River Programs & Volunteering

River Guardians Adopt New Rivermiles

Since our series of River Guardian trainings last spring and summer, several new volunteers have begun to monitor their rivermiles. Here are examples of a few new River Guardians and some of the issues they've encountered.

Chris and Marcie Durham
Rivermiles 83-84; Walking Wallace Marine Park, Salem
Top issue – public use and trash

Bill Egan
Rivermiles 4-16
Boating downtown and Portland Harbor, while fishing
Top issue – polluted outflows and industrial activity

Cherry Peterson
Rivermile 85
Kayaking backchannel around Minto-Brown Park, Salem
Top issue – seasonal changes of water level and water quality in the backchannel

Peggy Robinson
Rivermiles 187-188
Walks and lives near the confluence of the Mid and Coast forks
Top issues – gravel operations and dynamic seasonal changes

Thanks to all of you that have joined as River Guardian volunteers.
We look forward to highlighting your work in future newsletters.

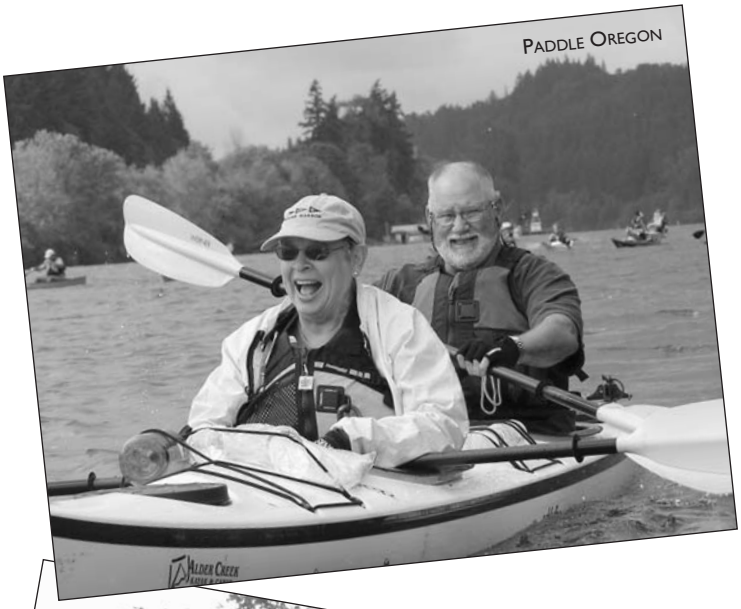
Volunteers Needed

If interested please contact Amy Morrison, River Protection Coordinator, at 503-223-6418 or amy@willamette-riverkeeper.og

River Discovery Program

Willamette Riverkeeper's River Discovery Program has come to mean different things to many different people. This year's Paddle Oregon, Portland Paddle, Youth River Discovery and River Discovery trips succeeded in getting over 800 individuals on the river. Whether spending five days on the river for Paddle Oregon or sharing the experience for the first time with your classmates, our River Discovery Program can provide a way to help you enjoy and learn about the wonders of the Willamette River.

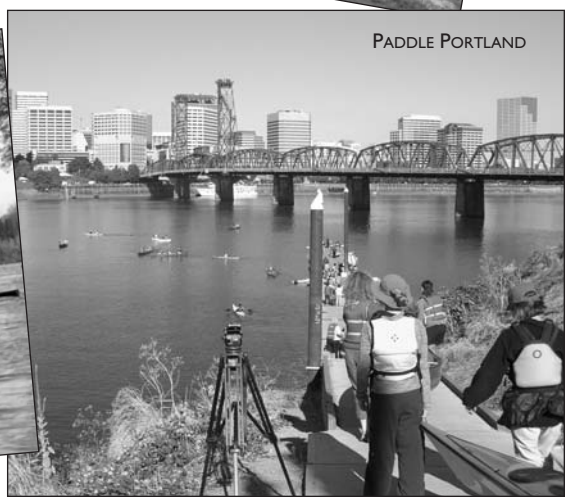
If you were unable to make a trip this year, we hope you can join us when the paddling season starts up again next spring. Photographs are the best ways to share with you the scope of our River Discovery Program. Here are some of our favorite shots.


