



Clean Water Services presents

The Stream Care Guide

a primer for streamside property owners

Learn how to enhance your
property and protect your stream.



Wherever there's water,
there's Clean Water.

CleanWater  Services



Congratulations!

You are privileged to live near a stream and to enjoy the scenery, sounds, smells and feel of nature. No wonder streamside owners are passionate about the health of our local streams and the Tualatin River, as surveys have shown. You might already know that water quality has improved in the Tualatin Basin, even as new challenges arise.

All watershed residents should care for our precious water resources, but people who have streams on their property have a greater responsibility than others. Clean Water Services is a water resources utility dedicated to protecting the health of the Tualatin River Watershed. We created this guide especially to help streamside property owners make stream-friendly choices for home and yard care. By taking a few simple steps, you can protect both the ecological and economic values of your streamside property.



Please visit our website at

www.cleanwaterservices.org

Clean Water Services
2550 SW Hillsboro Highway
Hillsboro, OR 97123
(503) 681-3600

A Watershed



Illustration courtesy of : County of San Mateo, CA

Get to know your watershed

The Tualatin River is Washington County's only river, an invaluable resource for drinking water, agriculture, recreation, and wildlife habitat. Like most rivers, the Tualatin and its tributaries suffered until we stopped using them as sewers. Since 1970, our community has invested hundreds of millions of dollars to protect and improve water quality in the Tualatin River Watershed.

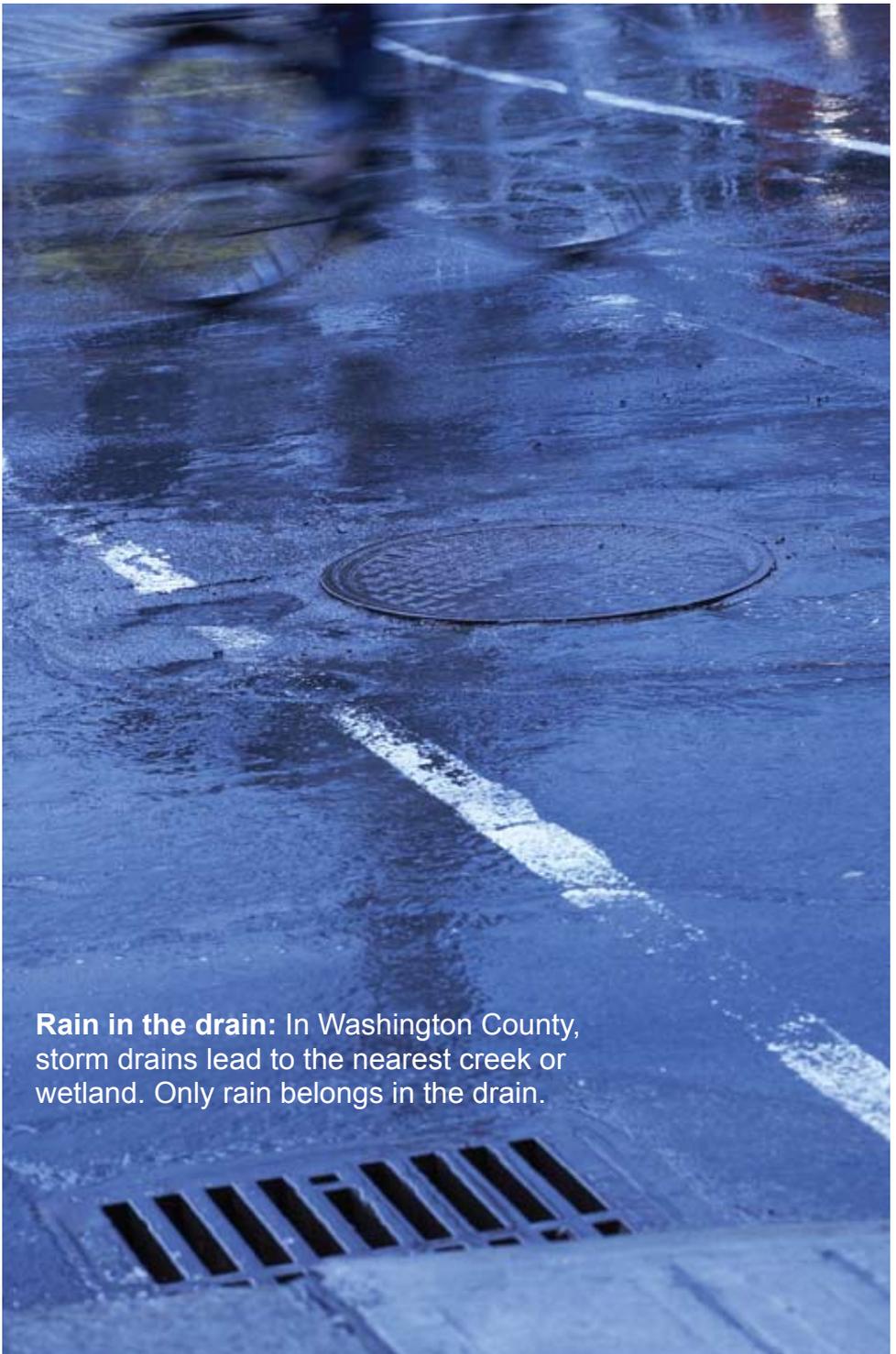
Clean Water Services is a water resources management utility for urban Washington County. We operate world-class wastewater treatment facilities that meet the nation's highest water quality standards. And, we manage surface water and stormwater runoff in conjunction with our member cities and Washington County, protecting local streams and wetlands. As a leader in water supply planning, we also help ensure water needs are met.

Thanks to these efforts, the Tualatin River is healthier today than it has been in generations.



Did you know?

- The Tualatin River meanders 80 miles along a flat river valley.
- In one 24-mile stretch the river drops only 12 inches.
- A watershed is the area of land that catches rain and snowmelt and drains it into a given body of water.
- Tualatin River Watershed is 712 square miles.
- Major tributaries: Gales Creek, Dairy Creek, Rock Creek, Fanno Creek.
- Much of the Tualatin River's summer flow is cleaned effluent from Clean Water Services' wastewater treatment facilities and releases from Hagg Lake and Barney Reservoir.
- The Tualatin River's only source of water is rainfall because the surrounding hills are too low to accumulate a snow pack.



Rain in the drain: In Washington County, storm drains lead to the nearest creek or wetland. Only rain belongs in the drain.

Get wise about water pollution

These days, the major threat to water quality is pollution from people's day to day activities — road dirt, soap, fertilizer, pet waste, pesticides, erosion, etc. Simple changes in home, yard and auto care really count.

When it rains, stormwater runoff from buildings, pavement and other impervious surfaces carries pollutants to the nearest wetland, pond, stream or other waterway. Think of stormwater flowing over streets, roofs, lawns and parking lots, and then imagine the oil, sediment, bacteria, grease and chemicals it carries.

