

# Stream Team News

**FREE**

**OLYMPIA • LACEY • TUMWATER**

**EDUCATE • PROTECT • RESTORE**



## *Inside...*

Purple Martin Monitoring Training | 2  
Compost: Garden Gold | 3  
Gardening for the Future | 4–5  
Native Plant Food Garden | 6  
Tumwater Valley Golf Course Salmon-Safe  
Certification | 7

Climate Conversations—Wolverines: Surviving  
in a Changing Climate & Are Migratory Birds  
"Keeping Up" With Earlier Springs? | 8  
Thank You Steve Parks for Your Dedicated Years of  
Service! | 9  
Prairie Appreciation Day Tour—Vanpool | 9  
What's Blooming in Budd? | 10–11

**SPRING EDITION**  
March–April–May 2019

Water Bears or Moss Piglet  
(*Tardigrada*) | 12  
Spring Cleaning Tips | 13  
Kids' Corner | 14  
Calendar of Events | 15  
Clean Cars Clean Streams | 16

## PURPLE MARTIN MONITORING TRAINING .....

- Thurs., April 11
- 5 – 6:30 p.m.
- Olympia City Hall, 601 E 4th Ave, Olympia

## Swallows: Harbingers of Spring!

It is that time of year again and the purple martins, North America's largest swallows, are back! Stream Team is looking for volunteers interested in monitoring the nest boxes at East Bay in downtown Olympia from April to September. Join us for a short training covering identification and data collection skills.

We will begin our training with a presentation from Washington Department Fish and Wildlife biologist, Michelle Tirhi. Michelle will discuss basic purple martin identification and the importance of purple martin monitoring programs. Following the talk, we will walk over to the nest boxes at East Bay to review data collection basics and practice our bird identification.

To register for this workshop, visit [www.streamteam.info](http://www.streamteam.info) and click on "register". For more information, contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us)

**ON THE COVER:** Yellow rumped warbler. See article "Are Migratory Birds "Keeping Up" With Earlier Springs?" on page 8. Photo by Michele Burton Photographer.

## STREAM TEAM MISSION

To protect and enhance the water resources and associated habitats and wildlife in Thurston County through citizen action and education.

*Stream Team is funded and jointly managed by the stormwater utilities of the Cities of Lacey, Olympia and Tumwater. Stream Team programs meet the requirements for the National Pollutant Discharge Elimination System (NPDES) permit for stormwater.*

## SPECIAL NEEDS?

Citizens requiring special accommodations can call one of the coordinators listed at least one week prior to an event to make special arrangements.

## FIND US ON FACEBOOK:

 [ThurstonStreamTeam](https://www.facebook.com/ThurstonStreamTeam)

## NEWSLETTER CONTRIBUTORS:

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## STREAM TEAM INQUIRIES

360-438-2672 or [streamteam@ci.lacey.wa.us](mailto:streamteam@ci.lacey.wa.us)



### IN LACEY:

City of Lacey Water Resources Program  
420 College St. SE, Lacey, WA 98503

#### Attn: Emily Watts

Tel: 360-438-2687  
TDD: 1-800-833-6388  
[ewatts@ci.lacey.wa.us](mailto:ewatts@ci.lacey.wa.us)



### IN OLYMPIA:

City of Olympia Water Resources Program  
P.O. Box 1967, Olympia, WA 98507-1967

#### Attn: Michelle Stevie

[mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us)



### IN TUMWATER:

City of Tumwater Water Resources Program  
555 Israel Road SW, Tumwater, WA 98501

#### Attn: Meridith Greer

Tel: 360-754-4148  
TDD: 1-800-833-6388  
[mgreer@ci.tumwater.wa.us](mailto:mgreer@ci.tumwater.wa.us)



## *Compost:* Garden Gold

As the season warms and the earth softens, many people start to dig in their yards and gardens. Whether you are a seasoned composter or are thinking of starting a pile at home, here are few things to know about “garden gold”.

### What is Compost?

Compost is decomposed organic material—such as yard and food waste—that can be added to soil to help plants grow.

### How Does It Work?

Bacteria in the soil breaks compost down into simple nutrients, such as nitrates, that are essential for healthy plant growth. Organic matter also increases water retention, air circulation and root penetration in the soil. Not only that, but compost also helps to neutralize acidic soils. This is especially important in the Pacific Northwest where soils are generally more acidic because of our high annual rainfall.

### What else is it good for?

Composting yard and food waste has tremendous environmental benefits for both the planet and your garden.

#### Protecting water quality

Adding nutrient-rich compost to your garden reduces the need for chemical fertilizers that would otherwise runoff into our streams, lakes and Puget Sound.

#### Conserving water

Compost increases soil's ability to retain water. It can reduce outdoor water expenses by up to 30%.

#### Diverting waste from landfills

According to the EPA, 60% of landfill waste is organic and compostable. By composting, you are helping to reduce the amount of waste that ends up in landfills.

#### Reducing greenhouse gas emissions

Organic materials in landfills break down anaerobically (without oxygen) and release methane and carbon dioxide. By composting, you are allowing organic materials to break down aerobically (with oxygen) and reducing the production of greenhouse gases.

For more about “garden gold”, including how to compost in an apartment, visit [www.sodgod.com/composting](http://www.sodgod.com/composting)

Want to start composting? Check out [www.mgftc.com](http://www.mgftc.com) for FREE composting workshops near you.

## QUICK COMPOSTING TIPS



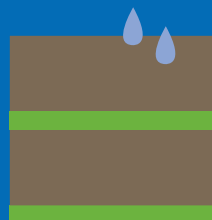
Select a convenient place near your garden and kitchen to locate your compost pile.

Compost only kitchen scraps and garden waste—no meat, bones, grease or pet waste.

4 PARTS  
BROWN  
WASTE

1 PART GREEN

Use 1 part high-nitrogen green waste (grass clippings, weeds, kitchen scraps) to 4 parts high-carbon brown waste (fallen leaves, sawdust, straw).



Alternate layers of green and brown waste to make a 3 ft. x 3 ft. x 3 ft. pile, wetting (not soaking) each layer with a hose and ending with a brown layer.



Turn the pile with a digging fork every few weeks to aerate.



Add new clippings, leaves, or kitchen scraps into the center of the pile or when you turn it.

Cover the pile with a tarp during the winter.