Paddle Oregon


Youth River Discovery


Paddle Oregon

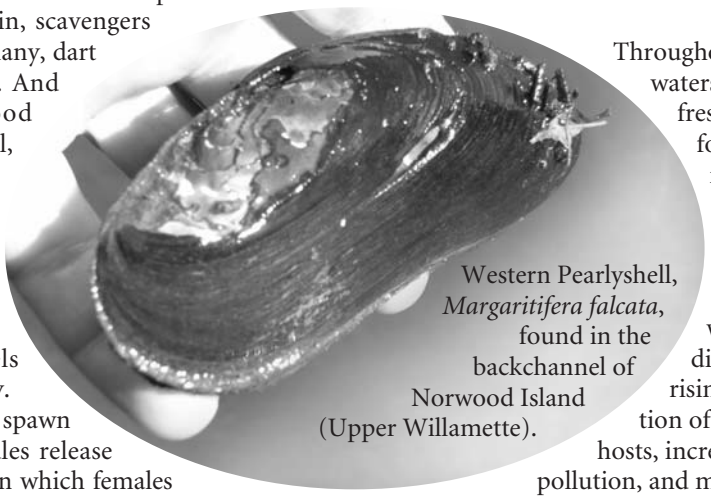

River Discovery


Paddle Portland

River Programs

Freshwater Mussels: food source, purifier, and sentinel

As one travels the Willamette River, a great variety of wildlife greets the eye. Osprey soar overhead sounding high-pitch cries, deer patrol the water's edge seeking a point of crossing, salmon frantically battle their way upstream fighting the current beneath the calm surface. We tend to focus on large animals with exciting behaviors. However, there are many under-appreciated key players surrounding us. Insect larvae cling to riffle rocks, breaking down organic matter and providing crucial fish food. Sculpin, scavengers of the bottom and prey of many, dart in and out of the shadows. And the freshwater mussel: food source, purifier, and sentinel, filters the Willamette's water with a life span often longer than ours.



Western Pearlyshell, *Margaritifera falcata*, found in the backchannel of Norwood Island (Upper Willamette).

In addition to playing an important role in river ecology, freshwater mussels have a fascinating life history. On the Willamette, mussels spawn from May through fall. Males release sperm into the water column which females will "inhale" through their intake valve. An embryo called a "glochidia" is released into the water where it will hopefully happen upon a host fish and attach to gills or fins. Once attached, glochidia create a tiny cyst for themselves and parasitize their host. Most mussel species have a specific subset of host fish species. If the right fish species is unavailable, certain mussels will be unable to reproduce. For instance, declines in salmon populations may have lessened the reproductive capability of the Western Pearlyshell, *Margaritifera falcata*.

When a glochidia is ready, it will detach and settle below river sediment to grow for several years. Mussels spend the majority of their life with both valves just above the surface of the sediment, difficult to detect. *M. falcata* might live for over 100 years and move less than a few yards. Mussels do all their traveling while parasitizing a host fish. Consider the distance that can be covered on an anadromous fish!

Freshwater mussels fill the role of food source, water purifier, and water quality indicator. Heron, sturgeon, fish, muskrat, otter, and more feed on young and old mussels. Although Native Americans consumed freshwater mussels, they are considered bitter, and, due to their ability to accumulate toxins, not recommended today. Mussels are filter feeders and therefore constantly clean the water that passes through their bodies. A large population of mussels could be a great step towards cleaner water. A mussel's long life, bio-accumulation abilities, and relatively easy sampling make it a great model species for water quality studies. Freshwater bivalves were used in toxin studies in our very own Portland Harbor.

Throughout the Willamette watershed, 3 or 4 species of freshwater mussels can be found. The ubiquitous mussel shells found from the headwaters to the lower Willamette belong to *M. falcata*. Although we see their shells everywhere, live organisms are difficult to locate. Due to rising temperature, introduction of asian clams, decreased hosts, increased siltation and pollution, and myriad other human impacts, the range of *M. falcata* has been drastically reduced. They are more readily found in colder, higher elevation tributaries and sections of the upper Willamette (the backchannel of Norwood Island is a great spot for mussel watching!).

Several floater (*Anodonta*) species can be found in the lower Willamette River. These short-lived, pollution tolerant species are evident at times of drought, slowly scooting towards deeper water. In the Portland area they can be found at Smith and Bybee lakes and even Westmoreland Park!

