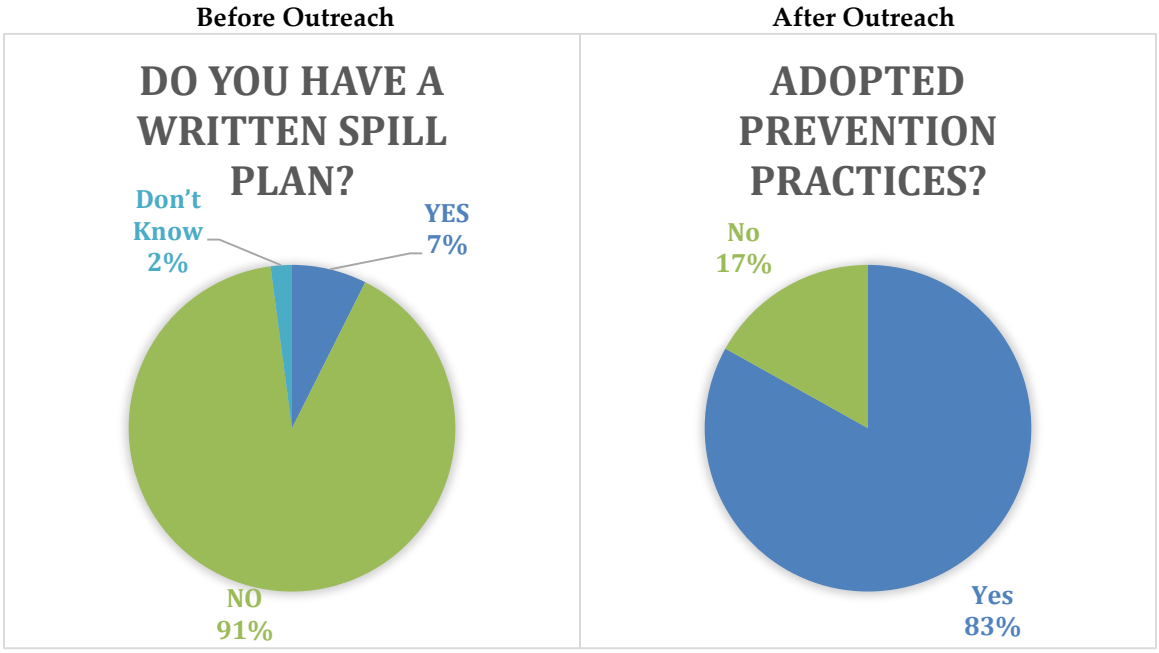

Figure 4. Baseline survey Question 5 (n=2439) and Post-Service survey Question 3 (n=981) result comparison.

The spill plans provided by the program establish the foundation of standard spill procedures for many businesses. The team found that only **7%** of the businesses served had written spill clean-up procedures developed before the initial outreach. All the businesses received spill plans through this project, bringing that to 100%. Furthermore, approximately **83%** of the businesses adopted spill prevention practices recommended through the program, such as bringing operations indoors, replacing leaky containers and conducting spill training after our visit (Figure 4).

