REPORT ON THE CONDITION OF EDMONDS STREAMS/MARSH AND SALMON STEWARDSHIP ACTIVITIES IN 2018/19

REPORT TO THE EDMONDS CITY COUNCIL

July 2019

EWHS - STUDENTS SAVING SALMON
EDMONDS STREAM TEAM

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INTRODUCTION

This report provides an update on the activities and findings of the Edmonds Woodway High School's (EWHS) Students Saving Salmon club involvement in the Edmonds Stream Team and salmon stewardship in Edmonds. Details on methodology and other aspects of the ongoing monitoring project are provided in prior year reports to the Edmonds City Council [see: *Edmonds Water Quality Monitoring Project: Preliminary Report, 2016*]. This report also provides recommendations, based on four years of monthly observations, for improvements to the Edmonds Marsh and local streams to enhance aquatic habitats for salmon, wildlife, and/or other aquatic organisms.

BACKGROUND

Students Saving Salmon is an Edmonds-Woodway High School club formed by students concerned about the environment, especially salmon and their habitat. Students Saving Salmon objectives are to collect and disseminate scientific information on Edmonds watersheds and local salmon populations; conduct community outreach; improve streamside habitat; and enhance salmon populations.

Since the start of the 2015/16 school year, EWHS students have conducted monthly stream monitoring with the Edmonds Stream Team, a citizen science project led by Joe Scordino (a retired fishery biologist) to assess stream water quality and habitat in Edmonds. Meadowdale High School students joined the Stream Team in the 2017/18 school year. The purpose of the citizen science project is to advance our knowledge and understanding of the local environment. Students used electronic instruments to obtain water quality measurements and document habitat conditions at 23 sites in local streams (Shell, Willow, Shellabarger, Hindley, Perrinville, and Lunds Gulch Creeks) and from the Edmonds Marsh.

Scientific information is collected every month on habitat conditions and water parameters that are important for aquatic organism survival including temperature, pH, dissolved oxygen, salinity, turbidity and nutrients. Water samples are collected periodically for analysis at an accredited laboratory in Everett for heavy metals and petroleum compounds, and for fecal coliform analysis at the Edmonds Wastewater Treatment Lab. This Citizen Science project is designed to provide baseline stream quality data that can be used to characterize individual stream conditions, evaluate temporal and spatial trends, and detect human perturbations or environmental factors.

EWHS and Meadowdale students are also involved with salmon stewardship activities throughout the year including stream surveys, streamside habitat restoration, outreach, salmon hatchery work, and other salmon enhancement efforts.

WATER QUALITY IN STREAMS AND EDMONDS MARSH

The Edmonds Stream Team has collected data on multiple water quality parameters; but to ensure brevity in this report, we are only reporting our findings on the principal parameters affecting aquatic life (i.e., water temperature, dissolved oxygen and pH).

Water Temperature in Creeks

Water temperatures in the creeks were generally good for salmon year-round (Table 1). All monthly water temperatures, except one, were below the maximum temperature requirement of 63.5°F for salmonid spawning, rearing and migration [Washington Administrative Code - WAC 173-201A-200(1)(c)]. The one exceedance was 63.8°F in Hindley Creek in August 2017.

Table 1. Seasonal Water Temperatures in Creeks (in degrees Fahrenheit)

	fall	Spring	summer	winter	average
Lower Shell Creek	51.1	52.7	56.1	47.2	51.5
Middle Shell Creek	50.7	52.0	54.5	47.2	51.0
Upper Shell Creek	51.0	51.6	53.1	47.2	50.8
Lower Hindley Creek	52.5	55.1	60.5	47.2	53.3
Lower Shellabarger Creek	53.8	55.9	60.8	47.5	54.4
Shellabarger Creek - Upper middle fork	53.0	56.3	59.3	48.7	54.4
Shellabarger Creek - Upper north fork	52.6	55.5	58.0	49.2	53.7
Shellabarger Creek - Upper south fork	53.1	55.2	59.1	47.6	53.8
Lower Willow Creek	51.8	52.3	57.9	46.1	52.4
Upper Willow Creek	53.5	53.2	56.7	50.3	53.4
Lower Perrinville Creek	51.5	52.3	- -	44.5	49.4
Upper Perrinville Creek	52.5	52.1	- -	48.3	51.1
Lower Lunds Gulch Creek	49.0	50.6	56.1	58.8	56.6
Middle Lunds Gulch Creek	48.0	51.8	58.8	41.5	49.1
Upper Lunds Gulch Creek	47.7	50.9	56.6	40.8	47.4

