City of Edmonds
2020 Stormwater Management Program (SWMP) Plan

Permittee Coverage Number: WAR04-5513

City of Edmonds
121 5th Avenue North
Edmonds, WA 98020

March 2020

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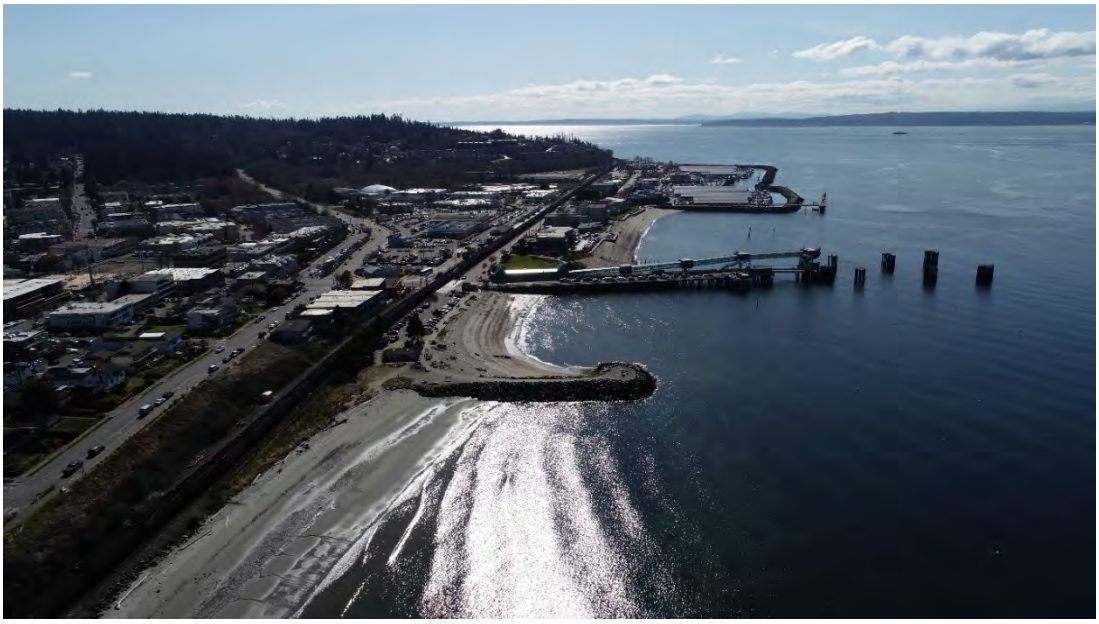
1 INTRODUCTION

This document has been prepared in accordance with the *Western Washington Phase II Municipal Stormwater Permit* (the Permit). The Permit was issued by the Department of Ecology (Ecology) to municipalities with populations of less than 100,000 as operators of small and medium municipal separate storm sewer systems (MS4s). The City of Edmonds is one of the municipalities who must comply with this permit.

The Permit authorizes the discharge of stormwater runoff from MS4s into the state's surface waters (i.e., streams, rivers, lakes, sounds, wetlands, etc.) and groundwater as long as municipalities implement Permit-specified actions and activities, referred to as Best Management Practices (BMPs), to protect these receiving waters. Permit requirements are phased in over the permit term per a specified schedule which is included as Appendix A of this report. Some of the required BMPs are carry-overs from the previous Permit cycles while other requirements are new. Additional schedule detail can be found in the full text of the Permit found on Ecology's website[1].

The initial Permit became effective back in 2007, but the current five-year permit was issued by Ecology and became effective on August 1, 2019 and will expire on July 31, 2024. The timing of the permit effective dates is such that the requirements were only in place for a portion of the year. However, the data provided in the annual report and this SWMP plan reflects the entire years' worth of operations, unless otherwise noted in the response.

In some cases, the Permit requires reporting and implementation of water-body-specific cleanup plans developed by Ecology. However, Ecology has not developed such plans for Edmonds' water bodies to date.



A view of the Edmonds' downtown shoreline on the Puget Sound (looking south)

[1] https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Municipal-stormwater-general-permits/Western-Washington-Phase-II-Municipal-Stormwater

1.1 The Stormwater Management Program Plan

Section S5.A of the Permit requires each Permittee to develop and implement a Stormwater Management Program (SWMP). Each Permittee must also annually prepare written documentation of the SWMP, called the SWMP Plan (Plan). This Plan is intended to be a forward-looking document describing the set of actions and activities (BMPs) the Permittee intends to complete in the upcoming calendar year to comply with the Permit.

Section S9 of the Permit requires the City to submit an Annual Report by March 31 of each year. This Annual report describes the status of the Permit requirements during the preceding reporting year (in this case, calendar year 2019). This report can be found on the City's website[2].

Per Permit section S5.A.5.b, this Plan includes a written description of the coordination mechanisms among departments within the City of Edmonds to ensure compliance. This written description is found in section 1.2 of this Plan.

This SWMP Plan does not include *all* of the activities and programs implemented by the City to address stormwater runoff issues; the plan only focuses on those that are required by, or are influenced by the requirements of, the Permit. The Plan does not include information about the capital improvement plan (CIP) which outlines improvement projects to address flooding, water quality, and aquatic habitat issues. More information on the stormwater CIP and previous Stormwater Comprehensive Plan can be found on the City's website[3].This Plan is organized per S5.C of the Permit and is updated annually for submittal with the City's annual reports to Ecology. The BMPs are grouped under the following Program components:

2.1. Stormwater Planning
2.2. Public Education and Outreach
2.3. Public Involvement and Participation
2.4. MS4 Mapping and Documentation
2.5. Illicit Discharge Detection and Elimination (IDDE)
2.6. Controlling Runoff from New Development, Redevelopment, and Construction Sites
2.7. Operations and Maintenance (O&M)
2.8. Source Control Program for Existing Development
2.9. Monitoring & Assessment (S8)

This SWMP Plan covers the City of Edmonds' activities planned in 2020 to comply with the Permit. Edmonds continues to track costs associated with the program's action and activities as required by the Permit.

[2] http://www.edmondswa.gov/stormwater-utility-system/phase-ii-municipal-stormwater-permit-compliance-npdes.html
[3] http://www.edmondswa.gov/government/departments/public-works-home/capital-improvement-program.html and http://www.edmondswa.gov/images/COE/Government/Departments/Development_Services/Planning_Division/Plans/Final_2010_SWM_Comp_PLan_Text.pdf

A volunteer local resident and retired fish biologist, instructs the *Student Saving Salmon* high school club how to correctly measure and classify fish.

1.2 Stormwater Management in Edmonds

Logger George Brackett founded Edmonds in 1890 making it the oldest incorporated city in Snohomish County with a growing population of approximately 42,000 and covering approximately 9 square miles of land area. Edmonds is approximately 94 percent built-out with the vast majority of the land-use as single-family or multi-family residential (City of Edmonds 2017). The City is broken into 26 local sub-basins, with 24 of those basins eventually draining into Puget Sound. The remaining two basins enter the greater Lake Ballinger watershed that discharges into Lake Washington.

Edmonds first adopted a stormwater code in 1977, and has been actively mitigating runoff from new impervious surfaces since this date. Responsible management of stormwater is something the City has been committed to well in advance of the current Permit.

1.2.1 Organization

There are three City departments that drive a majority of the work to comply with the Permit, however input or services from many other departments are needed to make the system function as a whole. Public Works, Development Services, and Parks & Recreation do most of the heavy lifting for permit compliance, but coordination with the finance department, police departments, City Clerk's office, and the City attorney have all been necessary for permit compliance. Compliance with the Permit continues to be one of the City's farthest reaching programs, involving a large portion of City staff and departments. The Public Works & Utilities Director holds the Permit Section G19 certification and signature authority and a copy of the authorization letter is include as Appendix B of this report. Figure 1 shows an organizational chart of the City Departments, highlighting with color the level of involvement each department has with Permit compliance.

The Stormwater Engineer is the permit coordinator for the City of Edmonds and is the lead person responsible for permit compliance. However, this work is further sub-divided within City

staff as shown in Figure 2. This figure demonstrates the lead staff person for each individual task per S5.C of the Permit, and all of the staff involved in each element; it highlights just how many staff members contribute to the effort of permit compliance.

The Stormwater Engineer in the Engineering Division of the Public Works Department is primarily responsible for ensuring Permit compliance. This role coordinates the annual report and update of the SWMP plan each year and is the lead for *Stormwater Planning*, *Public Involvement and Participation*, and *Controlling Runoff from New Development*. The Stormwater Engineer conducts reviews for compliance with stormwater codes directly and coordinates field activities and inspections with the Engineering Program Manager who oversees the engineering permit reviewers and field inspection staff. The position also leads stormwater related code, utility rate, comprehensive plan, and CIP updates which are the major processes for public involvement in stormwater decision making.

The City of Edmonds has two separate technicians who lead a majority of the remaining S5.C compliance tasks.

The Stormwater Technician is housed under the Engineering Division of Public Works and is 'the face' of the stormwater division. As the lead for compliance with the *Public Education and Outreach*, *Illicit Discharge Detection and Elimination*, and *Source Control Program for Existing Development* Sections of the permit as well as the lead for private facility inspections, this position spends much of their time interfacing with the public in various capacities. Whether it is educating business owners, working with contractors to improve stormwater services, or helping a resident get their rain garden project off the ground, this role is constantly out making a difference in our community and connecting with people. The benefit of this position goes far beyond the data that can be placed in the annual report or addressed in this Plan; this role is crucial to bringing the public in as partners in stormwater management and extends good stormwater practices well beyond the limits of the MS4.

The GIS Technician is housed in the Operations Divisions of the Public Works Department and generally focuses more on the City-owned elements of the compliance requirements. This role leads the *MS4 Mapping and Documentation* section of compliance and is responsible for the public facilities inspections. This role is a valuable liaison between the office and field staff and, as the lead data collector for the City systems, is critical in alerting others of conditions which warrant further attention.

The Public Works Operations Division handles all other *Operations and Maintenance*-related components of the City's MS4 including spill response and clean-up, catch basin inspections, IDDE screening, and adherence with the SWPPP for the Public Works Department storage and maintenance yard. The Parks & Recreation Department is responsible for stormwater management and municipal operations on park properties and for adhering with the SWPPP on the Parks & Recreation Department storage and maintenance yard.

The Finance Department manages the payments required to comply with the *Monitoring and Assessments* portion of the permit. The Community Services/ Economic Development department helps connect the stormwater program with local businesses and other local groups which can support stormwater messaging. The Code Enforcement Officer (Development Services Department) and the City Attorney get involved in a variety of issues as needed for

enforcement and updated of codes or ordinances. And the Police Department supports IDDE and source control efforts as needed for enforcement and staff safety.

Little ones explore the City's pervious pavement display at the *Watershed Fun Fair*; the mobile display remains on display in the *StormGreen Resource Center* at City Hall when not travelling.

1.2.2 Internal Coordination

The Stormwater Engineer and the Stormwater Technician in the Engineering Division regularly meet with other staff members involved in Permit compliance activities. Regular meetings are held with the Street/Stormwater Manager, Stormwater Division Lead, and GIS Technician to coordinate on issues related to municipal operations and maintenance and system mapping.

After major illicit discharge events the Stormwater Technician discusses and reviews the response and documentation with the Street/Stormwater Manager, Stormwater Division Lead, and Stormwater Engineer. Both the Stormwater Technician and GIS Technician transferred into their roles after being valuable members of the storm crews and have greatly improved communication between the Engineering and Operations divisions of the Public Work Department. Their knowledge of procedures and processes within the Operation divisions has led to significant improvements in the way information is shared and documented between the groups.

The Stormwater Engineer meets regularly with the Engineering Program Manager and Engineering Technicians to discuss issues related to *Controlling Runoff from New Development, Redevelopment, and Construction Sites*. The Engineering Program Manager and Engineering Technicians regularly meet with the Planners on this Permit component as well to ensure staff beyond the engineering division understand the importance of the stormwater components of development procedures.

The Senior Utility Engineer, the Stormwater Engineer, Associate Engineer, and the Stormwater Technician also meet every other week to coordinate utility projects and discuss field concerns, including stormwater permit compliance issues.

The Stormwater Engineer coordinates with all parties involved in permit compliance at the beginning of every year to collect the data needed for the annual report and SWMP Plan update, and to review potential impacts to workload and staffing needs.

New this year will be the formation of the inter-disciplinary team for the new stormwater planning requirements. See Section 2.1 for more information on the coordination required for this specific team.

Kids love shooting for the correct place to discard pet waste, a staple attraction at the City's *Watershed Fun Fair*

1.2.3 External Coordination

The City's Stormwater Engineer and Stormwater Technician coordinate with colleagues in the adjacent communities of Mountlake Terrace, Lynnwood, Lake Forest Park, Shoreline, and Snohomish County on SWMP-related issues.

The City continues to commit a Council Member, a staff person (Stormwater Technician or Stormwater Engineer as available), and annual funding to the Lake Ballinger/McAleer Creek Forum (the Forum). This is a multi-agency group, consisting of the City of Edmonds, City of Mountlake Terrace, and City of Lake Forest Park, which works with residents on the lake to address water quality and flooding concerns on Lake Ballinger and along the downstream McAleer Creek. The Forum is looking to expand and add members from Lynnwood and Shoreline to incorporate agencies which have lakes (Halls and Echo) which contribute to Lake Ballinger. Last year included the development and implementation of an aquatic vegetation management plan, funded by Ecology grants. The Forum has also joined the Snohomish County lake monitoring program and has a resident volunteer who is collecting data to track and map the health of Lake Ballinger. For the first time in years, new data is populating the Snohomish

County's webpage for Lake Ballinger[4] and Snohomish County is producing a 'report card' regarding the health of the lake. A copy of the *Lake Ballinger 2020 Health Report* is attached as Appendix E.

City staff also regularly attends STORM meetings and regional NPDES Coordinators meetings with other agencies to share and collaborate on ways to meet permit requirements and improve stormwater programs. The national convention 'StormCon' happens to be in Seattle this year and we have the Stormwater Engineer, Stormwater Technician, GIS Technician, and Stormwater Lead all planning to attend to keep up on current best practices and products which can assist with maintaining a healthy and functional storm system.

The City partners with the Snohomish Conservation District (SCD) to implement smaller scale LID retrofits within the City. The stormwater technician and SCD worked to gather three willing residents, in an impacted drainage basin, and provided partial funding, design, and installation of rain gardens on each of their private properties. Our partnership has produced similar projects in the past, and another cluster of rain gardens is being pursued currently with residents on another street; preliminary feedback is looking like this could be the largest rain garden project yet.

The City has also continued its partnership with Snohomish County, as the lead of the *Enhanced Natural Yard Care* educational program. The City continues to work jointly with as Sound Salmon Solutions, who operate the Willow Creek fish hatchery in Edmonds. And the City continues to provide financial and staff support to the extra-curricular club at the local high schools called *Students Saving Salmon*; see education and outreach section for more information.

Puget Sound Starts Here banner hung on at a City park during *Puget Sound Starts Here* Month.

1.3 Document Organization

The remaining sections of this document have been organized to follow the sequence of the Permit requirements S5.C.1 through S5.C.8, as well as for S8 (*Monitoring and Assessment*). Permit requirements, current/ongoing activities, and planned activities for each of the required elements are presented.

[4] https://snohomishcountywa.gov/5353/Ballinger

FIGURE 1 – City of Edmonds Organizational Chart

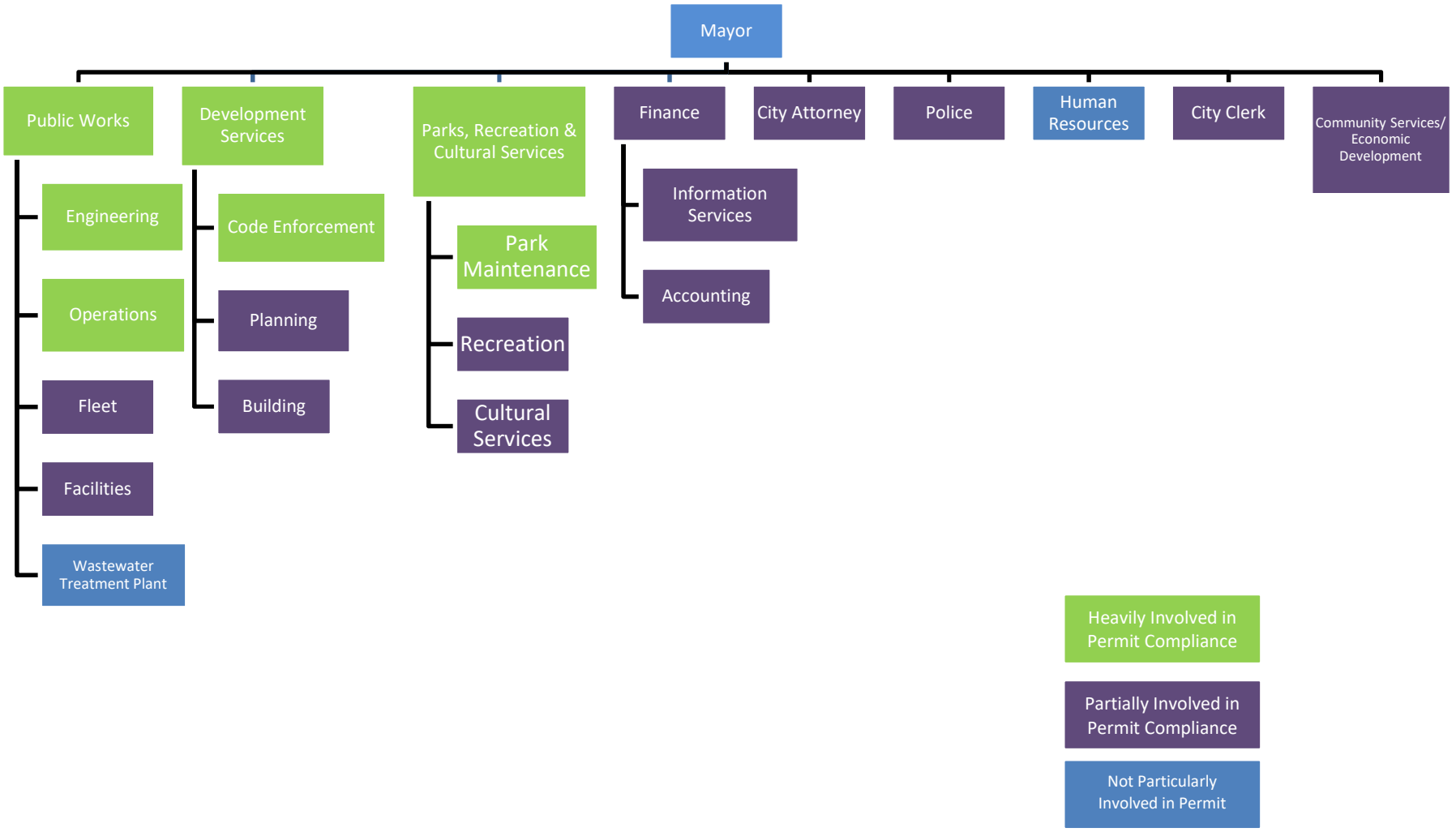
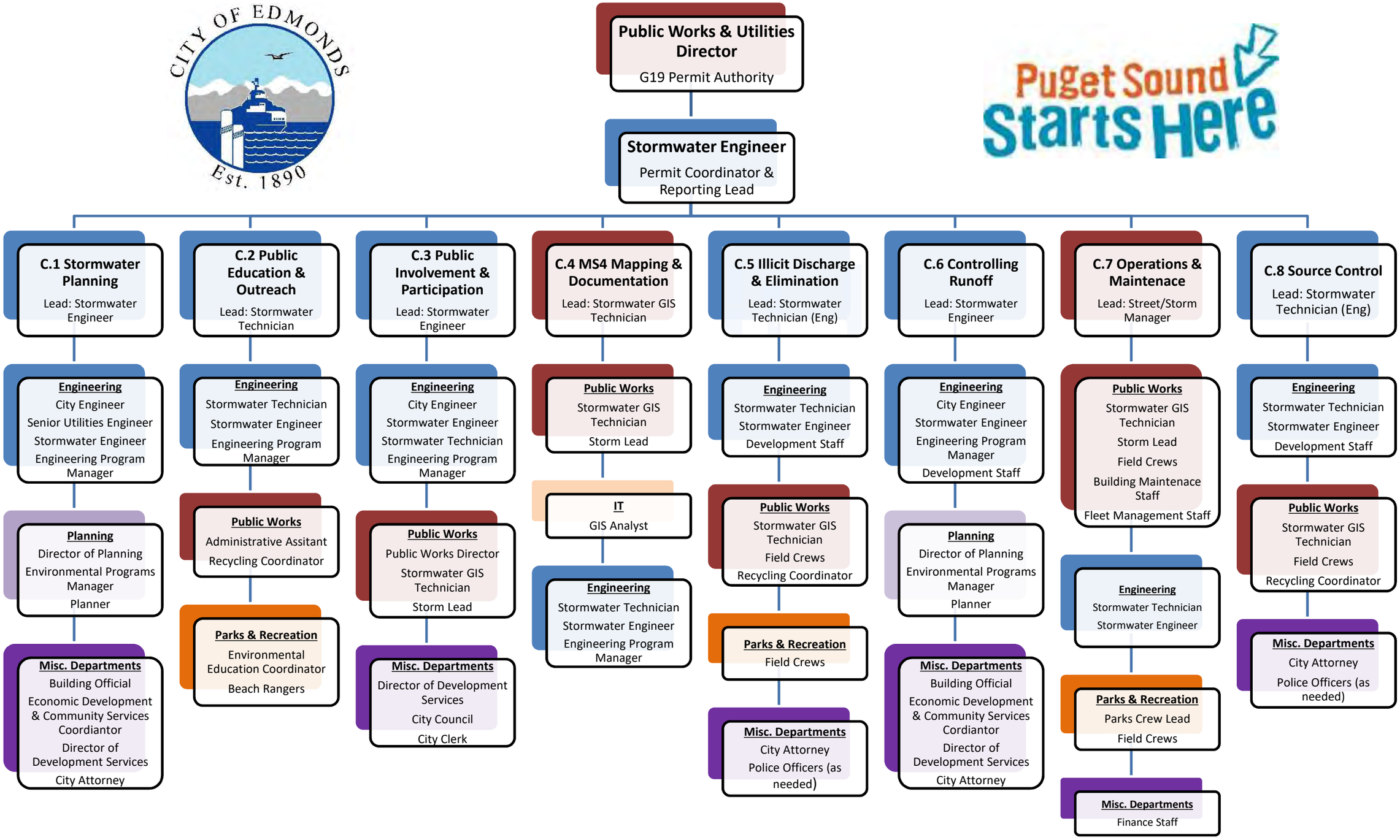


FIGURE 2 – City of Edmonds Municipal Permit Roles & Responsibilities



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2 STORMWATER MANAGEMENT PLAN ELEMENTS

2.1 Stormwater Planning

The SWMP requirements for the Stormwater Planning section (Section S5.C.1) of the Phase II permit are summarized below, followed by a description of the ongoing and planned SWMP activities that meet these requirements.

2.1.1 Permit Requirements

The Stormwater Planning section (Section S5.C.1) is an entirely new section for this permit cycle and the new requirements are implemented over the course of the permit life. Appendix A includes a quick visual of implementation timelines. Section S.5.C.1 requires that each permittee:

- Form an inter-disciplinary team by August 2020 to develop and implement a storm water planning program
- Coordinate with other City long-range plans
- Maintain and update codes to make LID the preferred alternative
- Submit a Stormwater Management Action Plan (SMAP) per Ecology's requirements, with intermittent submittals scheduled prior to final plan due date of March 31, 2023

Staff-gauge remnant from previous basin study conducted in Perrinville Creek; the City has several basin studies completed already.

2.1.2 Continuing/Ongoing Activities

As a new section of the permit, there are no continued activities for this requirement. However, it should be noted the City has conducted several major basin studies in the past years and generally believes it has developed a program which meets the intent of the Ecology prescribed requirements. So while the requirement is new, City staff view this section as a modification of our existing practices in order to meet the specific requirements of the Permit, rather than a completely new work effort.

The City of Edmonds remains wary of how this section will be expanded in future permit cycles and will continue to object strongly to any further Permit revisions which require the obligation of City funding to complete projects at Ecology's direction. We maintain that local jurisdictions should be allowed to control their own budgets and that local agency staff understand best how to manage and balance local resources and challenges to achieve measurable results, including balancing those resources through emergencies conditions such as the COVID-19 outbreak.

2.1.3 Planned Activities

The interdisciplinary team members have been identified and a meeting will be held shortly after the annual report and this SWMP plan are completed and submitted to Ecology. The team represents a wide range of functions and perspective across various departments. This year's meetings will be focused on identifying timelines and places in the Comprehensive Plan which can have stormwater impacts, as well as identifying a priority basin for further planning preparation.

The stormwater engineer meets regularly with development reviewers and inspectors to understand what is, or is not, working with the current stormwater codes and maintains a list of desired code changes to be implemented when stormwater codes are next updated. Generally, the City believes its codes are requiring the use of LID as the preferred alternative fairly well; however, minor adjustments have been noted for future updates to make some areas more clear, and/or result in more repeatable results in the field. Ecology has formally issued the updated *Stormwater Management Manual for Westerner Washington* (SWMMWW) and the City would like to begin updating the stormwater codes as soon as feasible, as workloads allow. S5.C.6 requires an update of the code to reflect the new SWMMWW by June 30, 2022 and the City will comply with this requirement at a minimum, if unable to achieve sooner.

As stated above, the City has many existing basin plans and studies which have been conducted throughout the City. The stormwater engineer will conduct a thorough review of the available information, reports and plans, before beginning a new work effort to generate the required SMAP. Staff believes the City may have documents which already meet the *intent* of the SMAP, and may begin asking Ecology to review these documents for concurrence with such determinations, prior to formally submitting them to satisfy S5.C.1. In particular, the Perrinville Creek drainage basin has been a basin of concern for several years and the City has been actively working to increase infiltration throughout the drainage basin, in order to offset the impacts of urbanization on this creek, with a combination of private and public projects ranging from rain garden clusters to large infiltration systems with underground injection wells.

2.2 Public Education and Outreach

The annual report filed with Ecology requires this information to be submitted as a standalone document. Thus, this section is included as Appendix C of this report; the entirety of the appendix is also included with the annual report submittal. See Appendix C for more information pertaining to *Public Education and Outreach* (S5.C.2)

The City's Development Services Lobby at City Hall includes the *Green Resource Center* to connect residents with information and freebies for good storm water practices and other sustainable practices which can benefit the environment

2.3 Public Involvement and Participation

The SWMP requirements for *Public Involvement and Participation* (Section S5.C.3 of the Phase II permit) are summarized below followed by a description of the recent and planned SWMP activities that meet these requirements.

2.3.1 Permit Requirements

Section S5.C.3 of the Phase II Permit states that Permittees shall provide ongoing opportunities for public involvement and participation through advisory councils, public hearings, watershed committees, participation in developing rate-structures, or other similar activities. The new Permit had relatively minor changes to this section and mostly represents a continued effort of the previous Permit cycle. Each Permittee shall comply with applicable state and local public notice requirements when developing elements of the SWMP. The minimum performance measures are:

- Permittees shall create opportunities for the public to participate in the decision-making processes involving the development, implementation and update of the Permittee' stormwater management program and components.
- Each Permittee shall post on their website their SWMP Plan and the annual report required under S9.A no later than May 31 each year. All other submittals shall be available to the public upon request.

Student volunteers get hand-on experience classifying fish as part of the *Student Saving Salmons Club*; the City provides financial support as well as coordination of activities, such as this electro-fishing effort, to support learning and stewardship.

2.3.2 Continuing/Ongoing Activities

The Permit had relatively minor changes to this section but requires that the City continue to provide ongoing opportunities for the public to participate in SWMP decision-making, and to post the annual report for previous calendar year and updated SWMP Plan to the City's website by May 31st each year. [5]

[5] http://www.edmondswa.gov/stormwater-utility-system/phase-ii-municipal-stormwater-permit-compliance-npdes.html

The City's website also provides a portal for residents to contact staff and voice their opinions regarding the SWMP and includes contact information for City stormwater staff, or all City staff[6]. Stormwater staff is also accessible to answer question or take feedback from walk-in residents at the permit counter (temporarily suspended due to COVID-19 precautions).

The City's budget is updated annually and includes a public hearing to allow for citizen input on stormwater proposals brought forth by the City. Stormwater utility rates were adopted January of 2019, and included several public hearings as the plan was revised at Council's direction. Many of the Council directed revisions were in response to public input they had received directly from citizens. Public hearings are also held before major code updates, including prior to the next round of required stormwater code updates, and allow the public to get involved in helping shape the stormwater policies of the City. There will also be public hearings and workshops associated with any updates to the City Comprehensive Plan which result from the efforts to comply with new *Stormwater Planning* section of the Permit.

City staff hosts a booth at the *Watershed Fun Fair* to share information with resident and answer questions.

2.3.3 Planned Activities

The plan is to continue with open and clear communication as is required, which falls in line with Edmonds standard practices. The new Mayor has identified a specific desire to refine communication with the Public; stormwater messaging and public involvement will be included in any review or improvements made in our public communication strategies. Very limited new work will be done this year for this Permit section. However, as a strategy for addressing *stormwater planning* requirements becomes evident, staff will begin to have a better idea of the public communication and outreach necessary for those elements. The City's stormwater comprehensive plan, specific to stormwater operations, will be updated in 2022, prior to the end of the currently approved utility rate adjustments (which sunset at the end of 2022). As a major document driving much of the future decision making in stormwater, the stormwater comprehensive plan update process will involve significant public outreach and communication.

[6] http://www.edmondswa.gov/homepage/contact-us.html

2.4 MS4 Mapping and Documentation

The SWMP requirements for the *MS4 Mapping and Documentation* section (Section S5.C.4) of the Phase II permit) are summarized below, followed by a description of the ongoing and planned SWMP activities that meet these requirements.