Newer developments are required to provide treatment to remove pollutants from stormwater, usually by filtration through a swale. Neighborhoods and businesses built before these regulations took effect in 1992 have little or no stormwater treatment.

Although runoff from the built environment is unavoidable, we can all work together to reduce the amount of pollution that is washed into our streams. Many pollutants come from everyday activities that you may do on a regular basis.

Get down on common sources of water pollution



Pollutant: Sediment, soil, silt, sand and clay

Source: Bare soil, erosion, construction sites, poor or no stream buffer, bare stream banks.

Effects: Cloudy water, degrades habitat for fish and aquatic plants, smothers fish eggs and macro-invertebrates.



Pollutant: Nutrients, phosphorus, nitrogen, organics, etc.

Source: Overused or spilled fertilizers, pet waste and farm manure, grass clippings and leaves decomposing on streets and sidewalks.

Effects: Promotes algae growth that crowds out other aquatic life, reduces oxygen level, harms aquatic plants and animals.



Pollutant: Toxic chemicals, anti-freeze, motor oil, pesticides, zinc, heavy metals, etc.

Source: Leaky vehicles, tire and break pad wear, roof treatments, power washing, improper use or disposal of chemicals and pesticides.

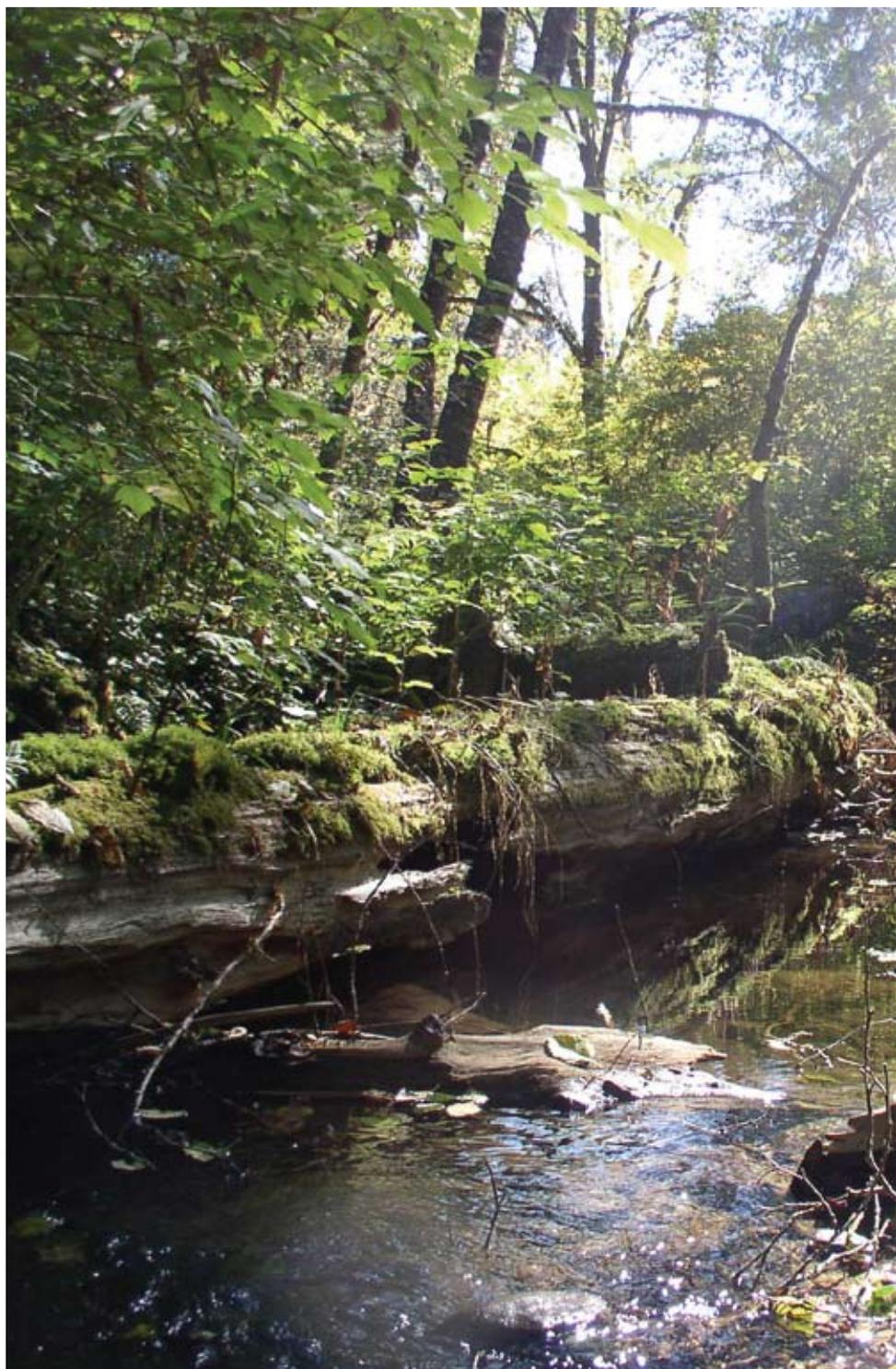
Effects: Threatens or kills fish and other aquatic life, harms people who eat contaminated fish and shellfish.



Pollutant: Bacteria and parasites, E Coli, giardia, etc.

Source: Pet feces, waterfowl, wildlife, livestock, failed septic systems, garbage.

Effects: Contaminated waters are unsafe for drinking, wading and swimming.



Get stream friendly

Simple changes in your home, yard and auto care habits can reduce water pollution. Try these tips to a stream-friendly lifestyle.



Get less toxic

For starters, try to reduce the amount of hazardous materials in and around your home. Buy only the chemicals you can use or share with a neighbor. Try alternatives to toxic household products. Read product labels before you buy, and then choose the least hazardous. Heed label warnings. Store toxic products safely away from contact with water. Dispose of leftovers and the container according to package instructions.

Clear out old paint, pool chemicals, pesticide, household cleaners and other toxic materials that are unsafe for children, pets and the environment.

For information on less toxic home and garden products, or how to dispose of toxic waste once and for all, see Metro's website at www.metro-region.org or call (503) 234-3000.