# Gardening for the Future

Are you unhappy with your home landscape? Are you worried about high water use or lawn and garden chemicals affecting the health of your family and local waterways? Maybe you are just tired of looking at a brown lawn all summer long! It could be time to rethink your yard and consider transitioning to a landscape that makes sense for the future.

Predictions made by local climate scientists can provide insight on gardening for future generations. The impact of climate change is likely to have extensive effects on the average residential landscape and many historic gardens in our region. Gardeners living around the Salish Sea are taking notice of how climate change is shifting growing conditions in the Pacific Northwest. Heavy rainfall caused by atmospheric rivers over the past few winters and longer periods of summer drought are having an impact on what we plant and how we maintain our gardens. Changing weather patterns affect plant health as well as backyard habitat for birds, pollinators and other wildlife.

## Rethinking Home Landscapes in a Changing Climate

You may have noticed milder, wetter and shorter winters followed by earlier spring flower displays, trees coming into leaf and the survival of typically frost-tender plants. This warmer weather might seem like a plus, but there's a catch-22. Studies show the potential benefits from a longer growing season will be outstripped by a host of other problems such as watering restrictions, damaging storms and the spread of unruly weeds.

Warmer temperatures can also bring new pest and disease problems for gardens. The changing climate is already creating ideal conditions for the spread of some harmful insects and fungal diseases that thrive with wet winter conditions. Additionally, planning studies for Pacific Northwest reservoirs suggest a significant increased need for reservoir storage to meet future summer irrigation demands under climate change scenarios. Locally, gardeners are already adapting their landscapes with these predictions in mind. So what can you do to adapt your yard to these changes?



## Downsize or Lose the Lawn

If you think your lawn is high maintenance now, it will only increase in years to come. The trouble with lawn is that it is not well suited for predicted weather pattern changes. In the Pacific Northwest, we typically plant cool season grasses that do not thrive under heat stress, drought conditions or soggy soils. With the onset of extended periods of hot and dry growing conditions and increased precipitation during the cool months, traditional turf grass will struggle!

Another problem is the amount of water required to keep lawns green during the warm season. Did you know that residential outdoor water use across the US accounts for nearly 9 billion gallons of water each day? Typically, lawns receive the highest percentage of irrigation water. This is because they require more water than most other plants in the landscape (plus most of us tend to overwater our lawns). As a result, landscapes with large expanses of lawn use more water than those with a mixture of other plants.

### Here's what to do:

- Reduce lawn to areas where it has a practical function, such as a kiddo play area.
- Remove lawn and replace with edible plants your family can enjoy (and save on your food budget!).
- Replace traditional lawn with turf grass types such as low water-using or native grasses and those that can withstand drought.



GARDENING FOR THE FUTURE PHOTOS  
CREDIT: LINDA ANDREWS LANDSCAPE & DESIGN



## Plant More Trees and Shrubs

Trees and large shrubs can provide shade for your home and yard and refuge for wildlife. Understanding changing weather and climate is important to make the best planting choices. You can use maps showing the shift of hardiness zones across the United States over the past decades. This will help you anticipate how growing conditions may change over time. With this information in hand, focus in on your own yard's unique characteristics such as sun aspect, soil conditions, slope, shade, wind, drainage and heat sinks. Through this process, you will gain a more robust understanding of the on-site specifics that need to be considered in planning your garden adaptation strategies. Keep in mind that climatic shifts can also mean that some native and iconic plants may no longer be able to survive in portions of their historic range or specific micro-climates within your own yard.

### Here are some tips to help:

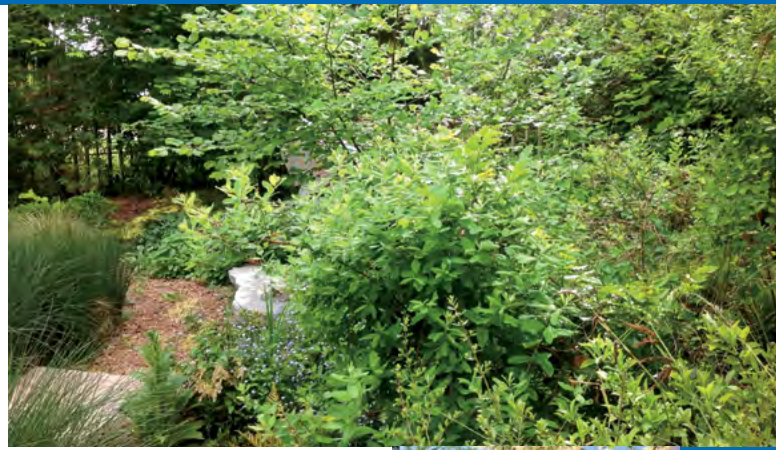
- Spend time in your yard observing on-site characteristics and conditions throughout the year.
- Plant for the future by using trees, shrubs and hedges that are drought tolerant.
- Whenever possible, choose trees and plants from the native plant community local to our area to help them thrive.
- Avoid planting non-native trees, shrubs and other plants that naturalize or are invasive. As the climate shifts, these persistent plants will also expand their boundaries jeopardizing native habitats used by pollinators and other wildlife.
- Plant windbreaks to protect your yard from stormy weather.
- Choose plants carefully, map out your landscape's unique environment use drought-tolerant or damp-loving plants best suited to specific areas and conditions in your yard.
- Understand the connections between pollinators, breeding birds, insects, and other wildlife and the plants they depend on. Pollinators such as hummingbirds and bees may arrive either too early or too late to feed on the flowers on which they normally rely. Consult local experts for alternative options.

## Create Healthy Soil

Did you know that healthy soils directly contribute to healthier water resources and thus indirectly support salmon? Healthy soils provide a number of vital functions including the ability to store water and nutrients, regulate the flow of water and immobilize and break down pollutants that contribute to healthier fish habitat. Healthy plants depend on healthy soils that contain essential nutrients, good structure and organic matter to promote mycelial growth.

### Here are some tips:

- Amend soil with compost to improve drainage, add organic matter and nutrients and support soil organism populations
- Prevent soil erosion by protecting slopes and grades when gardening. Do not clear too much of the existing vegetation as this will create soil erosion during heavy rain
- Compost yard clippings to produce a nutrient-rich soil amendment that will improve soil structure and microbial activity
- Avoid chemical fertilizers and weed and feed products that harm soil organism populations



## Keep Water On-Site

Due to milder and wetter winters, climate scientists predict we will have less snow pack in the mountains in future years. This means less snow melt to rely on during the extended summer drought. River flows will be low and reservoir levels will be impacted. Conserving water during draught and harvesting water when it rains are actions that each of us can take to protect our water supply and wildlife.