2.4.1 Permit Requirements

Section S5.C.4 of the Phase II permit is now *MS4 Mapping and Documentation*, which is technically a new section of the permit. However, it is more of a re-organization of existing requirements which were previously under other sections of the Permit. Most requirements are not actually new requirements. The revised permit section requires:

- Continue mapping the City' MS4 system
- New mapping requirement to add pipe size and material, areas not discharging to surface water, and private connections to the public system.
- Mapping format must be electronic and meet certain mapping standards by August 2021.

Staff maps an outfall in the Puget Sound at low tide.

2.4.2 Ongoing Activities

A majority of the City mapping effort has been completed in previous Permit cycles and can be viewed by anyone at the simplified URL: www.maps.edmondswa.gov. However, stormwater staff includes a GIS Technician responsible for mapping all new, or discovered public storm water systems. The stormwater and GIS technicians coordinate directly to identify mapping improvements for operational needs. This includes coordination with the development services staff to create facility files which include as-built plans and necessary drainage information for future inspection programs. Currently significant effort is being expended to update information in the mapping system for private drainage systems. While not specifically a permit requirement, staff believe that building out the GIS mapping to this level will improve efficiencies and

communication with the public and crews when responding to other issues (IDDE, spill response, private facility inspection, source control, etc.).

The City mapping system is already created in a standard ArcGIS format, readily shareable as shape files, and already includes most of the additional information added during this Permit cycle. Pipe sizes and materials are all identified as attributes within the system as well as whether any given feature discharges to an infiltration system. The original data gathering effort even noted where private connections were found previously.

2.4.3 Planned Activities

As noted above, the City has collected most of the additional data required to comply with the newest mapping requirements. Pipe size and material are already readily accessible on the map as attributes. Hidden in attributes previously was a toggle identifying if any feature drained to an infiltration basin (i.e. did not contribute to surface waters); the online map was modified to visually show this feature. Pipes and basins draining to infiltration basins now show in purple, as compared to the green used for surface water discharge pipes and basin. The notes section of each basin or manhole attribute also includes information about what connections were observed at that location. This year, staff will begin reviewing the notes data to create dummy pipe stubs in the mapping system to reflect, and easily show, the location of private connections to the MS4. Blind tees and mid-span connections will be added as found during field inspections (using our new video truck as of last year). With this minor work effort, the City believes it will be fully compliant with this permit section.

2.5 Illicit Discharge Detection and Elimination

The SWMP requirements for the *Illicit Discharge Detection and Elimination* (IDDE) section (Section S5.C.5) of the Phase II permit are summarized below, followed by a description of the ongoing and planned SWMP activities that meet these requirements.

City crews respond to a spill on a dry summer day.

2.5.1 Permit Requirements

Section S5.C.5 of the Phase II permit states that the SWMP shall include an ongoing program designed to prevent, detect, characterize, trace and eliminate illicit connections and illicit discharges into the MS4. The minimum performance measures are:

- Each Permittee shall implement an ordinance or other regulatory mechanism to effectively prohibit non-stormwater, illicit discharges into the Permittee's MS4 to the maximum extent allowable under state and federal law.
- Each Permittee shall implement an ongoing program designed to detect and identify non-stormwater discharges and illicit connections into the Permittee's MS4.
- Each Permittee shall implement an ongoing program designed to address illicit discharges, including spills and illicit connections, into the Permittee's MS4.
- Permittees shall train staff who are responsible for identification, investigation, termination, cleanup, and reporting of illicit discharges, including spills, and illicit connections, to conduct these activities. Follow-up training shall be provided as needed to address changes in procedures, techniques, requirements or staffing. Permittees shall document and maintain records of the training provided and the staff trained.
- Recordkeeping: Permittees shall track and maintain records of the activities conducted to meet the requirements of this section. The reporting shall collect certain data and provide it in an Ecology prescribed schema each year.

Local business owner receives free spill kit and training as part of the City's partnership with ECOSS..

2.5.2 Ongoing Activities

The Permit requires the City to continue implementing the enforceable mechanism to prohibit illicit discharges, have municipal staff training on illicit discharge detection, elimination and response, host a citizen hotline, but does not include any major new requirements except to record and report IDDE investigations in a certain Ecology prescribed schema. The City is currently implementing all of these activities and has IDDE specific code in ECDC 7.200 which were created and adopted in compliance with previous Permit cycles. The City of Edmonds plans to continue all operations except as noted in *Planned Activities* below.

The following is a summary list of IDDE program activities for 2019 to comply with the Phase II permit, Section S5.C.3; a more complete summary description can be found in Appendix D:

- Responded to 50 different IDDE related reports, only 12 of those impacted the MS4 and none were believed to reach receiving waters.
- Dry-weather tested 30 separate outfalls; no IDDE concerns found.
- Began new screening method utilizing video inspection; completed roughly 32% of the City piped system.
- Continued field screening of the City's stormwater drainage system by "look-and-lift" to facilitate the detection of illicit connections and non-stormwater discharges; 24% in 2019.
- Evaluated IDDE program based on reviews of responses to spill incidents and other investigations of illicit discharges or connections.
- Continued to ensure all appropriate staff are properly trained on IDDE and spill response and inspection staff maintain CESCL certifications.

- ECOSS reached out to 11 new businesses and re-visited 10 additional businesses; providing spill kits and translated stormwater and spill response education to business. Since 2013, ECOSS has now connected with 158 Edmonds businesses via this program.

City-owned outfalls to Puget Sound through the seawall; the City MS4 is impacted by tides cycles

2.5.3 Planned Activities

The coming year does not require any major revisions to the City's current IDDE program. With the addition of the stormwater department's new video inspection truck, the City is attempting to switch its IDDE screening method from "look-and-lift" at catch basin and manholes, to actual in pipe video inspection. Staff believes that more video inspection will benefit the MS4 and wants to swap to this method as an operational improvement. However, the catch basin inspection program (as required per Section S5.C.7) provides a lot of overlap with the current IDDE screening method, and the video inspection method usually requires formal traffic control which adds significant cost and labor in order to complete. It is not clear that current resources and workloads can fully support both programs at the Permit prescribed minimums. So the City is testing the new methodology, while continuing to gather IDDE data via the catch basin inspection program. The video program was extremely successful this year and we hope to continue this effort. However, if workloads do not permit sufficient time for the video inspection to reach Permit-prescribed minimums, the City may have to revert back to the original screening method in future years.

The stormwater technician has already updated the standard field reporting form that City field-staff use to document spills or illicit discharge issues to align with the revised Ecology schema for reporting. Training on the revised form was conducted at an all-staff meeting and the forms were distributed to field-vehicle kits along with spill kits to aid in response. With the new form ensuring that field staff is gathering the correct information, the City believes it is aligned to comply with the new schema requirements.

2.6 Controlling Runoff from New Development, Redevelopment, and Construction Sites

The SWMP requirements for the *Controlling Runoff from New Development, Redevelopment, and Construction Sites* section (Section S5.C.6) of the Phase II permit are summarized below, followed by a description of the ongoing and planned SWMP activities that meet these requirements.

A recently permitted and installed rain garden located in a commercial parking lot

2.6.1 Permit Requirements

Section S5.C.6 of the Phase II permit remains predominately the same as in previous years. Minor changes were made to require adoption of an updated stormwater manual, relocate private facility maintenance text to the *Operations and Maintenance* section, and remove the watershed-scale planning requirement from this section. The Permit lists the following requirements, only the first one is new:

- Revise stormwater codes to adopt the updated 2019 SWMMWW, or equivalent, by June 30, 2022
- Develop and implement an ordinance or ordinance revisions that address runoff from new development, redevelopment, and construction projects in a manner that meets the minimum requirements established by Ecology.
- Develop and implement a site planning process and selection and design criteria for best management practices (BMPs) that will protect water quality and reduce the discharge of pollutants to the maximum extent practicable.
- Develop and implement an approval process for new development that includes inspections of and enforcement of maintenance standards for private stormwater facilities.

- Develop and implement provisions in development code regarding techniques for low impact development (LID) that make LID the preferred and commonly-used approach to site development, in order to minimize impervious surfaces, native vegetation loss, and stormwater runoff in all types of development situations.
- Develop and implement a permitting process with plan review, inspection, and enforcement capability for both public and private projects to ensure sufficient stormwater management, proper installation and maintenance of erosion control BMPs and permanent stormwater facilities, and assignment of responsibility for post-construction maintenance.
- Inspect all construction sites before construction if they exhibit high potential for sediment transport during construction to ensure adequate erosion and sediment control BMPs, and again upon completion of construction to ensure proper installation of permanent stormwater controls.
- Provide access to Notice of Intent (NOI) letters to representatives of proposed new development and redevelopment projects that require a Construction General Stormwater Permit or an Industrial Stormwater General Permit from Ecology.
- Train City staff responsible for implementing the program described above, including staff involved with permitting, plan review, construction site inspections, and enforcement.

2.6.2 Ongoing Activities

The City will continue to implement and enforce City codes addressing construction/post-construction runoff controls, make Notice of Intents (NOIs) available for sites that require a Construction Stormwater General Permit or an Industrial Stormwater General Permit from Ecology[7], perform site plan reviews and permitting per the Edmonds Community Development Code (ECDC) Chapter 18.30 (Stormwater Management), perform construction, and train staff in all aspects of this Permit requirement.

City codes were fully updated during the previous Permit cycle, but ECDC 18.30 also includes two provisions which demonstrate Edmonds commitment to stormwater management above the minimum requirements. The first is the addition of detention tanks at the end of the Ecology provided lists for LID BMPs. On many reviews in the City of Edmonds, which is plagued with till soils and steep slopes in many areas, this revision is the only way that stormwater mitigation is achieved on smaller projects. The City also has a 'retrofit' requirement, which requires re-development projects, which meet drainage review thresholds, to mitigate for a portion of their existing unmitigated surfaces. The two provisions result in requiring mitigation (on smaller projects) which otherwise would not be required by the minimum provisions of permit Appendix A and proactively make an attempt to correct the existing impacts that urbanization has already had on stormwater in the City.

[7] Provided Ecology keeps it in a publicly available location on their website.

In Edmonds, all drainage reviews go through the stormwater engineer, who is the same person tasked with managing the stormwater code, and training other development staff in the stormwater related elements of their inspection work. The City issued 109 new permits that required stormwater review under these codes in 2019 (not all have facilities which necessitate inspection per S5.C.7). Every site is inspected for erosion & sediment control measures prior to clearing or grading. Including already issued permits and permits which did not require drainage review (but still require some form of erosion or sediment control inspection), 246 sites were inspected and 5 formal enforcement actions were taken to address stormwater or erosion control violations.

The re-arrangement of post-construction inspection and maintenance to the operations & maintenance section of the permit brings the permit more in alignment with operational procedures in Edmonds. Post-construction inspections are led by the Stormwater Technician, who is separate from the other development related tasks that the City supports; see Section 2.7 for more details regarding post construction inspections.

Erosion and sediment control violation at a development site which required additional enforcement action.

2.6.3 Planned Activities

As noted above, the changes to this section are minimal, and the City intends to continue all development-related programs currently in place. The storm water engineer has a running list of desired code revisions derived from lessons learned while reviewing projects under current codes. The City would like to update stormwater codes to the newest manual as soon as is possible; however, current workloads may not allow for the desired schedule. The City will of course elevate the priority of this effort as the Permit-required date approaches, in order to ensure compliance. The only major change the City plans to propose at this time is the removal of *perforated pipe connections* from the LID BMP lists, or to elevate the Edmonds option for detention as preferred above that particular BMP. No discussions to this effect have been started with Ecology staff to date though.

2.7 Operation and Maintenance

This section summarizes Phase II permit requirements related to *Operation and Maintenance* of stormwater system and facilities (Section S5.C.7) and describes current and planned SWMP activities related to these requirements.

City crews perform maintenance at City-owned sediment control device installed in Perrinville Creek

2.7.1 Permit Requirements

Section S5.C.7 of the Phase II permit lists the following requirements:

- Develop and implement standards for stormwater facility maintenance that are equivalent to those included in Ecology's Stormwater Management Manual for Western Washington.
- Inspect all permanent stormwater treatment and flow control facilities permitted by the City since the first Permit cycle annually, or reduced schedule as supported by field observation/data, and take appropriate maintenance enforcement actions.
- Inspect municipally owned or operated permanent stormwater treatment and flow control facilities annually, or reduced schedule as supported by field observation/data, and take appropriate maintenance actions.
- Conduct spot checks of potentially damaged permanent treatment and flow control facilities after major storm events.
- Inspect, and clean if necessary, all catch basins and inlets owned or operated by the City at least once by August 1, 2017, and then every two

years thereafter. Compliance will be determined by the presence of an established inspection program designed to inspect all sites and achieving 95% of inspections.

- Establish and implement policies and procedures to reduce storm water impacts from all lands owned and maintained by the City, including parks, open space, road rights-of-way, maintenance yards, and stormwater treatment and flow control facilities. With new documentation required by end of 2022.
- Develop and implement an ongoing training program for City employees whose construction, operations, or maintenance job functions may adversely affect stormwater quality.
- Develop and implement a stormwater pollution prevention plan (SWPPP) for all heavy equipment maintenance or storage yards and material storage facilities owned or operated by the City.
- Maintain records of inspections and maintenance or repair activities.

City crews repairing a storm main

2.7.2 Ongoing Activities

The City continued to maintain the MS4, inspect stormwater treatment and flow control facilities, perform spot checks of facilities on a regular basis (especially after large storm events), follow the SWPPPs for public storage and materials yards, and provide appropriate staff training.

The City is currently operating on a reduced inspection cycle for public facility inspections and for catch basin inspections. Documentation for both reduced schedules was provided in previous Permit cycles and both reduced schedules were utilized in previous years.

The City has had many of their facilities for decades and have extensive inspection data on many, very few inspections required any maintenance activity beside the routine cleaning that is done at the time of inspection. City inspection records did not indicate excessive wear or buildup of sediment in most traditional facilities. Accordingly, the City inspection of public facility was reduced to a 3-year cycle. The City data led to the conclusion that a reduced schedule of three years would be sufficient, with roughly 33% of the City-owned facilities required to be inspected annually. One exception has been made for Filterra devices and any other 'wetland-in-a-box' type BMPs; the City has limited experience or data with these devices and is inspecting these annually until their performance is better understood.

A new GIS Technician was hired late in 2019 (to fill a vacated position) and had a late start on achieving all of the required public facilities inspection. However, as an experience member previously part of our operations crews, he was able to hit the ground running and was able to reach the minimum goal of 33% public facility inspections.

City video inspection truck gathering valuable pipe condition data and performing IDDE screening

The City also has a unique catch basin inspection program which cleans and inspects the basin at the same time. The previous permit coordinator had reviewed the extensive backlog of catch basin inspection data and determined that a three-year cycle was sufficient for the City to meet compliance. The current permit coordinator re-reviewed the data in 2018 and reached the same conclusion. The City CB program now inspects *and cleans* all catch basins and manholes within the entire City on a 3-year cycle. IDDE screening by 'look-and-lift' is also done during this inspection process.

This year the City was only able to inspect about 24% of the catch basins. However, the City has made plans to ensure the full 3-year cycle can be completed on time (see *Planned Activities* below).

In 2018, the City filed a G20 letter pertaining to private facility inspections and had not fully satisfied the requirements of the Permit. As part of evaluating the short fall in early 2019 (prior to filing the 2018 Annual Report), the City did a massive cleanup of the private facility data base and revised the procedures for private facility inspection. With new facilities added this year, the total number of private facilities requiring inspection is 85 facilities. Of those, all 85 were inspected this year and approximately 88% of those inspected, did not require any maintenance. The City has gotten this program back on track and fully compliant. The City is now building a backlog of private inspection data to be evaluated for a reduce frequency cycle in future years.

While the permit requirements apply to a certain list of facilities as defined by the Permit, Edmonds has had drainage codes as early as 1977 and has many private drainage systems that have not been maintained for decades. Generally, staff believes that inspection of these neglected systems achieves far more good than inspection of new systems built to modern standards. Accordingly, City-staff take on the non-permit-required effort to improve water quality by expanding the inspection program to pre-Municipal-Permit-built systems as workloads allow. An additional 19 private systems were inspected which were not necessarily permit-require facilities, and all of which required some form of maintenance activity and follow up. Increasing the number of non-permit-required inspections on these older systems is another reason staff wish to pursue a reduced inspection cycle on the formal permit-defined facilities.

Operation crew leads and managers continue to gather and document all work effort and cost associated with permit compliance.

2.7.3 Planned Activities

Except as noted below, the City plans to continue all *Operation and Maintenance* programs into 2020 without significant changes, including continued use of reduced inspection cycles for catch basin inspection and public facility inspection. However, improving City databases, mapping, and processes is a constantly evolving process and new minor improvements are being added to the system as technology, workloads, and known information changes.

The one minor short fall in 2019 was in the catch basin inspection program, where the City only inspected and cleaned 24% of the basins and manholes this year. A meeting was held with the Stormwater Engineer, Street/Storm Manager, Storm Lead, Storm Technician, and GIS Technician to evaluate the operations process and why the short fall occurred. It was ultimately decided that unforeseen emergency work and the additional video inspection work led to reduced hours on the catch basin inspection program. Unforeseen emergency work is unfortunately one of the things the City must be able to address, but it was identified that the catch basin inspection program was mandatory per the Permit, but that the video inspection work was not necessarily required (as long as the IDDE screening occurred in a different fashion). Not wanting to give up the valuable information being gained through the video inspection program, a multi-level approach was decided on. First, more man hours will be *planned* for the catch basins inspection program which is believe to be enough to get the City back on track for completing the 3-year cycle on time. But recognizing that plans may have to change, two methods for managing an unforeseen reduction in available man hours have been agreed upon. For a minimal loss of hours, the plan is to use contracted traffic control (possibly utilizing capacity funds) to support an improvement in operations. By contracting traffic control, the City can, for a relatively low cost, free up crew-members for performing the more technical work and can run the catch basin and video inspection programs with significantly less City manpower. However, if the loss of hours

is significant, the video inspection program will be reduced. This may drop the video inspection numbers below Permit-prescribed minimum screening values; at which point the City would have to revert back to the 'lift-and-look' method for the IDDE screening requirement. Staff believe this approach will ensure that the City is fully compliant with reaching its 3-year catch basin and manhole inspection (and cleaning) obligation despite being slightly behind in the current year.

As noted above, the move of private facilities inspections to this *Operation & Maintenance* section actually aligns better with City operations and roles. We believe the improvements made by the City to its private facility inspection program have been sufficient and will keep the City on track for permit compliance with this section.

The stormwater engineer will continue to review the private facility inspection data annually to determine if it supports a proposal for a reduced inspection cycle on private facilities. The hope is that this can be done to offset some of the workload added by the new *Source Control Program for Existing Development* section of the Permit. Reducing the need for the Stormwater Technician to inspect compliant facilities, will free them up to perform more source control inspections as well as more inspection on older private systems which are not permit-defined facilities.

In 2020, our first major storm drain maintenance project is scheduled to break ground. The City has established a robust maintenance program which is programmed to provide up to $1.5 million in storm drain maintenance projects each year. Funding is now available for this program and design is being finalized currently for the first major effort. Initial projects are aimed at replacing or repairing pipes with structural deficiencies which could present a safety hazard. Improvements in water quality are anticipated, as some of the pipes scheduled for maintenance have rotted-out bottoms which expose soils to erosion. Infiltration and LID BMPs are planned to be worked into the system where and when feasible, making small but consistent improvements in current stormwater conditions.

This year's work for the Operations Division included rescuing and dismantling a runaway, unpermitted dock in Lake Ballinger

2.8 Source Control Program for Existing Development

This section summarizes Phase II permit requirements related to the new *Source Control Program for Existing Development* section (S5.C.8) of the Permit and describes current and planned SWMP activities related to these requirements.

2.8.1 Permit Requirements

Section S5.C.8 of the Phase II permit lists the following requirements:

- Develop and adopt an ordinance, or other enforceable documents, requiring source control BMPs for pollution generating sources associated with existing land uses and activities by August 1, 2022.

- Compile an inventory that identifies businesses and sites which generate high rates of complaint response, and/or which are on an Ecology-provided list of businesses considered to have a high potential to generate pollutants to the MS4. Inventory shall be complete by August 1, 2022.

- By January 1 of 2023, implemented an inspection program which annually inspects 20% of the businesses identified on the inventory (above).

- By January 1 of 2023, implemented a progressive enforcement policy which requires compliance.

Trash enclosure area found during IDDE investigation; such sites will be targeted with new source control program in the future

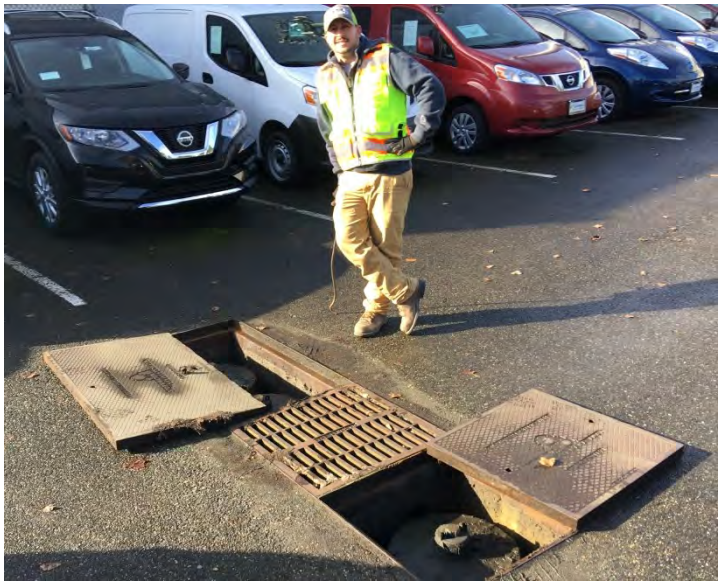
2.8.2 Ongoing Activities

This is an entirely new section of the Permit and all work associated with on-boarding this program is completely new workload to be shouldered by City budgets, staff, and resources. The City has completed its initial inventory as required per *Part ii* of this section. The initial list contains 274 businesses which would require inspection under the new program, which translates to roughly 55 inspections per year.

2.8.3 Planned Activities

Work on this section will be limited in 2020. It is unclear how much time or work effort is required for each inspection and is believed to vary greatly from business to business. The current plan is for the Stormwater Technician to perform and manage follow up for all source control tasks, while the Stormwater Engineer will lead the effort to update City codes as needed.

Staff remain concerned that elected officials may still object to passing an ordinance which could negatively impact businesses financially in the way that is demanded by this permit requirement; especially given the economic impacts of the current and on-going COVID-19 response. The Stormwater Engineer plans to lean heavily on existing Phase 1 permittees and initial Phase 2 agencies to comply with this section in order to mimic successful implementations and codes as much as feasible. However, we believe it is critical that this not be presented to Council until some normalization of the economy has occurred post COVID-19.



City technician during inspection of a water quality facility

2.9 Monitoring and Assessment (S8)

This section summarizes Phase II permit requirements related to stormwater *Monitoring and Assessment* (Section S8) and describes current and planned activities related to these requirements.

2.9.1 Requirements

Section S8 of the Phase II permit lists the following requirements:

- Regional Status and Trends Monitoring - Pay a fee to cover the permit extension period.
- Regional Status and Trends Monitoring - notify Ecology by December 1, 2019, whether the Permittee will pay into a collective fund to conduct stormwater discharge monitoring as prescribed in this Permit section.
- Stormwater Management Program (SWMP) Effectiveness and Source Identification Studies - Pay a fee to cover the permit extension period.
- Stormwater Management Program (SWMP) Effectiveness and Source Identification Studies - notify Ecology by December 1, 2019, whether the Permittee will pay into a collective fund to conduct stormwater discharge monitoring as prescribed in this Permit section.
- Provide information as requested to support Stormwater Action Monitoring (SAM) projects; maximum of three requests per cycle.

2.9.2 Recent/Ongoing Activities

The required notification for 2019 was filed and received by Ecology on November 18, 2019. The City has elected to pay into the collective fund in order to comply with this permit section. The alternative would require additional resources which would ultimately be more costly to the City.

2.9.3 Planned Activities

Nothing further than providing payments as invoiced is planned for compliance and the City plans to make prompt payment of any such invoices. The Stormwater Engineer will be tasked with responding to SAM request for information, as needed; but this work effort cannot be planned, as the nature of the requests are currently unknown.

3 APPENDICES

3.1 Appendix A – 2019-2024 Western Washington Phase II Municipal Permit Time Line

2019-2024 Western Washington Phase II Municipal Permit Time Line

SWE = Stormwater Engineer (Zack R) SWT = Stormwater Technician Engineering (Pat J)
OPS = Operations (Mike J/Tod M) GIS = Stormwater Technician Operations (Bryan C)

S5 Permit Components	Ongoing Program Implementation	2019	2020	2021	2022	2023	2024
A. Stormwater Management Plan	**Annually** update & submit the SWMP with Annual Report (S9) SWE - A.3.a. $ tracking: track the cost (or estimate) of development and implementation of each component of the SWMP OPS - A.3.b. activity tracking: track # of inspections, follow up actions, official enforcement, public ed activities SWT/ GIS						
A.5. Coordination	**Ongoing** coordination SWE			**By March 31:** Submit description of internal coordination mechanisms SWE			
C.1 Stormwater Planning		**Annually** assess and report LID code-related requirements. SWE	**By Aug. 1**: Convene interdisciplinary team to lead SW Planning program. SWE	**By March 31**: Respond to series of Annual Report (AR) questions describing SW Planning during 13-19 permit SWE	**By March 31:** Submit watershed inventory. **By June 30:** Document the prioritized and ranked list of receiving water basins. SWE	**By Jan. 1:** Submit report of responses to SW Planning AR questions for coordination of long range plans during this permit term SWE **By March 31:** Develop Stormwater Management Action Plan (SMAP) for at least 1 high priority area.	
C2. Public Education and Outreach	**Ongoing** implementation of ed & outreach		**By July 1:** Conduct new evaluation of	**By Feb 1:** Follow community-based social marketing			**By March 31:** Evaluate & report on

S5 Permit Components	Ongoing Program Implementation	2019	2020	2021	2022	2023	2024
	program elements SWT		effectiveness of current behavior change campaign SWT	practices, or similar, to develop or modify behavior change campaign tailored to the community SWT **By Apr 1:** Implement Strategy developed in S5.C.2.a.ii.(c)			implemented strategy SWT
C.3 Public Involvement and Participation	**Ongoing** -Create opportunities for public, inclunding overburdened communities, to participate in SWMP and SMAP - Post to website SWMP and Annual Report by **May 31** each year SWE / SWT						
C.4 MS4 Mapping and Documentation	**Ongoing** Maintain mapping data GIS		**By Jan 1:** Begin to collect size and material for all known MS4 outfalls GIS	**By Aug 1**: mapping data in electronic format with fully described mapping standards GIS		**By Aug 1**: Complete mapping all known MS4 connections to privately-owned stormwater systems GIS	
C.5 Illicit Discharge Detection and Elimination	**Ongoing** - Implement program to probihit, address, and eliminate illicit discharges. - Train staff SWT	**By Aug 1**: Begin tracking total % of MS4 screened OPS	**By Mar 31**: MAY Begin using WQwebIDDE form for annual reporting - If using own tracking: submit as much of the info as SWT possible in	**By Mar 31**: Required to use WQwebIDDE form for annual reporting SWT - If using own tracking: submit .xml file that follows the schema, but may submit	**By Mar 31**: If using own tracking system for recordkeeping, submit a .xml that follows the data schema SWT		

S5 Permit Components	Ongoing Program Implementation	2019	2020	2021	2022	2023	2024
			format requested (or similar)	alternative formats (i.e. .xls,.csv, .txt)			
C.6 Controlling Runoff	-Implement & enforce program to reduce pollutants in runoff. -Train staff. SWE				**By June 30:** Adopt and make effective program that meets requirements of App. 1 or equivalent PH I program.(See permit for other dates) SWE		
C.7 Operations and Maintenance	-Inspect & maintain stormwater facilities and catch basins controlled by & regulated by the Permittee. - Implement practices, policies, and procedures to reduce SW impacts from all permittee lands. -Train staff. OPS				**By June 30:** Update maintenance standards **By Dec 31:** Document practices, policies, and procedures to reduce SW impacts from all permittee lands. **By Dec 31:** Update SWPPPs for heavy equipment maintenance or storage yards/facilities. OPS / SWT		
C.8 Source Control					**By Aug 1:** -Adopt & make effective ordinances requiring source control BMPs. -Establish inventory of properties with SWE / SWT	**By Jan 1:** -Implement inspection program -Implement progressive SWE / SWT	

S5 Permit Components	Ongoing Program Implementation	2019	2020	2021	2022	2023	2024
					potential to generate pollutants to Permittee's MS4	enforcement policy - Train staff	

S8 Monitoring and Assessment

S8 Permit Components	2019	2020	2021	2022	2023	2024
S8.A Regional status and trends monitoring	**By Dec 1:** submit payment to collective fund if payed into during 2013 permit. - Submit written notification of option selected SWE	**By Aug. 15:** If option chosen, make annual payments to collective fund SWE				
S8.B SWMP Effectiveness and Source ID	**By Dec 1:** submit payment to collective fund if payed into during 2013 permit. -Submit written notification of option selected SWE	**By Aug. 15:** If option chosen, make annual payments to collective fund SWE				
S8.C Stormwater discharge monitoring		**By Feb 1**: If option chosen, submit draft QAPP for review and approval **By Aug 15**: submit final QAPP for approval within 60days of receiving approval of draft **By Oct 1**: Begin flow monitoring	**By Oct 1:** Fully implement discharge monitoring	**By Mar 31:** Annual report data and analysis in accordance with QAPP. Enter water & solids concentrations data into EIM		

Other significant elements of the permit All items below are for SWE

S1 Application for coverage	Co-Permittees can end or amend agreements at any time.
S4.F Response to violations of Water Quality Standards	Notification and possible adaptive management may occur at any time.
S7 Compliance with Total Maximum Daily Load (TMDL) Requirements	Comply with applicable TMDL requirements listed in Appendix 2 per individual timelines.
S9 Reporting	Keep all records related to the permit for at least five years. Beginning March 31, 2020, annually submit a report for the previous calendar year using WQwebPortal.