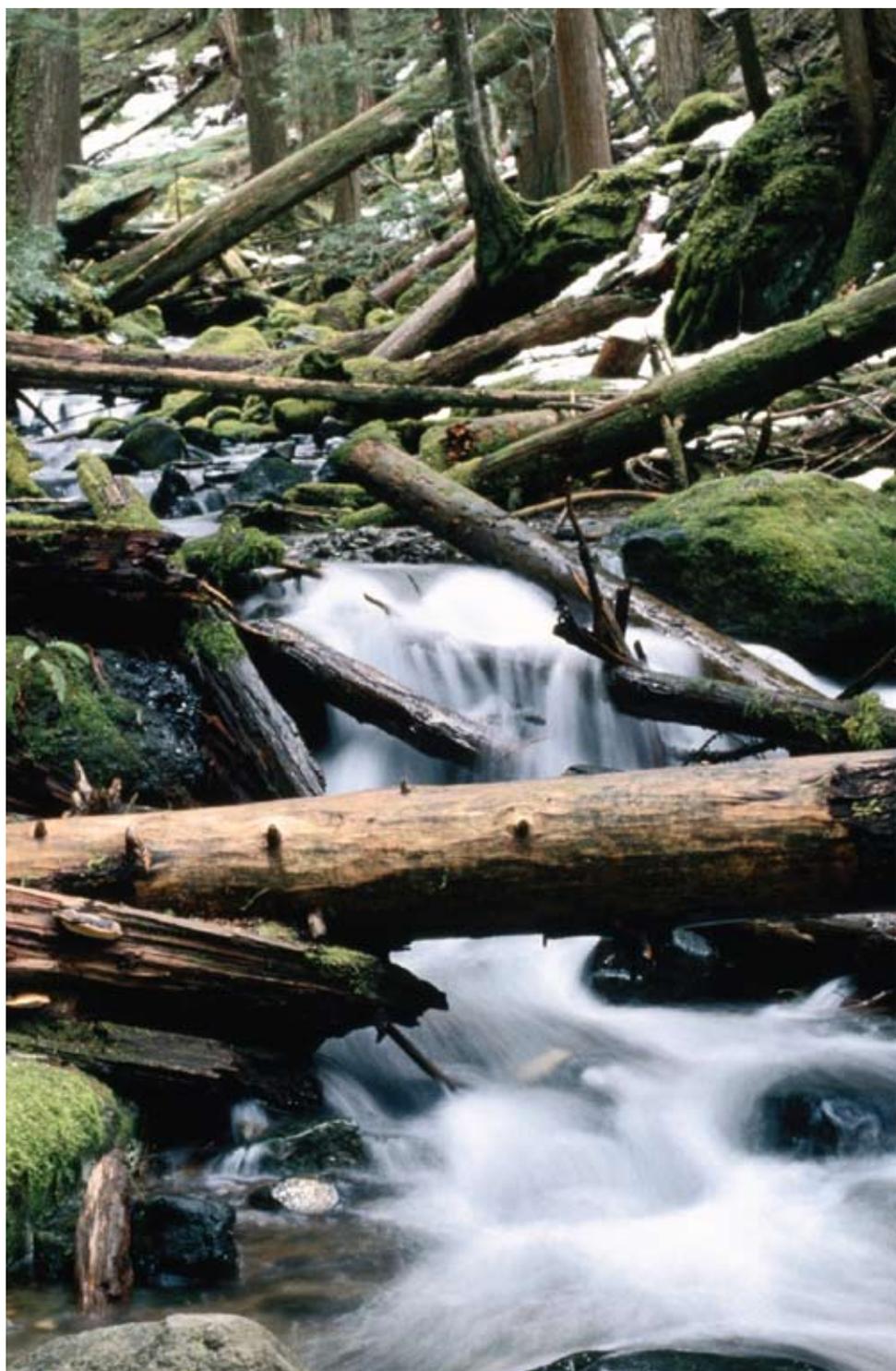


Get natural

Think about children, pets and wildlife before using pesticides and fertilizers on the lawn. Excessive pesticide use may pollute streams, eliminate natural predators, encourage resistance to pesticides, and kill beneficial insects, earthworms and other organisms. Learn about and use non-toxic approaches to reduce reliance on harmful chemicals and fertilizers. Consider reducing the size of your lawn and landscaping with native plants instead.

You can have a healthier lawn naturally if you:

- Mow lawn to three inches for strong roots, fewer weeds and less evaporation.
- Leave short grass clippings on the lawn as natural fertilizer.
- Pull weeds by hand.
- Aerate lawn every four years.
- Test soil pH and nutrient levels every three years or before applying fertilizer.
- Use a push mower. Gas mowers can pollute as much as a car. You'll cut noise, save money and get more exercise.



If you must use fertilizers and pesticides, please:

- Follow product directions carefully.
- Do not apply if rain is expected within 24 hours.
- Choose fertilizer that does not contain heavy metals (arsenic, cadmium, mercury, lead, nickel), as many do. Check www.oda.state.or.us/fertilizer for fertilizer content.

See the Natural Gardening Guide and other helpful information at www.metro-region.org

Use the Native Plant Finder at www.cleanwaterservices.org/gonative to choose plants appropriate for your site.



Get stingy—conserve water, time and money

In hot summer months some households put nearly half their water on the lawn. Over-watering is a common mistake that wastes precious water, money, time and effort. It also encourages shallow root growth, promotes weeds, and washes essential nutrients from the soil. To do it right:

- Water lawns one inch or less per week.
- Set an empty can under the sprinkler and time how long it takes to fill one inch; that's how long you'll need to water each time.
- Water early in the morning/night to avoid evaporation and sunburned leaves.

Reduce the size of or eliminate your lawn and plant native plants.

Get soft—reduce impervious areas

Natural landscapes absorb rain slowly. The built environment's hard surfaces, roofs and paving tend to speed and increase the volume of runoff. One solution is porous paving which allows soil to absorb rain, replenishing groundwater and providing more natural and consistent stream flows through the year.



Plants and soil naturally filter pollution out of runoff.

To reduce impervious surfaces on your property, consider these options:

- Install gravel trenches along sidewalks and driveways to collect rainwater.
- Instead of pavement, use bricks or blocks set in sand, gravel, or wood chips.
- Point downspouts away from paved areas. Use a rain barrel to collect the water, then use it to water your garden or lawn.

For information about pervious pavement, see the Slow the Flow booklet at www.cleanwaterservices.org.





Get gentle on roofs

Chemicals that kill roof moss and lichen often contain copper, zinc and iron sulfate that may wash into waterways. Use alternatives to chemical treatment to help protect our water resources. For example, keep your roof free of leaves and debris that hold moisture and promote damage and fungal growth. Consider non-organic roofing materials that resist moss growth.

Roof treatment: Have you thought about where the moss, chemicals and debris go? In urban Washington County, rain drains carry water to the nearest wetland or creek.

If treatment is needed, use less toxic products in minimal concentrations as recommended on the product label. Treat roofs only in dry weather to allow the treatment to soak into the roof. When applying liquid treatments, direct the downspout to soil. After treatment, monitor the runoff. Reconnect downspouts after at least three rainfalls, or when there is no visible chemical residue or sheen.

If you hire a roof treatment professional, ask what they use and how they manage runoff.



Get smart with suds

Where does the soap, grease and dirt go? Pressure washing your home, deck, sidewalk, driveway and vehicles can wash pollutants into storm drains and ditches that lead to waterways. Here are stream friendly tips:

- Sweep sidewalks and driveways, and put the debris in the garbage.
- Use automatic car washes that recycle the water and properly dispose of detergents.
- If you hand wash your car or boat, park it on grass so pollutants filter through the soil.
- If you pressure wash, plan to keep paint flakes, grease, and other pollutants from washing into storm drains, ditches or waterways. Collect and properly dispose of these pollutants, especially outdoor paint that might contain lead that is poisonous to plants, animals and children.
- If you pressure wash, direct the runoff toward grassy or planted areas.
- Try using water pressure alone to remove dirt and grime.