Water Temperature in Edmonds Marsh

Seasonal averages (Table 2) were above the maximum temperature requirement of 63.5°F for salmonid spawning, rearing and migration [WAC 173-201A-200(1)(c)] every summer monitored. Outgoing Marsh water exceeded maximum temperature requirements every summer in spite of cooler incoming freshwater that was below maximum temperature in all months except in August 2017 when incoming Shellabarger Marsh flow was 67.0°F. The highest water temperatures recorded at the Marsh outlet was 73.3°F.

Table 2. Seasonal Water Temperatures in Edmonds Marsh (in degrees Fahrenheit)					
	fall	spring	summer	winter	average
East edge at storm drain	51.7	53.0	60.6	45.7	53.2
Eastern edge	52.9	53.1	60.1	47.0	53.0
Eastern edge at Hwy 104 Culvert	52.9	55.6	60.6	47.0	54.2
Northwest corner	53.3	57.9	70.3	45.7	54.8
North edge - Harbor Square east culvert	53.9	56.8	67.3	45.7	56.2
North edge - Harbor Square west culvert	53.8	57.3	67.4	45.5	56.0
Northeast edge	49.5	54.0	- -	44.6	47.9
Marsh outlet at RR tracks	51.9	62.2	65.2	44.7	55.4

Dissolved Oxygen in Creeks

All of the creeks, except upper/middle Lunds Gulch, had dissolved oxygen levels (Table 3) at or above the 8.0 mg/L minimum requirement for salmonid spawning, rearing and migration [WAC 173-201A-200(1)(d)]. All of the creeks monitored originate from natural springs that flow year-round except in upper Lunds Gulch Creek. Upper Lunds Gulch Creek goes dry or stops flowing in the summer resulting in low dissolved oxygen levels in the standing water. Dissolved oxygen levels in lower Shell Creek, where salmon spawn in fall and winter, were above 11.0 mg/L which is an optimum level for salmon eggs in the gravel.

Table 3. Seasonal Dissolved Oxygen in Creeks (in mg/L)					
	fall	Spring	summer	winter	average
Lower Shell Creek	11.1	10.9	10.5	11.6	11.1
Middle Shell Creek	11.2	11.0	10.8	11.7	11.2
Upper Shell Creek	9.7	10.1	9.9	10.6	10.0
Lower Hindley Creek	10.6	10.5	9.7	11.5	10.6
Lower Shellabarger Creek	10.2	10.0	9.4	11.2	10.2
Shellabarger Creek - Upper middle fork	10.8	10.3	10.0	11.4	10.6
Shellabarger Creek - Upper north fork	10.3	10.3	10.0	10.8	10.4
Shellabarger Creek - Upper south fork	10.0	10.0	9.4	11.0	10.1
Lower Willow Creek	10.8	10.4	9.8	11.5	10.5
Upper Willow Creek	10.2	10.4	10.1	10.7	10.4
Lower Perrinville Creek	11.2	11.2	- -	12.4	11.6
Upper Perrinville Creek	9.6	9.8	- -	10.1	9.8
Lower Lunds Gulch Creek	11.4	11.1	10.3	12.7	11.4
Middle Lunds Gulch Creek	10.4	9.7	6.8	12.2	10.1
Upper Lunds Gulch Creek	7.6	8.2	6.1	10.8	8.6

Dissolved Oxygen in Edmonds Marsh

The main flow of water through the Edmonds Marsh (from Willow Creek and the Shellabarger Marsh inlet at the Hwy 104 culverts to the Marsh outlet) had dissolved oxygen

averaging over 8.4 mg/L at the outlet (Table 4) which exceeds the 6.5 mg/L minimum requirement for salmonid rearing and migration [WAC 173-201A-200(1)(d)]. The lowest dissolved oxygen measurement at the Marsh outlet was 6.7 mg/L in July 2017.