### Here's what you can do:

- Set up rain barrels or cisterns so you have a supplemental supply of irrigation water during warmer weather
- Mulch planting beds to keep moisture in the soil and plant roots cool.
- Use drip irrigation to conserve water, irrigate when early or late in the day to avoid evaporation
- Create wildlife gardens with raingardens and water features to give some respite to birds and other wildlife during extended hot and dry periods

Climate change warning signs such as rampant wildfires and severe storms point out the need to take steps now to curb our carbon emissions and adapt our landscapes for the future. Successful urban and suburban landscape designs will make the best use of limited space. They will support beneficial relationships between rainwater flow, retention and harvesting, healthy soils, food production, composting, sunlight, pollinator and wildlife habitat and social gathering spaces where families and friends can enjoy nature at home.

# Native Plant Food Garden

Looking for new landscaping ideas this spring? Plant a native food garden and fill your yard with the edible beauty of the Pacific Northwest! At the same time, you will help protect water quality, add wildlife habitat, decrease your need to water and eliminate the need for herbicides and pesticides. Many of the plants listed below are available at local nurseries specializing in native plants. Here is a short list of species that will tickle your tongue and nourish your body.

To see an expanded table of more edible plants, and to read the disclaimer, go to <http://streamteam.info/localstreams/plants/native/edible>. Thanks to Elise Krohn, Native Foods Educator, who provided much of the information for this article. She may be contacted at [elise@cwis.org](mailto:elise@cwis.org)



CREDIT: US FISH & WILDLIFE

## Evergreen Huckleberry (*Vaccinium ovatum*)

<b>Habitat:</b>	Full sun to full shade. Coniferous forests, edges, clearings.	
<b>Physical Description:</b>	Evergreen shrub. 3-5 ft. tall. Oval shaped leaves with bell shaped flowers that become colorful berries.	
<b>Part Used:</b>	Berries	
<b>Season:</b>	Summer	
<b>Culinary Use:</b>	Eat fresh, or add to pancakes, salads, desserts, or make into jam and jellies.	



CREDIT: WALTER SIEGMUND

## Native Roses (*Rosa* spp.; *R. gymnocarpa*, *R. nutkana*, *R. pisocarpa*)

<b>Habitat:</b>	Full sun to partial shade. Woodlands, moist areas to open and dry areas. (Depends on species.)	
<b>Physical Description:</b>	Deciduous shrub. Up to 8 ft. tall. Flowers have 5 petals growing on branches with thorns. Flowers turn to "hips" that are scarlet in the fall.	
<b>Part Used:</b>	Flower petals	Hips
<b>Season:</b>	Spring	Summer
<b>Culinary Use:</b>	Salads, flavoring desserts, sauces and jellies. Deseed the hips, dry and use for teas.	



CREDIT: WALTER SIEGMUND

## Salal (*Gaultheria shallon*)

<b>Habitat:</b>	Prefers part to full shade and soils with good drainage.	
<b>Physical Description:</b>	Evergreen shrub. Grows in low thickets with waxy oval leaves. Flowers are bell-shaped and white-pinkish. Berries are dark blue.	
<b>Part Used:</b>	Berries	
<b>Season:</b>	Late summer	
<b>Culinary Use:</b>	Eat fresh or dehydrate for fruit leather.	



CREDIT: WALTER SIEGMUND

## Service berry or Saskatoon (*Amelanchier alnifolia*)

<b>Habitat:</b>	Full sun to partial shade. Very drought tolerant. Likes well- drained soil in moist to dry areas.	
<b>Physical Description:</b>	Deciduous tree. 10-12 ft. tall. Spectacular autumn foliage. Flowers are showy with white clusters that hang. Fruit is dark purple when ripe.	
<b>Part Used:</b>	Berries	
<b>Season:</b>	Late spring	
<b>Culinary Use:</b>	Dry into cakes, fruit leather or eat whole.	



CREDIT: WALTER SIEGMUND

## Thimbleberry (*Rubus parviflorus*)

<b>Habitat:</b>	Full sun to partial shade. Does not like saturated soils. Grows in clearings and open areas.	
<b>Physical Description:</b>	Deciduous shrub. 2-10 ft. tall. Fuzzy leaves with 3-7 lobes. White flowers are in clusters. Berries are red.	
<b>Part Used:</b>	Young shoots	Berries
<b>Season:</b>	Spring	Summer
<b>Culinary Use:</b>	Eat raw or sautéed after they have been peeled.	Eat fresh or in salads, dips and desserts.





## Tumwater Valley Golf Course Salmon-Safe Certification

The Tumwater Valley Golf Course is on par to become the fourth golf course in Washington to be awarded the Salmon-Safe Certification. With this award, they will also become the first municipal, city-owned golf course in the country to earn the Certification. The Salmon-Safe Golf Course Certification Program motivates golf courses to use best management practices to ensure the operation and maintenance of their facilities help to improve water quality and aquatic habitats.

Salmon-Safe is one of the nation's leading ecolabels. Founded in 1996, Salmon-Safe has certified a total of 95,000 acres of farm and urban lands across the west coast of the United States and Canada. In addition to golf courses, Salmon-Safe also certifies urban developments, vineyards, farms, corporate and university campuses, infrastructure and parks/natural areas.

In Washington, the Salmon-Safe Golf Course Certification Program is administered by Stewardship Partners, a Seattle based non-profit. The Salmon-Safe Certification program focuses on improving habitat for salmonid species, including all five species of pacific salmon, rainbow trout and steelhead. Protecting the habitat that these species need to survive is essential to the overall health of the Puget Sound ecosystem.

The Salmon-Safe Golf Course Certification process begins with an assessment of how the current operations and design improve aquatic ecosystems. A team of experts, including habitat restoration experts and golf course management specialists, perform an on-site evaluation of the golf course. The evaluations focus on six key habitat-related categories: instream habitat protection and restoration, riparian/wetland/vegetation protection and restoration, stormwater management, water use management, and chemical and nutrient containment.