If you must use a pressure washing cleaner, try this gentler solution: 2 cups mild laundry detergent, 1/2 cup vinegar and 1/4 cup lemon juice.



Tualatin River



Get a grip on pets

Pets and livestock trample streambanks, kill the plants and create harmful erosion. Animal waste contains bacteria and parasitic organisms that can infect people and animals that drink or touch the water. Never place fencing across a stream.

- Pick up after your pet. Put the poop in the garbage.
- Take the Canines for Clean Water pledge at www.cleanwaterservices.org/canines.

Get out! Organic stuff is bad?

Oh, yeah. Even “natural” materials pollute the water by adding excess nutrients. As organic matter decomposes under water, it uses oxygen that fish and other water creatures need to survive.

Keep grass clippings, leaves and litter away from streams and ditches. In addition to polluting the water, yard debris that washes into storm drains and culverts may cause flooding.

Compost yard debris and kitchen scraps, leaves, grass clippings and other yard wastes into organic fertilizer. For details, go to www.metro-region.org.



Get your motor running

Well-maintained vehicles are less likely to pollute waterways with oil, antifreeze, brake pad and tire wear.

- Regularly maintain your vehicle and repair leaks.
- Never dump car fluids into a storm drain, ditch or onto the ground.
- Properly dispose or recycle motor oil, antifreeze, paint and other toxic materials. Call Metro at (503) 234-3000 for disposal advice and options.



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Eco-Logical Business
certification www.ecobiz.org*



Create a healthy stream buffer

Here's where a streamside property owner can really shine! A stream or riparian buffer is the vegetation along a stream. Natural, undisturbed streams are lined with a community of native plants that shade and stabilize the streambanks. But for many streamside properties in the Tualatin River Watershed, mowed lawn and invasive or exotic plants line the stream banks instead of a healthy buffer. While grass may be pretty, its shallow roots can't hold soil to prevent erosion.



“Create a healthy buffer of native plants along your stream or wetland to protect your property and water quality.”

A healthy riparian buffer offers many environmental, social and economic benefits, including:

- Protects property from bank erosion; native plant roots stabilize the banks, trees and stumps slow water velocity
- Attracts wildlife; provides habitat, food and cover while connecting wildlife corridors
- Enhances enjoyment by reducing traffic noise and providing a cool, shady place for picnics and bird watching
- Saves time spent mowing and maintaining lawn
- Saves money spent on fertilizers and pesticides
- Avoids costs of repairing eroded streambanks (engineering design, permits, bank stabilization, etc.)
- Protects the water supply, filters pollutants and sediment, absorbs water to replenish the water table

Clean Water Services partners with others to enhance streams and wetlands throughout the Tualatin River Watershed. Visit www.cleanwaterservices.org for more information.



Get started on your healthy stream buffer

Step 1 - Identify Your Buffer Area

A healthy buffer will take some time and work, but once it's established it requires only occasional maintenance. The buffer begins at the streambank and, depending on the site, is 25 to 75 feet wide. Study your yard and visualize the buffer area, considering steep slopes, yard size, property lines, utilities, sensitive habitat and features you wish to preserve.

Measure the buffer area to be planted. To measure the width, stand at the top of the streambank and walk to the outer edge of your future buffer. Next, measure the length, ideally the entire length of stream on your property. Length x Width = Area in square feet to be planted.



Step 2 - Create Your Planting Plan

An effective buffer will have enough plants to hold soil, filter pollutants and provide shade.

Calculate plant needs

Square footage x 0.01 = Number of trees

Square footage x 0.05 = Number of shrubs

Identify plant species: Select plants appropriate for the site, considering the soil moisture, sunlight and the appearance you desire. Native plants require less water than non-native plants and do not need fertilizer or pesticides. Birds and wildlife prefer native plants for their habitat. Many attractive native plants will grow well in your buffer. Follow these tips in choosing your plants:

Use the Native Plant Finder at www.cleanwaterservices.org/gonative

- Look for native plants growing nearby to know what is best adapted to your area.
- Diverse plants ward off pests and diseases and provide habitat diversity.
- Be aware of soil drainage and choose plants suited to dry or wet conditions.
- Place plants with similar watering needs together.



Sample planting and care schedule

September - November	Prep site
January - April	Plant site
May - August	Water, weed as needed

Step 3 - Prepare Site for Planting

Remove invasive, non-native plants from the site by cutting and pulling. For advice, go to www.cleanwaterservices.org. Replant areas that have been cleared with native grass seed before invasive species take over again.

Identify and remove invasive species

The plants listed below are just a few that should be removed from riparian and wetland areas. Many of these species can be controlled by regular cutting, mowing, or pulling before seeds set. In some cases, successful control may require herbicides by licensed applicators. For information, see www.cleanwaterservices.org.

To remove these plants: Pull the entire plant and roots out of the ground. Dispose of where seeds and roots cannot re-establish.



Purple Loosestrife
Lythrum salicaria



English Ivy
Hedera helix



Himalayan Blackberry
Rubus armenicus



Reed Canary Grass
Phalaris arundinacea



For the following species, you can also mow and cover with weed barrier cloth:



Canada Thistle
Cirsium arvense



Bindweed
Convolvulus arvensis



Common Teasel
Dipsacus sylvestris

Noxious Weeds

If you spot Japanese Knotweed, Giant Knotweed or Garlic Mustard, please report them to Clean Water Services. These species are so invasive that regional eradication resources may be available.



Japanese Knotweed
Polygonum cuspidatum



Giant Knotweed
Polygonum sachalinense



Garlic Mustard
Allaria petiolata

Tools checklist

You will need these tools and equipment:



Gloves



Pruning Shears



Wheelbarrow



Shovel



Pitchfork

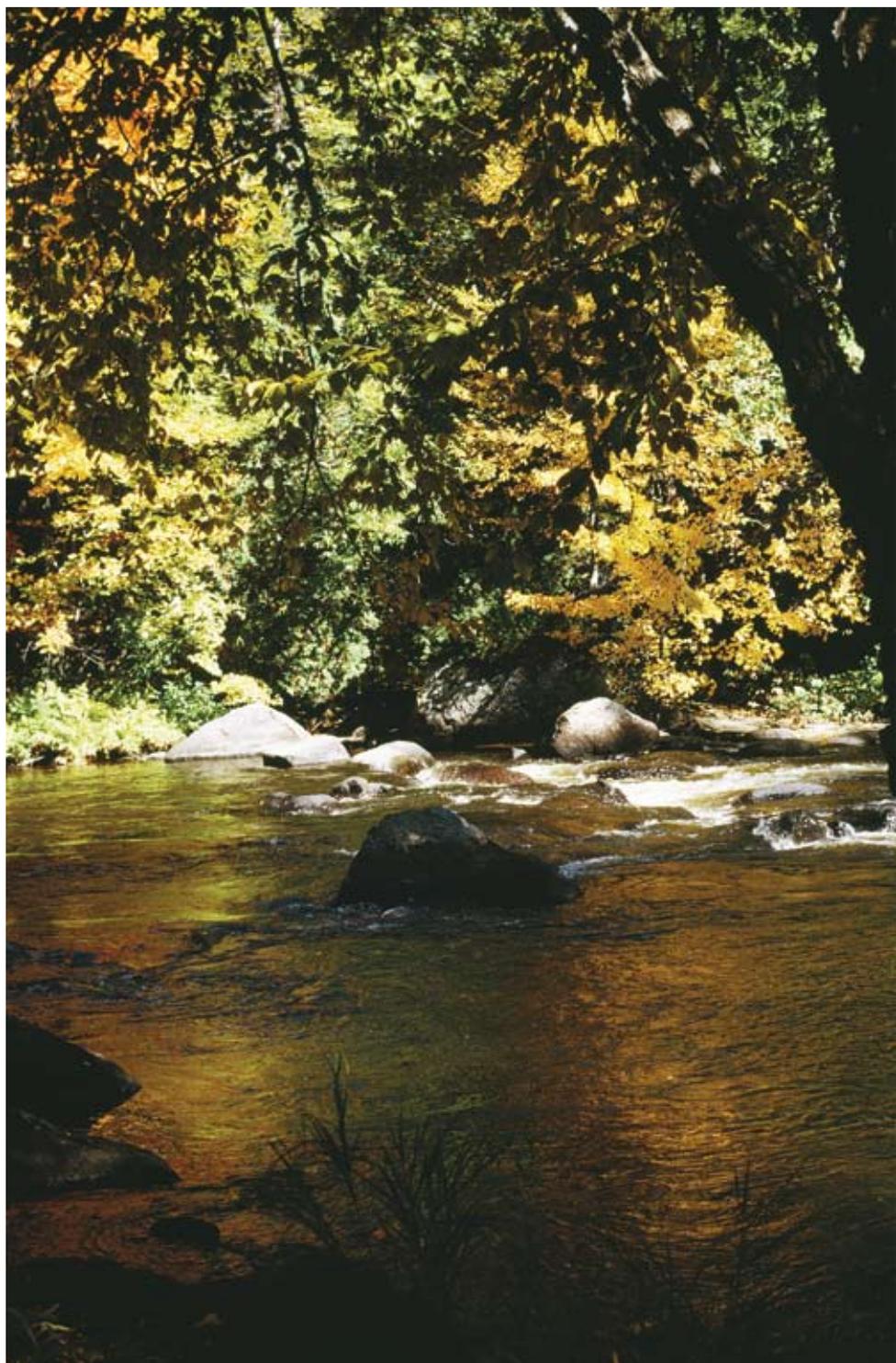


Buckets

Research nurseries and plant availability

A current list of nurseries that sell native plants is posted at www.cleanwaterservices.org.

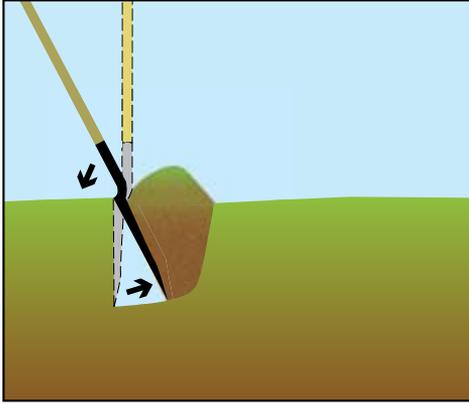
If possible, choose plants grown from local seeds adapted to local conditions. You may have access to local plants that you can take cutting from or transplant. For example, willow cuttings quickly stabilize streambanks.



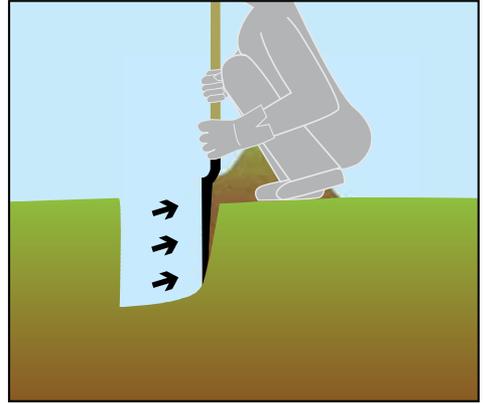
Step 4 - Plant Your Site

You probably know what to do with potted plants, so here are simple tips for bare root and pole cuttings. Native willows are excellent for pole cuttings, and you can make your own if you have permission to cut them. Be sure to plant when soil is moist and easy to dig. The hole must be deep enough for roots to spread.

Bare root plants



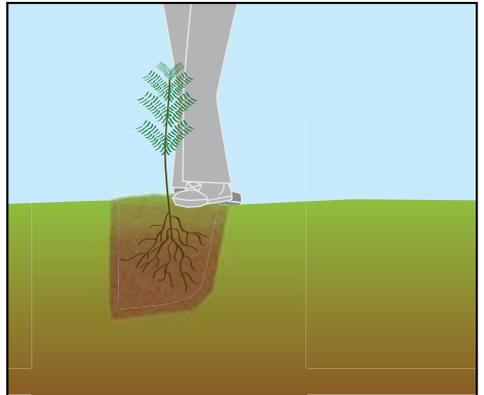
Push shovel straight in soil. Pull back shovel and return.