However, dissolved oxygen measured on the northern edge of the Marsh (along Harbor Square) and the eastern edge of the Marsh (along Highway 104) were below the WAC requirement in all months (Table 4). The northern edge of the Marsh along Harbor Square averaged 2.5 mg/L of dissolved oxygen over all months, and was frequently below 2.0 mg/L (which is lethal to most aquatic organisms) except during periods of rainfall. We do not have data for the southern edge of the Marsh because Chevron has denied access to their property.

Table 4. Seasonal Dissolved Oxygen in Edmonds Marsh (in mg/L)

	fall	spring	summer	winter	average
East edge at storm drain	2.2	2.1	0.9	1.9	1.7
Eastern edge	3.8	3.3	2.1	4.9	3.6
Eastern edge at Hwy 104 Culvert	9.2	9.0	8.3	10.3	9.2
Northwest corner	4.2	2.1	1.0	3.5	2.8
North edge - Harbor Square east culvert	3.6	0.7	0.9	2.9	2.0
North edge - Harbor Square west culvert	4.3	1.6	1.1	4.0	2.8
Northeast edge	2.7	5.0	- -	1.5	2.5
Marsh outlet at RR tracks	8.4	10.3	8.7	10.0	9.3

pH

All of the observed pH levels in the creeks were within the pH 6.5 to 8.5 range required for salmonid spawning, rearing and migration [WAC 173-201A-200(1)(g)] except for upper Lunds Gulch Creek which had a pH of 6.4 and 6.3 in October of 2017 and 2018 respectively. The average pH was 7.6 in all creeks (excluding upper Lunds Gulch).

The Edmonds Marsh had an average pH of 6.9 for all sites with the outgoing water averaging 7.2. Measured pH was below the minimum 6.5 pH requirement [WAC 173-201A-200(1)(g)] on multiple occasions on the northern and eastern edges of the Marsh where water circulation is poor.

Salinity in Edmonds Marsh

The salinity of the water in the Marsh is affected by a tidegate located downstream of the Marsh outlet. The tidegate functions to prevent saltwater intrusion into the Marsh from mid-October to mid-March (to prevent potential flooding during periods of coinciding high rainfall and high tides). In about mid-March, the tidegate is secured in an open position to allow full tidal exchange of saltwater through the spring/summer months.

The salinity measurements at the Marsh outlet (which is representative of the main body of the Marsh) from December to early March reflect the low salinity of the incoming freshwater (averaging 0.11 ppt) from the Shellabarger inlet and lower Willow Creek. When the tide gate is secured open and saltwater enters the Marsh with each high tide, the salinity measurements are significantly greater at the Marsh outlet.

Salinity measurements along the northern (Harbor Square) and eastern (Highway 104) edges averaged 0.2 ppt year-round. This indicates that the saltwater does not reach these areas even when the tidegate is secured open in the spring/summer.

Fecal Coliform Bacteria

Counts of fecal coliform bacteria colonies cultured from water samples collected varied considerably by location/season/day. There are no Washington Water Quality Standards for fecal coliform for freshwater aquatic life. However, if we use the Washington criteria for water contact recreation (i.e., levels must not exceed a geometric mean value of 100 colonies/100 mL) as an indicator of a potential bacteria problem, then there are a number of samples that are of concern. Fecal coliform counts appear to be higher after a period of rain. Extremely high counts of fecal coliform bacteria exceeding 8000 colonies per 100mL occurred at lower Willow Creek.

Pollutants

We will be collecting water samples for pollutant analysis through the end of this year using the $15K provided by the Edmonds City Council in 2018. We plan to collect two quarterly samples and at least two rainstorm samples and deliver them to the ALS Laboratory in Everett for heavy metals and polycyclic aromatic hydrocarbons (PAH). We plan to provide a separate comprehensive report on all the pollutant analyses to the Council when we complete this sampling.

To date, with past funding from the Council and other sources, we have had 127 water/sediment samples analyzed by the state accredited, ALS Laboratory in Everett for heavy metals (Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Zinc), and petroleum derived compounds (PAHs, TPH, BTEX). Due to the high cost of pollutant analyses, not all sites were sampled during each collection nor were all compounds tested for in each sample collected.

Of greatest concern to date is the detection of seven carcinogenic PAHs that exceeded WA State Human Health Criteria for Consumption of Water and Organisms [WAC 173-201A-240]. Of the 107 samples analyzed for PAHs, 84 (78%) had levels of one of more of the following carcinogenic PAHs that exceeded WA criteria: Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenzo[a,h]anthracene, and Indeno[1,2,3-cd]pyrene.