The field inspection and evaluation for the Tumwater Valley Golf Course took place on April 25th, 2018. The team of experts worked with City of Tumwater staff to complete the site visit. After the evaluation, the Salmon-Safe Certification team of experts recommended that the Tumwater Valley Golf Club become Salmon-Safe certified.

Salmon-Safe Golf Course Certifications are good for five years before needing to be re-assessed and renewed. During this five-year window, the Tumwater Valley Golf Course is required to continue the current best management practices. These practices include using reclaimed water to irrigate golf course greens and continuing to complete habitat restoration projects along the Deschutes River. In addition, the golf course was required to make some changes. These required changes included prioritizing and implementing additional habitat restoration projects, conducting habitat inventories, improving stormwater management in impervious areas, completing an inventory of stormwater infrastructure, developing a water conservation plan, researching alternatives to high-hazard pesticides, and developing and implementing an integrated pest management plan.

The Tumwater Valley Golf Course will join the ranks of many other innovative entities like the Nike World Headquarters Campus, Portland State University, Oregon Convention Center, Washington State Department of Ecology's headquarters campus, Port of Seattle's park system, Vancouver International Airport, and numerous other corporate, municipal, and institutional sites that are working to create healthier watersheds.

For more information about the Salmon-Safe program, visit their website at <https://salmonsafe.org>.





CREDIT: CATHY RALEY



CREDIT: MICHELLE BURTON PHOTOGRAPHER

## CLIMATE CONVERSATIONS .....

### WOLVERINES: SURVIVING IN A CHANGING CLIMATE

- Fri., Mar. 22 • 6:30 – 8 p.m.
- Olympia City Hall, 601 E 4th Ave, Olympia

### Wolverines: Surviving in a Changing Climate

Wolverines are some of the most elusive and misunderstood mammals that are at risk of extinction. They have specialized habitat needs, living where there is persistent spring snow-covered areas throughout the year and avoiding areas with warmer temperatures to prevent thermal stress. The wolverine is not currently federally listed as endangered or threatened under the Endangered Species Act. However, the U.S. Fish and Wildlife Service believes that the wolverine is warranted for listing based on concerns with climate change reducing the availability of essential habitat. With pending warmer climates, it is predicted that the wolverine's habitat will be even more marginalized and that they will need to move northward, making new conservation efforts most crucial for their survival.

Join us and special guest speaker, Cathy Raley, wildlife biologist for the U.S. Forest Service, Pacific Northwest Research Station. Cathy has worked for the US Forest Service's Pacific Northwest Research Station since 1988. She has been involved in various research projects including the ecology and management of pileated woodpeckers in Washington and Oregon, the ecology and conservation of fishers in the Pacific states and, since 2006, has been studying the distribution and ecology of wolverines in the northern Cascade Range in Washington and British Columbia.

## CLIMATE CONVERSATIONS .....

### ARE MIGRATORY BIRDS "KEEPING UP" WITH EARLIER SPRINGS?

- Fri., April 5 • 6:30 – 8 p.m.
- Olympia City Hall, 601 E 4th Ave, Olympia

### Are Migratory Birds "Keeping Up" With Earlier Springs?

Have you ever wondered how birds know when to migrate from their winter grounds to make their way north in time for spring? What happens if they arrive out of sync with "our" spring?

In this climatically changing world, the timing for migratory animals such as birds presents many challenges. Timing is integral to survival for migratory bird species. If birds leave too early, they may be caught in late winter storms, or if they leave too late, they may miss the early spring peak of insects, which they are dependent on to successfully raise their young.

As we experience a shift in spring and it begins earlier each year, the timing between migratory birds, plants and insects may have serious implications to the world as we know it. Join us and special guest speaker, John Withey, Ph. D, faculty of the Evergreen State College. John is a terrestrial ecologist who studies the responses of native wildlife to urbanization and climate change. He regularly works across disciplines in order to provide strategies for mitigation of and adaptation to environmental changes. His most recent work includes estimating the potential for phenological mismatch, namely differences in timing between the springtime arrival of migratory birds and the peak abundance of their insect prey.

**Phenological** is the study of cyclic and seasonal natural phenomena, especially in relation to climate and plant and animal life.



## *Thank You* Steve Parks for Your Dedicated Years of Service!

After seeing an announcement on the Stream Team website asking for volunteers to remove Himalayan blackberries at the City of Tumwater's Percival Creek property, Steve signed up to volunteer. Upon arriving at the site, Steve was surprised to find the property was almost entirely covered in blackberries. That first, small work group was only able to remove a small portion of the blackberries from one part of the site. From that day on, Steve decided he wanted to do more and he began going back to the site on his own time to finish the job. In 2007, Steve formally took charge of the site and became a Site Steward for this Tumwater property.

Since 2007, Steve has transformed the site. He has worked diligently to remove invasive species, primarily Scotch broom, Himalayan blackberry and tansy ragwort. In addition, he has restored the site, establishing a thriving community of native trees and shrubs and restoring the landscape to a more naturally functioning riparian area. Steve also supervised two Eagle Scout projects and assisted with the annual Tumwater Middle School Field Day at the site. Now after 11 years of incredible service, Steve is retiring from his Site Steward position.

Thank you Steve, for all your amazing hard work and dedication!



### **PRAIRIE APPRECIATION DAY TOUR—VANPOOL**

- Sat., May 11 • 10 a.m. – 1 p.m.
- Glacial Heritage Prairie,  
Mima Rd, Littlerock
- Vanpool leaving from  
Olympia location TBA