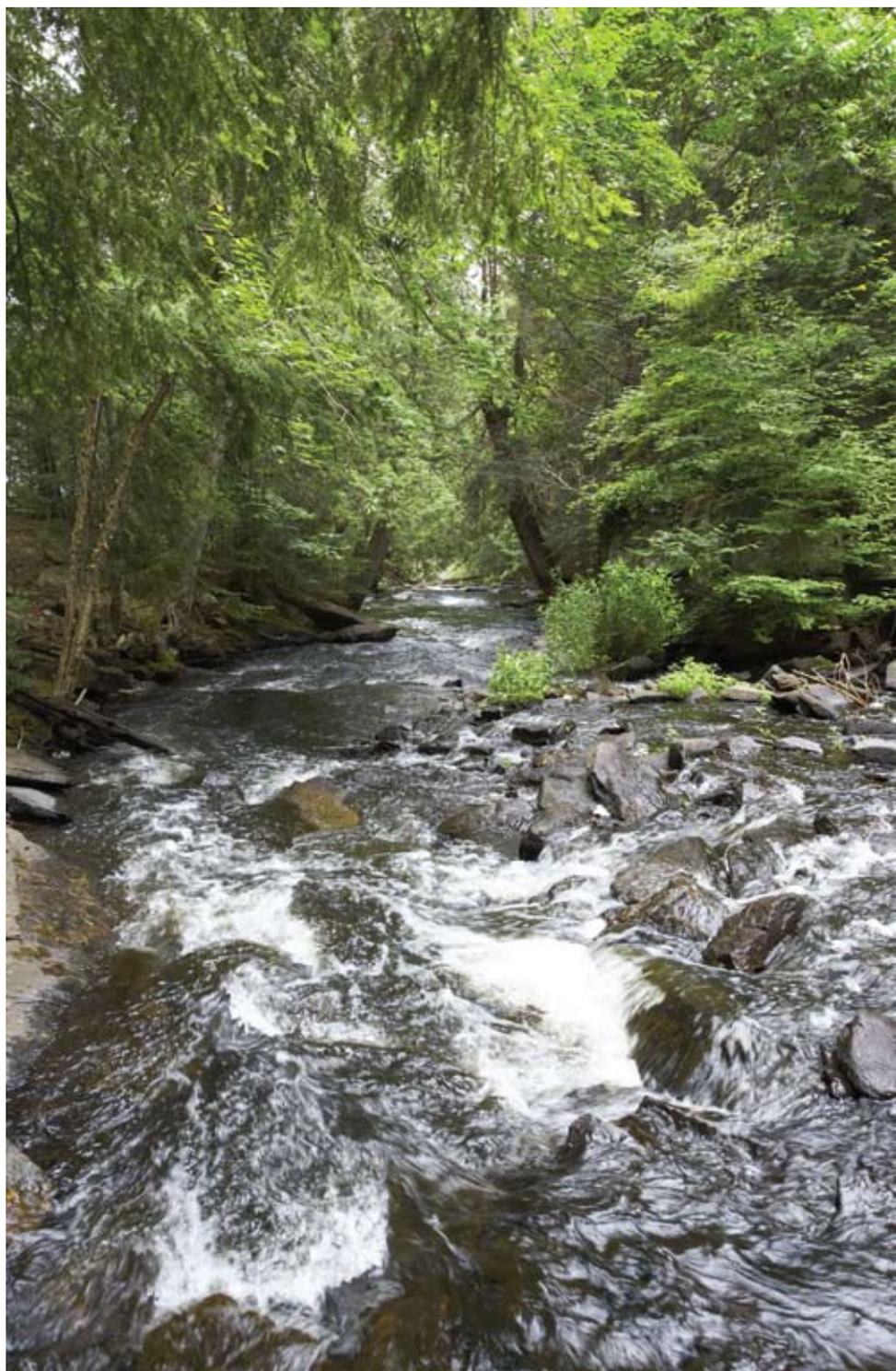
Pull loose soil up side of hole.



Place plant in hole.

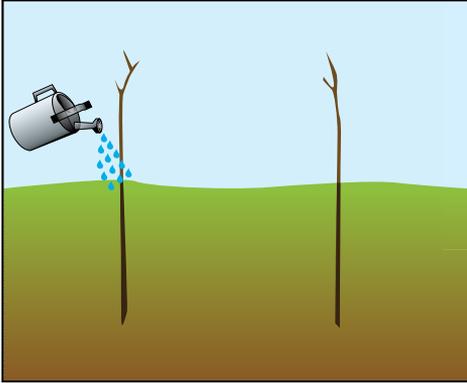


Gently press hole shut.

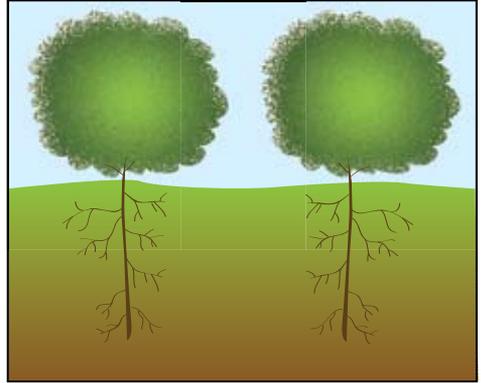


Pole Cuttings

Find native willows with branches $\frac{1}{2}$ to 1 inch in diameter at the base.



Insert willow cuttings 2/3 of way into wet ground and water thoroughly.



Watch your willows grow and flourish.

Mulch and watering

Apply up to 5 gallons of mulch, compost or grass clippings around each plant to suppress weeds and hold moisture.

Water during dry weather until plants are established. Water only as much as the ground can absorb.



Step 5 - Maintain the buffer

Congratulations, you now have a riparian buffer with beautiful native plants! To ensure the successful establishment of your plants, inspect regularly during the first few years. Native trees and shrubs do not need pruning, but grasses and other weeds may be cut or pulled to reduce competition for moisture and sunlight.

Get Legal—need a permit?

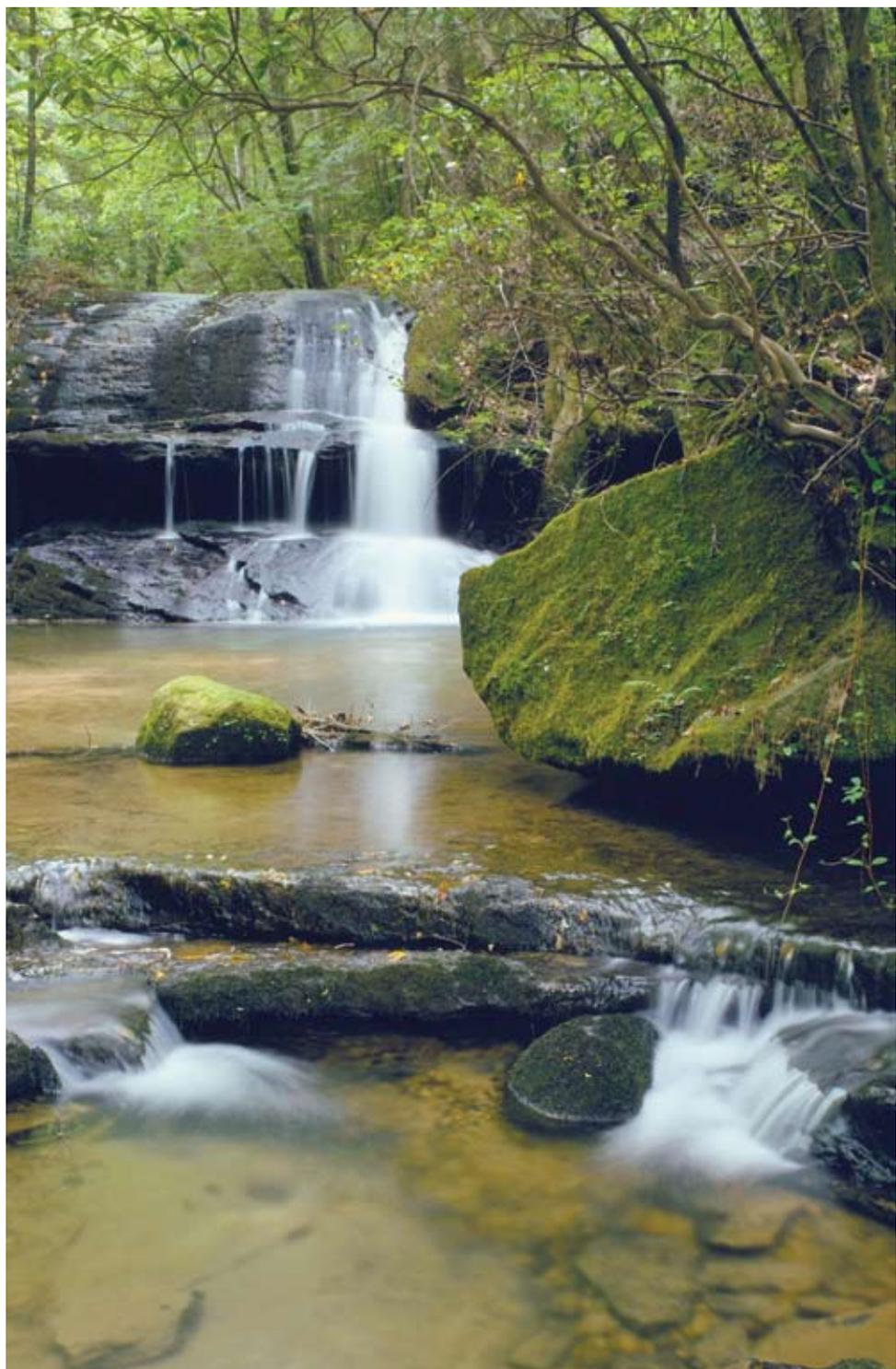
If you plan any of the activities listed below, please contact the city or county where you live to find out what type of permit you will need.