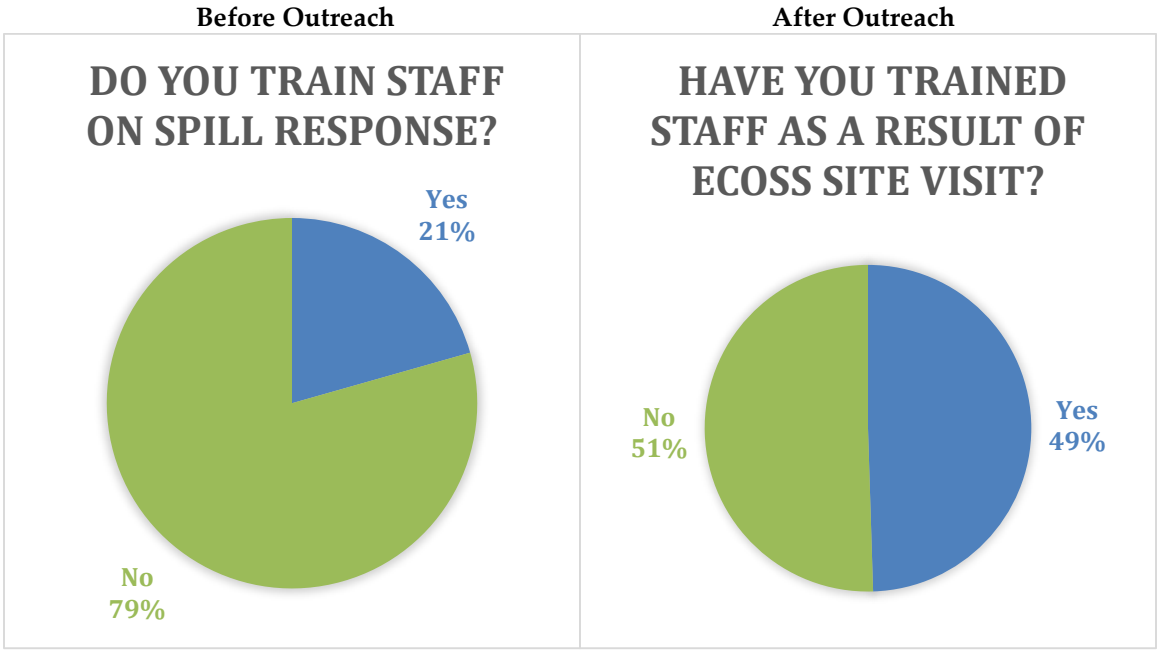

Figure 5. Baseline Question 4a (n= 2477) and Post-service Question 4a (n=981) result comparison.

Only **21%** of the businesses trained their staff on spill response prior to the outreach, whereas **49%** of the businesses conducted trainings for their staff as a result of the visit (Figure 5). While apparently automotive businesses were more likely to train their staff after the visit, food service businesses were least likely to do it (Appendix A).

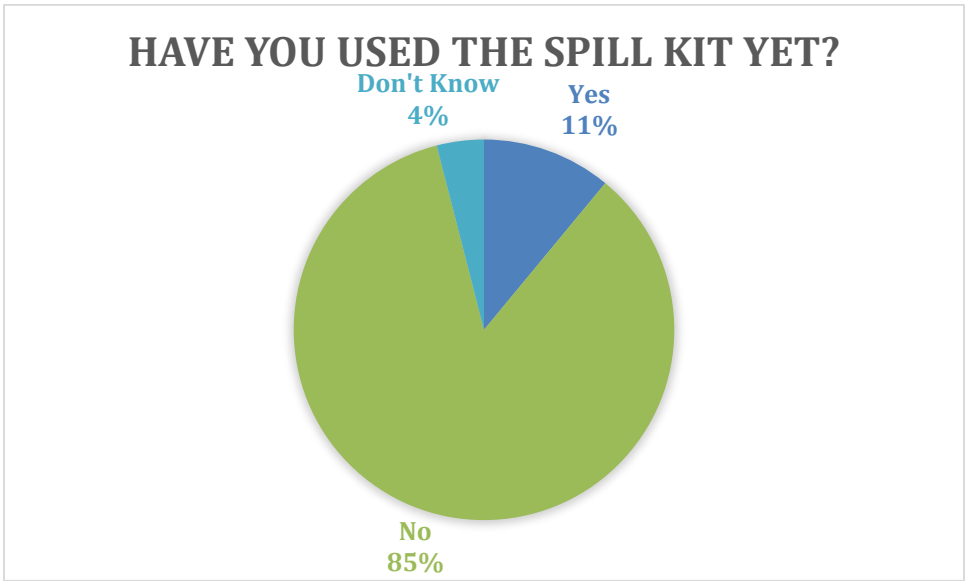

Figure 6. Post-service survey Question 2a result. n=981

After conducting the post-service survey, the team found that about **11%** of the businesses surveyed (111 businesses) had already utilized the spill kits since receiving the training (Figure

6). Most of these businesses used the spill kits for cleaning up common vehicle fluids **(73%)**, while others used the kits for miscellaneous chemicals (**10%**) and waste such as paints, solvents **(4%)** and cleaning products **(4%)** and fat, oil and grease **(4%)** (Figure 7). All but six of these spills were less than five gallons. In addition, **three** businesses voluntarily reported their spills to the local municipalities and **five** businesses hired a contractor to clean up the spills.