Although we have found freshwater mussels here and there along the Willamette, no one has a true understanding of their distribution and numbers. Acknowledging the need for more information on this mysterious and beneficial creature, Willamette Riverkeeper plans to perform statistically-based mussel surveys in the coming years. If you know of mussel hotspots or have other related information, please contact Art Bass at arthur@willamette-riverkeeper.org.

For more mussel information and a great field guide visit **www.fws.gov/columbiariver/musselwg.htm.**

River Care and Repair

Mercury continued from page 1.

Additionally, the majority of the fish caught by WRK were in the 400-800 gram range. Mercury contamination is more evident in larger (i.e., higher up the food chain) fish. Although angling may be more time consuming than electro fishing (the DEQ's preferred method), it is possible to specifically target larger fish (especially when you've got some expert fishermen!). The Willamette Falls area in Oregon City was selected as a sample site since little information on mercury levels in fish tissue exists for this area.

In order to document national mercury levels as well as the effect of coal-burning power plants, the Waterkeeper Alliance provided resources for over 40 waterkeeper groups to test mercury in fish tissue. Seven waterkeeper groups provided five or more Smallmouth Bass. In terms of average "normalized" mercury concentration (standardized to eliminate the effect of fish size); fish from the Willamette River were the second highest (Figure 1) of these seven. When compared to 27 other watersheds for normalized mercury concentration (only sample sizes five and greater considered), the Willamette River ranked sixth highest. Although these results from the Waterkeeper Alliance don't reflect mercury levels in the entire country, it is nonetheless disturbing that fish from the Willamette contain such a high concentration of mercury when compared to watersheds from 14 other states.

The results of this study demonstrate that fish tissue mercury concentrations from the Willamette are at an unsafe level. This supports the Oregon Health Department's Fish Consumption Advisory on consuming Smallmouth Bass and other resident fish, especially for young children and women of child-bearing age.

How can we lower mercury levels in the Willamette?

1) Lower river temperatures through aggressive restoration. Higher temperatures increase the rate at which mercury is methylated. Methyl mercury is the form of mercury that binds to animal tissue.
2) Decrease vehicle and industrial air emissions. The vast majority of unnatural mercury entering the Willamette is from the runoff of surface deposited air emissions.
3) Eliminate municipal and industrial discharges to the Willamette. These discharges are the second greatest anthropogenic source of mercury in the Willamette.

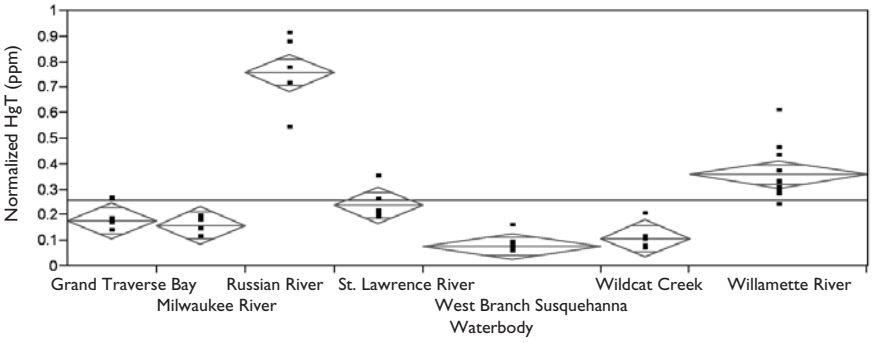


Figure 1: Normalized mercury concentration for Smallmouth Bass from seven Waterkeeper groups (MI, WI, CA, NY, OA, IN, OR respectively). All diamonds represent five or more fish.

Table 1: Statistics for Smallmouth Bass caught on July 21st at Willamette Falls. **Bolded** mercury concentrations indicate a violation of the EPA standard, .3 ppm.

Caught upstream or downstream of falls	Length (mm)	Weight (grams)	Mercury Concentration Parts per million
downstream	327	482	**0.313**
downstream	292	283	0.248
downstream	356	567	**0.63**
upstream	324	408	**0.312**
downstream	333	482	**0.401**
downstream	277	283	0.161
upstream	279	318	0.209
upstream	394	822	**0.384**
upstream	325	539	0.286
upstream	391	822	**0.588**
Averages:	330	500	**.353**