- Modify a river, stream, creek, or wetland
- Grade, clear, excavate, or any activity that may cause soil erosion
- Build a permanent structure or home addition
- Develop property
- Construct, modify or connect to the public sanitary and surface water management systems



Common Buffer Problems and Solutions

Problem	Solution
Leaf litter, fallen branches	Leave on the ground for beneficial insects
Disease	Remove plants; dispose to prevent spread to healthy plants
Pests	Remove by hand or flush with water; use barriers, traps, approved biological controls, or least-toxic chemical controls
Aggressive weeds	Remove by hand or least-toxic chemical methods before they take over; prevent from going to seed
Fallen tree	Leave for fish cover unless certain that it will cause flooding
Erosion	Seed bare soil with native or non-invasive grass seed. Call Clean Water Services for suggestions
Stressed plants	Plants may need more or less water or sun; learn about the species to identify common problems
Animal damage	See www.cleanwaterservices.org for nutria and beaver management
Drought	Water 1 inch or less per week



Get help

Some projects on private property may be eligible for volunteer events organized through SOLV, Friends of Trees, or a community event.

Clean Water Services may provide technical assistance and plants to some property owners whose streamside enhancement is a priority in the Healthy Streams Plan.

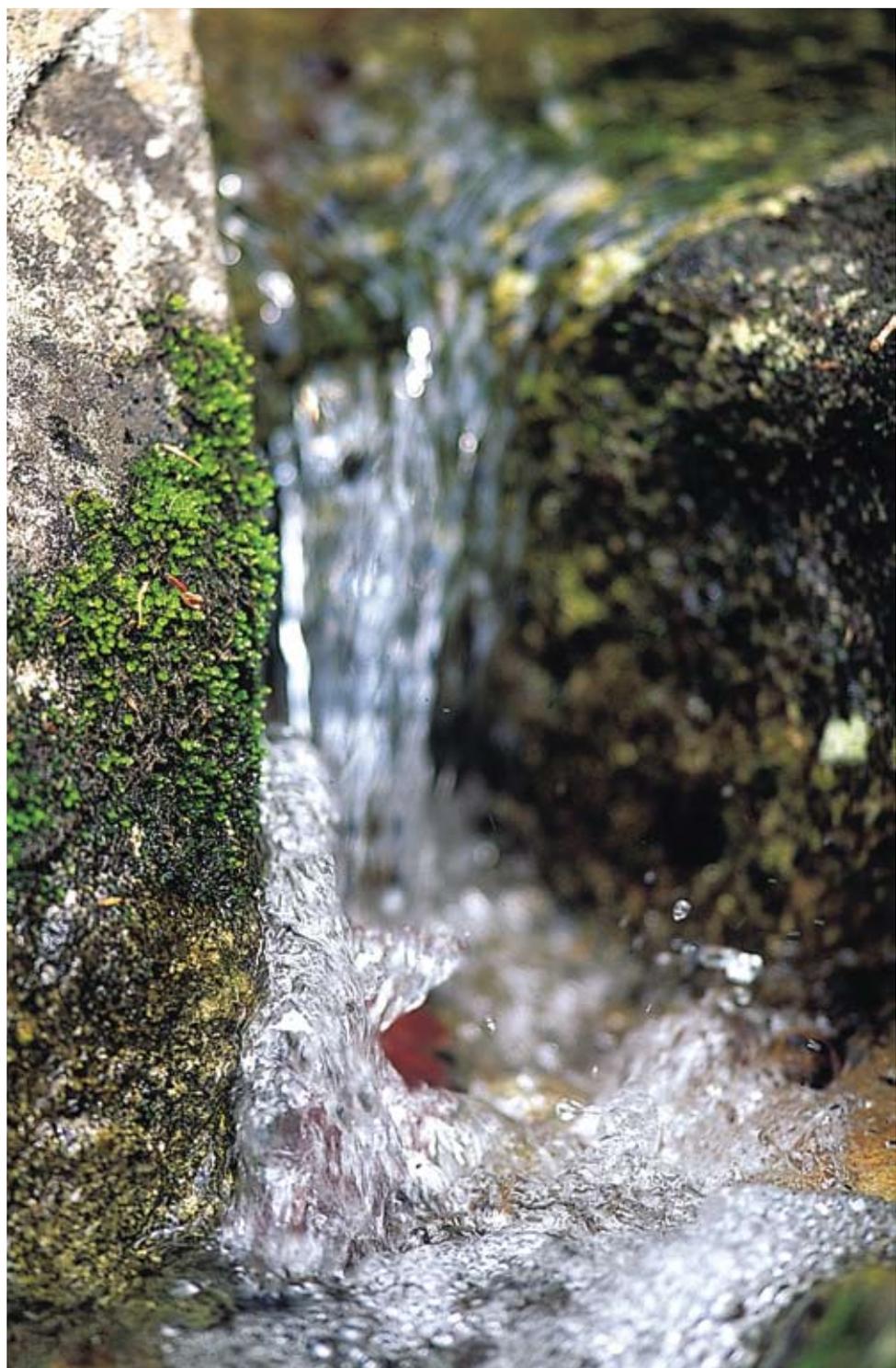
For a list of stream enhancement contractors or to view the Healthy Streams Plan please go to www.cleanwaterservices.org.