G3 Notification of Discharge Including Spills: Report discharge into or from the MS4 which could constitute a threat to human health, welfare or the environment	Discharge to water: Call Emergency Management Division (EMD) 1-800-645-7911 or 1-800-258-5990 Discharge to/from MS4: Report to Ecology within 24 hours (do not need to report if EMD has been called).
G.18 Duty to Reapply	Apply for permit renewal no later than Feb. 2, 2024 (180 days before permit expiration).
G20 Non-compliance Notification	Notify Ecology within 30 days of becoming aware of permit non-compliance.

3.2 Appendix B – G19 Permit Authority Letter

CITY OF EDMONDS

121 5TH AVENUE NORTH · EDMONDS, WA 98020 · 425-771-0220 · FAX 425-672-5750
Website: www.edmondswa.gov

PUBLIC WORKS DEPARTMENT
Engineering Division

MIKE NELSON
MAYOR

March 13, 2020

Department of Ecology NWRO
Attn: Colleen Griffith
3190 - 160th Ave. SE
Bellevue, WA 98008-5452

Subject: G19 Certification and Signature
Western Washington Phase II Municipal Stormwater Permit (WAR04-5513)

Dear Ms. Griffith:

This letter is submitted as allowed under federal regulations 40 CFR § 122.22 and in reference to the National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for discharges from Small Municipal Separate Storm Sewers, Phase II Municipal Stormwater Permit (WAR04-5513) and successive NPDES permits for City of Edmonds municipal stormwater discharges. As allowed by law, the City can authorize a representative to sign, on behalf of the principal executive officer or ranking elected official, all reports and other information submitted to the Washington State Department of Ecology.

This letter shall serve as authorization under permit section G19.B, and shall formally and specifically authorize the Director of the Public Works and Utilities Department, City of Edmonds, to sign on my behalf any documents required by the permit and any other official correspondence related to the NPDES program that would otherwise bear my signature, to the full extent allowed by permit or law. The current person in this role is Phil Williams, however, this authorization is intended to run with the position/title of Public Works Director.

In accordance with Permit section G19:
I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that Qualified Personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for willful violations.

Sincerely,

Mike Nelson
Mayor

cc: Phil Williams, Director, Public Works and Utilities
Zachary Richardson, Stormwater Engineer

3.3 Appendix C – Public Education and Outreach Activities for 2019

City of Edmonds
Public Education and Outreach Activities for 2019

Public Education and Outreach (S5.C.2)

The required elements for a public education and outreach program (Section S5.C.2 of the Permit) are summarized below, followed by a description of the ongoing and planned SWMP activities that meet these requirements.

The residential rain garden program produced aesthetically pleasing examples of rain gardens that attract public interest and include educational signage of the benefits of rain gardens. [Photo taken Oct. 5, 2019]

Permit Requirements

Permit Section S5.C.1 states that the SWMP shall include an education and outreach program designed to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts and encourage the public to participate in stewardship activities. The education program may be developed and implemented locally or regionally. The Permit lists the following minimum performance measures for compliance with this element. Each Permittee shall:

- Provide an education and outreach program for the area served by the MS4. The program shall be designed to educate target audiences about the stormwater problem and provide specific actions they can follow to minimize the problem.

- Create stewardship opportunities and/or partner with existing organizations to encourage residents to participate in activities such as stream teams, storm drain marking, volunteer monitoring, riparian plantings and education activities.

- Measure the understanding and adoption of the targeted behaviors for at least one target audience in at least one subject area. No later than July 1 2020, permittees shall use the resulting measurements to direct education and outreach resources and develop a strategy to affect behavior change. Permittees may meet this requirement individually or as a member of a regional group.

Continuing & Ongoing Activities

Our approach and priorities for education and outreach has been informed by surveys conducted in 2009 and 2013, which measured the public's knowledge and practices regarding stormwater, and helped inform priorities for specific topics to be addressed in our community. These results, as well as the requirements of the current Phase II Permit, continue to be a guide for our Public Education and Outreach Program (see Table 1).

The Permit requires the City to continue a public education and outreach program and measure changes in behavior for at least one audience in at least one subject area. Since Edmonds is predominantly residential, we have focused on educating homeowners on natural yard care techniques to encourage them to protect water quality; this work is done in partnership with regional organizations who lead the effort to implement and evaluate the program's efficiency.

A City of Edmonds partner organization, Students Saving Salmon, provides a fun learning opportunity to kids attending the Watershed Fun Fest. These interactive games help teach kids the benefits of clean water in our ecosystem. [Photo taken May 4, 2019]

Other topics we focus on include proper storage and disposal of pesticides, fertilizers and other household chemicals, BMP's for pet waste management, carpet cleaning, and auto and home repair and maintenance.

The City continues to partner with numerous organizations to encourage residents' involvement in educational opportunities. Current and ongoing partnering organizations to include non-permittees:

- Snohomish County Surface Water Management
- City of Mountlake Terrace
- SnoSTORM (Sub-group of STORM for Snohomish County Municipalities)
- Snohomish Conservation District (SCD)
- STORM (STormwater Outreach for Regional Municipalities)
- Washington State University Extension (Snohomish County Master Gardeners)
- ECOSS (Environmental Coalition of South Seattle)
- EarthCorps
- Sound Salmon Solutions
- Students Saving Salmon
- Zero Waste Washington
- Storm Drain Marking Volunteers

The annual 'Watershed Fun Fair', sponsored by the City of Edmonds' Parks and Recreation and Public Works departments was again held in 2019 at the Willow Creek Fish Hatchery. The 'Watershed Fun Fair' is our fun family event that offers insight into why we like to say "Puget Sound Starts Here". This free all ages community event engages participants by guiding them through exhibits and information about Puget Sound stewardship, stormwater, fish and wildlife, backyard habitat, recycling, energy, water conservation, and other environmental topics. Kids took part in hands on activities such as face painting, nature crafts, interactive games, dancing to a live musical performance, and the always popular feeding of the hatchery fish! With an estimated 212 local residents and families attending this past year, this event continues to provide our community the education and knowledge to keep Edmonds at the forefront of sustainability and environmental stewardship.

Residents from Edmonds, Monroe, Marysville, Mukilteo and Snohomish County attend the Natural Yard Care Programs 'Lawn and Garden Demonstration Fair'. [Photo taken June 22, 2019]

The continued partnership with Snohomish County also brought forth the next phase of our Natural Yard Care program. In 2019, the City of Edmonds with partner organizations Snohomish County, Mukilteo, Marysville and Monroe held a Lawn and Garden fair at Thornton A. Sullivan Park in Everett on June 22nd. Building on the success of 2018's Natural Yard Care workshops, these interactive demonstrations from Natural Yard Care experts allowed fair attendees 17 different hands-on demonstrations in 6 topic areas. This event also included the WSU's Snohomish County Master Gardener volunteers to assist in the best gardening practices for those protective of water quality. The 2018-2019 Natural Yard Care Workshop Series and Lawn and Garden Fair, which was a follow-up to the evaluation of 2014 program, was evaluated to assess the education program in a statically valid manner and chronicled in the 2019 Snohomish County Natural Yard Care Education Evaluation Report, which is included as Appendix F of the SWMP Plan.

Volunteers from Students Saving Salmon and Edmonds Public Works combine efforts to capture and document the fish caught in a lower stretch of Perrinville Creek prior to the annual maintenance of the Perrinville Creek Diversion Structure.
[Photo taken August 8, 2019]

In 2019, the City of Edmonds and partner organization Student Saving Salmon also collaborated on several occasions to allow for Edmonds-Woodway High School students and interested local volunteers to work to improve our fish habitat. These activities ranged from restoring riparian plantings, surveys on spawning salmon, cleaning fish passable culverts, inserting salmon egg hatch boxes into streams, monitoring sensitive stormwater outfalls and working alongside Edmonds Public Works in a project related fish exclusion activity.

The City of Edmonds continued promotion of the video series "*Certain Things Don't Mix*", a collaborative effort from STORM and Comcast Spotlight. This commercial series helps bring public attention and awareness to the relationship between the environment and pollutants. They take light hearted but poignant look at how stormwater and pollutants mix together to effect the environment. During 2019, they were posted multiple times on the City webpage, Green Resource Room, City newsletter, online newspapers and social media. They have received upwards of 1500+ views and responses since their debut in 2018. The Parks and Recreation Department also aired the commercials at their Summer Outdoor Movies series, which were seen by approximately 1400 viewers who attended the events.

A local community volunteer helps with invasive plant removal during the Student Saving Salmon "planting and restoration day" at Shell Creek near 7th and Glen St. [Photo taken June, 29, 2019]

The EarthCorps' Puget Sound Stewards continued to be supported in Edmonds during 2019. EarthCorps enables local community participation to help keep our parks, forests, wetlands and beaches healthy. Approximately 10 Puget Sound Stewards were active this year in leading volunteer groups throughout the City, performing a variety of habitat stewardship projects to include beach cleanups and riparian restoration and plantings.

Stormwater staff has also been dedicating time to a local high school project and supporting several students pursuing design of a new stormwater filter. After initial consultations, the students have completed an initial design, and staff is in the process of finding a suitable location in the MS4 to test the students' design.

For a complete list of our public education and outreach activities see Table 1.

Table 1. Ongoing Public Education and Outreach Activities

Educational Material / Activity	Description of Educational Material/Activity	Phase II Permit Sections(s) & Target Audience
Brochures, Booklets, Fact Sheets and Other Written Material (available from Engineering Department at City Hall, the Parks Department at the Francis Anderson Center, or on the City website)		
Stormwater Addendum & Checklists	Includes information to supplement or elaborate on the guidelines and requirements outlined in Edmonds Community Development Code Chapter 18.30 Stormwater Management and Ecology's Stormwater Management Manual for Western Washington.	S5.C.2.a.i General public and businesses S5.C.2.aii Engineers, contractors, developers, review staff and land use planners
Streamside Landowners Best Management Practices web page	This portion of the City's website discusses leaving stream banks natural, planting native plants and trees, limiting the use of lawn chemicals, proper car washing, and keeping pets out of streams. http://www.edmondswa.gov/water/stormwater/streamside-stewardship.html	S5.C.2.a.i Residents, landscapers and property owners/managers
Natural Yard Care booklet	This booklet was prepared by Seattle/King County and Washington State University Extension and is available at Edmonds City Hall. https://snohomishcountywa.gov/DocumentCenter/View/7260/Natural-Yard-Care?bidId=	S5.C.2.a.i General Public and businesses S5.C.2.a.ii Residents, landscapers and property owners/managers
How to be a Salmon Friendly Gardener brochure	Brochure describes building healthy soil with compost, using natural fertilizers, directing runoff to pervious areas, and protecting shoreline habitat. https://snohomishcountywa.gov/DocumentCenter/View/3769/Salmon-Friendly-Gardener?bidId=	S5.C.2.a.i Residents, landscapers and property owners/managers)
Safer Alternatives for the Home and Garden fact sheets	A collection of fact sheets prepared by Toxics Free Future (previously Washington Toxics Coalition) that lists less toxic fertilizers and describes alternatives to common toxic products for control of slugs, aphids, and weeds. https://toxicfreefuture.org/healthy-living/healthy-gardens/	S5.C.2.a.i General public and businesses S5.C.2.a.ii Residents, landscapers and property owners/managers
Protecting Water Quality in Urban Runoff	Fact sheet published by USEPA that discusses urbanization's impact on the quality & quantity of stormwater runoff and what can be done to best manage this runoff. https://www3.epa.gov/npdes/pubs/nps_urban-facts_final.pdf	S5.C.2.a.i General public and businesses S5.C.2.a.ii Residents, landscapers and property owners/managers
Protecting	Seven page environmental education guide that discusses a	S5.C.2.a.i

Washington's Waters from Stormwater Pollution	variety of topics related to stormwater runoff and presents ways to protect receiving waters from the detrimental effects of uncontrolled stormwater runoff. https://fortress.wa.gov/ecy/publications/documents/0710058.pdf	General public and businesses S5.C.2.a.ii Residents, landscapers and property owners/managers
City of Edmonds Stormwater Education and Outreach web page	City's Stormwater Education and Outreach web page provides information on stormwater and stormwater regulations, including FAQs, and information on car washing, vehicle leaks, and links to City and regional outreach brochures, articles, and web pages. http://www.edmondswa.gov/	S5.C.2.a.i General public and businesses S5.C.2.a.ii Residents, landscapers and property owners/managers
Car Wash brochures	Two car wash brochures are available that discuss the issues of car wash water discharging to storm drains. One brochure is focused on how to best handle washing cars at home, the other covers the use of the City's car wash kit during fund raising events. Both are available online. http://www.edmondswa.gov/stormwater-utility-system/stormwater-public- education-outreach/car-washing-in-edmonds.html	S5.C.2.a.i General public and businesses
Stormwater articles in City's electronic newsletter, social media and print publications.	A variety of stormwater related articles were posted in the City's electronic newsletter, the City's web page, the City of Edmonds' Facebook page as well as MyEdmondsNews.com and the Edmonds Beacon. These articles touched on such topics as drain cleaning, street sweeping, clean car washing, pet waste, snow and ice removal, vehicle leaks, rain gardens and natural yard care. These articles aim to be daily reminders and educational tools for our local residents that stormwater runoff is the single largest non-point pollution source to our waterways. https://edmondsbeacon.villagesoup.com/ https://myedmondsnews.com/ https://www.facebook.com/cityofedmonds/	S5.C.2.a.i General public and businesses S5.C2.a.ii Residents, Landscapers, and Property Owners/Managers
Wildlife of Edmonds poster	Developed by City Parks and Recreation staff, the poster has photos of the many animals (and their habitat) that can be found in Edmonds. The overall goal is to foster environmental stewardship among citizens of Edmonds and those who visit our parks and beaches. It is expected that this will result in behavior changes, such as picking up pet waste and fixing leaky cars, which will benefit watersheds and wildlife.	S5.C.2.a.i General public and businesses
Storm drain marking	Information regarding storm drain marking is provided on the City website http://www.edmondswa.gov/water/stormwater/storm-drain-stenciling.html . Free assistance and marking supplies are offered to volunteer groups that apply for the materials. In 2019, two groups of people checked out the current stock of marking supplies. A follow up in 2020 is scheduled with additional markers ordered.	S5.C.2.a.i General public and businesses S5.C2.a.ii Residents, Landscapers, and Property Owners/Managers

Rain Garden Handbook for Western Washington	This handbook is available for pickup at City Hall and given out during rain garden tours and information sessions. The Handbook can be used by homeowners, landscapers, landscape architects, engineers and others to create rain gardens in Western Washington, whether or not required by stormwater regulations. https://fortress.wa.gov/ecy/publications/documents/1310027.pdf	S5.C.2.a.i General public and businesses S5.C.2.a.ii Residents, Landscapers, and Property Owners/Managers
STORM *(Stormwater Outreach for Regional Municipalities)*	Access to the STORM public library as an open source of clean water, pollution prevention, and environmental outreach materials. https://www.pugetsoundstormgroup.org/Default.aspx#	S5.C.2.a.i General public and businesses S5.C2.a.ii Residents, landscapers, and property owners/managers
Presentations, Curriculums and Activities		
Spill Kit for Businesses Program – in partnership with ECOSS *(Environmental Coalition of South Seattle)*	The City continued to partner with ECOSS in 2019 to educate Edmonds' businesses on spill prevention and preparation. The businesses that received a spill kit were taught how to use the kit, the ways to minimize the occurrence and impact of future spills, and where their stormwater runoff flows to. In 2019, 21 businesses (many of them English speaking as a second language) were identified and served with ECOSS spill kits. To date, ECOSS has worked with 168 businesses in Edmonds. Edmonds will continue their partnership with ECOSS in 2020 in hopes of continuing our outreach and education throughout the city. https://ecoss.org/	S5.C.2.a.i General public and businesses
Edmonds Beach Ranger Education and Outreach Program	The City of Edmonds has supported the Beach Ranger program since 1986, when the first Rangers were hired to teach marine education and conservation to school-aged children within the Edmonds School District, staff the Olympic Beach Visitor Station, and patrol the beaches in the summertime. Rangers teach marine ecology and beach etiquette to all ages, including the impacts of human activities on the Puget Sound and steps people can take to limit the impact of their actions. In 2019, our Spring marine education program reached 3,250 children grades K-6; nearly 9,000 guests visited the Olympic Beach Visitor Station.	S5.C2.a.i General public and businesses S5.C.2.a.ii Residents, Landscapers, and Property Owners/Managers
Snohomish Conservation District	In 2019, in partnership with SCD, the City of Edmonds had 3 new rain gardens installed in the L.I.D. targeted Perrinville Creek watershed. These new rain gardens, along with previously installed ones will help reduce the flows and pollutants into Perrinville Creek. Substantial erosion issues recently has made this watershed a priority to seek infiltration and reduction as an alternative to the traditional piped storm system.	S5.C.2.a.i General public and businesses S5.C.2.a.ii Residents, Landscapers, and property owners/managers
Youth Education Program – in partnership with Snohomish Conservation	The City continued to partner with Snohomish Conservation District to sponsor stormwater presentations at local K – 12 grade schools. From April 1 – June 30, 2019, SCD reached 3 classrooms of students, teachers/adult staff with lessons taught ranging from Salmon of Puget Sound to Water Quality education and monitoring.	S5.C.2.a.i (General Public and businesses)

District	https://snohomishcd.org/	
Natural Yard Care program *(In partnership with Snohomish County)*	Since 2014, the City has partnered with Snohomish County and other regional municipalities to deliver a comprehensive natural yard care training program. Based on recommendations made after the first workshops were conducted, the Program has included a mix of medium/large scale workshops and small/medium scale expert-led demonstrations throughout the region in addition to locally sponsored on-going programs. In Edmonds, ongoing local programs include the City's Residential Rain Garden Program, pesticide reduction efforts in municipal land care practices, the City's Green Resource Room, and various natural yard care presentations to local groups. The major 2019 educational component included a 'Lawn and Garden Demonstration Day' at Thornton A. Sullivan park in Everett. This event brought participants to enjoy hands-on tutorials to better take care of your yard through sustainable and/or eco-friendly practices. This program is in partnership with other local municipalities and will continue into 2020.	S5.C.2.a.i General public and businesses S5.C.2.a.ii Residents, landscapers and property owners/managers
Residential Rain Garden Tour and Information Session Program	Staff from the Parks Department and Public Works led an autumn rain garden tour of the 3rd Ave. residential rain garden cluster on Oct. 5, 2019. Using the Rain Garden Handbook for Western Washington as a guide, participants explored the process of designing, building and maintaining a rain garden, and saw examples of key principles at work, and received a free copy of the Handbook and a list of local resources to take home. 14 people participated in the tour. A Raingarden Information Session was presented to 20 Snohomish County Master Gardeners in September 2019. The presentation was as desktop version of the residential raingarden tour and was very well received. https://fortress.wa.gov/ecy/publications/documents/1310027.pdf	S5.C.2.a.i General public and businesses S5.C.2.a.ii Residents, landscapers and property owners/managers
Lake Ballinger Water Quality Monitor Volunteer *(Funding Support)*	In 2019, the City of Edmonds, City of Mountlake Terrace and Snohomish County partnered in an interlocal agreement to better monitor the changing environmental conditions at Lake Ballinger. This agreement led to Snohomish County training a local lake resident to do basic water quality monitoring to which this data will be collected by Snohomish County and compiled into a year-end report.	S5.C.2.a.i General public and businesses S5.C.1.a.ii General public and businesses
Puget Sound Beaches & Pier Cleanups	Three corporate groups conducted volunteer beach cleanups in Edmonds in 2019. Most cleanups started along Sunset avenue at the northern tip of the Edmonds waterfront, and ended at Marina Beach Park, with participants picking up litter in all beach parks along the way. In addition, a volunteer group of scuba divers did their annual cleanup in waters below the fishing pier.	S5.C.2.a.i General public and businesses
Watershed Fun Fair	This annual event was held this year on May 4, 2019 at the Willow Creek Fish Hatchery. Exhibits included information on soil health, water quality, clean stormwater, fish and habitat restoration, pervious pavement, recycling, amphibians, and backyard wildlife. An Enviroscape stormwater model showed the impacts of stormwater. Native plant starts from Edmonds Parks' greenhouse were given away to participants who	S5.C.2.a.i General public and businesses S5.C.2.a.ii General public and businesses

	completed their event 'Passport'. Students Saving Salmon presented on their stream monitoring efforts. Sound Salmon Solutions joined the event for the first time and provided macroinvertebrate investigations in Willow Creek. Total participation was 212 children and adults. The fair is currently planned for May 10, 2020, however we are tacking the unprecedented COVID-19 response closely and may be forced to eliminate this event this year.	
Students Saving Salmon *(Funding Support)*	In 2019, the City of Edmonds continued its stewardship with Students Saving Salmon. This club of high school students mentored by a retired fish biologist have under taken several small projects along Edmonds waterways, and perform hands-on in-field testing and observation of drainage courses. The City continues to provide funding to this program, which provides further engagement for those interested in stormwater and environmental related fields. Student projects are routinely covered in articles in the local newspaper, leading to increased awareness amongst a larger audience than just the students involved. In 2019, the students conducted water monitoring in the Edmonds Marsh, culvert cleaning, riparian restoration and plantings as well as releasing Coho eggs in several local creeks. The students also become educators and share their knowledge with the public by hosting a booth at the City Watershed Fun Fair and prepare a written report to present to City Council each year.	S5.C.2.a.i General public and businesses S5.C.2.a.ii General public and businesses
Watershed Habitat Restoration Stewardship *(in partnership with EarthCorps)*	In 2019, more than 2.2 acres of parkland was under active restoration with the goal of replacing invasive species with native trees and shrubs to both increase habitat diversity and resilience, and help control flooding and erosion. Restoration activities include site preparation, planting, and maintenance, with work being performed by Parks staff, contractors, and/or volunteers. EarthCorps' Puget Sound Stewards receive ongoing funding through the Parks Department to manage a volunteer program in Edmonds. Approximately 10 Stewards are active in Edmonds, leading volunteer stewardship events in our forests, wetlands, and shorelines.	S5.C.2.a.i General public and businesses S5.C.2.a.ii General public and businesses
Other		
Green Resource Room	The City continues to promote and update the City's Green Resource Room, to showcase sustainability and low impact development (LID) techniques and provide guidance and information to Edmonds residents and developers. The Green Resource Room maintains a stock of low flow garden nozzles, garden timers, moisture meters and low flow showerheads that are offered free to the public. Solar Panels, rain barrels and a monitor which cycles through a variety of LID topics are also on display. A highlight of the room is the pervious pavement display which was created to spark interest and inform both residents and contractors of the benefits of incorporating infiltration on	S5.C.2.a.i General public and businesses S5.C.2.a.ii General public and businesses

	their properties. This display can be disassembled and brought to outreach events.	
Mutt Mitt pet waste stations	"Leash and Scoop" signs are posted throughout Edmonds. Mutt Mitt pet waste stations are located at 11 parks and public areas in Edmonds, including the well-used and popular City dog park at Marina Beach. The Off Leash Area Edmonds(OLAE) non-profit organization help maintain and volunteer their time for maintenance and cleanups. These pet waste stations are maintained daily by City of Edmonds Parks and Recreation staff. As a controllable pollution source, the pet waste stations have educated and encouraged dog owners to utilize them throughout the city, with the Marina Beach Dog Park approximately removing 300 pounds of pet waste every week..	S5.C.2.a.i General public and businesses S5.C.2.a.ii General public and businesses
City proclamation for "Puget Sound Starts Here Month"	Official City proclamation in May of each year to promote awareness of the Puget Sound Starts Here (PSSH) campaign which serves to educate the general public about local and regional water quality issues. This coincided with the Watershed Fun Fair, a substantial social media campaign, and a month long PSSH banner displayed over heavily travelled arterials for awareness.	S5.C.2.a.i General public and businesses
"Puget Sound Starts Here" Decals on City Vehicles	In 2019, the City continued to refresh and replace the 14 in. x 6in. "Puget Sound Starts Here" campaign decals on the 8 vehicles used by the Stormwater Department. These vehicles are out on the streets of Edmonds daily for residents to see and promote the idea of clean stormwater. These vehicles include a Vactor truck, 2 street sweepers, a dedicated stormwater TV truck, and fleet vehicles.	S5.C.2.a.i General public and businesses
Stormwater Community Research Report	In 2013, Edmonds sanctioned a survey of a sample of its residents and businesses to measure the public's knowledge and practices regarding stormwater quality issues to be compared to a baseline study conducted in 2009 along with five other municipalities. These 2009/2013 studies continue to guide our public education and outreach activities and enable the City to measure change in target behaviors as a result of our efforts. The report has been posted on the City's stormwater outreach web page. In 2018, the City was invited to participate in another similar survey which we are considering for 2020. http://www.edmondswa.gov/images/COE/Government/Departments/Public_Works/Stormwater_Utility/pdf/2013_Edmonds_Stormwater_survey_report_FINAL_4_21_2014.pdf	S5.C.2.a.i General public and businesses S5.C.2.a.ii General public and businesses Residents, landscapers and property owners/managers
Puget Sound Starts Here Commercials "Certain Things Don't Mix" Campaign.	In 2019, the City in partnership with STORM and Comcast Spotlight helped fund the successful and well received 3 commercials bringing public attention and awareness to how "Certain Things Don't Mix". The commercials took a light hearted but poignant look at how stormwater and pollutants mix together to effect the environment, and were posted multiple times on the City webpage, Green Resource Room, City newsletter, online newspapers and social media where they received upwards of 1500+ views. The commercials were also aired by the Parks Department at their Summer Outdoor Movies, and were seen by an estimated 1400 viewers who attended the	S5.C.2.a.i General public and businesses S5.C.2.a.ii General public and businesses

	events. https://www.youtube.com/watch?v=DjkwzGSz69g https://www.youtube.com/watch?v=B2JCLtUf7E8 https://www.youtube.com/watch?v=L-QeXauQQng	
Participation in regional municipal stormwater educational forums/groups.	The City regularly attended local and regional meetings convened to share and promote outreach resources and techniques. The groups were formed with the intent of educating the general public and specific interest groups about stormwater and the impacts of stormwater on our environment. The City of Edmonds hosted a STORM regional meeting in February 2019.	S5.C.2.a.i General public and businesses

3.4 Appendix D – IDDE Summary & Spreadsheet

IDDE (S5.C5.b) Summary

Response to 2019 Annual Report Question #33

Detection/Inspection/Enforcement

In 2019, the City of Edmonds IDDE program documented 50 reported spills, connections, and/or discharges. A streamlined effort in reporting and better public awareness for these discharges likely led to the increase in reporting, totaling 14 more than the previous year. Of these documented IDDE incidents, 64% were reported by City of Edmonds employees while 36% came from the public or other sources.

City response to reported events was, again, very good. Of the 50 reported IDDE incidents, only 12 were determined to have impacted the MS4. The rest were nuisance issues (which were not spills, but more 'source control' type issues), or were contained in place by City crews or first responders. None of the activity this year was determined to have reached receiving waters in observable quantities. The City of Edmonds did not have any S4.A or S4.B violations in 2019 and likewise did not have to file any S4.F letters.

Every IDDE case that was reported to the City of Edmonds, and where follow up contact information was available for the reported address or business, was also sent an educational and/or correction letter documenting the incident. These letters restate the incident as witnessed by the inspector and what steps are needed to restore and clean up the affected areas. The City of Edmonds takes an educational approach first, prior to enforcement actions; the Stormwater Department has been very successful in using this approach to work with residents and businesses. Only in very rare instances have we had unresponsive or multiple occurrences of IDDE.

Going into 2020, there will only be 2 carry-over IDDE issues from 2019. The first of which is an illicit connection (COE IDDE #19-042) that is still within its 6-month repair/disconnect post-discovery window. However, this particular illicit connection is in the process of being elevated for further enforcement through Code Enforcement. The other enduring IDDE case is an ongoing polluted groundwater issue (COE IDDE # 19-043) which continues to require City resources to manage in place. The City has been maintaining an ongoing management of this condition, which has kept it from reaching the local receiving waters. In documenting the response, the City has undertaken numerous rounds of stormwater sampling to identify the potential sources and has worked with Ecology toxics and spills response staff, but has thus far been unable to eliminate the source. While the City believes the historically polluted groundwater is beyond the scope of City authority, we are still expending resources to investigate, manage, and ultimately correct its impacts to surface waters.

Overall, 2019 was a challenging year for IDDE investigations and management. The City also discovered what appears to be, by the best estimates of City staff, four separate oil discharges. These polluted releases originated from existing underground sources, including sources where the Department of Ecology (Ecology) were aware of contamination and either chose to leave it in place or considered "cleaned", and some which were previously unknown to Ecology. Each of these discharges required extensive resources to manage and investigate and significant costs were incurred by the City, despite other agencies being tasked with ensuring those sources do not become contaminated in the first place. Plainly put, this approach is not sustainable if the same conditions continue to present themselves, and the City will be unable to fulfill future IDDE

obligations if these sources are not adequately protected in the first place by those tasked with protecting them. The City must find a way to defend against impacts to surface water as result of previously contaminated waters of the state and is in the process of pursing options to ensure compliance with the Permit, while limiting the use of local funding to mitigate the existing responsibilities of other parties.

Screening & Outfall Testing

The City implemented a new IDDE screening method at the beginning of the permit cycle. In an attempt to make more significant progress in identifying illicit connections (and cross-bores) the City focused its efforts conducting screening with CCTV, making best use of the latest technology available in our new video inspection truck. This year was the first year of conducting a formal video inspection program and while it appears successfully in its pilot project phase, it is not entirely clear if the City will be able to maintain the resources needed to hit the minimum screening percentage year-in and year-out. The video inspection work often required minimal to full traffic control in most locations and therefore required more work force to conduct. In times of heavy workloads or emergencies, this program need to be some of the earliest work to be sacrificed due to redirected manpower needs. Thus, the new program was rolled out in an effort to attempt to hit the minimum percentage each year, but with the current plan to continue the traditional method of 'look-and-lift' at catch basins as a fall back.