### **Prairie Appreciation Day Tour—Vanpool**

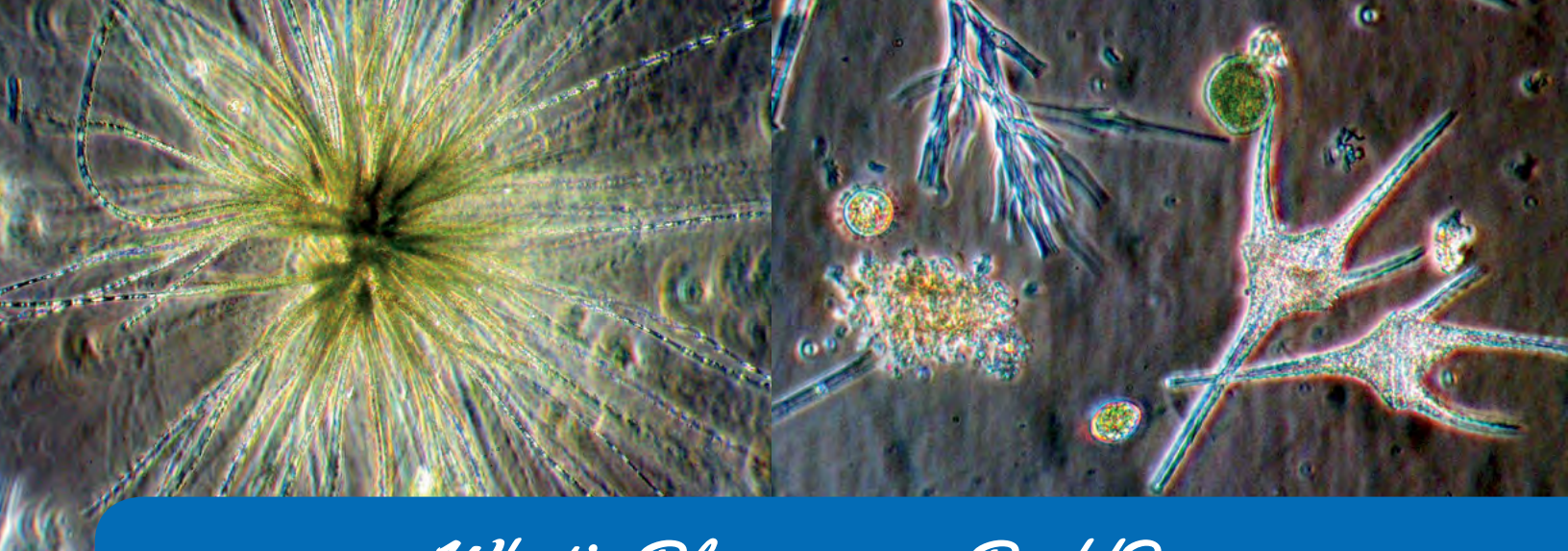
Prairies are one of our rarest ecosystems, and in the Puget Sound region, they were created when the glaciers retreated 15,000 years ago. When the glaciers retreated, they left a deep deposit of gravelly soils behind. These soils dry out quickly during summer, making this ecosystem a harsh place to live, even in our mild maritime summers.

Prairie ecosystems include temperate grasslands and savannas. They have a moderate temperate climate with moderate rainfall. The dominant vegetation consists of grasses, forbs and shrubs, rather than trees. Unique wildflowers and slow growing oaks, which are adapted to the harsh summer temperatures and drought, preside over the prairie landscape. Butterflies found in no other habitat feed upon the prairie wildflowers.

Over thousands of years, Native Americans managed prairies by using fire to keep encroaching forests from dominating the landscape so that they could harvest the bulbs of camas. Today, many of our prairies are restored through similar active management, including the use of fire and by planting native vegetation.

Join us in our vanpool to visit the prairies at Glacial Heritage for Prairie Appreciation Day! At this yearly event, you can learn all about these fragile ecosystems. Bring your lunch and enjoy a relaxing walk to see a blanket of spring colors. Walk between educational stations to learn about this fragile ecosystem and the decades of volunteer efforts to restore local prairies. Biologists will talk about management efforts to remove invasive vegetation and the reestablishment of native plants to support endemic species such as the endangered Taylor's checkerspot butterflies. If we are fortunate, we will see blue birds and hear the lilting voice of the meadowlark when we visit!





## *What's Blooming in Budd?*

*By Aimee Christie Pacific Shellfish Institute*

The plankton season has arrived! As the longer daylight hours push crocus and daffodils out of the ground, they also lead to brilliant blooms of microscopic plants throughout Puget Sound. Bathed in both nutrients and glimpses of sunshine, Budd Inlet teems with an array of diatoms, dinoflagellates, and zooplankton—an otherworldly assemblage that will entertain those with microscopes for hours.

Since 2013, Stream Team has partnered with Pacific Shellfish Institute to share this magical experience with the community. During the summer, citizen scientists are invited to pull nets out of the water to view plankton species and record how the community assemblages shift throughout the season and from year to year. Oceanographic conditions are also recorded such as temperature, salinity, water clarity, dissolved oxygen and pH. These physical properties offer us clues as to the timing and concentration of these species or impact on the environment.



At LOTT's WET Science Center, participants comb through single drops of water to quantify (count) the number of harmful algal bloom species (HABs) observed including *Dinophysis*, *Pseudo-nitzschia* and *Alexandrium*. Data is submitted to SoundToxins—a monitoring program managed by NOAA, WA SeaGrant and WA Department of Health to provide early warning of HAB events in an effort to minimize human health risks and losses to Puget Sound fisheries.

This past summer (2018), monthly sampling at Long Lake was folded into the “What’s Blooming?” program. While Long Lake is a freshwater system, it reacts to nutrients similarly to Budd Inlet’s marine waters. Phytoplankton can bloom under nutrient rich conditions ultimately leading to low oxygen levels at depth during bacterial decomposition. The increase of HAB species can result in swimming and fishing restrictions or closed shellfish harvesting areas. In mid-August, lake managers closed Long Lake to swimming due to a thick bloom of cyanobacteria, or blue green algae, which dropped visibility to only a few feet.

Now entering its 7th year, data collected under the “What’s Blooming in Budd?” program is beginning to show changes and patterns over time. For example, a 2°C increase in surface temperature was clearly observed in 2015 during the intrusion of the extensive warm water mass nicknamed “the blob.” Patterns in the local plankton community are also taking shape. While the bioluminescent dinoflagellate, *Noctiluca*, persists throughout the entire summer, it appears to dominate in late June—making





this the perfect time for a late night kayak paddle. *Ceratium fusus* tends to take stage in July followed by *Akashiwo sanguinea* in late August—the overlap of the two species turning the water orange, or bloody red as the root word “sanguinea” suggests. This is also a time when lower Budd’s visibility can drop to less than 1 meter during incoming tides.

According to our data, the HAB species, *Dinophysis*, routinely calls lower Budd its home—mysteriously thriving even during the cold and dark winter months. Together with Sequim and Discovery Bay, Budd Inlet experiences relatively frequent shellfish harvest closures in response to this species. By entering cell count data (cells/L) into the SoundToxins database, this information allows resource managers to better understand the relationship between the number of cells in the water and the biotoxin concentration found in tested

mussel tissue. Coupled with oceanographic data like temperature and salinity, the data may also contribute to improving HAB forecasting.