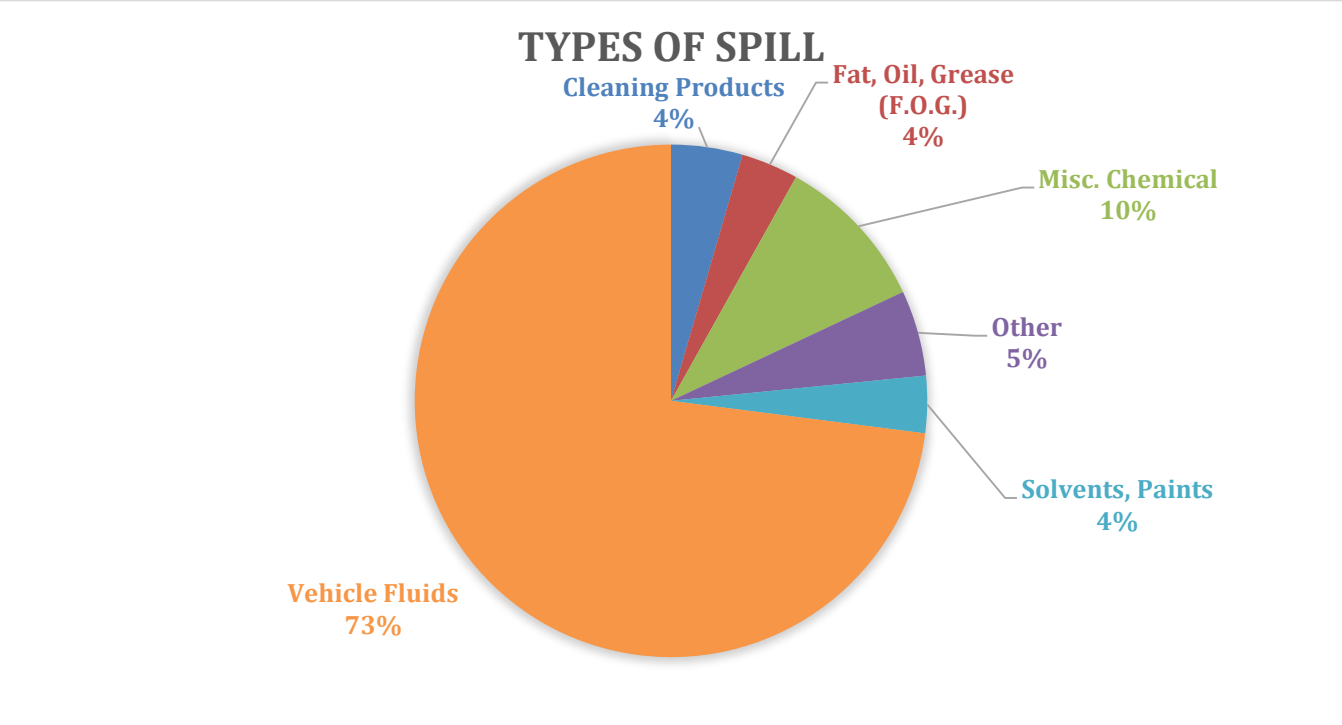

Figure 7. Types of spills record in post-service survey n=111

The full Survey analysis can be found in Appendix A.