In 2019, the City was able to video approximately 39,000 linear feet of pipe, which represents approximately 32% percent of the piped system. The Stormwater Department felt the video inspection program was extremely successful, and it appears the pilot operation will continue for the time being. In addition, we did perform look-and-lift screening at 2,056 catch basins and manholes, which represented roughly 24% of the system based on catch basin/manhole quantities.

Additionally, on Aug. 14-15th, 3 Public Works employees also took part in the screening process by participating in the Ecology required IDDE program for Dry Weather Outfall Screening. The field crews prioritized the drainage basins of Deer Creek, Willow Creek, Shell Creek and Halls Creek. They used screening parameters outlined in the Herrera 2013 manual. In total, 30 outfalls were screened over the course of two days where no potential sources of IDDE issues were discovered. New drainage basins within Edmonds will be identified and screened for 2020.

Training/Internal Education

In 2019, the City continued efforts to inform and train employees as well as citizens and businesses in illicit discharge detection and elimination. This educational process stresses the important topics of spill prevention and response. With several new employees in both the Public Works and Parks departments this past year, refresher IDDE trainings were conducted in the spring for field staff. Additional SWPPP guidance was also provided for lead workers. This provided both a reminder in identifying and handling environmentally sensitive situations as well as instructing the proper channels in how to report a spill/discharge. With updated SWPPP's for the two Public Works yards and the Parks operations facility this year, operations crews received a refresher of the best management practices and routine preventive steps that need to be taken in the yard to adequately protect surface waters. With monthly yard inspections, lead workers

reported that at years end, no substantive spills had taken place within their yards to warrant response or follow up actions. It is also of note, that spill kits at both yards were thoroughly gone through and restocked this year. Staff have developed and had success with a peer-led training program that requires individual crewmembers to become trainers for a day. This program will continue into 2020. Crewmembers that act as first responders to spills and discharges will also continue to attend sponsored IDDE classes outside of the City of Edmonds. Two Public Works employees also received the CESCL certification this past year.

Public/Business Education

The ECOSS spill kit program was also continued in 2019. Since 2013, ECOSS has been a partner with the City in educating and training local businesses on spills and spill prevention. This past year the City of Edmonds re-identified a target area along the Highway 99 corridor to revisit due to past IDDE documentation and new occurrences. On Sept. 19, 2020, three ECOSS employees and the City's Stormwater Technician spent a day at both the Ranch 99 plaza and Boo Han plaza delivering spill kits, examining existing spill kits, providing bmp's and educating managers/employees on the importance of properly cleaning spills and protecting the stormwater system. This year's effort included translation services in Vietnamese, Korean, Cantonese, and Mandarin. A total of 21 businesses were visited this year. Of those, 11 received new spill kits and 10 were follow-up visits to build on previous years efforts and reinforce lessons learned.

City of Edmonds
IDDE Tracking Sheet 2019

ID	Spill Date	Spill location	Resident / Owner / Caller	Hotline / Website Notification	Description	Resolution	Immediate response to discharge	< 7 days to investigate discharge	21 days to Investigate illicit connection	Remove connection w/in 6 months	Currently under construction	IDDE/Spill Impacted MS4	IDDE/Spill Eliminated	Follow up Dates & Notes
19-001	1/5/2019	71 Main St. (Ferry Terminal)	Marie Waterman (WSF's)	Yes	Caller reporting that an unknown amount of sewage was discharging onto the Ferry Pier and into Puget Sound. Discharge is reported to be from the drainage cap on the sewage line. ERTS # 686434	WSF's confirmed on 01/07/2019 that the leak was now contained and cleaned up. No updated amount of spillage was indicated.	Y	Y	N/A	N/A	N	No	Yes	01/07/2019 - No follow up needed.
19-002	1/28/2019	810 9th Ave. N.	Public Works Operations (Tod Moles)	No	Crew called in to report slurry on 9th Ave. N. from recent pole installations, assumed to be permitted. Zack investigated to find it entered the MS4 at 8-234 & 8-238.	Zack made site visit and documented IDDE. Unknown amount of bentonite slurry came from pole Installation. PW notified and cleaned CB's and swept street. IDDE did not reach further downstream of 8-238.	Y	Y	N/A	N/A	Y	Yes	Yes	01/29/2019 - Followed up with PW to have curbline swept and CB's cleaned. Will bill P.U.D. for our cleanup efforts. 01/30/2019 - P.U.D. cleaned the curb line and CB's affected. No follow up needed.
19-003	1/29/2019	660 Edmonds Way	David Welch	Yes	Caller reporting fuel leaking from gas pump at the Westgate Mini-Mart Shell station. Not indicated whether it's still leaking or in the MS4. ERTS # 686985	Received photos. Investigated and found no seepage. Typical odors. Pumps still in use. This reported fuel leak did not reach the City's MS4.	Y	Y	N/A	N/A	N	No	N/A	01/29/2019 - No follow up needed.
19-004	1/31/2019	24202 Firdale Ave.	Public Works Operations (Jeff Whatmore)	No	Crew called in a concrete slurry spill from a recently poured aggregate driveway. Slurry washed down ADA ramp, around corner and into 15-306 in the MS4.	Spoke to owners daughter who will pass along the info to clean up the spill of an unknown quantity. This was an unpermitted job. Will need a Vactor and Sweeper to clean up the slurry.	Y	Y	N/A	N/A	Y	Yes	Yes	1/31/2019 - Darren B. installed a BMP in 15-306 prior to the rains. 2/01/2019 - Mike J. followed up at 8:30am at the spill was cleaned up. Unknown contractor. No follow up needed.
19-005	1/29/2019	121 3rd Ave.	Public Works Operations (Tod Moles)	No	Crew called in to report slurry on 3rd Ave. N. from a recent concrete saw cut job., This job is permitted and referred to Chris Rivera. It entered the MS4 at 7-253 in an unknown quantity.	Spoke to Chris Rivera about the IDDE.	Y	Y	N/A	N/A	Y	Yes	Yes	1/29/2019 - Referred to Chris R. as a permitted job. 03/05/2019 - Inspected, no indicatation of slurry. 03/12/2019 - Inspected CB's downstream, no indication of slurry. Contractor has finished the job and no further action necessary.
19-006	2/26/2019	130 2nd Ave.	D&D Excavating (Jim Waite Contacted)	No	During construction activity a water main along east side 2nd ave. was damaged by a contractor leading to a main break. Water was reported to have minor flood implications on nearby businesses and parking garages. The flow of water continued down Main St. for upwards of 30-40 min. City crews and contractors were on scene shortly after to mitigate further issues and repair the break The sediment laden water did enter the MS4..	COE Water Dept. crews arrived on scene just after 9am to repair the broken water main. The sediment laden water did enter the MS4, causing some temporary CB clogging issues which was rectified post pipe repair. All CB's affected will be thoroughly cleaned and streets swept. No hazardous conditions were created from this estimated 3,000 gpm spill.	Y	Y	N/A	N/A	Y	Yes	Yes	02/26/2019 - City Hall potable water supply was flushed into MS4 as a precaution. (standard procedure) Contractor was awaiting a Vac truck to remove sediment from CB's. 02/27/2019 - City sweeper truck swept residual sediment from both 2nd ave. and main st. 03/05/2019 - CB's still contain sediment after I spoke with contractor. 03/11/2019 - Operations crew cleaned CB's effected on Main St. and 2nd Ave. No further action necessary.
19-007	3/13/2019	Skyline Dr.	Resident (Dale Soelter)	Yes	Resident reported either a fuel or hydraulic leak from a Republic Services garbage truck servicing their neighborhood. Runs the length of Skyline Dr.	Mike J. investigated site to find an estimated 2 quarts of hydraulic fluid had leaked. Spread kitty litter on 4 spills and spoke with the resident.	Y	Y	N/A	N/A	N	No	Yes	03/14/2019 - Site visit indicated spill was largely cleaned up with spill absorbant materials. The leak/spill did not enter the MS4. No further action necessary.
19-008	3/12/2019	9702 227th PL SW	Resident (Mark Levin)	Yes	Resident reported either a fuel or hydraulic leak from a Republic Services garbage truck servicing their neighborhood. Resident took photos.	Resident reported incident to Royce the following day after a rain event, thus washing most of the evidence away prior to clean up efforts. Republic Services did invesigate site.	Y	Y	N/A	N/A	N	No	Yes	03/14/2019 - Site visit indicated spill/leak had been washed away due to the recent rains. . Spoke to Mark Levin who indicated spill travelled down 227th and onto 98th. The leak/spill did not enter the MS4 in a measurable amount. 03/19/2019 - Spoke to resident and made site visit. No indication of the leak. No further action necessary.
19-009	3/14/2019	7011 Lake Ballinger Way	Edmonds Public Works/Multiple residents along Lake Ballinger Way. (Jim Waite contacted)	No	ERTS #687819 was filed by Zachary Richardson and Jim Waite for a sewage spill. The spill is reported to have been from a 30" trunk line that feeds King County and a valve was closed by a KC Maintenance Tech. which then surchaged the system and caused residential flooding and ponding.	At time of calls to the local government offices (4:30pm), flow had been restored to the King County pump station. Clean up efforts were underway with no estimation available of affected area and volume of leak. Jim Waite listed as contact with all offices.	Y	Y	N/A	N/A	N	Yes	Yes	03/15/2019 - Spoke to Jim Waite/Phil/MLT. Confirmed spill did reach the Lake as well as ponded on multiple residences along lake. Estimated at 223,000+ gallons of ponding. Sewer Dept. is following up and providing WQ testing. KC is aiding in the cleanup efforts and water sampling. 03/19/2019 - Lake has been reopened with WQ testing seeing positive results.
19-010	3/18/2019	8507 Bowdoin Way	Engineering Dept. (Jack Carlock)	No	Jack reported a contractor on Bowdoin Way/Magnolia LN. working on the 5 corners reservoir broke a hydraulic line on a piece of equipment.	Hydraulic Oil leaked onto the pavement at 8507 and 8509 on Magnolia LN as well as some on Bowdoin. An estimated 1-2qts spilled.	Y	Y	N/A	N/A	Y	No	Yes	03/19/2019 - Hydraulic Leak has not reached MS4 but remains as a visible stain on pavement. Need to Follow Up. 03/21/2019 - Jack Carlock reported contractor used absorbant material to reduce staining on pavement. 03/26/2019 - Pavement stained, but spill is no threat to MS4. No further action necessary.
19-011	3/27/2019	22130 HWY 99	Engineering Dept. (Natalie Griggs/Jennifer Lambert)	No	Engineering Inspectors Natalie and Jennifer observed car washing flowing from Dougs Mazda into City MS4. Washwater was running over bare dirt prior to entering system.	Jennifer and Natalie spoke with Jon Ikegami (Sales Manager) and provided a temporary alternate solution to draining to city system. Wilcox const. is helping mitigate the runoff.	Y	Y	N/A	N/A	Y	Yes	Yes	04/26/2019 - Drove by site to find no addional IDDE triggers. 05/07/2019 - No further instances or reports of washwater. No further action necessary.
19-012	4/2/2019	8127 212th ST SW	Resident (Gary Porter, Unit #2)	Yes	Resident contacted Zack that a Republic Services garbage truck leaked hydraulic fluid last week, approx Mar 26th. Amount discharged is unknown.	I inspected the site on 04/03/2019 after a short duration rain event to find no more than the typical oil sheen runoff from a shared condominium driveway. No visible evidence of a concentrated spill. Will follow up with resident to ensure that future incidents at this location are better documented.	N	Y	N/A	N/A	N	No	Yes	N/A
19-013	4/3/2019	8507 / 8509 Magnolia LN.	Engineering Dept. (Jack Carlock)	No	Jack reported a contractor (Purcell) on Bowdoin Way/Magnolia LN. working on the 5 corners reservoir project spilled diesel fuel as they were attempting to fill a generator.	Jack C. followed up on 04/04 and determined the 5 gallons or less spill was approx.210 sq. ft. and largely contained within the soil/rock adjacent to the generator. Jack C. confirmed the contractor (Redside) will perform soil remediation and CB protection. This occurred during dry conditions and the spill did not reach the MS4.	Y	Y	N/A	N/A	Y	No	Yes	04/04/2019 - CB protection and absorbtion materials have been applied to the soil and asphalt. 04/05/2019 - Redside const. used a mini excavtor to remove contaminated soil and hauled away. No further action necessary.

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19-014	4/8/2019	8507 / 8509 Magnolia LN.	Engineering Dept. (Jack Carlock)	No	Jack reported a Purcell sub-contractor working on the Water Tank project had a forklift hyraulic spill onsite at 8507/8509. Estimated spill at approx. 1-2 gallons around 8:30am.	The operator of the forklift reported the spill immediately and deployed absorbant pads and placed absorbant booms near the closest cb. The pavement was slightly wet from rains overnight.	Y	Y	N/A	N/A	Y	No	Yes	04/08/2019 - Hydraulic spots were noticed approx. 200ft on private driveway and for approx. 100ft. on Bowdoin Way. 04/26/2019 - Site visit indicated no further action necessary.
19-015	4/8/2019	HWY 99 & 216th ST SW	PW Operations (Darren Browning / Bryan Clemens)	No	Jeff W. called to inform me that the PW Signal crews found a motor oil spill on HWY 99 (and 216th) around 12:30pm on 04/08. Estimated spill to be around 5-10 quarts of motor oil, likely from a disabled vehicle.	Public Works crews spread absorbant dry sweep in the north bound left hand turn for approx. 30ft. Sweeper will follow up to remove the used material. No further action necessary. The spill did not hit the MS4.	Y	Y	N/A	N/A	N	No	Yes	N/A
19-016	4/11/2019	16721 76th Ave. W.	PW Operations (Mike Johnson)	No	Mike Johnson reported an illegal dumping of yard waste into the ditchline of 76th and MBR.	Lawn clippings and cut ferns look to have been intentionally dumped in the ditchline. Evidence of freshly cut ferns are on the residents property. Will send a letter addressing the IDDE.	Y	Y	N/A	N/A	N	No	Yes	04/15/2019 - Sent IDDE letter addressing dumping to resident. 04/26/2019 - Lawn waste not cleaned up. 05/07/2019 - No further instances of lawn waste seen. No further action necessary.
19-017	4/15/2019	10119 Edmonds Way (Taco Bell)	Republic Services (via Steve Fisher)	No	Steve Fisher reported that Republic Services had documented a grease spill at Taco Bell. Taco Bell's grease barrels are located within the garbage storage and collection area.	Visited site (4/16) to find that grease spill had occurred in the garbage storage area. Took pictures and sent letters to business and owner.	Y	Y	N/A	N/A	N	No	Yes	04/26/2019 - Second site visit revealed little to no clean up has occurred. Grease barrels slightly uncovered and residual grease remains on surface. 06/03/2019 - Ron Clyborner (owner of property) contacted me via phone message and indicated he informed Taco Bell of letter. Upon inspection, the refuse site looked to be pressure washed or scrubbed clean. Left message with Ron Clyborne informing him of my findings. No further action necessary.
19-018	4/18/2019	23830 Highway 99	PW Operations (Mike Johnson)	No	Mike Johnson reported a leak/spill had occurred at 238th & HWY 99. A vehicle was confirmed to have been leaking what was thought diesel fuel in a private lot and pulled out onto 238th before driving south on HWY 99.	Mike J. was on scene to place booms in downstream CB's starting at private CB 975 and protect the diesel from entering MS4. PW Operations crew will follow up with cleaning. An estimated 1/2 gallon may have spilled.	Y	Y	N/A	N/A	N	Yes	Yes	04/18/2019 - PW Operations Vactor truck cleaned the downstream CB's along highway 99 removing any old sediment and oils trapped in the sumps. No further action necessary.
19-019	4/26/2019	17121 Sea Lawn Dr.	PW Operations (Mike Johnson)	No	Mike Johnson reported a concrete slurry spill. Indicated it was from a poured driveway but had not entered MS4.	Visited site to find dried slurry from 17121. The pour was from an undetermined date, and the slurry has been there for some time. Will send a educational letter to homeowner as no contractor is present.	Y	Y	N/A	N/A	Y	No	Yes	04/26/2019 - Sent letter to resident and made WO for sweeper to make a pass. No further action necessary.
19-020	4/29/2019	18802/18807 188th ST SW	PW Operations (Mike Brown / Jimmy Ward)	No	Mike Brown / Jimmy Ward on the Vactor called in a dried concrete slurry spill from the new housing development. Looks to be slurry from aggregate driveways.	Visited site to find dried slurry from concrete pour. The pour was from an undetermined date but was fairly recent. Does not look like rain had occurred to flush the slurry down the line. The CB sump (5-608) caught the majority of it. PW crews cleaned the CB as part of their normal maintenance and inspected the pipes downstream. The contractor is cleaning the gutter line. Will send a educational letter to contractor. This is a permitted job site.	Y	Y	N/A	N/A	Y	Yes	Yes	04/30/2019 - Contractor cleaned the gutter line, removing excess dried slurry. Will have City sweeper make a clean up pass. 05/07/2019 - Sweeper cleaned gutter line and no further occurences of debris and/or slurry have been present. No further action necessary.
19-021	5/3/2019	9920 Edmonds Way	Jerri Eilert (Via PW Operations / Royce)	Yes	Resident phoned this morning to alert the City to incidences/conditions at their private Stormwater system. They have reason to believe there may be illicit material being poured down the storm drain.	Site visit visibly showed an illicit discharge, likely grease or another food waste byproduct. Took a sample. IDDE has progressed to another private CB and into the MS4. Will have storm dept. clean those two CB's. Will continue to monitor the initial dump site and notify the businesses surrounding the CB.	Y	Y	N/A	N/A	N	Yes	Yes	05/03/2019 - Spoke with caller and an Ivar's representative and both confirmed Chopsticks is the source of the contaminant, and have been for 'over a year'. 05/06/2019 - Vactor cleaned two cb's near 100th to remove pollutants. 05/07/2019 - Sent letters to business and owners. 05/08/2019 - Found second discharge in downstream private CB that was just cleaned 2 days ago. Wrapped the CB being dumped into with filter fabric. New discharge has not yet reached the MS4. 05/13/2019 - Received voicemail from Terry Woo who admitted illegal dumping. City Vactor crew cleaned system and we will bill Chopsticks for our time and clean up efforts. 05/15/2019 - Letter sent to recoup costs associated with cleaning. Site visit indicated no new dumping. 05/16/2019 - Site visit, no dumping. 05/20/2019 - Site visit, no dumping. 05/21/2019 - Owner, Terry Woo made payment in full . Closed permit #COD20190054 Will continue to monitor. ($1,131.06)
19-022	5/6/2019	401 Howell Way	PW Operations (Chuck Hiatt)	No	Chuck Hiatt reported steam cleaning and/or pressure washing of vehicles at Edmonds Autobody.	Site visit indicated recent washwater, however CB did sump did not indicate any visible pollutants. Slightly turbid, pretty standard. Will send business a follow up educational letter.	Y	Y	N/A	N/A	N	No	Yes	05/07/2019 - Wrote educational letter to business. No further action necessary.
19-023	5/1/2019	240th and Hwy 99	Resident (Joshua Kinney)	Yes	Citizen reported a illegal dumping into CB at 240th and Hwy 99 by a 'unknown' business. Dumping had taken place 9 days previous to reporting. ERTS # 689091	Mike Johnson attended scene to find no evidence of dumping. Checked basins 16-444, 16-445, 16-215, 16-834, 16-835 & 16-836.	Y	Y	N/A	N/A	N	No	Yes	05/10/2019 - Zack followed up with DoE to report findings or lack thereof. No further action necessary.

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19-024	5/14/2019	9213 224th ST SW	PW Operations (Tod Moles / Chuck Hiatt)	No	Tod Moles sent photos to me of contractor allowing unknown washwater flow down street towards 95th sumps.	Site visit 1/2 hour after photos taken indicated G&B Painting and Cleaning had stopped the washwater from leaving property. Due to rain, any washwater left on road had no washed away. Will monitor additional work and send letter to contractor.	Y	Y	N/A	N/A	N	No	Yes	05/15/2019 - Contractor is gone. Sent letter to contractor. Some light staining on asphalt but no further action necessary.
19-025	5/23/2019	96th Ave. W. (between 220th and 224th)	PW Operations (Tod Moles/ Mike Johnson	No	Tod Moles and Mike Johnson notified me around 9am that the City paint truck had blown a hydraulic line and leaked fluid on 96th ave. between 220th and 224th.	Site visit indicated responsive cleanup efforts. Some minor staining to asphalt but fluid did not reach MS4. Spill occurred on a dry day. Unknown amount of fluid was discharged, but believe to be around an estimated 20 gallons.	Y	Y	N/A	N/A	N	No	Yes	05/23/2019 - site visit showed cleanup occurred. Slight staining on asphalt. Sweeper cleaned up the dry sweep. No further action necessary.
19-026	6/4/2019	720 9th Ave. S.	PW Operations (Skylar Merback / Ryan Hill)	No	Skylar and Ryan (Painting Crew) found CB on 9th Ave. S. that contained fresh concrete slurry from an unidentified location. The CB was also found to be full of needles and sediment, to which the Vactor was called in to clean.	The dry conditions, along with the CB already being full of sand and needles from the winter prevented the slurry from reaching the MS4. Created WO for the Vactor to clean CB.	Y	Y	N/A	N/A	N	No	Yes	06/04/2019 - A & D Custom Concrete vehicle at address but likely as the pour site is located away from the street, the washwater is from the unknown concrete company vehicle. 06/24/2019 - PW Operations completed WO to clean CB. No further action necessary.
19-027	6/6/2019	401 Howell Way	Engineering Dept. (Ryan Hague)	No	Ryan Hague reported a repeated washwater/pressure washing discharge around 14:00. (also first witnessed by him and Chuck Hiatt on 05/06/2019)	Dry conditions turned quickly to rain which halted their operations and masked the visible discharge. Will follow up with Owner (again) through a letter and phone call.	Y	Y	N/A	N/A	N	No	Yes	06/11/2019 - Had meeting with Owner, Larry Taylor. Showed me his sump pump method in pumping out the washwater to the sewer system. In pumping, no water reaches the MS4. No further action necessary.
19-028	6/9/2019	6609 170th PL W	PW Operations (Darren Browning)	No	Darren was called out (street watch) to an illiegal paint dishcharge/washing that fire/police were also called to. He documented scene and the incident has a case number. EPD CASE # 19-13812	Was determined that resident was running a garden hose to clean spilled paint off his driveway. Fire Dept. asked the man to stop. Darren used Sweep #66 to vacuum up the discharge.	Y	Y	N/A	N/A	N	No	Yes	06/11/2019 - Sent letter to resident/homeowner informing them of a monetary penalty in order for the City to get reimbursed for the spill response. They have two weeks to comply. 06/19/2019 - Spoke to Kevin Vogeler who is cutting a check to pay for the cleanup costs. 07/02/2019 - Received check from Kevin Vogeler. No further action necessary.
19-029	6/8/2019	23511 74th Ave. W.	Anonymous	Yes	ERTS# 689791 A recreational user on Lake Ballinger reported a resident operating a backhoe near/in Lake Ballinger.	City was notified on 6/14. Will follow up with Mike Thies to pursue code enforcement action. No illiciit discharge was noted on report, only that the equipment may be causing mud or sediment laden water.	Y	Y	N/A	N/A	N	No	Yes	06/18/2019 - Site visit at Lake Ballinger; did not see equipment. Mike Thies is following up. No further action necessary.
19-030	6/19/2019	856 Main St.	PW Operations (Bryan Clemens / Darren Browning)	No	Bryan and Darren witnessed two individuals intentionally leaf blowing grass clippings, leaves, yard waste onto city ROW near the corner of Main St. and 9th Ave. Took pictures and video but the individuals upon being noticed disappeared.	Sent IDDE Letter to tennant and owner.	Y	Y	N/A	N/A	N	No	Yes	06/24/2019 - Spoke with Mrs. Ridley, resident. She fired the landscapers. Grass clipping have dissipated through vehicle travel and rain. Will continue to monitor from time to time, however no further action necessary.
19-031	6/24/2019	6th & Elm St.	Anonymous (via PW Operations)	Yes	Anonymous caller phoned in a paint spill from 6th and Elm St. to 220th.	Met Chuck out at 6th and Elm at 2:45pm to look over spilled paint. Paint was dry, but it turns out it was just dribbles likely from an open bucket or over filled bucket. It is only trace amounts and did not reach the MS4. It will in short order wear down.	Y	Y	N/A	N/A	N	No	Yes	06/24/2019 - No further action necessary
19-032	6/26/2019	8715 236th ST SW	Resident (Beth Sosik)	Yes	Resident contacted DoE in regards to a probable concrete slurry discharge from the permitted short plat ERTS#690231.	Site visit indicated multiple slurry dumps in the ditchline just to the south of 8715 236th. Slurry and construction debris looked to have been dumped from a wheel barrow as it was scattered high on bushes as well. Jennifer Lambert contacted developer Chris Lyon to discuss the issue. The IDDE did not reach the MS4 as it has dried but will be following up with Mr. Lyon to clean it up.	Y	Y	N/A	N/A	Y	No	Yes	06/26/2019 - Chris Lyon PH# 1-425-478-9189 06/27/2019 - Talked to Chris and has his subs cleaning up the spill. Sent pictures to show cleanup had happened. Cleanup is confirmed. No further action necessary.

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19-033	6/28/2019	23830 Highway 99	Resident (Patsy Granger)	Yes	Citizen reported to Royce around 2:15pm a probable oil spill around a dumpster at the listed address.	Zack made a site visit to find multiple issues which he documented in his notes. Site has both source control issues as well as a probable MS4 IDDE issue. Contacted SeQuential for container questions/replacement.	Y	Y	N/A	N/A	N	Yes	Yes	07/01/2019 - Site visit revealed garbage dumpsters with open lids, grease/oil on asphalt, uncovered waste barrels. Need to install better filter fabric at CB. Will follow up with owner of property. Sent letter to property owner. 07/02/2019 - Installed proper CB protection w/ Mike Johnson. 07/03/2019 - Received follow up from SeQuential that they will replace container. The account assoicated with it is "Stars in the Sky" Korean Fried Chicken. 07/08/2019 - Witnessed a person pressure washing the affected area near the used cooking oil receptacle. The CB protection was still in place. 07/09/2019 - Owner has taken action spreading dirt on affected areas and pressure washing. The grease receptacle still needs cleaning. 07/16/2019 - Site visit indicates no further spillage and clean up efforts have stabilized the site. Will continue to monitor. 07/31/2019 - Leaky grease/oil receptacle was removed from site by SeQuential. Some dirt remains from the cleanup efforts but largely the issue is resolved. Will continue to monitor the dumpsters and new grease barrels that are now located within the garbage gates. No further action necessary. 11/26/2019 - Resident Patsy Granger notified Royce of another incident at dumpsters. Will follow up with a phone call to resident. 12/02/2019 - Spoke with Patsy Granger and informed me that it looked as if the barrels with cooking oil were being spilled intentionally into the drain. Will send a follow up letter to businesses. 12/04/2019 - Site visit and sent follow up letter to property owner. No further action necessary.
19-034	7/2/2019	Edmonds Marsh	Ron Gouguet (Windward) via Phil Williams	No	Consultant found oil sheen in marsh as he was retrieving his equipment. Contacted Dian Buckshnis who forwarded it on to Public Works.	Zack and I made a site visit to find an oil sheen in and around the canary grass. (see attachment in folder) Sheen looked to not originate from our MS4. The amount of sheen found was not quantifiable. Passed this information back to Phil for further thoughts and documentation.	Y	Y	N/A	N/A	N	No	Yes	07/08/2019 - ERTS received #690434. 07/31/2019 - Aerial photos from 2018 indicted that this issue has been ongoing and not a recent stormwater MS4 discharge. DoE have been notified. No further action necessary.
19-035	7/5/2019	210 5th Ave S (Windermere Building)	PW-Eng (Greg Malowicki)	No	Greg called when he observed the driver of a van running a hose from the van to a CB while doing Dayton project photos.	Got on-site and spoke with operator. He was cleaning at address, and had van and hosing laid out on the north side of the building in the private parking lot. Discharge was potable water from a tank inside the van which was un-used water intended for pressure washing. Driver was draining tank to avoid driving with it full.	Y	Y	N/A	N/A	N	No	N/A	07/05/2019-Water appeared clean; no reason to suspect operator was not being forthcoming with his response. Appears to be an allowable discharge per 7.200.070.D.4 No further action necessary.
19-036	7/3/2019	Madrona Elementary School	PW Operations (Jeff Whatmore)	No	Jeff W. notified me with pictures of a witnessed discharged by custodial staff dumping what looked to be a cleaning product in the planting beds at Madrona Elementary. Also witnessed was suds in one of the areas drains.	This site infiltrates. This is considered to be an illicit discharge since it was a diliberate act. An email for further clarification was sent to ESD.	Y	Y	N/A	N/A	N	No	Yes	07/09/2019 - Exchanged emails with multiple ESD staff members to clarifiy and educate the staff responsible for the disharge. We were assured this won't happen again. The liquid was identified as Spitfire (commerical cleaner). No further action necessary.
19-037	7/10/2019	423 Main St. (Sante Fe Mexican Restaurant)	PW Operations (Jeff Whatmore)	No	Jeff W. notified me on July 11th via text of a plausible concrete slurry discharge at 5th and Main.	Site visit indicated a concrete slurry discharge coming from 423 Main St. The contractor had unknowingly cut a roof drain the previous day which drains to main st. When snaking the drain and repairing it, slurry water exited the drain. The slurry did not enter the MS4 and largely dried in the curbline. While vehicles did track it westbound, cleanup efforts took place immediately when made aware. Staining of the road surface is expected.	Y	Y	N/A	N/A	Y	No	Yes	07/12/2019 - Spoke to Blake ?, the maint. supervisor for this property. Confirmed the chain of events which led to discharge. 07/31/2019 - Site visit showed no further discharge issues, the sweeper has followed up and swept gutter line and residual road tracking has dissapated. No futher action necessary.
19-038	7/12/2019	18109 84th Ave. W.	PW-Eng (Ryan Hague)	No	Ryan texted me as his site visit indicated signs of a slurry discharge.	Site visit showed concrete slurry washout from a truck on a recent pour which had jumped the sidewalk and discharged onto the road surface. MS4 showed no signs of concrete accumulation in the CB or vegetation. The road is to ground during repaving operations. No cleanup needed. Will follow up with permitted contractor.	Y	Y	N/A	N/A	Y	No	Yes	07/15/2019 - Sent letter to contractor. No further action necessary.
19-039	7/11/2019	Edmonds Marsh	Shannon Wilson (Consultant)	No	While performing work in the marsh, the consultant performed water and sediment testing. These tests showed pollutant levels higher than anticipated.	Zack filed an ERTS#690562	Y	Y	N/A	N/A	N	No	No	Zack has forwarded the entirety of the discharge information to Dept. of Ecology for further investigation and to make a determination in how to proceed. 01/13/2020 - It has been determined this is not an ongoing IDDE issue but rather a historical discharge. There is no further action necessary until Dept. of Ecology resonds and/or a follow up incident reporting occurs.