Figure 1 shows the levels of exceedance by season at each site sampled. Note that the east edge of the Marsh (at storm drain off Hwy 104) and the north edge of Marsh (along Harbor Square) had the highest percentage exceedance for multiple carcinogenic PAHs.

SALMON STEWARDSHIP

Stream Surveys

For the past three years, we have surveyed private property owners on lower Shell Creek to obtain local knowledge on coho and chum salmon spawning in the creek, and conducted periodic surveys of the creek to determine salmon presence/absence and habitat conditions. Through these surveys, we have identified fish passage barriers and restoration needs, and then worked with private property owners to improve salmon habitat.

Unfortunately, we saw very few salmon or redds this year. While the residents say there are generally more salmon every other year (so fewer salmon isn't too odd), some residents said this was the first time ever that they had seen no salmon at all.

Habitat Restoration -

Students Saving Salmon has worked with streamside residents along Shell to plan habitat restoration on multiple properties over the past two years. Over 600 native plants have been planted along Shell Creek by students and community volunteers that assisted. Students plan to conduct further restoration work if donations are available for purchase of native plants and wire cages (as needed).

In March of 2019, Students Saving Salmon worked with Holy Rosary Church to develop a plan for planting 160 native plants consisting of 12 species of shrubs and trees along Shell Creek on the church's property. The plan included placing wire cages around some of the new plants to prevent mountain beaver foraging (a prior planting at this site in 2017 essentially failed because mountain beavers ate most of the new plants within a 6-month period). The Olympic Fly Fishers Club donated the funding used to purchase the plants and wire cages. Prior to the planting event, invasive species were removed and the site was plotted for individual plant species locations. Over 40 students and community volunteers, including Edmonds City Council, Edmonds Tree Board and Sound Salmon Solutions, participated in the planting event.

Salmon Enhancement

Since 2017, students have volunteered at the Willow Creek Salmon Hatchery assisting with incubating about 80,000 coho eggs, transferring coho fry to raceways, preparing the pond for rearing, feeding the juvenile coho in the rearing pond, and capturing and releasing coho fry into streams. Students have learned valuable skills about the handling of salmon and the importance of hatcheries in supplementation programs. We hope more of the hatchery coho can be released in local creeks in Edmonds to help bring back salmon populations in our area

The water quality data collected by Students Saving Salmon, demonstrating the good quality of water in Shell Creek, was used to convince the Washington Department of Fish and Wildlife to allow the placement of juvenile coho from Willow Creek Salmon Hatchery into upper Shell Creek. The upper areas of Shell Creek have good habitat for spawning and rearing of juvenile salmon, but it has been blocked from access by spawning salmon for many years due to man-made obstacles such as impassable culverts, pipes, and a five-foot man-made waterfall.

Students have released juvenile coho salmon from the Willow Creek hatchery into Shell Creek each year since 2017. Over 1,000 juvenile coho salmon measuring 3-4 inches have been released each year at various locations including Yost Park, along Sprague Ave., on Holy Rosary Church property, and along Brookmere Drive. These juvenile coho salmon live and grow in freshwater streams for their first year of life and then migrate to the ocean the next year.

The Stream Team has also assisted with a small chum salmon hatchery located in upper Lund Gulch Creek. This hatchery raises 10,000 chum salmon for release into lower Lunds Gulch Creek.

Hatchboxes

Working with the WA Dept Fish and Wildlife, Grover's Creek Salmon Hatchery and Willow Creek Salmon Hatchery, the Stream Team is exploring the use of instream egg incubators (called 'hatchboxes') to see if the salmon eggs from the hatchery could be hatched in the stream under more natural conditions with "natural" release of the hatched fry when they have consumed their yolk sac and are ready to begin life in the stream.

Our first attempt with a single hatchbox in 2018 was unsuccessful because sediment filled the hatchbox over time. That experience taught us that we needed to select very specific sites in stream where sediment buildup would not occur, or be minimal (which is very difficult to do due to the amounts of naturally flowing sediments in creeks).