Projected Impact and Savings

The post service survey data gathered during this program shows that between 2013 and 2014, 111 businesses (representing 11.3% of the businesses sampled) have already had an outdoor spill since receiving the service and that they utilized the kit to clean up the spill. Assuming that those businesses were in jurisdictions that had spill response programs, those agencies would have saved $287 per incident based on data provided by Seattle Public Utilities[1], which collectively would add up to approx. $32,000. If a contractor had been used to clean up these spills, the accumulated costs would have been approx. $300,000[2]. More importantly, if the percentage of sampled businesses that had a spill (11.3%) were extrapolated to the full dataset of businesses served (i.e., 2,860), it would be expected that this program could help clean up spills in approx. 323 businesses. Thus the projected savings of spill costs averted based on contractor costs would be close to $1 million. If, as the historical data suggests, 50% of these businesses will have a spill at some point[3], the projected savings could be close to $4 million. The calculations used to derive the potential savings are shown in Appendix B.

An additional consideration is the decreased environmental impact in terms of the volume of pollutants diverted from local waterways. While the available historic data[7] indicates that the spill kits provided through this program may be able to successfully clean up or sorb approximately 85% of upland spill incidents, the actual data collected in the post service survey indicated that the spill kits provided to the businesses served were actually able to clean up 99% of the spills.

[1] Eric Autry, Senior Spill Coordinator SPU, Personal Communication.

[2] SPU reported that when there is a spill that requires the use of a contractor, the average cost per incident is $2,700 (Eric Autry, Senior Spill Coordinator SPU, Personal Communication).

3 SPU 2005 Spill Kit Evaluation Study and Evaluation of SPU' Public Involvement and Education Programs (February 2009) Question Q6a

Conclusions

In summary, the main findings from this project are:

- **2,860** businesses throughout Puget Sound received educational training, spill kits and related services in 2013-14.
- Prior to the service, **20%** of the businesses that took part in the program were unaware of where polluted runoff went; while this number increased significantly to **72%** with the sample of businesses that completed a Post Service Survey.
- **11%** of the businesses served reported an outdoor spill since receiving the service and utilized the spill kit they received to clean up the spill. Assuming that those businesses were in jurisdictions that had spill response programs, those agencies would have collectively saved approximately $32,000. Assuming that a spill was not cleaned, and therefore did reach a storm drain, a contractor would need to be used to address the spill by jurisdictions without spill response equipment. In this case the cumulative costs would had been close to $300,000. The projected savings of the whole program are ~$1-4M.
- It is not uncommon to see businesses that have spill clean-up materials to address indoor spills due to health and safety concerns, but not all of them would recognize that the materials could/should be used to address outdoor spills as well.
- Of the different types of businesses reached, restaurants and automotive related businesses displayed the highest risk of an outdoor spill. Storage, handling, and outdoor work were the observed on-site activities related to these sectors.

The following are observations, findings and recommendations for future pollution prevention outreach efforts.

Spill Kit Outreach Findings – Challenges and Lessons Learned

- Occasionally, the business owners did not trust that the members of the outreach team were official and represented the partner city. Early on in the interactions, some businesses were hesitant to trust the outreach team. The city's logo on the brochure, and business cards (when available) were very helpful to gaining their trust and demonstrate to them that the outreach team wanted to help them with their existing liabilities. Continuing to work in collaboration with partner cities, and showing their outright support of the program is crucial to its continued success
- Through the post service surveys with businesses, it became clear that while there was support from owners and managers to address behaviors that might lead to a spill, there was little time or few resources available to continually train staff to address the

issue of spill prevention. This may be due to a number of factors, but through deeper interviews with some participants we found the following common themes:

- The time required to train staff on an annual basis is more than most businesses have. Their busy schedules seem to prevent them from making training a priority
- There was a general belief amongst the managers and owners interviewed that they did not have the expertise or the level of understanding needed to provide complete trainings. Two businesses in particular said that without being able to give the contextual background on the potential environmental impacts of their businesses, such as what they themselves received from ECOSS, that their staff were not likely to accept this additional facet of their jobs (spill prevention and cleanup).
- The language proficiency required to train a diverse staff is also an issue. It is not uncommon to see the managers' and/or owners' primary language is not necessarily representative of the primary language spoken by the "back-of-house" staff.