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ID	Spill Date	Spill location	Resident / Owner / Caller	Hotline / Website Notification	Description	Resolution	Immediate response to discharge	< 7 days to investigate discharge	21 days to Investigate illicit connection	Remove connection w/in 6 months	Currently under construction	IDDE/Spill Impacted MS4	IDDE/Spill Eliminated	Follow up Dates & Notes
19-040	7/24/2019	7607 234th ST SW	PW-Eng (Natalie Griggs / Jennifer Lambert)	No	Natalie called to inform me of an IDDE issue, as contractors had washed slurry down gutter line and into CB.	Upon arriving on scene, contractor had begun cleanup by shopvac'ing CB, and collecting the residual slurry in the gutter line. The slurry did not reach further down the MS4. Had an educational discussion with the lead. (Twins Construction - 425-314-4800)	Y	Y	N/A	N/A	Y	No	Yes	07/24/2019 - Sweeper will follow up on the upcoming Friday. No further action necessary.
19-041	8/19/2019	415 Main St. (Alley)	PW-Eng (Mike Delilla)	No	Mike informed me of a grease spill in alley next to dumpsters.	Site visit indicated a relatively new grease spill that had now been tracked by cars into the alley. Grease drips lead to the dumpster area for many downtown restaurants. Will follow up with a letter. Placed absorbant pads and a cone on spill to reduced tracking.	Y	Y	N/A	N/A	N	No	Yes	08/22/2019 - Site visit showed grease spill was largely soaked up and dried. Some staining. The dumpster area was also cleaned of litter indicating they complied with the letter sent. Will continue to monitor. No further action necessary.
19-042	8/21/2019	432 Olympic Ave.	PW Operations / PW-Eng (Natalie Griggs)	No	Natalie informed me of an illicit connection at address that was found due to a sinkhole investigation from PW. The drainage pipe was broken due to a crossbore.	Collected pictures and formed a formal response letter to the property owners of 432 Oly Ave. Requested they seek a permit to properly repair the pipe.	Y	Y	Y	No	N	No	No	08/28/2019 - Confirmed appt. with Randy Hall (resident) to discuss repair/replace options. 09/03/2019 - Natalie and myself spoke with Randy Hall at the front counter and presented him with the options and necessary paperwork. He will determine whether his line is currently functional and let us know how he will proceed. (Randy Hall - Ph: 425-345-8443) 10/17/2019 - Resident came back to pick up a permit to conduct the necessary work. Spoke with Natalie and Zack. 12/03/2019 - Sent follow up letter. March 2nd is deadline before enforcement actions.
19-043	8/30/2019	15920 72nd Ave W	PW Operations (Mike Brown)	No	Mike B. reported (10:30am) (via Mike J) a diesel or fuel smell and sheen in ditch line just above MH 1-74 off of North Meadowdale Rd.	Investigated throughly but could not identify source of diesel (fuel), see write up sheet for more info. Believe this was small, one-time spill most likely, but should be followed up on next week. (ERTS #693622)	Y	Y	N/A	N/A	Y	Yes	No	See timeline document in folder
19-044	10/2/2019	1502-1508 7th PL S	Resident (Milo Hegamin)	Yes	Resdient called PW Operations (Royce) and reported a Republic Services truck leaking hydraulic fluid from the lift arm. He also notified Republic Services of the incident. The spill was said to cover the trucks route and not just the residential street where the resident lives.	Drove around area of reported spill and witnessed a few stained spots. Difficult to spot due to the wet surface of the previous nights rain. Not an immediate threat to the system in as it is a very minor hydraulic fluid discharge.	Y	Y	N/A	N/A	N	No	Yes	10/03/2019 - The fact that Republic Services was notified of leak and the spill was minor should be enough. Leak not spreading or affecting the MS4. No further action necessary.
19-045	10//7/2019	702 7th Ave S.	Resident (Ellen Ernst) via Phil Williams	No	Phil informed Zack on the morning of 10/07 that a resident had inquired about a probable illegal dumping at the catch basin near her residence. I was asked to check in on it and follow up if necessary.	Inspection of the CB 12-29 showed that the surface has visible slurry on it. It is a concentrated spill and not runoff from the road surface. Inside the CB contains roughly 12-18 inches of sediment, up to the outfall, thus the basin needs cleaning. This may have prevented the solidifying of said unknown amount of slurry on bottom of CB. No visible signs of spill going down outfall pipe. Will inform PW to clean CB.	Y	Y	N/A	N/A	N	No	Yes	10/07/2019 - Corresponded with Ellen Ernst in emails to follow up on this incident. 10/30/2019 - No further action necessary
19-046	10/29/2019	711 Puget Lane (and neighboring properties)	Resident (Anonymous)	Yes	Anonymous caller emailed Zack to inform the City of a probable illegal dumping on BNSF and City property.	Sent IDDE letter to neighboring residents to this site location.	Y	Y	N/A	N/A	N	No	Yes	No further action necessary. 11/04/2019 - Tom Nicholson @ 702 Driftwood LN. called to inform the City of the continued dumping from the resident at 702 Driftwood LN.
19-047	11/19/2019	408 Daley St.	PW Operations (Via Edmonds PD, Officer Henderson)	No	Received call from Royce (PW) that there had been an illegal siphoning of fuel from a car, which left a spill on the ground. Mike Johnson attended scene around 10:30am on 11/19. Called in by EPD, officer Sutton.	Mike Johnson attended scene to find very little cleanup needed. A small amount of fuel was discharged and did not impact the MS4. EPD Case # 2019-29124	Y	Y	N/A	N/A	N	No	Yes	11/19/2019 - No further action necessary.
19-048	12/5/2019	401 Howell Way	Resident (Anonymous)	Yes	Online reporting by a resident for a suspected IDDE for Edmonds Autobody. Reports suggests they are continuing to wash into the MS4. ERTS # 694726	This is the 3rd report for an IDDE this year. I have spoken with the owner and gone over his pumping system to the sewer. Will follow up again.	Y	Y	N/A	N/A	N	No	Yes	12/05/2019 - Followed up with the owners of the shop who informed me that they were indeed using the pump system to drain to sewer and had educational signage in place notifying passerbys. No further action necessary.
19-049	12/26/2019	14th Way & 100th Ave. W.	PW-Eng (Natalie Griggs)	No	Natalie noticed on Dec 27th, what looked to be a spill on 14th Way leading up to 100th Ave. The spill looked to be tended to already with dry sweep already applied.	On investigation by Zack, it turns out Darren Browning from Public Works had spread dry sweep to contain the spill and it did not enter the MS4. Darren felt the overall amount did not trigger additional concern (although the amount leaked is unknown) and had already scheduled a sweeping of the road. The source was found to be from a Republic Garbage Truck. Will follow up with them.	Y	Y	N/A	N/A	N	No	Yes	12/30/2019 - No further action necessary. 12/31/2019 - Traded voicemails with Megan Darrow at Republic. Got clarification from Royce that it was an anonymous caller who phoned it in.
19-050	12/30/2019	910 Brookmere Drive	Resident	Yes	City was notfied by the homeowner after heavy rains of a sheen forming over driveway and running down the road.	Site visit on 12/31 didn't' in as so much indicate any sheen, however, two samples were taken at the site to be analyzed by ALS labs. ERTS # 695373 The quanity released into the MS4 is unknown.	Y	Y	N/A	N/A	N	Yes	Yes	12/31/2019 - Ran two samples to ALS Labs. 01/16/2020 - Added Absorbent Boom in CB 8-70 01/23/2020 - No sheen found in sustained rains. Boom remains in CB on 9th Ave.N. Will continue to monitor. 02/24/2020 - No further sheen found. Constant monitoring will stop until sheen can be witnessed again. No further action necessary.

3.5 Appendix E – Lake Ballinger 2020 Health Report

Lake Ballinger
2020 Health Report

CITY OF MOUNTLAKE TERRACE
CITY OF EDMONDS Inc. 1890
Snohomish County
Public Works
Surface Water Management
425-388-3464

Lake Health = **FAIR**

The lake health is currently fair. Actions are needed to prevent pollution and improve shoreline health.

Health Indicators	Poor	Fair	Good	Excellent	Details
Water Clarity *Visibility in water*		■			**Fair** – Average clarity is 10.1 feet deep.
Phosphorus *Keeping it low prevents algae*		■			**Fair** – Phosphorus levels are high.
Algae *Problematic if too much*			■		**Good** – Algae levels are moderate. The lake has occasional toxic algae blooms.
Shorelines *Shoreline plants protect the lake*		■			**Fair** – Half of the lake shoreline has trees and shrubs rather than lawns.

Possible ratings include: Poor Fair Good Excellent

Based on data collected in 2019. For more information and data, visit www.lakewise.org.

Take Action to Protect Lake Ballinger

Reduce Pollution

Make small changes on your property to prevent phosphorus pollution (see reverse side).

Retain Trees & Shrubs

Keep or plant more trees and shrubs. They reduce and clean polluted runoff.

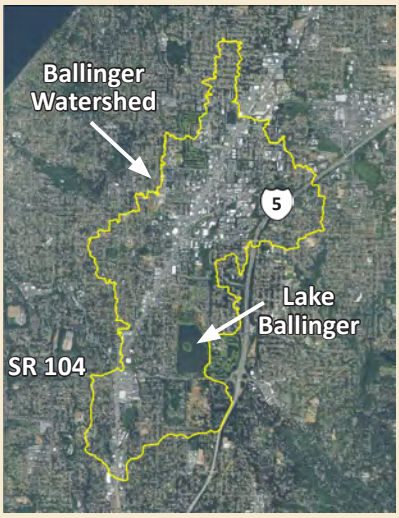
Prevent Milfoil

Clean, drain and dry your boat before launching or leaving the lake to prevent the spread of invasive plants.

See back for details on how you can help.

Lake Ballinger Watershed

The properties inside the yellow line drain to the lake and make up the lake's watershed. The area outside the yellow line drains to other lakes, streams or rivers.



Ballinger Facts

- Lake Ballinger is a 100-acre lake within the cities of Mountlake Terrace and Edmonds.
- The lake name was changed from McAleer to Ballinger in 1901 when R.A. Ballinger purchased the island and surrounding lands.
- In 1970, City of Mountlake Terrace purchased a golf course on the north end of lake which is now a popular recreational park.
- Ballinger Park provides great opportunities for wildlife habitat and recreation for local residents.

Protect Lake Ballinger
Reduce Phosphorus Pollution

What you do makes a difference. Here are the most important actions you can take on your property to reduce harmful phosphorus pollution and protect Lake Ballinger.

Lawns and Yards

Practice Natural Lawn Care

Avoid fertilizer that contains phosphorus and watch natural lawn care videos at www.naturalyardcare.org.

Pick Up Pet Waste

Scoop it, bag it, and place it in the trash.

Prevent Soil Erosion

Cover bare soil areas with mulch or plants and fix eroding areas.

Infiltrate Roof & Driveway Runoff

Divert roof and driveway runoff into lawns or vegetated areas to absorb and filter pollutants.

Septic Systems

Maintain A Leak-Free Septic System

Have an inspection at least every three years*. Visit www.SavvySeptic.org for more information.

Shorelines

Create A Healthy Shoreline (if applicable)

Maintain existing shoreline vegetation and replace some shoreline lawns with trees and shrubs.

* System type determines frequency.

Title VI/ADA: Interpreter and translation services for non-English speakers and accommodations for persons with disabilities are available upon request. Call 425-388-3204. For questions regarding Public Works' Title VI Program, contact our Title VI Coordinator via email at spw-titlevi@snoco.org, or phone 425-388-6660. Hearing/speech impaired call 711.

3.6 Appendix F – 2019 Snohomish County Natural Yard Care Education Evaluation Report

Snohomish County Natural Yard Care Education Evaluation Report

Follow-up Evaluation to the Evaluation of the 2014 Program

Prepared for:
Snohomish County

December 31, 2019
Final Report

CASCADIA CONSULTING GROUP
SEATTLE, WA | OAKLAND, CA
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- Washington State University Snohomish County Extension Master Gardener Program (Philomena Kedziorski)

The evaluation was designed and conducted by Cascadia Consulting Group:

- Jessica Branom-Zwick

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Background and Introduction

Program History

In 2009, Snohomish County began developing an outreach program on "yard care practices protective of water quality" in response to a requirement in its 2007–2013 NPDES permit. Snohomish County's pilot program was based on the successful King County and Seattle models, which the County used with permission. Because these models had been developed for urban areas, Snohomish County adapted them for residents of suburban and rural areas. They were (and are) focused on reaching residents of detached single-family homes on properties sized less than one acre.

In 2010, Snohomish County piloted lecture workshops after developing supporting resources, including a County webpage, locally appropriate versions of the Natural Lawn and Garden Guides (originally developed by the City of Seattle), and a regional website (in coordination with King County).

Snohomish County used social marketing techniques to refine the program's target audience, logistics, and program elements. The workshops were fully implemented in 2012, with additional refinements in 2013.

In 2014, Snohomish County continued the education effort by holding seven series of workshops (each series consisting of three workshops) and conducted an in-depth evaluation to assess their effectiveness and identify recommendations for further refinements.[1] Several Phase II permittees joined in this effort to meet their 2007-2013 NPDES Permit requirements under S5.C.1.ii.c. The evaluation assessed behavior change by comparing participants' self-reported yard care practices before the workshops and their practices six to twelve months after the workshops. The evaluation also included surveys of selected residents who did not attend workshops and of participants in a more intensive natural lawn care program conducted in Thurston County at the same time.

[1] Cascadia Consulting Group. *North and South Sound Natural Yard Care Education Evaluation Report*. Prepared for Snohomish County and City of Olympia. 2015.

In 2018-2019, Snohomish County, in partnership with Edmonds, Everett, Marysville, Monroe, and Mukilteo and Washington State University Snohomish County Extension Master Gardeners (WSU), held three workshop series (listed as Mukilteo, Marysville, and Everett – which corresponds to the three venue locations) and enhanced the program with new program elements to address recommendations from the 2014 evaluation. (The term "Snohomish County" used throughout this document also includes the partnering organizations.) These program enhancements focused on providing more interactive, visual, and up-close learning opportunities including more demonstrations during workshop lectures, new tabletop displays on view before and after workshops and during workshop breaks, and a Lawn and Garden Fair event with demonstration sessions and booths.

Program Model

Base Lecture Workshops in 2014

In 2014, Snohomish County provided up to six hours of natural yard care education through three, two-hour lecture workshops held on weekday evenings (once per week over three

weeks). Workshops accommodated up to 75 participants per workshop and included the following elements:

- Just under one hour of lecture (with visual demonstrations) on each of six topics (two topics per workshop):
  - Natural Lawn Care: sheet mulching
  - Smart Watering: no demonstration
  - Right Plant, Right Place: plant showcase
  - Natural Pest, Weed & Disease Control: crop rotation
  - Growing Healthy Soil: what's in soil
  - Sustainable Landscape Design: soil jar shake test
- Diagnostic and identification technical assistance from Washington State University (WSU) Master Gardeners before and after workshop and at breaks
- Small products that encourage participant use of natural yard care best practices offered to participants for attending lectures and completing surveys

Enhanced Workshops in 2018–2019

In 2018–2019, Snohomish County continued and enhanced the lecture workshops with additional visual demonstrations during lectures and tabletop displays staffed by yard care experts during workshop breaks. Workshops also lasted half an hour longer for a total of 2.5 hours of education each.

Visual demonstrations conducted by presenters during lectures were:

- Natural Lawn Care
  - Apply lime to lawns (video)
- Smart Watering
  - Smart watering methods (video)
- Right Plant, Right Place
  - Plant and water in new plants (live demonstration)
- Natural Pest, Weed, & Disease Control
  - Use the "Grow Smart, Grow Safe" website and "Stop Before You Spray" good bug guide (online resources)
  - Create a crop-rotation plan for a food garden (hands-on demonstration)
- Growing Healthy Soil
  - Use compost or mulch on existing plants or gardens (live demonstration)
- Sustainable Landscape Design
  - Use King County's online native plant guide (online resource)
  - Convert lawn to garden by sheet mulching (live demonstration)

Tabletop displays presented the following practices and were displayed at one or more workshops related to each practice:

- **Mulch Matters**: choose and apply mulch
- **Improving Soil Health**: perform soil test
- **Lawn Aeration**: aerate and top-dress lawn
- **Diagnosing Plant Problems**: identify and control plant problems with least-toxic methods
- **Matching Plant to Place**: choose plants that match your garden's conditions
- **Planting Right**: plant properly, following all steps

New Lawn and Garden Fair (2019)

In 2019, Snohomish County held a Lawn and Garden Fair to provide interactive demonstrations and give residents the opportunity to ask advice from natural yard care experts. The event was held at Thornton A. Sullivan Park on Saturday, June 22 from 9:00 a.m. to 12:30 p.m. The event featured 17 different hands-on demonstrations in six topic areas, with demonstrations starting at half-hour intervals (Table 1).

At the end of each demonstration, the presenter asked a question on the key point of the session. One person per demonstration who answered correctly received a garden product related to the practice, such as a hand lens with an LED light for the Problem Pests and Natural Controls demonstration and a soil test for Managing Moss demonstration.

The event also included booths for Master Gardeners as another opportunity for participants to ask questions. WSU's Snohomish County Master Gardener volunteers receive in-depth training on best gardening practices, including those protective of water quality. They are a local trusted

resource trained to provide easily understood solutions to the gardening public through small group and one-on-one demonstrations.

Table 1. Lawn and Garden Fair Demonstration Sessions

Area Number & Topic Title	"How To" Demonstration	9:00	9:30	10:00	10:30	11:00	11:30	12:00
1 Natural Yard Care	Crop Rotation Prevents Problems	✓	✓		✓		✓	
	Hand-Tool Sharpening	✓		✓		✓		✓
	Problem Diagnosis & Plant Identification	✓	✓	✓	✓	✓	✓	✓
2 Think Twice Before Using Pesticides	Meet the Beneficials & Pollinators	✓		✓		✓		✓
	Problem Pests & Natural Controls		✓	✓	✓		✓	✓
3 Practice Smart Watering	How Long to Water for 1-inch?		✓	✓	✓	✓	✓	
4 Build Healthy Soil	Backyard Composting		✓		✓	✓		✓
	Get to Know Your Soil	✓	✓	✓	✓		✓	✓
	Mulch Matters	✓	✓	✓		✓	✓	✓
5 Plant Right for Your Site	Matching Plant to Place	✓		✓	✓	✓		✓
	Native Plants	✓	✓	✓				✓
	Planting It Right		✓	✓	✓	✓	✓	✓
	Plants for Wet Soil		✓		✓	✓	✓	
6 Practice Natural Lawn Care	Aerate & Overseed: A Healthier Lawn	✓	✓	✓	✓		✓	✓
	Fertilizer: How to Apply the Correct Amount	✓	✓		✓	✓	✓	✓
	Mowing Tips & Blade Sharpening		✓	✓	✓	✓	✓	✓
	Managing Moss	✓		✓	✓	✓	✓	✓

Recruitment

Workshops

Workshops in 2018–2019 were advertised primarily using postcards mailed to residents living near the workshop location. To personalize the mailers, they are printed with recipients' names. Due to an issue with the spring mailing list, first names were omitted on many of the spring postcards, reducing the level of personalization and registration rates. As a result, Snohomish County supplemented the postcards in spring 2019 with geographically focused social media posts and ads. After each spring workshop, the survey asked how participants learned about the workshop. Participants reported having learned of the workshop through the postcards (71% to 79%), friends or family (10% to 14%), or NextDoor or Facebook (6% to 15%). Many of the write-in responses mentioned a mailer, flyer, or other term that likely meant the postcard. Social media was a large source for participants at the Marysville workshops (19% to 28% of attendees), where registrations were especially low.

Lawn and Garden Fair

The Lawn and Garden Fair was promoted through a direct mail postcard. Unlike previous similar events, the Lawn and Garden fair did not use social media, partner websites, or newspaper articles for recruitment.

Evaluation Approach and Activities

Evaluation Goals

This evaluation has three goals:

- Understand whether behavior change created by natural yard care workshops was sustained in the long-term.
- Understand the value of new program elements implemented based on recommendations from the 2014 natural yard care workshop evaluation report.
- Meet new requirements in the NPDES Phase 1 Permit 2019–2024 (S5.C.11.a.iii) and NPDES Phase II Permit 2019-2024 S5.C.2.a.ii.(b).

Per NPDES Phase 1 Permit 2019–2024 S5.C.11.a.iii: No later than July 1, 2020, each Permittee shall conduct a new evaluation of the effectiveness of the ongoing behavior change program

(required under S5.C.10.a.ii of the 2013 Permit). Permittees shall document lessons learned and recommendations for which option to select from S5.C.11.a.iv.

Per NPDES Phase II Permit 2019-2024 S5.C.2.a.ii.(b): No later than July 1, 2020, each Permittee shall conduct a new evaluation of the effectiveness of an ongoing behavior change campaign (required under S5.C.1.a.ii and S5.C.1.c. of the 2013 Permit). Permittees shall document lessons learned and recommendations for which option to select from S5.C.2.a.ii.(c).

Evaluation Activities

This evaluation addressed lecture workshops and the Lawn and Garden Fair. Separate evaluations were conducted for participants in the 2014 program (called the "2014 cohort"), participants in the 2018–2019 workshops (called the "2018–2019 cohort"), and attendees to the 2019 Lawn and Garden Fair.

Workshop Evaluation

The 2014 program evaluation was designed to assess the education program in a statistically valid manner. The 2018–2019 program evaluation was designed to be comparable to the 2014 evaluation but did not include statistical analysis. Participants in both programs completed surveys before and after participating in the programs. In 2014, surveys were also administered to randomly selected non-participating households to measure whether they made changes during the same time period without participating in one of the programs.

Workshop participants completed surveys at three or four points during their participation:

- **Baseline survey** to assess participants' use of natural yard care best practices before they received education. These web-based surveys were incorporated into registration forms.
- **Immediate post-outreach surveys**, conducted at the workshops directly after receiving education, to assess workshop quality. These paper surveys addressed program feedback and intended actions (after each workshop).
- **Medium-term post-outreach survey**, conducted six to twelve months after receiving education to assess behavior change and participants' use of natural yard care best practices after they received education. This paper and web-based survey also addressed social diffusion and program feedback.
- **Long-term post-outreach survey** (2014 cohort only) conducted five years after receiving education to assess whether changes in participants' use of natural yard care best practices were sustained. This paper and web-based survey also addressed social diffusion and other changes since the workshops.

Table 2 on page 13 summarizes the participation rates, survey activities, and response rates for each of the cohorts.

Additional details on evaluation methods and results are presented in the following appendices.

- Appendix A —Survey data summary tables
- Appendix B—Survey instruments

Lawn and Garden Fair Evaluation

Snohomish County staff estimated that 114 people attended the fair. Attendance was likely reduced due to limited marketing and the unseasonably cold temperatures on the day of the event.

The Lawn and Garden Fair was evaluated using a survey that participants filled out and returned during the event. A total of 53 surveys were returned, for a response rate of approximately 46%. Participants who completed surveys were offered small products that encourage use of natural yard care best practices: bag of compost, gauge rule to measure lawn watering, and a 15% off coupon for compost. They were also entered into a drawing for a grand prize consisting of a collection of natural yard care products including a soil test, a bag of organic fertilizer, a bag of lime, a compost thermometer, a hose-end irrigation timer, a hand lens, a pair of gardening gloves, a laminated *Mac's Field Guide to Good Garden Bugs of the Pacific Northwest*, and three books (*The Maritime Northwest Garden Guide*, *Month-by-Month Gardening in the Pacific Northwest*, and *Grow Your Own Native Landscape*).

Table 2. 2014 and 2018–2019 Respondents and Response Rates

Evaluation Elements	2014 Cohort	2018–2019 Cohort
Baseline survey	Total attending households: 451 Survey respondents: 457, of which between 383 and 417 attended a workshop Response rate: 85–92%	Total attending households: 228 Survey respondents: 221 Response rate: 97%
Immediate post-outreach surveys	**Workshop 1 (*Lawn Care/Smart Watering*)** Attending households: 334 Survey respondents: 288 Response rate: 86% *In 2014, responses were limited to one per household.* **Workshop 2 (*Right Plant/Healthy Soil*)** Attending households: 314 Survey respondents: 303 Response rate: 96% **Workshop 3 (*Design/Pest & Weed Control*)** Attending households: 297 Survey respondents: 287 Response rate: 97%	**Workshop 1 (*Lawn Care/Smart Watering*)** Attending households: 148 Attending individuals: 204 Survey respondents: 162 Response rate per household: 109%* Response rate per individual: 79% **Workshop 2 (*fall – Design/Pest & Weed Control; spring – Pest & Weed Control/Healthy Soil*)** Attending households: 158 Attending individuals: 211 Survey respondents: 166 Response rate per household: 105%* Response rate per individual: 79% **Workshop 3 (*fall – Right Plant/Healthy Soil; spring – Design/Right Plant*)** Attending households: 146 Attending individuals: 197 Survey respondents: 159 Response rate per household: 109%* Response rate per individual: 81%
Medium-term post-outreach survey	Participating households: 451 Survey respondents: 284 Response rate: 63% Timing: May–September 2015	Participating households: 228 Survey respondents: 121 Response rate: 53% Timing: September–October 2019
Long-term post-outreach survey	Participating households: 401 (after removing households that moved out of Western Washington and undeliverable addresses) Survey respondents: 237 Response rate: 59% **Timing: February–July 2019**	Not applicable

** Response rates per household are higher than 100% because more than one person per household completed a survey.*

Behavior Change Results

Figures in this report are rounded to the nearest percentage point. As a result, the sum of "baseline" and "change" figures may not appear to equal the "post-outreach" and "long-term" figures, but each figure is independently the most accurate rounded amount.

In the narrative findings, two icons indicate the **level of behavior change** (H, M, or L) from baseline to the long-term post-outreach survey and the **long-term and medium-term use** (✔, ▲, ●) as follows:

Behavior Change

H High behavior change
20 or more percentage points

M Moderate behavior change
10 to 19 percentage points

L Low behavior change
Less than 10 percentage points

Post-Outreach Use

✔ High post-outreach/long-term use
70% or more for preferred practices
25% or less for harmful practices

▲ Moderate post-outreach/long-term use
40% to 69% for preferred practices
26% to 60% for harmful practices

● Low post-outreach/long-term use
Less than 40% for preferred practices
More than 60% for harmful practices

Additional details on results are presented in Appendix B—Survey Data Summary Tables.

2014 Cohort Results

Summary of Behavior Change (2014 Cohort)

Table 3 summarizes the behavior change outcomes for participants from 2014 (called the "2014 cohort"), including self-reported use of practices from the baseline, medium-term, and long-term surveys as well as the change in usage between baseline and long-term surveys and between medium-term and long-term surveys.