Phytoplankton, while microscopic in size, are the heartbeat of the Puget Sound, making all life possible as they release oxygen and serve as the base of the marine food web. When we listen, plankton tell us a story, giving us clues about oxygen dead zones, ocean pH, food availability or scarcity and biotoxicity to name a few. Long term monitoring is key to understanding these issues and recognizing trends and changes over time—not to mention, it’s fun!

So come join us this summer to discover What’s Blooming in Budd and Living in Long Lake. Every week is different; every drop of water is a surprise. Until then, you may view prior data and Final Reports on PSI’s webpage at: [www.pacshell.org/whats-blooming-in-budd.asp](http://www.pacshell.org/whats-blooming-in-budd.asp).

## Learn more about local algae monitoring programs:

SoundToxins: <https://soundtoxins.org/sites.html>

Thurston County Blue-Green Algae: [https://www.co.thurston.wa.us/health/ehadm/swimming/blue\\_green\\_algae.html](https://www.co.thurston.wa.us/health/ehadm/swimming/blue_green_algae.html)

WA State Toxic Algae—Freshwater Algae Monitoring Program: <https://www.nwtoxicalgae.org/Default.aspx>



## Featured Creature

### Water Bears or Moss Piglet (Tardigrada)



## Water Bears or Moss Piglet (Tardigrada)

**Tardigrades are the most resilient form of life on earth.**

In 1773, Johann August Ephraim Goeze, a German pastor, discovered these minute animals naming them tardigrada, meaning "slow stepper." Water bears or tardigrades are a water dwelling, eight legged, segmented micro animal. There are 1150 known species and they are likely related to arthropods, which include insects, spiders and crustaceans.

These animals are tiny, measuring 1mm (0.04 inch) or less and best seen under a microscope. They have four pairs of legs ending with claws, a thick cylindrical body shape and use their legs for locomotion. Their round head includes a mouth with tiny knives used to pierce food. They feed on the fluid of plants cells, such as moss and on animal cells and bacteria. They are preyed upon by nematodes (worms), amoebas and other tardigrades. Water bears reproduce sexually and asexually. During sexual reproduction, females lay one to 30 eggs at a time and the males then fertilize them. In asexual reproduction, the female will lay the eggs, which develop without fertilization. Their body color is often bright depending on the species, such as bright red, orange, blue and green, resembling colorful gummy bear candy.

Tardigrades can live up to sixty years and are found in every habitat all over the world! They are considered aquatic, as they need water to live. They need water to surround their bodies to perform gas exchange as they do not have a respiratory system. Tardigrades can be found from the

highest mountaintops to the deep sea and from the Antarctic to tropical rain forests. They are found in moss and lichens, in fresh and salt water, on flowering plants, and in sand.

Tardigrades are the most resilient form of life on earth. Resilient barely covers how hardy these creatures are. Experiments have been done where tardigrades have survived many decades without food or water, going dormant and returning to life once again when exposed to water. In one extreme case, live tardigrades regenerated from dried moss after being in a museum for over 100 years!

Tardigrades have been found 6000 meters (19,685 feet) in the Himalayas and can survive being frozen for years. They have endured temperatures of absolute zero, or negative 272° Celsius (-457.6° F) and exposure of 150° C (302° F). They have survived extreme radiation exposure, the frozen vacuum of outer space and the pressures of the deepest seas. The longer tardigrades are exposed to extreme environmental conditions the higher their chance of not surviving.

### How are they able to survive?

Through a process known as cryptobiosis, they are able to adapt to environmental stress. Cryptobiosis is a state in which metabolic activities come to a reversible standstill.

Astrophysicists at Harvard University have calculated that there are only 19 asteroids in our solar system massive

enough to eradicate tardigrades and that stellar collisions are so rare that they have calculated that there is only a 1 in 3 billion chance of one exterminating them. These tiny creatures are predicted to be around for at least 10 billion years longer than humans, surviving until the sun no longer shines!

So, what do they do? Unfortunately, not much is known about tardigrades other than they may be the last living organism surviving on earth.

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**Cryptobiosis** is a metabolic state of life an organism can achieve in response to adverse environmental conditions such as desiccation, freezing and oxygen deficiency. In the cryptobiotic state, all measurable metabolic processes stop, preventing reproduction, development and repair. When environmental conditions return to being hospitable, the organism will return to its prior metabolic state of life.

# Spring Cleaning Tips

Helpful tips to keep your spring cleaning from polluting our local waterways!

## Sweep driveways and sidewalks to remove debris

Sweep driveways and sidewalks to remove debris instead of pressure washing or using a hose. Dispose of dirt and debris in a garbage.



## Test your paint to find out if it contains lead or heavy metals

If your home was built before 1978, test your paint first to find out if it contains lead or heavy metals. Cover the ground with tarps before pressure washing to capture paint flakes and direct dirty wash water into a grassy or graveled area to keep contaminants from washing into storm drains.



## Properly dispose of dirty carpet cleaning water

When cleaning your carpet, make sure to dispose of the dirty wash water properly. If on a sewer system, filter out the debris and flush dirty wash water. If on a septic, filter and spread dirty water over a landscaped area. Place filtered debris into the trash. If contracting a service, ask the company about their wash water disposal policy.



## Properly dispose of hazardous supplies

Any old paint, thinners, motor oils, chemicals or cleaning supplies should be properly disposed of for FREE at Thurston County's HazoHouse! For more information call (360) 867-2912.

### Is This Product Hazardous?

Look for these key words on the label:

**POISON**  **DANGER**  
**WARNING**  **CAUTION**

Safely Dispose of Household  
Hazardous Waste at

### HazoHouse

2418 Hogum Bay Rd. NE, Lacey

Open: Fri. – Tues., 8 a.m. to 5 p.m.  
FREE to residential customers.

For more information, contact  
Thurston County HazoHouse at 360-786-5494 or go to  
[www.co.thurston.wa.us/solidwaste/hazardous/haz-hazohouse.htm](http://www.co.thurston.wa.us/solidwaste/hazardous/haz-hazohouse.htm)



## Report spills! If you see something, report it.

If you see someone dumping anything into a storm drain or find a small-scale spill, call the City's 24-hour hotline. Feel free to remain anonymous.