- The survey results indicated that food service businesses are relatively not as prepared for spill response compared to other served business sectors. In particular, only **37%** of the food service businesses think it is their responsibility to cleanup spill. The team also found that food service businesses are less likely to train their staff after our visit mainly due to high staff turnover and a lack of time and expertise/resources.

- As this program continues in the future, it would be best to allocate resources to allow more time for staff to be an ongoing resource to the businesses served. By providing regularly recurring training, not only would we increase the value of the program to businesses that don't have the resources and experience to train their staff, but also increase the likelihood that pollution prevention practices become institutionally embedded at those businesses.

- ECOSS will continue to underwrite this program with both public and private grants from sources such as the Washington State Department of Ecology, local foundations, and other funding sources. Currently the program has roughly $90,000 of funding for continued outreach efforts in 2015. The program will continue; however, with the sustainability of the program in mind, ECOSS will be requesting that partners consider contributing funding to a regional pool.

Spill Kit Outreach Findings – Successes

- The large step-by-step posters (particularly in languages other than English) displaying images of proper spill cleanup procedures were very useful at the trainings and people responded well.

- The post service interviews found that most of the businesses served felt that free access to expertise and assistance was very helpful. These business managers/owners were very interested in this program and supportive of the outreach work.
- Most of the trainings were very well received and the outreach team received very positive feedback from the attendees about how much they learned.
- The outreach team believed that the number of substantial interactions with businesses helped to create useful relationships. Appreciative businesses helped by providing referrals and introductions to friends and neighboring businesses.
- Approximately **11%** of businesses served through the program voluntarily reported using the spill kit they received to clean an outdoor spill. Additionally, **three** businesses voluntarily reported spills to their municipality as well.

Appendices

Appendix A – Survey Result Analysis

Total Baseline Surveys = 2,477
Total Post Surveys = 981

Table 1: Where does runoff go? Overall Comparison

(n=952 with data at BASELINE and POST)	Baseline	Post
Reports knows where runoff goes (YES)	20.4%	71.9%
Reports YES and provides correct answer *(i.e., local waterbody or storm drain)*	18.1%	72.3%

Table 2: Where does runoff go? Subgroups

Reports YES and provides correct answer *(i.e., local waterbody or storm drain)*	% Correct Response (POST)
OVERALL	72.3%
COUNTY	
King	73.3%
Snohomish	71.0%
Thurston	70.7%
LANGUAGE	
English	77.1%
Korean	66.8%
Spanish	64.9%
Other	68.6%
BUSINESS	
Automotive/Gas	81.4%
Food/Grocery	63.1%
Industrial/Manufacturing	81.6%
Property/Warehouse	80.0%
Retail/Other	72.0%

Table 3: Business Responsibility for Spills? Subgroups

Reports YES it is business responsibility for outdoor spill clean-up	% Yes (BASELINE)
OVERALL	64.9%
COUNTY	
King	60.2%
Snohomish	67.5%
Thurston	70.4%
LANGUAGE	

English	86.4%
Korean	26.3%
Spanish	46.9%
Other	50.6%
BUSINESS	
Automotive/Gas	94.5%
Food/Grocery	36.7%
Industrial/Manufacturing	85.4%
Property/Warehouse	88.9%
Retail/Other	49.4%

Table 4: Do you have spill cleanup materials? (asked only at Baseline)

(n=2,439 responded)	Baseline	Post % who adopted spill prevention practices
YES	45.9%	86.6%
NO	52.8%	78.3%
Don't Know	1.3%	n/a

** of note, after initial ECOSS visit all would have the materials*

Table 5: Adopted Spill Prevention Practices? Subgroups

	% Yes (POST)
OVERALL	83.1%
COUNTY	
King	81.0%
Snohomish	82.2%
Thurston	94.2%
LANGUAGE	
English	86.9%
Korean	75.6%
Spanish	96.1%
Other	66.7%
BUSINESS	
Automotive/Gas	85.9%
Food/Grocery	78.4%
Industrial/Manufacturing	95.6%
Property/Warehouse	100.0%
Retail/Other	48.6%