Table 3. Yard Care Practices (2014 Cohort)

Type	Yard Care Practice or Understanding	Baseline Use & Medium-Term Use & Long-Term Use	Long-Term Behavior Change (vs. Baseline)	Long- vs. Medium-Term
Using Weed-and-Feed	HARMFUL PRACTICE: Use weed-and-feed	64% 13% ✓ 33% △	-30% H	20%
Fertilizing	HARMFUL PRACTICE: Use fast-release or weed-and-feed fertilizer	50% 26% △ 34% △	-16% M	9%
	Use slow release, organic or natural fertilizer	30% 59% △ 62% △	32% H	3%
Managing Weed and Pests	HARMFUL PRACTICE: Pests/diseases: broadly apply product	11% 6% ✓ Not asked		
	Pests/diseases: remove, prune, use netting or collars, or tolerate	78% 92% ✓ Not asked		
	HARMFUL PRACTICE: Weeds: broadly apply weed killer	25% 6% ✓ 12% ✓	-13% M	5%
	Weeds: pulled, smothered, tolerated, spot-treated	97% 96% ✓ 99% ✓	1% L	3%
Applying Lime	Apply lime at least every 2 to 3 years	29% 24% ○ 34% ○	5% L	10%
Aerating	Aerate at least every 2 years	20% 25% ○ 27% ○	7% L	2%
	Top-dress with compost, if aerated	27% 57% △ 26% ○	-1% L	-31%
Applying Mulch	HARMFUL PRACTICE: Bed cover: landscape fabric, plastic, or bare soil	35% 22% ✓ 27% △	-8% L	5%
	Bed cover: mulch, grass clippings, or plants	90% 90% ✓ 90% ✓	0% L	0%

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Table 3. Yard Care Practices (2014 Cohort), continued

Type	Yard Care Practice or Understanding	Baseline Use & Medium-Term Use & Long-Term Use	Long-Term Behavior Change (vs. Baseline)	Long- vs. Medium-Term
Mulch Mowing	Sometimes or always mulch mow in dry months	49% 70% ✓ 59% △	9% L	-12%
	Sometimes or always mulch mow in wet months	46% 66% △ 60% △	14% M	-6%
Mowing Height	Mow 2-3" or higher	91% 96% ✓ 91% ✓	0% L	-5%
Choosing Plants	Always match plant to where it thrives	19% 59% △ 35% ○	16% M	-24%
	Always look for a plant's soil drainage needs	24% 53% △ 40% ○	15% M	-14%
	Always look for whether a plant is native to Pacific Northwest	17% 43% △ 34% ○	17% M	-9%
	Always look for a plant's pest and disease resistance	12% 39% ○ 26% ○	15% M	-12%
	Always look for a plant's full-grown size	52% 73% ✓ 66% △	14% M	-6%
	Always look for a plant's cold temperature tolerance	29% 51% △ 44% △	14% M	-7%
	Always look for a plant's watering needs	42% 57% △ 52% △	10% L	-5%
	Always look for a plant's sun/shade needs	65% 84% ✓ 73% ✓	8% L	-11%
	Has sketched a map of the yard	Not asked 25% ○ 27% ○		3%

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Table 3. Yard Care Practices (2014 Cohort), continued

Type	Yard Care Practice or Understanding	Baseline Use & Medium-Term Use & Long-Term Use	Long-Term Behavior Change (vs. Baseline)	Long- vs. Medium-Term
Preparing Soil	Know to prepare soil with compost	67% 92% ✓ Not asked		
	Know to mix materials into soil 6-8 inches deep	24% 38% ○ Not asked		
Watering	Measure sprinkler watering rate (tuna can test), if waters	29% 36% ○ 32% ○	4% L	-3%
	Water lawn once a week or less	69% 64% △ Not asked		
	ACCEPTABLE PRACTICE: Water lawn two to three times per week	25% 31% ○ Not asked		
	HARMFUL PRACTICE: Water lawn daily or every other day	6% 5% ✓ Not asked		

Long-Term Behavior Change (2014 Cohort)

Practices that Protect Water Quality

In the long term, 2014 participants continued using several key practices that directly protect water quality, as shown in Table 4, but with some backsliding compared to the medium term. Despite backsliding, participants from 2014 retained a high level of behavior change in no longer using weed-and-feed (long-term adoption level of 67%, down from 87% in the medium term).

In this report, the term "backsliding" is used to indicate when participants initially increased their use of natural yard care practices after the workshop, but the behavior change was not retained in the long term.

With backsliding, participants from 2014 also retained moderate behavior change in not using quick-release fertilizer (66%, down from 74%) and not broadly applying weed killer (88%, down from 94%). Backsliding decreased long-term behavior change from moderate to low levels for not leaving beds bare or covered in landscape fabrics or plastics (73%, down from 78%)

Backsliding entirely erased gains in top-dressing lawns with compost after aerating (26%, down from 57%). While gains in aerating were retained (27%, up from 25%), those behavior changes had been low in the medium term (5%).

As described below, the program also achieved varying levels of long-term behavior change in practices that support a healthy yard and reduce the weed, pest, and disease reasons people use toxic yard care products.

Table 4. Adoption of Practices that Protect Water Quality (2014 Cohort)

Long-Term	Medium-Term	Practice
H ▲	H ✓	Avoiding weed-and-feed use
M ▲	H ✓	Avoiding fast-release fertilizer use
M ▲	H ✓	Avoiding broad application of weed killer
L ▲	M ▲	Not leaving beds bare or covered in landscape fabric or plastics
L ●	H ▲	Top-dressing lawns with compost after aerating
L ●	L ●	Aerating every two to three years

Where the Program Worked Effectively in the Long Term

H ▲ **Substantial change with room for additional improvement**

- Not using weed-and-feed *(backsliding of 20 percentage points)*
- Using slow-release, organic, or natural fertilizer

Long-term behavior change was high for the practices, but final adoption levels for these practices indicate opportunities to further increase adoption. For weed-and-feed, substantial backsliding indicates that reminders or refreshers may be needed. Participants retained changes in using recommended fertilizers, but incentives may be needed to increase adoption of this practice.

M ✓ **Moderate change resulting in high long-term use**

- Not broadly applying weed killer

In the long term, the percentage of respondents who said they do not broadly apply weed killers increased by 13 percentage points.

L ✔ **Little change because of high adoption levels before the workshops**

- Non-toxic weed control: pulling, smothering, tolerating, or spot-treating weeds
- Mowing two to three inches or higher
- Covering plant beds with mulch, grass clippings, or plants
- Always looking for a plant's sunlight and shade needs *(backsliding of 11 percentage points)*

High baseline adoption resulted in little behavior change or backsliding for non-toxic weed control, mowing height, and covering plant beds with suitable materials. As with several other plant choice practices, backsliding reduced the behavior change gains in the long term for choosing plants based on light needs.

Where the Program Created Moderate Long-Term Change

M ▲ **Moderate changes with moderate long-term use**

- Not using fast-release fertilizer
- Mulch mowing in wet months
- Always matching a plant to where it thrives *(backsliding of 24 percentage points)*
- Always looking for a plant's:
  - Full-grown size
  - Cold temperature tolerance
  - Watering needs

Due to backsliding (between 5 and 9 percentage points except where noted), respondents retained moderate (rather than high) long-term behavior change for these practices, resulting in moderate final adoption levels. Matching a plant to where it thrives experienced a particularly large decrease between the medium- and long-term surveys. Reminders or refreshers may be needed for all these practices as well as incentives to purchase recommended fertilizers.

M ● **Moderate changes with low long-term use or understanding levels**

- Always looking for a plant's:
  - Soil drainage needs *(backsliding of 14 percentage points)*
  - Status as native to the Pacific Northwest
  - Pest and disease resistance *(backsliding of 12 percentage points)*

Again, due to backsliding, behavior change in plant choices decreased from high in the medium-term to moderate in the long-term, resulting in low final adoption levels (26% to nearly 40%).

Where the Program Achieved Little Long-Term Change

Little change with moderate post-outreach use

- Not leaving beds bare or covered in landscape fabric or plastics
- Mulch mowing in dry months *(backsliding of 12 percentage points)*

Little change with low post-outreach use

- Applying lime *(growth of 10 percentage points)*
- Aerating
- Top-dressing with compost after aerating *(backsliding of 31 percentage points)*
- Measuring sprinkler watering rate

In the long term, low behavior change was achieved for several lawn, soil, and mulch-related practices as well as measuring sprinkler watering rates. Backsliding reduced previous behavior change gains in mulch mowing in dry months and top-dressing after aerating. While use of aerating did not change, more respondents reported applying lime in the long-term than in the medium-term, although the total long-term behavior change was a low 5 percentage points.

Long-Term Retention of Behavior Changes

For practices where the program achieved moderate or high behavior changes in the medium term, Cascadia analyzed retention of those behavior changes in the long term. Percentage point differences compare adoption levels between the medium-term and long-term surveys. Practices where backsliding occurred may require reminders, refreshers, or other additional interventions to increase retention.

↑ Adoption increased between medium and long term

- Apply lime (+10 percentage points)

↔ Behavior changes achieved after workshop were retained between medium and long term (change less than 5 percentage points)

- Use slow release, organic or natural fertilizer (+3 points)

↓ Adoption decreased between medium and long by 5 to 10 percentage points

- Always look for a plant's:
  - Status as native to Pacific Northwest (-9 points)
  - Cold temperature tolerance (-7 points)
  - Full-grown size (-6 points)
  - Watering needs (-5 points)
- Not using fast-release fertilizer (-9 points)
- Sometimes or always mulch mow in wet months (-6 points)
- Mow 2-3" or higher (-5 points)
- Not broadly applying weed killer (-5 points)

↓↓ Adoption decreased between medium and long term by 10 percentage points or more

- Not using weed-and-feed (-20 points)
- Top-dressing with compost after aerating (-31 points)
- Always matching a plant to where it thrives (-24 points)
- Always looking for a plant's:
  - Soil drainage needs (-14 points)
  - Pest and disease resistance (-12 points)
  - Sunlight and shade needs (-11 points)
- Mulch mowing in dry months (-12 points)

Major Changes to Yard Care or in Yard (2014 Cohort)

On the long-term survey, respondents were asked whether they had made any major changes in their yard or how they care for it in the past few years. About half of respondents (49%) reported making major changes. Respondents were asked open-ended questions to describe those changes and why they had made them. Responses were categorized into themes shown in Table 5. Responses most commonly related to adding or moving plants, using mulch or mulch mowing, and using natural lawn care. The overall tone of the comments seemed optimistic, and people listed more than one action taken, sometimes up to five or six significant activities. Only one person reported that the action they took did not last.

Reasons for making changes are listed in Table 6.

Table 5. Types of Changes Made (2014 Cohort)

Type of Change Made	Percent	Number of Respondents
Added or moved plants, gardens, and/or fixtures	16%	37
Applied mulch or grass clippings	11%	26
Applied natural lawn care	10%	24
Applied Right Plant, Right Place principles	8%	18
Adjusted watering system, pattern, or drainage	7%	16
Decreased lawn size	7%	16
Reduced or eliminated chemical fertilizer, pesticides, and herbicides	7%	16
Made or applied compost	6%	14
Planted native, drought-tolerant, or weather-appropriate plants	3%	8
Re-sodded or re-sowed lawn	3%	6
Planted new ground cover/reduced bare soil	2%	5
Hired a professional	2%	5
Applied weed, pest, or disease best management practices	2%	5
Removed dying or invasive species	2%	4
Undesirable change	6%	14
Neutral change	6%	13
No major change	2%	5
Other changes	1%	2
Total number of respondents		**234**

Table 6. Reasons for Making Changes (2014 Cohort)

Reasons for Making Changes	Percent	Number of Respondents
Easier maintenance	13%	20
To make general improvements and add/change plants and features	12%	18
To address specific problems	12%	18
To address environmental concerns	11%	17
To implement lessons learned from the workshop	10%	16
To improve appearance and functionality of yard	10%	16
To improve soil and plant health	7%	11
To conserve water and/or reduce runoff	6%	10
To grow food	5%	7
To be hospitable to birds/bugs	4%	6
Other reason	10%	16
Total number of respondents		**155**

Social Diffusion (2014 Cohort)

Respondents from the 2014 program were asked in the long-term post-outreach survey whether they shared information about natural yard care with others. Over half of survey respondents (52%, or 118 participating households) reported sharing information. As shown in Table 7, participants most frequently shared information on natural lawn care (16%); choosing and installing plants (15%); weeds, pests, and diseases (15%); and mulching or ground cover (12%).

Table 7. Topics Shared (2014 Cohort)

Topics Shared	Percent	Number of Respondents
Natural lawn care	16%	34
Right plant, right place; choosing and planting plants	15%	31
Weed, pest, and disease management, prevention, and tolerance	15%	31
Mulching practices and ground cover	12%	24
Smart watering or general watering practices	9%	19
Soil improvements and care	8%	16
Making or using compost	5%	11
Tips for pruning and best practices	4%	8
Growing food	3%	7
Unspecified lawn care, gardening, or workshop information	11%	23
Other topics	1%	3
Total number of respondents		**207**

Respondent Demographics (2014 Cohort)

To identify whether respondents experienced major changes in demographics that may have affected their yard care behaviors, the long-term survey included questions on three key characteristics. Comparing survey responses indicated no major differences:

- **Residence**: about 7% of respondents reported moving in 2015 or later.
- **Home ownership**: 96% of respondents reported owning their home at baseline compared to 98% on the long-term survey.
- **Who performs yard care:** responses were largely similar for mowing, fertilizing, controlling weeds, applying mulch, and installing new plants. Responses differed for:
  - **Controlling pests or applying pesticides**: more households say "no one" controls pests or applies pesticides (from 22% in at baseline to 33% at long-term) while fewer households affirmed pesticide application (from 72% at baseline to 53% at long-term).

2018–2019 Cohort Results

This section describes the medium-term-term behavior change outcomes for participants from 2018–2019 workshops (called the “2018–2019 cohort"), including final adoption levels of natural yard care practices and change in usage between baseline and medium-term surveys. When comparing results to the 2014 cohort, it is important to note some meaningful differences in baseline use of practices.

At baseline, more of the 2018–2019 cohort reported using the following practices:

- **Do not use weed-and-feed**: 59% of the 2018–2019 cohort did not report using the product compared to 36% of 2014 cohort.
- **Do not apply weed killer broadly**: 85% of the 2018–2019 cohort did not report applying weed killer broadly compared to 75% of 2014 cohort.

At baseline, fewer of the 2018–2019 cohort reported using the following practices:

- **Measure sprinkler watering rate**: 13% of the 2018–2019 cohort versus 29% of the 2014 cohort.
- **Top-dress with compost after aerating**: 13% of the 2018–2019 cohort versus 27% of the 2014 cohort.
- **Cover beds with mulch, grass clippings, plants, or bark**: 77% of the 2018–2019 cohort versus 90% of the 2014 cohort.
- **Know to prepare soil with compost**: 56% of the 2018–2019 cohort versus 67% of the 2014 cohort.

Summary of Behavior Change (2018–2019 Cohort)

Table 8 summarizes the behavior change outcomes including self-reported use of practices from the baseline and medium-term as well as the change in usage between the two surveys.

Table 8. Yard Care Practices (2018–2019 Cohort)

Type	Yard Care Practice or Understanding	Baseline Use & Medium-Term Use	Behavior Change: Baseline to Medium-Term
Using Weed-and-Feed	HARMFUL PRACTICE: Use weed-and-feed	41% 16% ✓	-25% H
Fertilizing	HARMFUL PRACTICE: Use fast-release or weed-and-feed fertilizer	41% 18% ✓	-24% H
	Use slow release, organic or natural fertilizer	35% 53% ▲	19% M
Managing Pests	Used Grow Smart Grow Safe Website	0% 17% ●	17% M
	HARMFUL PRACTICE: Pests/diseases: broadly apply product	14% 3% ✓	-11% M
	Pests/diseases: remove, prune, use netting or collars, or tolerate	86% 94% ✓	8% L
	HARMFUL PRACTICE: Weeds: broadly apply weed killer	15% 4% ✓	-11% M
	Weeds: pulled, smothered, tolerated, spot-treated	91% 98% ✓	7% L
	Created crop rotation plan for food garden	Not asked 39% ●	
Applying Lime	Apply lime at least every 2 to 3 years	26% 25% ●	-1% L
Aerating	Aerate at least every 2 years	25% 30% ●	5% L
	Top-dress with compost, if aerated	13% 75% ✓	63% H
Applying Mulch	HARMFUL PRACTICE: landscape fabric, plastic, or bare soil in beds	40% 27% ▲	-14% M
	Bed cover: mulch, grass clippings, bark, or plants	77% 91% ✓	13% M
	Added mulch to cover bare soil	Not asked 63% ▲	
	Sheet mulched to convert lawn	Not asked 22% ●	
	Sheet mulched to smother weeds	Not asked 40% ●	

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Table 8. Yard Care Practices (2018–2019 Cohort), continued

Type	Yard Care Practice or Understanding	Baseline Use & Medium-Term Use	Behavior Change: Baseline to Medium-Term
Mulch Mowing	Sometimes or always mulch mow in dry months	41% Not asked	
	Sometimes or always mulch mow in wet months	37% Not asked	
Mowing Height	Mow 2-3" or higher	91% Not asked	
Choosing Plants	Always match plant to where it thrives	14% Not asked	
	Always look for a plant's soil drainage needs	25% 26%	1% L
	Always look for whether a plant is native to Pacific Northwest	17% 25%	8% L
	Always look for a plant's pest and disease resistance	14% 22%	7% L
	Always look for a plant's full-grown size	49% 40%	-9% L
	Always look for a plant's cold temperature tolerance	25% 35%	10% M
	Always look for a plant's watering needs	38% 36%	-1% L
	Always look for a plant's sun/shade needs	64% 53%	-11% L
	Has sketched a map of the yard	Not asked 23%	
Preparing Soil	Know to prepare soil with compost	56% 81%	25% H
	Know to mix materials into soil 6-8 inches deep	17% 32%	15% M
	Had soil tested	Not asked 19%	
	Used soil test results	Not asked 78%	
Watering	Measure sprinkler watering rate (tuna can test), if waters	13% 32%	19% M
	Started using smart watering techniques	Not asked 69%	

Medium-Term Behavior Change (2018–2019 Cohort)

Practices that Protect Water Quality

After the program, participants were using several key practices that directly protect water quality, as shown in Table 9. The program achieved a high level of behavior change in reducing weed-and-feed and fast release fertilizer use—the share of participants who used these harmful products decreased from 41% to 16%. The program also achieved a high level of behavior change for top-dressing lawns with composting after aerating, increasing from 13% to 75%. The program also saw high post-outreach use for five of the six areas that protect water quality. As described below, the program also achieved varying levels of behavior change in practices that support a healthy yard and reduce the weed, pest, and disease reasons people use toxic yard care products.

Table 9. Adoption of Practices that Protect Water Quality (2018–2019 Cohort)

H ✔	Avoiding weed-and-feed use
H ✔	Avoiding fast-release fertilizer use
M ✔	Avoiding broad application of weed killer
M ✔	Avoiding broad application of pesticides
M ✔	Not leaving beds bare or covered in landscape fabric or plastics
H ✔	Top-dressing lawns with compost after aerating
L ●	Aerating every two to three years

Where the Program Worked Effectively

H ✔ **Substantial change resulting in high post-outreach use**

- Not using weed-and-feed
- Not using fast-release fertilizer
- Knowing to prepare the soil with compost
- Top-dressing lawns with compost after aerating

After the program, more than 80% of respondents said they did not use weed-and-feed or fast-release fertilizer, a substantial decrease. Three-quarters of respondents reported top-dressing compost after aerating, although only 30% reported having aerated at all. Over 80% of participants reported knowing to prepare soil with compost for planting.

M ✓ **Moderate change resulting in high post-outreach use**

- Not broadly applying weed killer
- Not broadly applying products for managing pests and diseases
- Covering beds with mulch, grass clippings, plants, or bark

More than 95% of respondents reported that they do not broadly apply weed killer or products for managing pests and diseases, a change of about 11 percentage points compared to the baseline. In total, 91% of respondents reported that beds are covered with mulch, grass clippings, bark, or plants; excluding bark from this list would reduce final adoption levels to 72%.

L ✓ **Little change because of high adoption levels before the workshops**

- Using at least one least-toxic weed management technique (pulling, smothering, tolerating, or spot-treating)
- Using at least one least-toxic pest or disease management technique (removing, pruning, using netting or collars, or tolerating)

Due to high baseline levels, more than 90% of participants reported using at least one non-toxic weed, pest, or disease management technique despite low levels of behavior change.

M ▲ **Substantial change with room for additional improvement**

- Not leaving beds bare or covered in landscape fabric or plastics

Despite a moderate change in behavior, after the program over a quarter of respondents reported having bare soil or using landscape fabric or plastics in garden beds.

H -- **Substantial changes to start using new practices (not asked on baseline survey)**

- Started using at least one smart watering technique
- Added mulch to cover bare soil
- Sheet mulched to smother weeds
- Created a crop rotation plan for a food garden
- Sketched a map of the yard noting growing conditions
- Sheet mulched to convert lawn to other uses

While no comparison to baseline is available, between 20% and 63% of respondents reported that they used practices relating to smart watering, mulching, crop rotation plans, and sketching a yard map.

Where the Program Achieved Moderate Change with Room for Improvement

M ▲ **Moderate changes with moderate post-outreach use**

- Using slow release, organic, or natural fertilizer

After the program, 53% of respondents said they use recommended fertilizers, an increase of 19 percentage points.

M ● **Moderate changes with low post-outreach use or understanding levels**

- Measuring their sprinkler watering rate
- Using the Grow Smart Grow Safe Website
- Knowing to mix materials six to eight inches deep in soil when planting
- Always looking for a plant's cold temperature tolerance

After the program, 17% of respondents reported using the Grow Smart Grow Safe website, while around one-third of respondents reported using the other practices listed above.

M -- **Moderate changes to start using new practices (not asked on baseline survey)**

- Had soil tested (of which 78% used the soil test results)

While no comparison to baseline is available, 19% of respondents said they had a soil test, yielding moderate behavior change but overall low adoption.

Where the Program Achieved Little Change

L ▲ **Little change with moderate post-outreach use**

- Always looking for a plant's full-grown size
- Always looking for a plant's sun/shade needs

Despite unexpected decreases in usage, after the workshop more than 40% of respondents reported always looking for full-grown size while 53% said they always look for sun/shade needs.

L ● **Little change with low post-outreach use**

- Aerating
- Applying lime
- Always looking for a plant's soil drainage and watering need, pest and disease resistance, and whether a plant is native to the Pacific Northwest

No or low behavior change was seen in two soil-related lawn care practices, resulting in 25% reporting having applied lime and 30% reporting having aerated since the workshop. Between 22% and 36% of respondents reported looking for key plant characteristics when planting a new plant.

Comparison Between 2018–2019 and 2014 Cohorts

Levels of behavior change achieved with the 2018–2019 cohort varied compared to those achieved with the 2014 cohort, but differences did not consistently relate to new workshop elements. In many cases, they stemmed from differences in baseline starting points, with both cohorts achieving similar final levels of adoption.

Improvements in behavior change occurred in top-dressing with compost, covering beds with mulch and plants, and smart watering. Unexpectedly, large decreases occurred in practices related to choosing plants.

↑↑ For the following practices, the 2018–2019 workshops achieved better results (defined as a change in use that is 10 percentage points greater than in 2014).

- Top dressing with compost after aerating lawns: +32 points (final adoption: +18 points)
  - *However, there was no difference in behavior change levels for aerating (with or without top-dressing).*
- Covering beds with mulch, grass clippings, plants, or bark: +13 points
  - *However, the post-outreach use for both groups was very high and similar due to an approximately 13-point difference between the baselines for the cohorts.*
- Measuring sprinkler watering rate: +12 points

↑ For the following practices, the 2018–2019 workshops may have achieved better results (defined as a change in use that is 5 percentage points greater than in 2014).

- Not broadly applying products for managing pests and diseases: +6 points
  - *However, the post-outreach use for both groups was very high and similar.*
- Using at least one least-toxic weed management technique (pulling, smothering, tolerating, or spot-treating): +8 points
  - *However, the post-outreach use for both groups was very high and similar.*

↓ For the following practices, the 2018–2019 workshops may have achieved worse results (defined as a change in use that is 5 percentage points lower than in 2014).

- Use at least one non-toxic pest and disease control method (removing, pruning, using netting or collars, or tolerating): -6 points
  - *However, the post-outreach use for both groups was very high and similar.*

- The change in not broadly applying weed killer: -8 points
  - *However, the post-outreach use for both groups was very high and similar.*

↓↓ For the following practices, the 2018–2019 workshops achieved worse results (defined as a change in use that is 10 percentage points lower than in 2014).

- Not using weed-and-feed: -26 points
  - *However, the post-outreach use for both cohorts was nonetheless high and similar because at baseline fewer members of the 2018–2019 cohort used weed-and-feed compared to the 2014 cohort.*
- Always look for key plant characteristics *(cohorts started with similar baselines)*:
  - Full-grown size: -30 points
  - Sun/shade needs: -30 points
  - Soil drainage needs: -28 points
  - Pest and disease resistance: -19 points
  - Native to Pacific Northwest: -18 points
  - Watering needs: -16 points
  - Cold temperature tolerance: -11 points
- Using slow release, organic, or natural fertilizer: -10 points
  - *However, the post-outreach use for both groups was similar but moderate.*

Most Useful Things Learned (2018–2019 Cohort)

In an open-ended question on the medium-term survey, respondents were asked to describe the most useful things they learned from the workshop (Table 10). Respondents most commonly mentioned natural lawn care (15%), smart watering (13%), and mulching or ground cover (12%).

Table 10. Most Useful Things Learned (2018–2019 Cohort)

Most Useful Things Learned	Percent	Number of Respondents
Natural lawn care	15%	29
Water conservation and best watering practices	13%	25
Importance of ground cover and mulch	12%	22
Right Plant, Right Place; Choosing and Planting Plants	9%	17
Weed/pest/disease management or acceptance	7%	14
Soil improvements and care	7%	14
Using or making compost	6%	12
Fertilizer choices or techniques	5%	9
Better understanding impacts of fertilizers/pesticides/weed killers	4%	8
Planting rotation and timeline	4%	8
Found the workshop generally useful	4%	7
Learned something new (unspecified)	4%	7
Other	9%	18
Total number of respondents		**190**

Social Diffusion (2018–2019 Cohort)

The 2018–2019 workshops reached a total of 228 households, with an average of 1.4 attendants per household. Participating households were asked in the medium-term post-outreach survey whether they shared information about natural yard care with others. Four-fifths of survey respondents (79%, or 93 participating households) reported sharing information. They most frequently shared information with friends (72%), neighbors (61%), and family (60%). Among these respondents, 84 estimated how many people they shared information with, ranging from one to fifty, with an average of five. In total, participants reported reaching more than 420 additional people.

Respondents most frequently shared information on lawn care (66%) and smart watering (54%), as shown in Table 11. Participants also reported sharing information on soil preparation (36%), planting (33%), and/or plant choice (31%).

Table 11. Topics Shared with Others (2018–2019 Cohort)

Topics Shared with Others	Percent	Number of Respondents
Lawn care tips	66%	59
Smart watering tips	54%	48
Soil preparation tips	36%	32
Planting tips	33%	29
Plant choice tips	31%	28
Pest and disease management tips	27%	24
Other (please describe)	11%	10
Total number of respondents		**89**

Resources Used (2018–2019 Cohort)

Nearly half (45%) of survey respondents said they have not had pest or disease problems since the workshops (Table 12). One-quarter of respondents (24%) said they used Master Gardeners as a resource to help diagnose pests and diseases. Other resources mentioned by respondents included the County extension office, WSU Plant Clinic, other online resources, and local nurseries.

Table 12. Resources Used to Diagnose Pests and Diseases (2018–2019 Cohort)

Resources Used to Diagnose Pests and Diseases	Percent	Number of Respondents
Have not had pest or disease problems	45%	54
Master Gardener	24%	28
“Stop Before You Spray” good bug guide	10%	12
www.GrowSmartGrowSafe.org	7%	8
Another method	14%	17
Other (please describe)	18%	21
Total number of respondents		**119**

The most commonly reported resource people said they used when trying new natural yard care techniques were program brochures and handouts (81%), followed by notes from the training (67%), as shown in Table 13. Approximately one-third reported using Master Gardeners

as a resource (34%) or their local nurseries (31%). Compared to what the 2014 cohort reported in their medium-term survey, more 2018–2019 respondents reported using program brochures and handouts (81% versus 68%) and Master Gardeners (34% versus 18%)

Table 13. Resources Used when Trying New Techniques (2018–2019 Cohort)

Resources Used when Trying New Techniques	Percent	Number of Respondents
Program brochures and handouts	81%	96
Notes from the training	67%	79
Internet search	42%	50
Master Gardener	34%	40
Advice from local nursery	31%	37
King County's online Native Plant Guide	25%	29
Other websites or hotlines provided by the program	19%	23
www.GrowSmartGrowSafe.org	17%	20
"Stop Before You Spray" good bug guide	16%	19
Other (please explain)	8%	10
Total number of respondents		**118**

Evaluation of Program Enhancements

New Workshop Elements (2018–2019 Cohort)

This section evaluates the new workshop elements that enhanced the 2018–2019 program, including new live demonstrations and videos used by presenters and new tabletop displays available before and after the presentations and during the workshop breaks.

New Live Demonstrations and Videos

Respondent Demonstration Ratings

Respondents rated most workshop demonstrations highly, with nearly three-quarters or more saying they were very or extremely helpful (Table 14). Three demonstrations received lower ratings, indicating an opportunity to improve them:

- **Planting and watering in a new plant** (Right Plant, Right Place): respondents indicate this demonstration was difficult to see.
- **Smart watering video** (Smart Watering): no suggestions on the video were requested from participants.
- **Online Native Plant Guide** (Sustainable Garden Design): respondents wanted better slides or a printed copy of slides as well as more plant suggestions.

More information on respondent suggestions for improving demonstrations are presented in the next subsection.

Respondent ratings were similar in fall 2018 and spring 2019 workshops for all demonstrations, with the following exceptions:

- **Crop rotation**: more Marysville respondents rated it highly (92% rated as very or extremely helpful, shown in Table 15)
- **Sheet mulching**: more Mukilteo respondents rated it highly (85%)
- **Online native plant guide**: fewer Marysville respondents rated it highly (54%)

- **Plant and water in new plant**: fewer respondents rated it highly from Marysville (38%) or Everett (43%).

Table 14. Helpfulness of Workshop Demonstrations (2018–2019 Cohort)

Presentation Demonstration	Not at all	Slightly	Moderately	Very	Extremely	Very + Extremely	Total Respondents
Crop rotation (Pest & Weed Control)	2%	5%	13%	61%	19%	**80%**	161
Lime video (Natural Lawn Care)	0%	6%	18%	65%	11%	**76%**	159
Use compost and mulch on existing garden (Soil & Composting)	0%	6%	19%	48%	27%	**75%**	158
Convert lawn using sheet mulching (Sustainable Garden Design)	1%	6%	18%	57%	18%	**75%**	163
Grow Smart, Grow Safe & Stop Before You Spray (Pest & Weed Control)	0%	7%	19%	62%	12%	**74%**	162
Online Native Plant Guide (Sustainable Garden Design)	0%	7%	26%	59%	9%	**67%**	164
Smart watering video (Smart Watering)	1%	5%	29%	56%	9%	**65%**	160
Plant and water in a new plant (Right Plant, Right Place)	3%	14%	32%	44%	8%	**51%**	156

Table 15. Percent of Respondents Rating Workshop Demonstrations Very or Extremely Helpful (2018–2019 Cohort)

Presentation Demonstration	Marysville	Everett	Mukilteo	All
Crop rotation (Pest & Weed Control)	73%	84%	79%	80%
Lime video (Natural Lawn Care)	75%	79%	74%	76%
Use compost and mulch on existing garden (Soil & Composting)	92%	75%	68%	75%
Convert lawn using sheet mulching (Sustainable Garden Design)	64%	70%	85%	75%
Grow Smart, Grow Safe & Stop Before You Spray (Pest & Weed Control)	85%	69%	75%	74%
Online Native Plant Guide (Sustainable Garden Design)	54%	69%	70%	67%
Smart watering video (Smart Watering)	65%	65%	65%	65%
Plant and water in a new plant (Right Plant, Right Place)	38%	43%	66%	51%

Respondent Demonstration Suggestions

Respondent suggestions for improving demonstrations were categorized into the following themes. Appendix B presents all comments provided by respondents.