In 2019, with help from a donation of hatchboxes from Olympic Fly Fishers, students evaluated the use of the hatchboxes with coho salmon eggs in Shell Creek and chum salmon eggs in Lunds Gulch Creek. Students assisted in the placement and retrieval of the hatchboxes in the creeks and examined each chamber in the hatchbox for sediment loading and unhatched eggs. We were able to achieve 89% hatching/release overall with the lowest hatching of 78% in a Lunds Gulch chum hatchbox with sediment problems and the highest hatching/release of 100% in a different Lunds Gulch chum hatchbox. A coho salmon hatchbox in Shell Creek had a 99% hatching/release.

We plan to continue the use of hatchboxes in these creeks next year with plans to place 3,000 coho eggs in hatchboxes in Shell, Willow and Lunds Gulch Creeks, and 2,000 chum salmon eggs in hatchboxes in lower Shell Creek and lower Lunds Gulch Creek.

OUTREACH

Students work to increase awareness of the need to protect and improve streams, wetlands, and nearshore environments. Students have presented the results of their water quality analyses and observations on stream conditions to the Edmonds City Council each year for the past three years. Besides talking to streamside residents about salmon and their habitat during our surveys each year, more formal presentations have been made to community groups including Rotary Clubs, Olympic Fly Fishers, Trout Unlimited, Puget Sound Anglers, Save Our Marsh, Brighton School, Taming Bigfoot, and Edmonds Floretum Club. We have had a booth at

community events such as Edmonds' Watershed Fun Festival, Family Day at the Port, Westgate Elementary Science Night, Edmonds Heights School Science Fair, and the Edmonds Waterfront Festival.

RECOMMENDATIONS

Stream and Marsh Monitoring

We appreciate the continued support we've received from the Edmonds City Council and the City of Edmonds, and ask that $2,500 provided each year in the city budget continue as those funds are critical for obtaining the supplies necessary for students to conduct this project. The citizen science project and stream surveys provide real-time information on our environment that is essential for stormwater management, city planning, and salmon restoration efforts.

Fish Passage Barriers

We have observed both manmade and debris/log barriers that prevent adult salmon from accessing potential spawning and rearing areas. The City should consider developing protocols and plans for addressing barriers in creeks whether on public or private property.

Manmade waterfall - Shell Creek has a manmade 5-foot waterfall just downstream of 7th Ave. N. and Glenn Street between the Soundview Apartments and 625 Carol Way that totally blocks salmon passage. Students are willing to help the property owner apply for salmon restoration funds to replace the waterfall with upstream step-pools, but the property owner has refused to discuss this serious obstacle that blocks access to considerable upstream spawning habitat in Shell Creek.

Impassable culverts (pipes) under roads - This is a problem affecting salmon throughout Washington, and Edmonds has them too.

Perrinville Creek has an impassable culvert under Talbot Road that has been known for some time but not addressed. Newer restoration techniques that don't require expensive culvert replacement/road removal should be pursued to allow salmon passage. Adult salmon were observed below this culvert in 2018 and are currently limited to a short length of freshwater spawning area due to this impassable culvert.

Shell Creek has impassable culverts at 9th Ave (near Main Street) and upstream just before the creek goes under Main Street into Yost Park. However, these blockages don't actually affect adult salmon at this time since the manmade waterfall near 7th Ave. N. prevents adult salmon from reaching 9th Ave.

Debris/log passage obstacles at culverts - Debris and logs flow naturally in steams, but can get lodged in culverts or in front of culverts and prevent fish passage. Protocols and city authorizations are needed to have such obstacles removed, whether it is on public or private property, as they occur so they don't impede salmon passage.

This past winter, a very large log was pushed up high on the beach by winter storms/high tides landing right in front of the railroad tracks culvert where Shell Creek exits to Puget Sound. This log, due to its size and location high on the beach, is very unlikely to be moved by tides

prior to the coming fall migration of adult salmon. Although the creek is flowing under the log and not backing up, there is only about one inch of water depth and that will likely prevent adult salmon from entering the creek. Due to the low numbers of adult salmon observed in Shell Creek these past two years, we can't risk losing the coming years' run due to this obstacle.

Through our salmon surveys, we also observed a partially blocked culvert in lower Shell Creek that is preventing adult chum salmon passage though coho salmon did pass it. As time passes, it likely will prevent all fish passage and likely become a flooding problem. Because this culvert is on private property, the City personnel have advised they don't have authority to use their equipment to help remove the debris. This needs to change so City staff can help restore public resources (i.e., salmon) in the creek.