**Olympia: (360) 753-8333 Lacey: (360) 491-5644 Tumwater: (360) 754-4150 Thurston County: (360) 867-2099**

If you find a large scale spill, call the Washington Department of Ecology at (360) 407-6300.

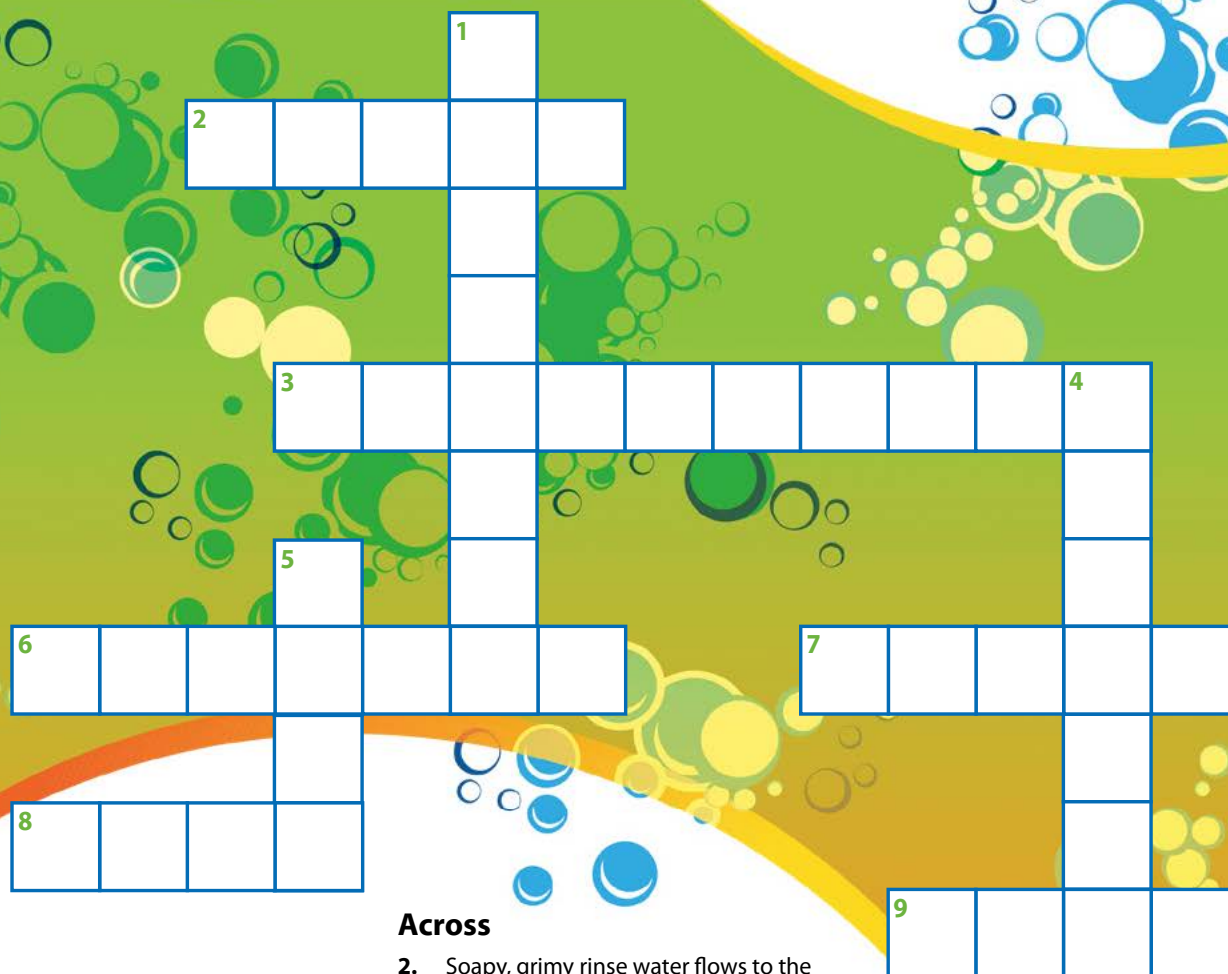
**For life-threatening spill emergencies, call 911.**



# Kids' CORNER

## Clean Clean CARS STREAMS

We know how much kids love washing cars, whether it is to help around the house or raise money for a charitable organization. But, did you know washing a car can contribute to water pollution? When you wash a car, heavy metals, oil, grease, road salts and other chemical contaminants can get washed down storm drains and end up in our streams, lakes and Puget Sound.



### Down

1. Contaminants can harm fish and \_\_\_\_\_.
4. Instead, it empties into \_\_\_\_\_, lakes, and Puget Sound.
5. Only \_\_\_\_\_ down the drain!

### Across

2. Soapy, grimy rinse water flows to the nearest storm \_\_\_\_\_.
3. Dirty car wash water contains toxic \_\_\_\_\_.
6. Water from storm drains does not get \_\_\_\_\_ at a wastewater treatment plant.
7. Let's all do our best to protect \_\_\_\_\_ quality!
8. If you wash your car at home, wash it on the \_\_\_\_\_.
9. You can take your car to a commercial car \_\_\_\_\_.

Answers: 1. wildlife 2. drain 3. rain 4. streams 5. pollutants 6. cleaned 7. water 8. lawn 9. wash





# Stream Team *Events*

For additional events, event details or to register, please visit our website and click on "Calendar" or "Register": [streamteam.info](http://streamteam.info)



For maps and directions to any of these events, go to: [streamteam.info/getinvolved/directions/](http://streamteam.info/getinvolved/directions/)

## MARCH

### Amphibian Egg Mass Survey

Sat., Mar. 2, 9, 30 • 9 a.m. – Noon

Wed., Mar. 6 • 2 – 4 p.m. AND

Wed., Mar. 13 • 9 a.m. – Noon

Missed the training? On-site field training provided. For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) Register online.

### Forage Fish Surveys

Tues., Mar. 5 • 9 a.m. – 3 p.m.

Priest Point Park, Flora Vista parking entrance

Survey various local beaches for surf smelt and sand lance eggs. Lab analysis of samples to follow. Surveys are tide dependent so survey dates are variable. Trained and untrained volunteers welcome!