Sustainable Garden Design: Convert lawn using sheet mulching and Use Online Native Plant Guide

- Wanted better slides or a printed copy of the slides (5 people)
- Wanted more time or noted that the speaker went too fast (4 people)
- Wanted more plant suggestions or details on plant names (3 people)
- Suggestions from one person each:
  - Logistics: microphone holder for the presenter
  - Topic: acid soil base needs of plants
  - Topic: "Xeriscaping" or dry gardening
  - Question: Cardboard as a sheet mulch option

Pest & Weed Control: Crop rotation; "Grow Smart, Grow Safe"; and "Stop Before You Spray"

- Wanted additional time and/or presenter moved too quickly (5 people)
- Wanted in-depth or additional topics (4 people)
- Suggestions from one person each:
  - Logistics: Wanted printed handout of the presentation
  - Logistics: Wanted movable mic and elevated stage for presenter

Right Plant, Right Place: Plant and water in a new plant

- Difficult to see hands-on demonstration (9 people)
  - Wanted video camera to show the demonstration onscreen (3 people)
  - Wanted smaller groups/event (1 person)

Soil & Composting: Use compost and mulch on existing garden

- Wanted a way to more easily see hands-on demonstration (4 people)
- Wanted more time (5 people)
- Wanted more detail or additional topic (3 people)
  - Requested topics: additives, worm bin, more compost detail
- Suggestions from one person each:
  - Logistics: Wanted to buy the presenter's book or learn more about where to purchase it
  - Logistics: Wanted speaker to be at a lower volume

New Tabletop Displays

Respondent Tabletop Display Ratings

Between 47% and 68% of respondents rated the tabletop displays either very or extremely effective. Some displays were shown multiple times, so ratings are presented for each workshop. For the mulch display, respondent ratings changed over the course of the workshops. Respondent ratings were similar across all three workshops for all tabletop displays (see Table 16 and Table 17), with the following exceptions:

- **Improve Soil Health** (how to perform a soil test): Mukilteo participants rated this display higher.
- **Planting Right** (how to plant properly): Marysville participants rated this display lower.
- **Matching Plant to Place** (how to choose plants): Marysville participants rated this display much lower.
- **Diagnosing Plant Problems** (how to identify and control plant problems)**:** Everett participants rated this display lower.

Respondent suggestions for improving tabletop displays are presented in the next subsection.

Table 16. Effectiveness of Tabletop Displays (2018–2019 Cohort)

Tabletop Display	Not at all	Slightly	Moderately	Very	Extremely	Very + Extremely	Total Respondents
Mulch Matters (workshop #1)	1%	5%	38%	43%	14%	**57%**	152
Mulch Matters (workshop #2)	0%	3%	29%	54%	14%	**68%**	149
Mulch Matters (workshop #3)	1%	4%	28%	52%	15%	**67%**	144
Improving Soil Health (workshop #2)	1%	11%	37%	43%	8%	**51%**	143
Improving Soil Health (workshop #3)	3%	11%	39%	39%	8%	**47%**	138
Diagnosing Plant Problems	0%	6%	34%	50%	10%	**59%**	145
Planting Right	0%	5%	36%	52%	6%	**58%**	148
Lawn Aeration	1%	8%	35%	46%	10%	**56%**	154
Matching Plant to Place	1%	9%	42%	43%	5%	**48%**	148

Table 17. Percent of Respondents Rating Tabletop Displays Very or Extremely Effective (2018–2019 Cohort)

Presentation Demonstration	Marysville	Everett	Mukilteo	All
Mulch Matters (workshop #1)	58%	56%	58%	57%
Mulch Matters (workshop #2)	77%	67%	67%	68%
Mulch Matters (workshop #3)	57%	62%	75%	67%
Improving Soil Health (workshop #2)	45%	41%	62%	51%
Improving Soil Health (workshop #3)	40%	43%	53%	47%
Diagnosing Plant Problems	68%	50%	65%	59%
Planting Right	43%	57%	65%	58%
Lawn Aeration	58%	57%	56%	56%
Matching Plant to Place	24%	55%	51%	48%

Respondent Tabletop Display Suggestions

When asked for suggestions, several respondents (14 people) provided praise instead. Respondent suggestions for improving tabletop displays were categorized into the following themes. Appendix B presents all comments provided by respondents.

Wanted more space or better visibility

- Larger displays or more spacing between displays to reduce crowding (5 people)
- Elevate displays (2 people)
- Increase visibility in general (1 person)

Wanted displays to be staffed or to have more time to view displays

- Provide more time to learn from displays (2 people)
- Have a staff person to answer questions (1 person)

Wanted a list of resources or source and cost information

- Provide handouts with contact information for soil test companies and instructions on taking a soil test (2 people)
- Provide information on cost of renting and difficulty of operating an aerator (1 person)
- Provide sources of mulch (1 person)
- Don't hide logos or brands of products (1 person)
- Offer help explaining practices to the yard care company (1 person)

Wanted more information on specific topics

- Information on automated irrigation sprinkler systems (1 person)
- More information on how to do soil test (1 person)
- More information on about controlling pests, bugs, and weeds (1 person)
- Show plugs on aerating displays (1 person)

General Workshop Quality (2018–2019 Cohort)

Knowledge Provided by Sessions

Nearly all respondents (98% to 100%) at all workshops said they had enough information to use the new practices, although some marked that they had a few questions. Table 18 shows the percentage who said "yes, I know what to do" when asked whether they had enough information. Participants were most confident about their knowledge of smart watering and natural lawn care. The largest share of respondents said they had a few questions about Sustainable Garden Design; Right Plant, Right Place; and Natural Pest, Weed, and Disease Control.

Table 18. Percent of Respondents Who Had Enough Knowledge to Use the Practices (2018–2019 Cohort)

Workshop	Marysville	Everett	Mukilteo	Workshops Overall
Natural Lawn Care	75%	79%	68%	73%
Smart Watering	85%	81%	71%	76%
Natural Pest, Weed, and Disease Control	54%	60%	61%	59%
Soil and Composting	85%	74%	58%	69%
Sustainable Garden Design	38%	34%	65%	48%
Right Plant, Right Place	48%	43%	61%	51%

Would They Recommend Workshops?

Nearly all respondents (98% to 100%) at all workshops said they would probably or definitely recommend the workshop to others. Table 19 shows the percentage that would definitely recommend each workshop. Everett participants rated the workshops higher than Marysville participants. Topics for the second and third workshops were paired differently the fall 2018 workshops held in Mukilteo and the spring 2019 workshops held in Marysville and Everett.

Table 19. Percent of Respondents Who Would Definitely Recommend Workshop (2018–2019 Cohort)

Workshop	Marysville	Everett	Mukilteo	Workshops Overall
Lawn Care and Watering (spring and fall)	60%	83%	67%	72%
Pest Control and Soil/Composting (spring)	64%	70%	NA	68%
Garden Design and Pest Control (fall)	NA	NA	63%	63%
Garden Design and Planting (spring)	50%	75%	NA	68%
Planting and Soil/Composting (fall)	NA	NA	80%	80%

Respondent Workshop Suggestions

Respondent suggestions for improving workshops were categorized into the following themes. Appendix B presents all comments provided by respondents.

Workshops overall (from post-outreach survey)

- Provided general praise and/or requested more workshops (20 people)
- Would change or add additional content (7 people)
- Wanted individual instruction and/or help finding the right tools or products (3 people)
- Would improve workshop logistics (7 people)
  - Allow more time
  - Do demonstrations on stage
  - Invite Cisco Morris to be a presenter
  - Let people know the chairs are uncomfortable so they can bring a cushion
  - Provide name tags for participants and invite them to meet the people sitting next to them
  - Schedule workshops on different times and days to reach more people
  - Shorten the class to two hours
- Requested online materials and transcripts (2 people)

Natural Lawn Care + Smart Watering (all locations)

- Wanted slower or a different pointer (2 people)
- Wanted resource handout and/or summary sheet (2 people)

Sustainable Garden Design + Natural Pest, Weed, & Disease Control (Mukilteo)

- No suggestions provided

Right Plant, Right Place + Growing Healthy Soil and Composting (Mukilteo)

- Wanted more information on pruning (2 people)
- Wanted information on plants (especially native) for specific situations, such as in deep shade or in areas to prevent erosion (1 person)

Natural Pest, Weed, & Disease Control + Growing Healthy Soil and Composting (Marysville & Everett)

- Wanted longer workshop (2 people)
- Wanted presenter to have a lapel microphone (1 person)

Sustainable Garden Design + Right Plant, Right Place (Marysville & Everett)

- Wanted less repetition of slides and content (2 people)
- Wanted additional workshops throughout the year (1 person)

Lawn and Garden Fair (2019)


This section evaluated the new Lawn and Garden Fair held in June 2019, after the 2018–2019 workshops were completed. The event was open to the public but intended to supplement workshops by providing a hands-on opportunity to see natural yard care practices up close and to ask questions of experts. The evaluation primarily uses feedback from a survey of attendees distributed and collected during the event. It also includes feedback that workshop participants from the 2018–2019 cohort provided on the medium-term follow-up survey.

Lawn and Garden Fair Attendees (2019)

Of Lawn and Garden Fair attendees who completed the onsite survey at the event, one-third (32%) had previously attended a workshop (Table 20). About 8% (10 people) of 2018–2019 workshop participants who responded to the medium-term survey said they attended the Lawn and Garden Fair, corresponding to the results of the Lawn and Garden Fair survey.

Table 20. Prior Workshop Attendance of Lawn and Garden Fair Attendees (2019)

	Percent	Number of Respondents
Previous workshop attendants	32%	15
Spring or fall 2014	*11%*	*5*
Fall 2018	*13%*	*6*
Spring 2019	*9%*	*4*
Had not attended any workshop	72%	34
Total number of respondents		**47**

Overall Assessment of the Lawn and Garden Fair (2019)

All 53 people who responded to the Lawn and Garden Fair survey said they would definitely recommend (91%) or probably recommend (9%) the Lawn and Garden Fair (Table 21). When asked why they would recommend the Lawn and Garden Fair, respondents most frequently mentioned:

- It was very informative and useful information was provided.
- They liked the presenter, using phrases including "knowledgeable," "friendly," and "dynamic."
- They liked the hands-on demonstrations or opportunity to ask questions.

Appendix B presents all comments provided by respondents.

Table 21. Percent of Attendees Who Would Recommend the Lawn and Garden Fair (2019)

Would you recommend the Lawn and Garden Fair?	Percent	Number of Respondents
Definitely yes	91%	48
Probably yes	9%	5
Not sure	0%	0
Probably not	0%	0
Definitely not	0%	0
Total number of respondents	**100%**	**53**

Among the ten members of the 2018–2019 workshop group who both took the medium-term survey and attended the Lawn and Garden Fair, nine people said the Fair added to what they learned in the workshops to a moderate (three people) or great (six people) extent (Table 22).

Table 22. Extent to Which the Lawn and Garden Fair Added to Workshops (2018–2019 Cohort)

To what extent did the Lawn and Garden Fair add to workshops?	Number of Respondents
To a great extent	6
To a moderate extent	3
To a small extent	1
Not at all	0
Total number of respondents	**10**

Learning at the Lawn and Garden Fair (2019)

Most Useful Things Learned (2019)

In an open-ended question, Lawn and Garden Fair attendees were asked to describe the most useful things they learned from the event. Responses were categorized into the following themes.

- **Soil, Mulch, Composting (24 people)**
  - Make and use mulch (13 people)
  - About compost or how to properly compost (9 people)
    - Soil and how composting impacts overall health. One respondent noted, "composting was absolutely a valuable lesson."
- **Lawn Care (18 people)**
  - Overall lawn care, seeding, moss control, and use of lime. (One person mentioned aeration demo.)
- **Plants & Planting (14 people)**
  - How to select, place, and care for existing and new plants
- **Tool & Equipment Care and Use (11 people)**
  - Blade and tool sharpening guidance written explicitly in all comments in this category
- **Pests, Beneficials, Disease, Weed ID & Control (11 people)**
- **Fertilizing (5 people)**
  - Appropriate amount of fertilizer to use and timing for application (3 people)
  - Identify if a plant needs fertilizer (2 people)
- **Reliable Resources to use (4 people)**
  - Resource books and websites and tips learned at the events.

- **Vegetables (2 people)**
  - One person noted that they found crop rotation and another about how pollination helps food grow "most useful."
- **Smart Watering (3 people)**
  - Watering advice and guidance on how to water.

How Workshop Attendees used Fair Information (2018–2019 Cohort)

On the medium-term survey, participants in the 2018–2019 workshops were asked how they used what they learned at the Fair. Respondents said they maintained or added trees (2 people), started composting (2), performed tool care (1), avoided chemical weed killer (1), and improved watering practices (1).

Session Popularity and Ratings (2019)

Respondent Lawn and Garden Fair Session Ratings (2019)

Based on the number of respondents who rated each session (see Table 23), the following sessions seemed to be the most well-attended:

- Hand-Tool Sharpening (21 respondents)
- How Long to Water for 1-inch? (16 respondents)
- Mulch Matters (15 respondents)
- Problem Pests & Natural Controls (14 respondents)

In general, most respondents said the sessions gave them enough information to use practices on their own. However, one or two respondents said they still had a lot of questions after the following sessions:

- Problem Diagnosis and Plant Identification
- Hand-tool Sharpening
- Meet the Beneficials & Pollinators
- Problem Pests & Natural Controls
- Backyard Composting
- Get to Know Your Soil

Respondent suggestions for improving Lawn and Garden Fair sessions are presented in the next subsection.

Table 23. Effectiveness of Lawn and Garden Fair Sessions (2019)

Did the session give you enough information to use the practices on your own?

	A lot of questions	Several questions	Question or two	Yes	Number of Respondents*
Natural Yard Care					
Crop Rotation Prevents Problems	--	--	4	5	9
Hand-Tool Sharpening	1	1	2	17	21
Problem Diagnosis & Plant Identification	2	1	--	5	7
Think Twice Before Using Pesticides					
Meet the Beneficials & Pollinators	1	--	2	9	11
Problem Pests & Natural Controls	1	1	3	9	14
Practice Smart Watering					
How Long to Water for 1-inch?	--	1	--	16	16
Build Healthy Soil					
Backyard Composting	1	--	--	8	9
Get to Know Your Soil	1	--	--	10	11
Mulch Matters	--	1	2	12	15
Plant Right for Your Site					
Matching Plant to Place	--	2	1	9	12
Native Plants	--	--	--	9	9
Planting It Right	--	1	1	8	10
Plants for Wet Soil	--	--	--	5	6
Practice Natural Lawn Care					
Aerate & Overseed: A Healthier Lawn	--	1	1	9	10
Fertilizer: How to Apply the Correct Amount	--	1	1	6	8
Mowing Tips & Blade Sharpening	--	--	1	7	8
Managing Moss	--	1	1	11	11

** Note: some respondents marked multiple responses.*

Respondent Lawn and Garden Fair Session Suggestions (2019)

When asked for suggestions to improve individual Lawn and Garden Fair sessions, most respondents provided praise instead. For those who provided suggestions, their comments were categorized into the following themes. Appendix B contains all comments provided by respondents.

Natural Yard Care

Problem Diagnosis & Plant Identification

- Location: Hold session in McCollum Park
- Topic: Invasive plants

Think Twice Before Using Pesticides

Meet the Beneficials & Pollinators

- Topic: differences between bees
- Topic: beneficial plants for beneficial insects and pollinators

Problem Pests & Natural Controls

- Topic: actions and how to take them

Practice Smart Watering

How Long to Water for 1-inch?

- Topic: how to take a faucet apart (watering infrastructure)

Plant Right for Your Site

Planting It Right

- Topic: how deep to plant

Practice Natural Lawn Care

Fertilizer: How to Apply the Correct Amount

- Content: session was difficult to understand

No Suggestions Provided

Attendees provided no suggestions for the following sessions:

Practice Natural Yard Care

- Crop Rotation Prevents Problems
- Hand-Tool Sharpening

Build Healthy Soil

- Backyard Composting
- Get to Know Your Soil
- Mulch Matters

Plant Right for Your Site

- Matching Plant to Place
- Native Plants
- Plants for Wet Soil

Practice Natural Lawn Care

- Aerate & Overseed: A Healthier Lawn
- Mowing Tips & Blade Sharpening
- Managing Moss

Reasons for not Attending Fair (2018–2019 Cohort)

The most common reasons among 2018–2019 workshop respondents to the medium-term survey for not attending the Lawn and Garden Fair were schedule conflicts (54%) and lack of awareness about the event in time to attend (32%), as shown in Table 24. Write-in responses primarily related to time or schedule constraints (4 people) or being out of town (5 people).

Table 24. Reasons 2018–2019 Cohort Members Did Not Attend the Lawn and Garden Fair

Reasons to Not Attend Lawn and Garden Fair	Percent	Number of Respondents
Had a schedule conflict	54%	58
Did not know in time to attend	32%	35
Already learned everything at the workshops	6%	7
Not interested in the topics	2%	2
Preferred a different format or event type	1%	1
Another reason	11%	12
Total number of respondents		**108**

Respondent suggestions for improving Lawn and Garden Fair sessions to address these reasons were categorized into the following themes.

What topic would you be interested in?

Six people who did not attend the Lawn and Garden Fair provided suggestions for topics.

- Lawn and garden design, including the opportunity to bring in a photo of their lawn for an expert consultation
- Lawn and garden tips or information in general (4 people)
- Tree planting, particularly for privacy and near fences (1 person)

What days or times would you prefer for an event like this?

Respondents who did not attend the Lawn and Garden Fair prefer a variety of alternative days and times (Table 25). Saturday afternoons or evenings in late spring seemed the best for these respondents.

- **Weekend**: Saturday or no preference (8 people). One person noted they prefer Sunday.
- **Weekday**: afternoons or evenings (3 people) or no preference (3 people). At least two respondents noted working on the weekend.
- **Late spring** was the season four people identified as their preferred time of year.

Table 25. Preference for Alternative Event Times (2018–2019 Cohort)

Preferred Time	Weekday	Saturday	Sunday	Weekend	No Preference
No Preference	3	4	2	1	1
Morning		1			
Afternoon	1			2	
Evening	2				

What format or type of event would you prefer?

Eight people who did not attend the Lawn and Garden Fair provided input on the format or type of event they prefer instead of the Lawn and Garden Fair. Four people said they like the current format, although one person felt the content needed to be presented more simply for beginners. Other recommendations included a panel discussion with experts as well as elements already provided by the event: topic-specific booths or tables and hands-on displays supplementing speakers.

Overall Suggestions for Lawn and Garden Fair (2019)

Suggestions from Lawn and Garden Fair Attendees (2019)

Respondent suggestions for improving the Lawn and Garden Fair were categorized into the following themes. Appendix B presents all comments provided by respondents.

- Wants additional topics, more stalls, or pamphlets (5 people)
- Wants more or clearer marketing; website improvements (6 people)
- Wants a longer event (6 people)
- Wants to see the event continue or done more often (3 people)
- Wants warmer weather (3 people)
- Wants coffee, plants, or other items available for sale or free (4 people)
- Other individual suggestions were:
  - Wants the event to be more child friendly
  - Did not want to have a set schedule for the sessions

Format Suggestions from Workshop Participants Who Did Attend (2018–2019 Cohort)

Four of the members of the 2018–2019 cohort who attended the Lawn and Garden Fair were asked on the medium-term survey for comments or suggestions on the format of the Fair.

Suggestions included holding the event in July for warmer weather, extending the length of the event, and demonstration how to identify and control noxious weeds without chemicals.

Other Suggestions from Workshop Participants Who Did Not Attend (2018–2019 Cohort)

All respondents to the follow-up survey from 2018–2019 workshop were asked about what Snohomish County could offer besides the Lawn and Garden Fair to build on what participants learned in the workshops. Most either had no suggestions (12 people), praised the existing structure (7 people), and/or expressed a desire for the event to be held again in the future (10 people). Alternative options included a yearly refresher course and an opportunity to ask questions by phone or email.

Some individuals identified topics they want to learn about:

- Raised beds and crop rotation
- Composting examples
- Plants for specific conditions:
  - Native plants in general
  - Plants that both provide privacy and support wildlife
- How to safely use heavy or motorized tools
- How to protect plantings from excessive summer heat
- Water reclamation
- Garden structures

Lessons Learned and Recommendations

This section presents lessons learned and recommendations to improve future workshops and events. Overall, the new elements appear to be helpful and appreciated by participants; however, connecting them directly to behavior change is difficult due to the differences in baseline usage and in presenters between the 2014 and the 2018–2019 programs.

New Workshop Elements

Fertilizing and Avoiding Weed-and-Feed

The workshops did not include new elements focused on fertilizing, fertilizer choices, or avoiding weed-and-feed. Both the 2014 and 2018–2019 programs achieved high behavior change and similar final adoption levels related to avoiding fast-release fertilizer and weed-and-feed. However, only 53% of respondents from 2018–2019 who fertilize said they used recommended fertilizer, indicating more assistance is needed.

- **Add a fertilizer tabletop display** with empty bags of slow-release, organic, and natural fertilizers to show attendees how to identify them. The display could be combined with the lime tabletop display recommended below.

Recommendations from the prior evaluation of the 2014 cohort to increase the use of recommended fertilizer included:

- **Show participants how to identify and choose slow-release fertilizer**, including how to read the guaranteed analysis (NPK numbers) and how to identify words that signal the fertilizer contains slow-release nitrogen. Information could be provided in lectures, videos, and a webpage.
- **Offer a coupon with a discount** on slow-release fertilizer redeemable at stores that have agreed to promote this product. In addition to providing a discount, the coupon is intended to inform participants how to identify slow-release fertilizer and which stores carry the product. Consider asking retailers and manufacturers of slow-release fertilizer if they would fund the coupon values while the local jurisdiction funds the design, printing, and distribution costs. *Note: this and the following recommendation may not be feasible in Snohomish County because large chain stores typically do not partner with public agencies in this way, and only one independent nursery remains in the county at this time.*
- **Encourage stores to carry recommended fertilizers and publish a list of those that do.** Through a STORM natural yard care work group and in partnership with incorporated cities,

coordinate on a local level with individual stores and store managers to regularly stock and promote slow-release fertilizer—and list participating stores and fertilizer information on program webpages.

Soil Testing

The program should continue using the soil test tabletop display. While 19% of 2018–2019 follow-up survey respondents had a soil test (and 78% of those households used the results), additional assistance may be needed to expand use. The program could consider implementing the recommendation from the prior evaluation of the 2014 cohort to:

- **Distribute the resource list of soil testing labs** that partners from Washington State University created in response to workshop participant requests.
- **Facilitate soil testing** through partnering with local agencies to offer a low-cost soil test in conjunction with the workshops and Lawn and Garden Fair. Kits should include detailed, graphics-heavy instructions on how to collect soil samples properly. Soil test results should include an easy to read report that provides detailed information on actions to take based on results.

Aerating and Applying Lime

As in 2014, the program achieved little behavior change in aerating (presented in a tabletop display) and applying lime (presentation video) among 2018–2019 workshop participants. These practices were also presented in the Lawn and Garden Fair, but few participants from 2018–2019 workshops attended the event. Low behavior change may also be due to non-knowledge barriers such as the effort required to rent an aerator or and the timing of workshops (after the ideal time to aerate) and the follow-up survey (before the ideal time to aerate). Recommendations include:

- **Implement recommendations to increase participation in the Lawn and Garden Fair**. The Lawn and Garden Fair included live demonstration of aerating and applying lime.
- **Modify the aeration tabletop display** to:
  - **Add still images of someone using an aerator**. Continue to show the aeration video while adding still images of the practice in use for workshop attendees who do not stop to watch the video.
  - **Separate the video from the staffed display by a few feet.** This could allow more space for some participants to watch the video and whole others are able ask questions of the person staffing the display.
  - **Include samples of plugs**.

- **Implement recommendations to increase soil testing**. Of the 18 participants who used their soil test results, 12 people added lime.
- **Continue to emphasize the benefits** of lime and communicate that it is as easy to apply as fertilizer (which most participants already apply themselves).
- **Add a lime tabletop display** that includes stills from the lime video showing how to apply lime and connecting it to the already-used practice of fertilizing.
- **Implement recommendations from the prior evaluation of the 2014 cohort to:**
  - Encourage participants who live in the same neighborhood to coordinate on renting an aerator and compost top-dressing equipment.
  - Help participants hold an aeration day in which all participants in a neighborhood can jointly rent an aerator and top-dressing equipment (or can jointly hire a professional to aerate and top-dress).

Applying Mulch

Education regarding applying mulch worked well. Overall 63% of respondents said they added mulch to cover bare soil, 40% said they used sheet mulching to smother weeds, and 22% used sheet mulching to convert lawns. In addition, 91% of respondents reported keeping beds covered with mulch or plants, an increase from 77% at baseline.

- **Continue to use the new workshop elements**:
  - Live demonstration on sheet mulching to convert a lawn.
  - Live demonstration on using mulch or compost on existing plants and gardens.
  - Tabletop display on choosing and applying mulch, including real samples of mulch types.
- **Continue to distribute a list of local suppliers of mulch.**

Smart Watering

Education regarding smart watering worked relatively well: more respondents in 2018–2019 reported measuring sprinkler rates and starting to use at least one smart watering practice. However, opportunities remain to increase sprinkler measuring from the current level of 32%.

- **Continue to show the smart watering methods video.**
- **Distribute the rule gauge for measuring sprinkler output** that was given out at the Lawn and Garden Fair. The rule lists steps for measuring sprinkler output and the County's natural yard care website.
- **Implement recommendations to increase participation in the Lawn and Garden Fair**. The Lawn and Garden Fair included live demonstration of measuring sprinkler rates and using smart watering methods.

Choosing and Planting Plants

It is unclear why the level of behavior change in plant choices decreased substantially in 2018–2019 compared to 2014. In particular, it is counterintuitive that fewer participants from the 2018–2019 workshops would say they always look for sun/shade needs and full-grown size after attending the workshops compared to before they attended. Potential explanations may be that the quality of the presentation differed between the two programs, the time spent on demonstrating the online native plant guide reduced emphasis on the importance of other plant characteristics, or the discrepancy is due to sampling error.

Recommendations to improve plant choices include:

- **Refocus presentation demonstration on looking for key plant characteristics**. Walk participants through the *Choosing the Right Plants* guide, which includes a template with instructions on how to identify and sketch a map of wet versus dry, sunny versus shady, and heat sink areas of their yard. Also consider showing side-by-side picture of how well and poorly plants grow in right and wrong places.
- **Expand the matching plant to place tabletop display with a poster showcasing recommended plants** showing photos, plant names, and key characteristics (full-grown size, sun/shade needs, drainage and watering needs, pest/disease resistance, native status, and cold tolerance). The display would both provide plant names (requested by some participants) and emphasize the importance of looking for these characteristics. A laptop station next to the display could show and allow participants how to use King County's online native plant guide.

Recommendations to improve planting practices include:

- **Ensure participants can see the live demonstration** on how to plant and water in new plants by using a video or phone camera to project the live demonstration onto the presentation screen.
- **Expand the planting right** tabletop display with images and numbers for recommended compost depth and with containers showing live plants planted at correct and incorrect depths.

Natural Pest, Weed, & Disease Control

Overall, the workshops worked as well as in 2014, but usage of the "Grow Smart, Grow Safe" website is still very low (17%) and creation of crop rotation plants is also somewhat low (39%). Recommendations include:

- **Continue using the new program elements:**
  - Demonstrate use of the "Grow Smart, Grow Safe" website and "Stop Before You Spray" good bug guide.
  - Demonstrate how to create a crop-rotation plan for a food garden.
  - Present a tabletop display on how to identify and control plant problems with least-toxic methods.
- **Add time to the lecture demonstrations** in response to participant comments that the presenter moved too quickly.
- **Email participants the day after the workshop with links to the online resources.** Consider creating a small, useful item that lists selected links, such as the "Grow Smart, Grow Safe" website, the County's natural yard care website, and contact information for the local Washington State University extension. Potential items include a bookmark or a magnet.

Long-Term Retention of Behavior Changes

For several practices, backsliding indicates that reminders or refreshers may be needed. These practices include not using weed-and-feed or fast-release fertilizers, top-dressing with compost after aerating, mulch mowing, choosing appropriate plants for yard conditions, and not broadly applying weed killer.

Participants in the 2014 program previously expressed interest in obtaining follow-up assistance and continuing to participate in the program. Participants in the 2018–2019 program also request a way to ask follow-up questions.

Recommendations include:

- **Sending monthly or quarterly emails** with seasonal tips and updates, particularly mentioning fertilizer choices, top-dressing with compost and applying mulch, mulch mowing, and looking for key plant characteristics.
- **Sending one or two annual paper mailers** to past participants reminding them of these key practices.
- **Creating a one-page calendar** on waterproof paper and online that shows proper months, frequency, and reminders about key practices.

- **Providing a program contact email or phone number** for when participants have questions or need reminders.
- **Continuing to invite past participants** to the Lawn and Garden Fair.
- **Organizing one annual refresher workshop session** open to all past participants that features all the tabletop displays staffed by yard care experts to answer questions, a Master Gardener table, and possibly one presentation or panel discussion on a new or popular topic. Potential topics to expand on workshop lessons include rain gardens, plant choices for specific conditions, or additional time on weed and pest control.
- **Sending a dedicated invitation to past participants** to invite them to attend current workshop series if they want a refresher and encouraging them to refer their friends and family. One option is to include these events on the quarterly email sent by Snohomish County's Surface Water Management to people who opt in. Adding an opt-in option to the registration form could increase sign-ups.