Get going—volunteer opportunities

Fortunately, in the Tualatin River Watershed there are many options for people who want to care for local streams, wetlands and the river. Here are just a few ideas:

- Learn more about stream restoration and protecting water resources at www.cleanwaterservices.org.
- Share the information with friends and neighbor.
- Join or form a “Friends” group to monitor, protect and restore your stream. Contact the Tualatin River Watershed Council at www.trwc.org.



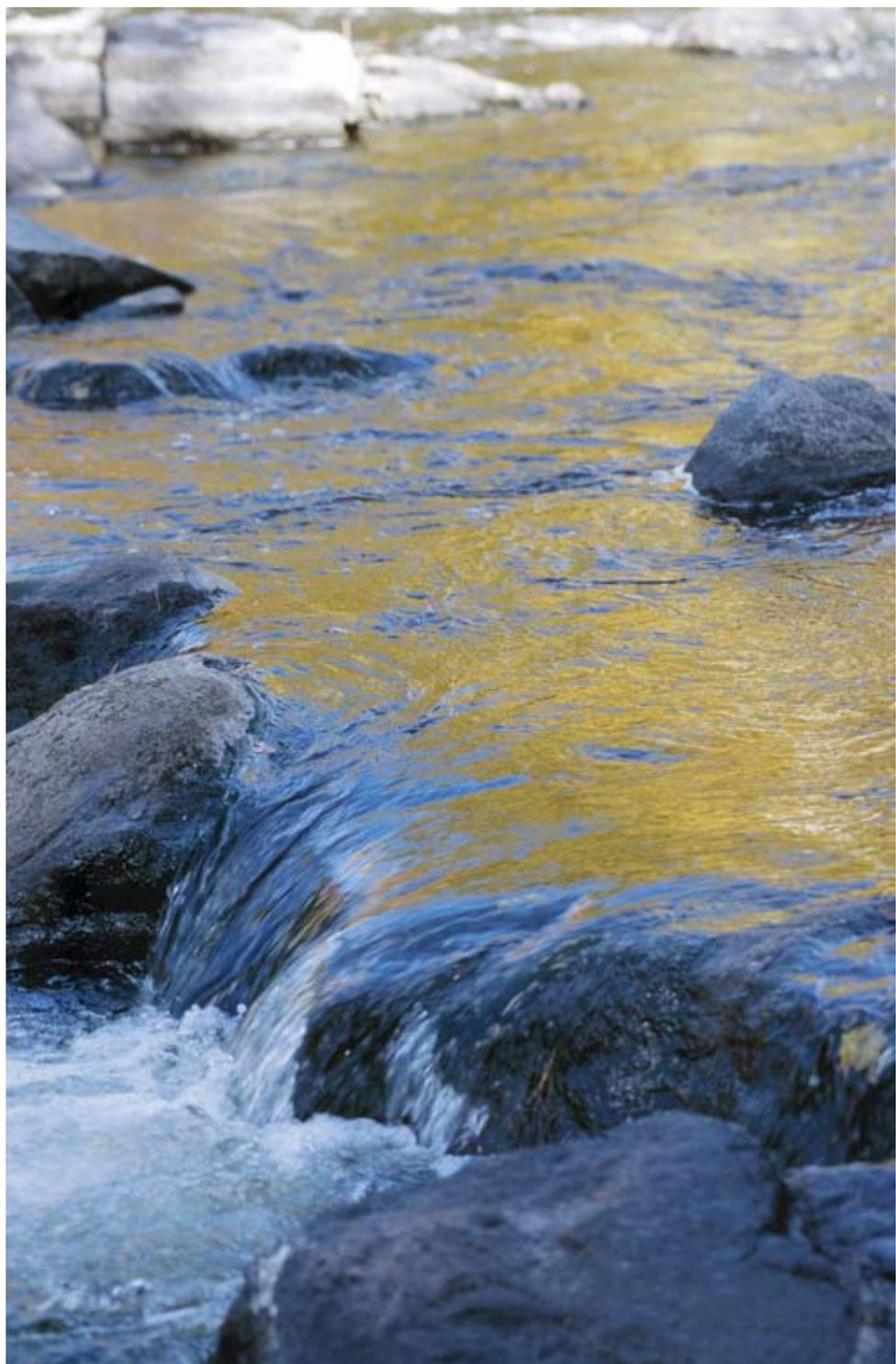


- Volunteer for community stream cleanup and enhancement projects.
- Report illegal dumping and chemical spills to DEQ at (503) 229-5263.
- Mark storm drains in your neighborhood with the “No Dumping, Drains to River” message. Contact Clean Water Services for free materials and instructions.
- Work with Clean Water Services to remove invasive plants, create a long-term management agreement, implement a large-scale restoration plan, or create a conservation plan.



Get a tax break—conservation easements

Some streamside property owners may take advantage of conservation easements or donate land to a conservancy. A conservation agreement or easement is a legal agreement by which the owner keeps the land but gives up the right to develop or clear it. The agreement between the landowner and a conservancy or public agency ensures the permanent protection of the important natural or cultural resources while keeping the land in private ownership. For more information, contact Three Rivers Land Conservancy at (503) 699-9825 or www.trlc.org.



Native Plant Sources	Technical Assistance	Volunteer Opportunities
<p>www.cleanwaterservices.org</p>	<p>Life on the Edge: Improving Riparian Function By D. Godwin, 2000, OSU Extension Service, EM 8738 www.extension.oregonstate.edu/catalog/</p>	<p>SOLV Watershed Programs www.solv.org (800) 322-3326</p>
<p>Invasive Species</p>	<p>Tualatin River Watershed Council www.trwc.org (503) 846-4810</p>	<p>Raindrops to Refuge (R2R) www.raindrops2refuge.org (503) 625-4223</p>
<p>Oregon Department of Agriculture Noxious Weed Control www.oregon.gov/ODA/PLANT/WEEDS/</p>	<p>Oregon State University Extension Service Washington County www.extension.oregonstate.edu (503) 725-2300</p>	<p>Tualatin Riverkeepers www.tualatinriverkeepers.org (503) 620-7507</p>
<p>Invasive Species www.invasive.org</p>	<p>Center for Watershed Protection www.cwp.org</p>	<p>Wetlands Conservancy/ Urban Streams Council www.wetlandsconservancy.org (503) 691-1394</p>
<p>4 County Cooperative Weed Management Area www.4countycwma.org</p>	<p>EPA Watersheds website www.epa.gov/owow/watershed/</p>	<p>Friends of Trees www.friendsoftrees.org</p>
<p>Clean Water Services www.cleanwaterservices.org</p>	<p>USDA-Natural Resources Conservation Service www.nrcs.usda.gov/feature/backyard/ www.nrcs.usda.gov/feature/buffers/</p>	<p>Recycling, Composting, Hazardous Waste Disposal</p>
	<p>Healthy Streams Plan</p>	<p>Metro www.metro-region.org</p>
	<p>Clean Water Services www.cleanwaterservices.org</p>	<p>Conservation Agreements</p> <p>Three Rivers Land Conservancy www.trlc.org (503) 699-9825</p>



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