Excess sediment in creeks

Heavy rainfall and excess stormwater runoff can cause erosion that results in excess sediment deposits in creeks that cover streambed gravel that is essential habitat for aquatic life. Salmon lay their egg in gravel and excess sediment can smother laid eggs or prevent salmon access to the gravel they use for spawning.

Shell Creek sediment deposits - Over the past four years, we have observed increased sediment deposits each year in Shell Creek. Areas of lower Shell Creek where we observed chum salmon spawning in gravel are now covered with sediment and thus unusable for spawning. We have also observed that some of the steeper bluffs along the creek in Yost Park are eroding and likely contributing to the sediment problem. We recommend the City begin examining approaches for curtailing some of the erosion in Yost Park whether it be specialized planting or use of logs or other material to stabilize the bluffs.

Perrinville Creek sediment flow - Perrinville Creek has known sediment problems and city staff do remove excess sediment each year in the lower area to prevent flooding. High flows from heavy rain and excess stormwater through the steep ravine in Southwest County Park is likely the source of much of the sediment. All of the upper Perrinville Creek watershed is in storm drains that all combine to enter the creek at one culvert next to the Perrinville Post Office, thus causing high velocity heavy flow during large rainstorms. Any additional stormwater will only exacerbate the problem, so a management plan needs to be implemented for the watershed that requires any new stormwater drainage to be injected into the ground and not in additional storm drains to the creek.

Edmonds Marsh Restoration

The Edmonds Marsh has water quality problems and deteriorating habitat that require a comprehensive restoration effort. The Edmonds Marsh is supposed to be a saltwater estuary, but saltwater flow is curtailed in fall and winter months due to flooding concerns. Fish passage is precluded because the Marsh drains to Puget Sound in a 1,600-foot pipe that exits into deep water well below the surface. The many years of curtailed flow through the Marsh has resulted in sediment deposits and vegetation growth on fences that prevent adequate circulation. Invasive species dominate much of the riparian areas preventing native plant growth needed for a healthy ecosystem. Lack of water circulation has caused standing water in portions of the Marsh that

have low dissolved oxygen. The western edge of the Marsh lacks vegetation and water temperatures exceed 70 degrees in summer months. The City is well aware of these problems and recently prioritized efforts to construct tidal/stream channels that will provide an open "daylighted" connection to Puget Sound. However, it may be some years before the City obtains the grants and authorizations necessary to undertake this project.

In the interim, a few things the City should consider are:

1) Leave the tide gate secured open year-round to allow the marsh to begin reverting back to a true saltwater estuary.
2) Work with WSDOT to remove the fences on both sides of Highway 104. Invasive nightshade has grown into a web on the fences that accumulate sediment and prevent water circulation. Better circulation and flow of water from Shellabarger Creek into the Marsh also may help prevent flooding.
3) Improve water circulation by dredging areas where flow is restricted
4) Remove invasive species and replacing them with native plants
5) Plant vegetation on western edge of the Marsh and require BNSF to stop using herbicides near the Marsh.

Water quality and pollutants

We've found that stream water quality in Edmonds is generally good, but stormwater inputs carrying pollutants is a problem. We encourage residents to keep doing what they're doing and following best management practices suggested on the City's webpage. Stormwater pollutants were highest at the Marsh along Highway 104 where ferry traffic is heavy. One suggestion is to explore ways to minimize car idling (reducing exhaust fumes) while they wait to move forward in the ferry lines. The City should work with WSDOT Ferries on this issue.

Salmon enhancement and habitat restoration

Much of the streamside habitat in Edmonds needs restoration and salmon numbers have declined. Since most of our creeks are on private property, restoring salmon and streamside habitat will require private property owner "buy-in" and participation. With continuing support from the City, Students Saving Salmon will continue working with private property owners and undertaking additional enhancement efforts such as the use of hatchboxes and community restoration projects.

ACKNOWLEDGMENTS

We want to thank the many people in the community that have supported our efforts to restore salmon in Edmonds!!

Figure 1. Seasonal Occurrence of Carcenogenic PAHs Exceeding Human Health Criteria (graph shows % exceedance)