Lawn and Garden Fair

Lawn and Garden Fair participants who provided feedback rated the workshop highly. All of them would recommend it to others, including 91% who said they would definitely recommend it. Among 2018–2019 participants who said they did not attend the event, only 6% said the reason was that they had already learned everything at the workshops.

Snohomish County should repeat the event, considering the following recommendations.

Marketing and Logistics

- **Continue conducting extensive planning and partnering** before the event to ensure enough staffing and presenters as well as a smooth set-up and logistics during the event.
  - Partnership with jurisdictions and WSU Extension were vital to the event's success. Approximately two-thirds of presenters were Master Gardeners from the WSU Extension, and most partner agencies provided at least two staff to support the event.
  - Presenters commented positively on the level of pre-planning, clarity of instructions, and the pre-event walkthrough of the site.
- **Expand marketing** to increase attendance with the following elements:
  - Direct mail focused on people who moved to or within the County in the previous two years.
  - Improved webpage addressing participant comments related to clarity.
  - Promotions on social media, community event calendars, and partner websites.
  - Press release or other news media engagement.

  - Street signs and/or a welcome tent next to the entrance to attract passersby.
- **Continue messaging that no prior gardening experience** is needed in event promotional materials. Presenters said that the communication materials and graphics were effective at attracting new gardeners.
- **Select the event date as early as possible** to be able to promote the event to workshop attendees on the registration form and at each workshop so they can save the date. Half (54%) of 2018–2019 workshop participants who said they did not attend the event cited schedule conflicts while one-third (32%) said they did not know about the event in time.
- **Start the event later** at 10 a.m. instead of 9 a.m. If possible, extend the length for the event to 4 p.m. so attendees who are interested can attend more sessions. A longer event would require recruitment of a food truck or other refreshment options.
- **Consider holding the event in autumn**. A September event might provide warmer weather, more participant interest in smart watering and drought-tolerant plants, and the opportunity to recruit a food truck. An autumn event would not have the lawn-use restrictions since the venue rental season is during the summer and not the autumn.
- **Explore alternative parks or reconfigure the layout to:**
  - Consider wind-tunnel effects lest the weather be windy and cold again.
  - Group all stations closely, ideally within sight of each other.
  - Instead of using picnic shelters, consider using tents arranged in rows similar to a farmer's market or street-fair.
- **Expand and better organize the information booth:**
  - Consider creating two separate booths: a welcome booth and a booth to fill out the exit survey.
  - Ensure the booth offers empty table space for filling out forms.

Sessions and Topics

- **Continue the most popular sessions:**
  - Based on the event survey, the following sessions were highly attended: Hand-Tool Sharpening, How Long to Water for 1 Inch, Mulch Matters, and Problem Pests & Natural Controls.
  - Other well-attended sessions were Matching Plant to Place, Getting to Know Your Soil, Managing Moss, and Meet the Beneficials & Pollinators.
  - While the survey suggested lower attendance, program staff reported that Mowing Tips and Blade Sharpening were also very popular.
- **Provide more experts or opportunities to answer questions, particularly on weed, pest, and disease management**. One workshop attendee commented on the long line to talk to pest management experts. When asked why they would recommend the event, several participants commented on the ability to ask questions. Options include:

  - Recruit more presenters or schedule sessions so each area has at least one person who is not presenting and can answer questions about the topic.
  - Encourage presenters to present for only a portion of their session time, leaving substantial time for questions.
  - Consider reducing the number of lecture-style sessions and replacing them with question-and-answer sessions on focused topics.
  - To engage attendees, consider bringing the tabletop spinning wheel of questions that Snohomish County uses at other events. The wheel has natural yard care questions for attendees to answer, and the presenter has the list of correct answers.
- **Ensure presenters are prepared to be flexible regarding the schedule.** Many attendees did not follow the schedule. Instead, they moved between sessions at their own pace. As a result, most sessions did not stay on schedule as the presenters adapted their demonstration to accommodate attendees.
  - Consider encouraging presenters to create self-contained mini-modules that can be conducted in about 10 minutes so attendees do not need to follow a schedule in order to benefit from the sessions.
- **Reduce sessions in Plant Right for Your Site.** Plant choice sessions were less popular, although participants liked being able to ask questions. Event staff, including Master Gardeners, recommending reducing these sessions.
  - Keep the sessions Matching Plant to Place and Planting it Right.
  - Replace Native Plants and Plants for Wet Soil with a question and answer booth that includes information resources with photos. Consider creating a notes template that booth staff or participants can use to record plant recommendations that also emphasizes best practices. In addition to recording common and/or Latin plant names, the template should include space or checkboxes to record key plant characteristics (e.g., full-grown height, sun/shade needs, soil drainage needs, drought tolerant, pest-resistant). If space allows, include brief planting instructions (ideally using simple line drawings) on amending soil with compost, planting to the proper depth, and watering plants in.

- **Modify the aeration session if needed due to venue restrictions to keep all sessions groups closely**. Because the venue prohibited using the aerator on the main lawn during the event season, the lawn care area was located away from other areas; however, event staff report that participants did not generally choose to see the aerator operating. Showing the machine and plugs from elsewhere provides more location flexibility.
- **Provide a session on rain gardens**, given the current interest in them. While rain gardens are not a natural yard care topic and one session may not provide enough information to help someone install a rain garden, it could increase interest in the event. The session should connect rain gardens to natural yard care, such as a session on choosing the right plants for rain gardens with varying conditions (e.g., the bottom of the garden versus the top, rain gardens in sunny versus shady areas) or managing rain garden weeds and pests. Alternatively, the County could consider combining the Lawn and Garden Fair with its RainScaping Expo (focused on solutions that include rain gardens).

Fair Evaluation

- **Conduct a follow-up survey of event participants** to learn what changes they made as a result of the event.
- **Revise the event evaluation form in the following ways:**
  - Place the session rating question next to each session by name and not time slot. Participants often did not write the session name or fill out the survey by time slot.
  - Remove the request for session-specific comments and suggestions. Most comments consisted of general praise. Instead ask event-wide questions about what questions they still have, what topics they would like to learn about, and/or what changes they would make to the sessions or event.
  - Consider asking a multiple-choice question about what elements of the event they value highly: demonstrations, booths, opportunity to ask questions, and other elements as appropriate.
  - Consider adding a "pledge" question asking for one action they plan to take as a result of what they learned.
- **Continue to offer small products that encourage participant use of natural yard care** best practices for participants who complete surveys and who answer questions at the end of the session, with some refinements:
  - Improve messaging to ensure participants understand they must complete the feedback form to receive products.
  - Consider offering a grand prize that consists of one large item instead of a collection of small items. Ideas from partners included plants or a rain barrel.

List of Appendices

This report includes the following appendices.

Appendix A. Survey Instruments

2014 Workshop Forms

- 2014 baseline (integrated into registration form in 2014)
- 2014 immediate post-outreach (instruments for three workshops covering six topics distributed in 2014)
- 2014 medium-term term post-outreach (distributed in 2015)
- 2014 long-term term post-outreach (distributed in 2019)

2018–2019 Workshop Forms

- 2018–2019 baseline for fall 2018 (integrated into registration form in 2018)
- 2018–2019 baseline for spring 2019 (integrated into registration form in 2019)
- 2018–2019 immediate post-outreach for fall 2018 (instruments for three workshops covering six topics)
- 2018–2019 immediate post-outreach for spring 2019 (instruments for three workshops covering six topics)
- 2018–2019 medium-term term post-outreach (distributed in 2019)

2019 Lawn and Garden Fair Form

- 2019 Lawn and Garden Fair onsite survey (integrated into event map and schedule)

Appendix B. Survey Data Summary Data

Summary data are provided in Excel files. Note that data in these tables are presented for all respondents, while report tables comparing baseline to post-outreach use of natural yard care practices presented data only for participants who responded to both the baseline and post-outreach surveys.

2014 Workshop Data

- 2014 baseline data (all respondents)
- 2014 immediate post-outreach survey data
- 2014 medium-term data (all respondents)
- 2014 long-term data (all respondents)

2018–2019 Workshop Data

- 2018–2019 baseline data (all respondents)
- 2018–2019 immediate post-outreach survey data
- 2018–2019 medium-term data (all respondents)

2019 Lawn and Garden Fair Data

2019 Lawn and Garden Fair survey data

Appendix C. Implementation Documents and Staff Debrief Summaries

2018–2019 Workshop

Marketing Materials for Spring 2019 Workshops

Materials are presented on the following pages.

Photos from Visual Demonstrations at 2018-2019 Lecture Workshops

Crop Rotation Exercise

Your crops

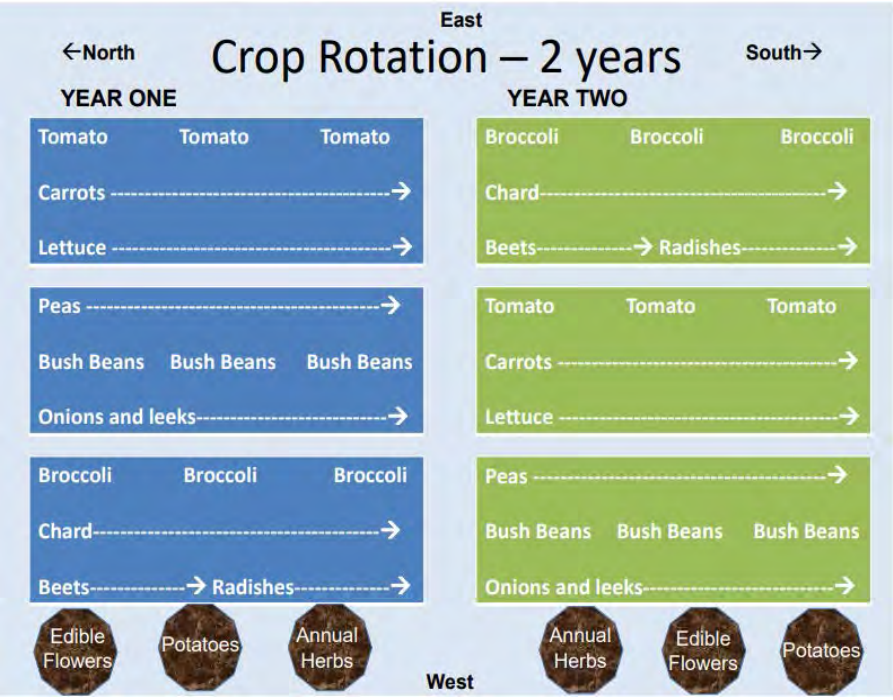
3 – Cherry Tomato
3 – Broccoli
5 – Bush Bean
5 - Potato
Row of Chard
Row of Onion
Row of Carrot
Row of Lettuce
Row of Radish
Row of Beet
Row of Leek
Row of Peas

Garden Space

Three metal feed troughs:
6 feet by 2 feet by 2 feet
One Whiskey Barrel

Considerations:

- Plant families
- Seasonality of crops
- Sizes of mature plants
- Intervals between rotations
- Length of growing cycle

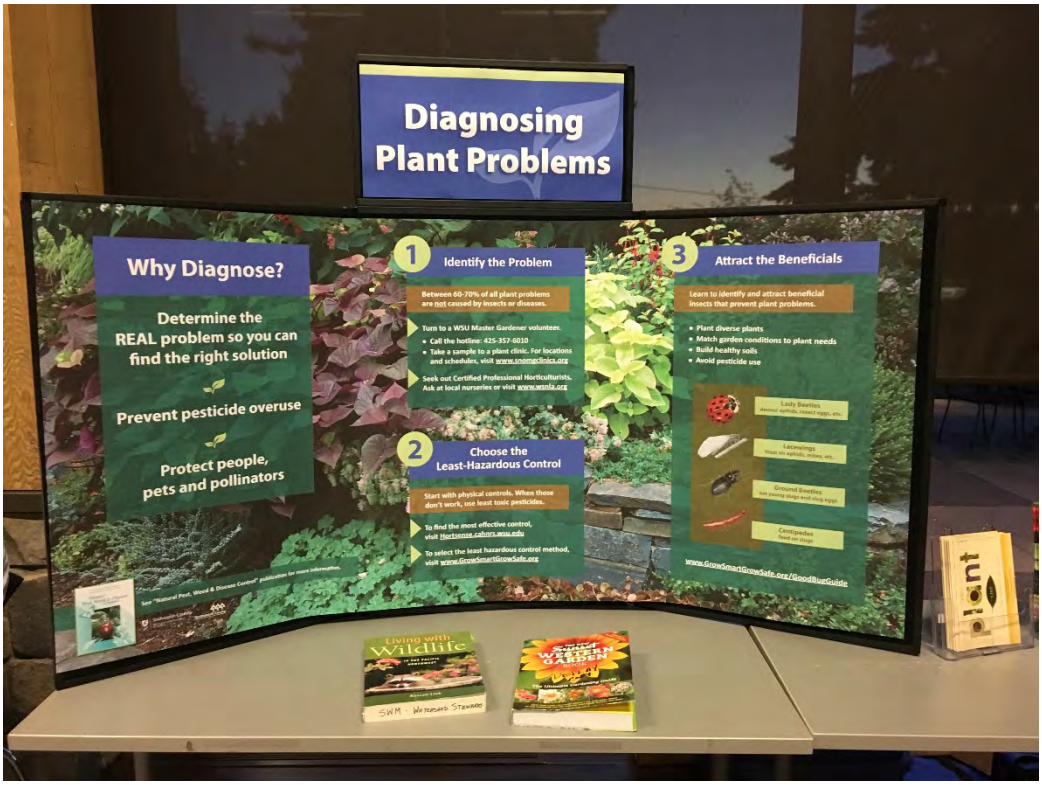


Tabletop Display Content

Tabletop displays are presented on the following pages, followed by photographs of the displays as they were set up at workshops.

Photos of Tabletop Displays at 2018-2019 Lecture Workshops


Lawn Aeration
Why Aerate & Top-dress with Compost?
Reduces soil compaction
Gets air, water and nutrients into the root zone
Improves soil and lawn health
1 Rent a Core Aerator (or hire it done)
Run the aerator across your lawn in two directions
Done right, it looks like a goose convention!
Leave the cores on the lawn
2 Overseed
Use rye/fescue blends for Northwest lawns
Spread seed twice, in two directions
5-pounds per 1,000 square feet
3 Top-Dress with 1/4" to 1/2" Compost
Breaks down thatch
Germinates grass seed
Improves soil structure and health
4 Lightly Rake the Surface
5 Keep Grass Seeds Moist During Germination
During dry weather, use sprinklers
If the weather is rainy, you may not need to water
6 Wait a Couple Weeks to Mow
Set mowing height to the highest setting to protect the new seedlings
Bring the setting down to a 3" height once the new grass is established


Diagnosing Plant Problems
Why Diagnose?
Determine the REAL problem so you can find the right solution
Prevent pesticide overuse
Protect people, pets and pollinators
1 Identify the Problem
Between 60-70% of all plant problems are not caused by insects or diseases.
Turn to a WSU Master Gardener volunteer.
Call the hotline: 425-357-6010
Take a sample to a plant clinic. For locations and schedules, visit www.snomgmtbcs.org
Seek out Certified Professional Horticulturists. Ask at local nurseries or visit www.wnhi.org
2 Choose the Least-Hazardous Control
Start with physical controls. When those don't work, use least toxic pesticides.
To find the most effective control, visit Hortsense.cahnrs.wsu.edu
To select the least hazardous control method, visit www.GrowSmartGrowSafe.org
3 Attract the Beneficials
Learn to identify and attract beneficial insects that prevent plant problems.
Plant diverse plants
Match garden conditions to plant needs
Build healthy soils
Avoid pesticide use
Lady Beetles
Lacewings
Ground Beetles
Centipedes
www.GrowSmartGrowSafe.org/GoodBugGuide
Living with Wildlife
Sunset Western Garden Book


Matching Plant to Place
Why Match Plants?
Allow plants to thrive
Create beautiful, healthy gardens
Reduce pests and diseases
Reduce maintenance
Always Choose Plants That Will Thrive On Your Site
1 Soil Drainage Needs
Choose plants that thrive in your soil without extra irrigation
2 Pest and Disease Resistance
Request pest and disease resistant varieties
3 Cold Temperature Tolerance
Check the plant's tag and match it to your locale's average lowest temperature
4 Sun/Shade Requirement
Refer to plant tag
Helpful Online Resources
plant


Planting Right
Why Plant Right?
Grow deeply-rooted, healthy gardens and lawns
Prevent common problems
Reduce weeds and watering
1 BEFORE Planting, Grow Healthy Soil
NEW Gardens or Lawns
Loosen soil 10 to 12 inches deep throughout
Add compost into loosened soil:
- Lawns: mix 1 to 2 inches into top 6 inches
- Other: mix 2 to 3 inches into top 12 inches
Add compost into entire planting area
Plants get the nutrients they need from the soil
NEW Plants into EXISTING Gardens
Loosen soil in 3- to 4-foot diameter area
Do NOT add compost to this small area because it can prevent plant roots from growing beyond the planting hole
2 WHEN Planting, Plant Right
Water plant(s) thoroughly
Dig wide hole as deep as the root ball
Form a soil mound high enough so top of root ball sits slightly above ground
Loosen and spread roots, untangle circling roots
Backfill with native soil, firm by hand (no stomping)
Never add compost into hole
3 AFTER Planting, Mulch and Water Wisely
Cover bare soil with mulch. Keep mulch away from plant trunks and stems.
Water deeply
- Daily for first week or so
- Year 1 to 3: weekly in dry season

Lawn and Garden Fair

Partner Debrief Meeting Notes

This section reproduces notes from a debrief meeting held with event partners on July 18, 2019.

What worked well?

- **Organization**, set-up and logistics ran smoothly
    - Roles and tasks were clear. Pre-planning paid off.
    - Signage and balloons were effective in helping attendees find stations.
    - Putting together boxes for each demonstration station, was super helpful for keeping the presenters' stations well-contained and easy to set-up.
- **Venue** worked well.
    - Each station had enough space.
    - Visually, it was easy to see and find everything.
    - Station spacing worked well to be able to hear each speaker.
    - Grateful for the flexibility of the city Parks department.
    - Mulch booth worked well at this venue due to proximity of City of Everett's mulch pile and available site at venue that needed mulching. If venue location changes, this demo may not work as well.
- **First-aid kit** was great to have on hand. Ended up needing the icepack.
- **Presenters**:
    - Were very well-prepared and briefed on the logistics as well in order to function autonomously.
    - Engaged well with the attendees.
    - Did not complain about the cold weather even though they were adversely impacted
    - Master Gardener (MG) presenters
    - Professional Landscaper presenters
- **WSU Extension** was vital to the event's success by providing Master Gardener (MG) presenters for several of the topics (2/3^{rds} of all presenters were MGs).
    - Walk-through with the Master Gardeners was helpful in determining the layout and needs for rental equipment.
- **Info booth** worked well for attendees entering and we managed to motivate people to fill out the surveys.
    - It was helpful that the compost giveaways were set-up by the entrance to entice people to fill out the survey.
    - Carrying out the bags of compost helped provide an opportunity to engage with the attendees a bit more 1 on 1.
- **Networking** opportunities with elected officials.
- **Graphics** turned out great. Presenters felt that they seemed effective at attracting new gardeners. The communication materials made the event approachable to novice gardeners.

What could be improved?

- **Turnout**
  - Probably influenced by the weather. Casual attendees may have been the most deterred.
  - Depends on if we're looking to attract the general public or not…
  - Targeted mailing limited attendee numbers
  - *Ideas* to increase turnout:
    - Street signs
    - Being able to see the tents from the road (depends on venue)
    - Later start time
    - Use social media, press release and other cost-effective marketing
- **Booth spacing**
  - Seemed a little too spaced out. You couldn't see all of the booths. There was a lot of blank space.
  - Lawn demos were remote and not visible from main area. Unable to locate them on field lawn due to Park's summertime use restrictions. But the Lawn demonstrations didn't actually go as planned either. The presenter only passed over the grass once with the aerator, for example. In which case, Parks may have allowed that after all.
  - *Ideas*:
    - Consider farmer's market/fair style with rows of tents
    - Put the Lawn demonstrations in the center
    - Put up a tent next to entrance from parking lot into the grounds to catch more attention.
- **Info Booth**
  - Looked messy and uninviting. Wasn't clear what people were to do.
  - There wasn't a lot of space to hang the banners. Made it closed off and seemed harder for the staff to talk to the attendees.
  - *Ideas for a more inviting Info Booth:*
    - Strategize how to best utilize the space for what we are asking people to do.
    - Less signage would be clearer, more approachable and eye-catching.
    - A big sign to draw the eye to the giveaways would have been helpful. Could have helped attract more general public attendees.
    - Two Info Booths would increase the real estate and offer space to include tables for attendees to fill out the surveys on exit. Check-in/check-out booth.
    - Need empty table space to allow attendees to fill out forms.
- **"Receive Products"** -- used to advertise practices and encourage turning in the Feedback Form
  - People didn't get that we wanted them to complete the Feedback Form. Staff had to figure out how to best encourage them to complete it and fill it out. Staff were able to say "if you'd like to receive products, please fill out the Feedback Form"
  - Grand prize wasn't flashy, as in it would be good to have one big prize and not a prize consisting of a lot of little things.
  - *Ideas*:
    - Need display, signs, and space to be visually clearer about completing the form to receive the products
    - Something flashier for grand prize. Plants? Rain barrel?

- **Survey form**
  - Confusing for attendees. Mostly filled them out at the end upon exit not as they moved through the stations. So it was hard for them to remember the titles and times of the sessions they attended.
  - The survey was designed around the more structured event experience which ended up not being the reality for most attendees.
  - *Ideas*:
    - If using similar event handout, ditch the session time information. Instead spread the schedule and Feedback form across the inside pages (schedule on left side and feedback on right side). On the Feedback Form side of the page, list the demos again with the instruction to circle the topics attended. Include the Feedback Form questions as column headings.
- **Structured sessions**
  - Planning was focused on a structured event. But that isn't how the attendees actually experienced it.
  - People milling in and out of sessions. Didn't seem to negatively impact the attendees' experience, but did throw off the presenters a bit.
  - 85% of the time the session time slots were not closely adhered to.
  - Presenters couldn't stay on the track with the 20-minute slots with the way the audience was flowing. It required presenters to be more nimble.
  - The lack of structure wasn't necessarily a bad thing though.
  - Demonstration-based sessions facilitated more structured experience and adhesion to the schedule.
  - *Ideas*:
    - Might be better for attendees to have the 1 on 1 experience opposed to the general lecture style while they have to sit through the whole talk for them to glean one relevant nugget.
    - Could restructure to booths and then a central stage with rotating speakers/topics.
    - Have a "Bring Your Questions" booth and schedule topics, such as 9:30 – Bugs, 10:00 Compost, 10:30 Lawn, etc.
    - More advance notice to attendees (post on website) of what to expect (schedule, topics, style of learning like a demo or Q&A, etc.)
- **Event Timing**
  - Attendance was light from 9 to 10, yet started picking up at 10:00.
  - Early summer timing impacted ability to secure any food truck vendors as well as limited where the lawn demos could be held at this particular site.
  - *Ideas*:
    - 10am – 4pm could be a better timeframe for the event
    - Hold the event during September. Parks would likely allow use of the field for lawn demos.
- **Getting the word out**
  - What was identified for improvement were known limitations before the event (advertisement and survey, etc.)

What might such an event look like in the future events?

- **Partnership**
  - All jurisdictions present voted they'd be willing to participate again next year
  - Partner again with County jurisdictions (plan it as regional event within Snohomish County)
  - If all the partners were advertising and getting the word out it might look more like the Home and Garden Show; which would change the event dynamics and venue selection, etc.
  - Municipalities could choose their own budget for advertising in their jurisdiction and partner to split costs evenly for the joint items e.g.) tents.
- **Plan / Coordinate**
  - Partners appreciated Snohomish County's planning and coordination.
  - Snohomish County willing to coordinate if partners can figure out a funding and partner mechanism that works (ILA, cost-share, etc.)
- **Getting the word out**
  - Use social media and mailers to broaden the reach across partnering jurisdictions
  - Connect to the benefits of natural lawn care/gardening and the relationship with municipal stormwater permitting
- **Logistics** (venue, season, time of day, day of week)
  - Hold event from 10AM to 4PM
  - Thornton-Sullivan venue worked well. Consider rotating venue to other areas of the county if that works
  - Consider Fall due to limitations on lawn demonstrations if power equipment is to be used
- **Implement** (presenters, garden products, set up, staffing, etc.)
  - Want to keep the demonstration aspect
  - Include Master Gardeners as presenters (at least 2/3^{rds} of all presenters overall)
  - Use tents throughout rather than picnic shelters
  - Staffing (2 per partner agency) worked well. NOTE: two jurisdictions were unable to provide the required 2 staff, yet two others provided more than 2 which made the difference)
- **Other**
  - Food trucks (will be important for a longer event)

Logistics Guide for Lawn and Garden Fair

In 2020, Snohomish County will draft and attach a succinct logistics guide for the Lawn and Garden Fair.

Appendix D. Summary of 2014 Medium-Term to Baseline Behavior Changes

This section presents the original evaluation findings regarding whether the natural yard care education created behavior change six to twelve months after the workshops.

Practices that Protect Water Quality (2014 Medium-Term)

After the program, at least 70% of participants were using several key practices that directly protect water quality, as shown in Table 26. Notably, the program achieved a high level of behavior change in reducing weed-and-feed use—the share of participants who used this harmful product decreased from 66% to 14%. As described below, the program also achieved varying levels of behavior change in practices that support a healthy yard and reduce the weed, pest, and disease reasons people use toxic yard care products.

Table 26. Medium-Term Adoption of Practices that Protect Water Quality (2014 Cohort)

H ✓	Avoiding weed-and-feed use
H ✓	Avoiding fast-release fertilizer use
L ✓	Avoiding broad application of pesticides
M △	Not leaving beds bare or covered in landscape fabric or plastics
H △	Top-dressing lawns with compost after aerating
L ○	Aerating every two to three years

Where the Program Worked Effectively (2014 Medium-Term to Baseline)

H ✓ **Substantial change resulting in high post-outreach use**

- Avoiding weed-and-feed
- Avoiding fast-release fertilizer
- Knowing to prepare the soil with compost

Whether asked about the fertilizers they use or asked directly about weed-and-feed, less than one-quarter of participants reported using harmful weed-and-feed or fast-release fertilizers after the workshop, a substantial decrease.

Interviewed participants also frequently mentioned using compost and composting when asked to name the most useful thing they learned in the workshops.

M ✓ **Moderate change resulting in high post-outreach use**

- Always looking for a plant's sunlight and shade needs and full-grown size

Both sunlight and shade needs and full-grown size are often listed on plant tags, enabling participants to find this information easily when choosing plants.

L ✓ **Little change because of high adoption levels before the workshops**

- Mowing two to three inches or higher
- Using at least one least-toxic weed management technique
- Not broadly applying pesticides

While most participants were using some least-toxic pest management techniques before and after the program, interviewed participants reported that they need more information and resources to manage weeds and pests. Including this information in the workshops is helpful for reinforcing preferred behaviors and strengthening the audience's understanding of how these behaviors contribute to a healthy yard and result in less need to manage weeds and pests.

H ⚠ **Substantial change with room for additional improvement**

- Always matching a plant to where it thrives
- Always looking for a plant's soil drainage needs, pest and disease resistance, watering needs, cold temperature tolerance, and status as native to the Pacific Northwest
- Using slow-release, organic, or natural fertilizer

While participants frequently mentioned "Right Plant, Right Place" principles when asked to name the most useful thing they learned from the workshops, they may need more hands-on education or tools to help them apply these practices.

While more participants reported using slow-release, organic, or natural fertilizer, nearly half were not using this product after the workshops.

Where the Program Achieved Moderate Change but Room for Improvement Remained (2014 Medium-Term to Baseline)

M ⚠ **Moderate changes with moderate post-outreach use**

- Mulch mowing, especially in wet months
- Not leaving beds bare or covered in landscape fabric or plastics

After the program about two-thirds of participants reported mulch mowing at least sometimes (67% in dry months and 64% in wet months). Fewer reported that they always mulch mow (43% in dry months and 46% in wet months).

When asked why they did not always mulch mow, participants most frequently said they do not leave clippings when the grass is too long, they do not want to track grass clippings into the house, and they do not like lots of grass clippings on the lawn.

Participants may have multiple beds, some of which follow natural yard care practices and some of which do not.

M ● **Moderate changes with low post-outreach use or understanding levels**

- Measuring their sprinkler watering rate
- Knowing to mix materials six to eight inches deep in soil when planting

Despite the unusually hot and dry year, many participants did not follow the important conservation practice of measuring their sprinkler watering rate. After the program, about 37% of participants selected the correct way to mix planting materials into the soil, although another 30% selected mixing in materials to a shallower depth of four to six inches deep.

Where the Program Achieved Little Change (2014 Medium-Term to Baseline)

L ▲ **Little change with moderate post-outreach use**

- Lawn watering frequency: participants did not reduce lawn watering frequency, with participants watering slightly more frequently after the workshop, potentially due to the unusually dry weather in 2015

Watering lessons may need to emphasize more that this practice results in healthier lawns. Education on proper watering and on other techniques to reduce the need to water (such as using mulch and top-dressing) during times of watering restrictions may be important given predictions that 2016 will also be unusually dry.

L ● **Little change with low post-outreach use**

- Aerating: after the program 27% of participants reported having aerated, an increase of 8 percentage points compared to before the program
- Applying lime: after the program 26% of participants reported having applied lime, an increase of 4 percentage points compared to before the program

The change in implementation of these practices after the program were statistically significant but relatively small—as were the levels of post-outreach use. While a larger percentage of

participants say they plan to aerate (another 44% of respondents) and apply lime (another 44%), more education, hands-on demonstrations, or incentives may be needed to promote these practices. Although few participants aerated after the workshops, nearly half who did aerate said they also top-dressed with compost, an improvement from before the program (23% baseline and 48% post-outreach).