For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) Register online.

### Climate Conversations:

**WOLVERINES: SURVIVAL IN A CHANGING CLIMATE**

Fri., Mar. 22 • 6:30 – 8 p.m.

Olympia City Hall, 601 E 4th Ave, Olympia

Learn about how changes in local temperatures will affect native wildlife species.

For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) See page 8 for details. Register online.

### Olympia Arbor Day Celebration

Sat., Mar. 23 • 1 a.m. – 2 p.m.

Percival Landing, 217 Thurston Ave NW, Olympia

Celebrate trees and all they contribute to our community! Take home a FREE native tree or shrub! Olympia's Arbor Day event will include festivities, workshops on pruning and other tree-related topics and activities for the whole family. Visit <http://olympiawa.gov/arborday> for a complete schedule. No registration required.



Check online at [www.streamteam.info/getinvolved/calendar/](http://www.streamteam.info/getinvolved/calendar/) for up-to-date events, including additional tree planting events.

## APRIL

### Forage Fish Surveys

Thurs., Apr. 4 • 9 a.m. – 3 p.m.

TESC, Sunset Beach Drive

Survey various local beaches for surf smelt and sand lance eggs. Lab analysis of samples to follow. Surveys are tide dependent so survey dates are variable. Trained and untrained volunteers welcome!

For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) Register online.

### Climate Conversations:

**ARE MIGRATORY BIRDS "KEEPING UP" WITH EARLIER SPRINGS?**

Fri., April 5 • 6:30 – 8 p.m.

Olympia City Hall, 601 E 4th Ave, Olympia

Learn about how changes in local temperatures will affect native wildlife species.

For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) See page 8 for details. Register online.

### Purple Martin Monitoring Training

Thurs., April 11 • 5 – 6:30 p.m.

Olympia City Hall, 601 E 4th Ave, Olympia

Stream Team is looking for volunteers interested in monitoring the nest boxes at East Bay in downtown Olympia from April to September.

For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) See page 2 for details. Register online.

### Plankton Monitoring at City of Lacey's Annual Family Fish-In!

Sat., April 13 • 8 a.m. – 1 p.m.

Woodland Creek Community Park, 6729 Pacific Ave SE, Lacey

Join us and Pacific Shellfish Institute for a fun day of plankton sampling! Sample water quality, perform a plankton net tow, view plankton under microscopes and test your identification skills using field guides. Learn how animal waste and fertilizers impact water quality and what you can do to keep streams clean and fish healthy. All ages welcome! To fish, register with the Lacey Parks Department beginning March 6th. Spaces fill up fast! \$5 per youth participant (includes rod and reel).

Call (360) 491-0857 for more information.

### Lacey Arbor Day Event

Sat., Apr. 13 • 10 a.m. – 1 p.m.

Huntamer Park, 618 Woodland Sq. Lp. SE

During Lacey's annual seedling giveaway, various tree species will be available for free! The seedlings, up to three feet in height, are limited to one per person, so bring the entire family!

## MAY

### Juvenile Chinook Release Party at Tumwater Falls

**\*\*\* CANCELLED \*\*\***

Unfortunately due to the catastrophic Chinook fry loss at Minter Creek Hatchery power outage, there will be no fry release party.

**SAVE THE DATE! Sat., June 8 • 10 a.m.**

Please join us and Pacific Shellfish Institute for family friendly activities, June 8, 10 a.m. – 2 p.m. at Tumwater Falls Park to celebrate World's Ocean Day!

### Forage Fish Surveys

Tues. May 7 • 9 a.m. – 3 p.m.

Priest Point Park, Flora Vista parking entrance

Survey various local beaches for surf smelt and sand lance eggs. Lab analysis of samples to follow. Surveys are tide dependent so survey dates are variable. Trained and untrained volunteers welcome!

For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) Register online.

### Prairie Appreciation Day Tour—Vanpool

Sat., May 11 • 10 a.m. – 1 p.m.

Glacial Heritage Prairie, Mima Rd, Littlerock, Vanpool leaving from Olympia location TBA

Join us in our vanpool to visit the prairies at Glacial Heritage for Prairie Appreciation Day! Bring your lunch and enjoy a relaxing walk to see a blanket of spring colors. Walk between educational stations to learn about this fragile ecosystem and the decades of volunteer efforts to restore local prairies.

For more info., contact Michelle at [mstevie@ci.olympia.wa.us](mailto:mstevie@ci.olympia.wa.us) See page 9 for details. Register online.





# Stream Team

EDUCATE • PROTECT • RESTORE  
Olympia • Lacey • Tumwater

2000 Lakeridge Dr SW  
Bldg 4 #100  
Olympia, WA 98502  
streamteam.info

## Clean Cars Clean Streams

Spring is here and so is car washing season! There are many options when it comes to cleaning your car, and your choices have huge impacts on the pollution in our local water bodies.

When you wash your car in a driveway or on the street, all the soapy, oily rinse water flows to the nearest storm drain. Generally, the water from storm drains is piped directly to the nearest body of water. The problem with this is that it's more than just dirt that washes off your car. This runoff contains oil, gas, and pollutants such as antifreeze and heavy metals including zinc and copper. These pollutants affect water quality in surface and ground water and can harm aquatic life.

Luckily, there are ways to keep both your car and streams clean. The best option is to take your car to a commercial car wash. The rinse water at car wash businesses is piped to a wastewater treatment facility where pollutants are removed before they can harm fish and wildlife. Commercial car washes also use much less water than a simple home wash.

If you do choose to wash your car at home, the best place to do it is on your lawn. This allows the grass and soil to soak up the water, filtering out some of the pollutants before they reach our waterways. Be careful not to drive your car on top of your septic drain field or green riser lids in your yard.

Many charity groups choose to do car washes to raise much-needed funds for their programs. However, these events are often held at locations where the water runs off and ends up in our water bodies. There are options for raising money from a charity car wash without polluting our streams. The best option is to sell car wash tickets. You can get tickets from Puget Sound Car Wash Association at [www.charitycarwash.org](http://www.charitycarwash.org).

# IT'S NOT JUST DIRT!



**KEEP POLLUTANTS  
OUT OF PUGET SOUND**

**Clean ↓ Clean  
CARS STREAMS**

**CAR WASH**



A commercial car wash is the best way to clean your vehicle without polluting our local surface and ground water.