TABLE 6: Do you have a written spill plan? (asked only at Baseline)

(n=2,446 responded)	Baseline

YES	7.4%
NO	90.5%
Don't Know	2.1%

TABLE 7: Do you train staff on spill response? (At Baseline) Have you trained staff as a result of ECOSS site visit? (At Post)

	Baseline (% yes)	Post (% yes)
OVERALL	20.6%	49.5%
COUNTY		
King	16.4%	43.7%
Snohomish	28.3%	55.5%
Thurston	21.8%	58.8%
LANGUAGE		
English	33.3%	66.3%
Korean	3.7%	22.9%
Spanish	7.4%	44.4%
Other	9.1%	36.6%
BUSINESS		
Automotive/Gas	40.4%	69.8%
Food/Grocery	2.9%	30.8%
Industrial/Manufacturing	40.0%	77.8%
Property/Warehouse	21.1%	68.4%
Retail/Other	12.8%	36.2%

Table 8: How confident are you in your ability to clean up spills? (asked only at Post)

	Overall	Among those who have trained staff after ECOSS Visit	Among those who adopted spill prevention practice	Among those who had a spill
Not confident at all	1.0%	0.0%	0.8%	1.9%
Not very confident	3.8%	0.4%	3.9%	0.0%
Somewhat Confident	46.1%	29.4%	21.8%	9.7%
Very Confident	49.1%	70.1%	73.5%	88.3%

Table 9: Confidence in Cleaning Up Spills? Subgroups

	% Very Confident
OVERALL	49.1%
COUNTY	
King	46.2%
Snohomish	51.8%
Thurston	53.1%

LANGUAGE	
English	59.1%
Korean	38.4%
Spanish	50.0%
Other	33.0%
BUSINESS	
Automotive/Gas	63.8%
Food/Grocery	31.4%
Industrial/Manufacturing	79.6%
Property/Warehouse	80.0%
Retail/Other	46.3%

Table 10. Percent of businesses which used the spill kit since our visit.

	%
OVERALL	11.0%
COUNTY	
King	11.5%
Snohomish	7.6%
Thurston	14.4%
LANGUAGE	
English	13.2%
Korean	5.6%
Spanish	7.1%
Other	12.9%
BUSINESS	
Automotive/Gas	16.4%
Food/Grocery	6.4%
Industrial/Manufacturing	12.5%
Property/Warehouse	20.0%

Appendix B – Details on projected impact and savings

The calculations below give detail on how the projected impact and savings were derived. Three different scenarios are considered:

- Scenario 1: Considers that 11.3% of the businesses that participated in the post-service survey have already reported having an outdoor spill since receiving the spill kit provided by this program. This scenario hence considers 111 businesses.

- Scenario 2: Extrapolates the results of the post-service survey to all the 2,860 businesses serviced and assumes that 11.3% of them (representing a total of 323 businesses) would have had a spill already.

- Scenario 3: Uses existing historical data that suggests that 50% of businesses will have a spill at some point[4], which would imply that 1,430 of the businesses serviced will have a spill.

The table below shows the estimated costs for each scenario.

Projected clean-up cost for different scenarios			
	Number of spill	Agency costs (assuming $287 per spill)[5]	Contractor costs (assuming $2,700 per spill)[6]
Scenario 1	111	$31,857	$299,700
Scenario 2	323	$92,701	$872,100
Scenario 3	1,430	$410,410	$3,861,000

[4] SPU 2005 Spill Kit Evaluation Study and Evaluation of SPU' Public Involvement and Education Programs (February 2009) Question Q6a

[5] Eric Autry, Senior Spill Coordinator SPU, Personal Communication.

[6] SPU reported that when there is a spill that requires the use of a contractor, the average cost per incident is $2,700 (Eric Autry, Senior Spill Coordinator SPU, Personal Communication).