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Photo: Rachel Werling, © Oregon State University

Trees, shrubs and other vegetation along the Rogue River help maintain water quality and habitat.

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

STREAMS AND RIPARIAN AREAS:
Clean Water, Diverse Habitat

Rachel Werling and Max Bennett

Streams provide many benefits to landowners. They can be a natural resource, providing water for livestock or crops, or they may simply provide the joy of a cool, shady area full of wildlife. But streamside areas are critical for many reasons.

The area alongside a stream or other body of water is called the riparian area — a place where moisture interacts with the surrounding soils and geology, creating a special habitat. This zone is easy to identify, since the plants and trees are often different from those in the upland areas away from the stream.

Diverse streamside, or riparian, areas are vital for supporting water quality and wildlife habitat in a multitude of ways. Good streamside stewardship will help ensure the many benefits a stream provides into the future.

Note: Most land activities in and near streams are regulated. Be sure to familiarize yourself with the rules and regulations in your area before undertaking any development, restoration, modification or other activity.

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Oregon State University

EM 9244
December 2019

3 EASY STEPS

Use this document to evaluate and improve your own riparian areas

1. Read *Streams and Riparian Areas: Clean Water, Diverse Habitat.*
2. Use Worksheet 1: Resource assessment for streams and riparian areas, page 6, to assess the condition of your resource.
3. Use Worksheet 2: Management activity assessment for streams and riparian areas, page 8, to assess your current management practices and identify areas for improvement.

If you have questions, contact your local county Extension office, county Soil and Water Conservation District, watershed council, state or federal Fish and Wildlife officials, watermaster, or other local resources.

About the Rural Resource Guidelines

This is one of a series developed for private landowners with little or no technical background by the Land Steward program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties, but many of the practices are applicable to other areas.

Photo: Rachel Werling, © Oregon State University

This landowner could improve stream stewardship by creating a buffer of native vegetation along the water.

Photo: Rachel Werling, © Oregon State University

Before and after blackberry removal along Bear Creek. The area will be planted with native shrubs and trees.

Create a vegetated buffer strip

Plants in riparian areas protect water quality in many ways: by reducing erosion, filtering pollutants, slowing floodwaters, increasing groundwater recharge, providing cooling shade and serving as wildlife habitat. Here are some actions you can take to nurture plant life on your riparian property.

- **Promote a vegetated buffer strip** along the stream that emphasizes native trees, shrubs, grasses and plants suitable for the site. Vegetated buffers reduce erosion, filter sediment and other pollutants, create stream shade to maintain cooler water, and provide wildlife habitat.

  If you want to create or expand a streamside buffer, the width you plan for will depend on local regulations, the size of the stream, adjacent slope and land uses, and your personal objectives. Some riparian functions, such as reducing erosion along small streams, can be achieved with relatively narrow buffers. Other functions, such as providing shade and filtering pollutants, may require larger buffers.

- **Know your local regulations.** Oregon city and county governments, the Department of Agriculture and the Department of Forestry require careful management of trees, shrubs and other vegetation along streams and may dictate minimum buffer widths in many circumstances. These regulations vary widely, from 10 feet wide for many small seasonal streams to 50 feet and more for larger streams that flow year-round and have salmon or trout. (see "Follow the rules," page 4).

- **Limit mowing.** Don't mow within 10–25 feet, or more, of the stream bank. Although a lawn may look neat, more diverse native vegetation does a better job of protecting water quality and providing habitat.

- **Avoid the removal of trees, shrubs and native plants** in the riparian zone. In many cases, such removal is prohibited by law.

- **Plant native species.** These are adapted to local conditions and will help promote the many beneficial functions of riparian areas. Native bushes and trees found along streams in southwest Oregon include many willows, Ponderosa pine, black cottonwood, bigleaf maple, Oregon ash, white alder, blue elderberry and red-osier dogwood. Become familiar with the native riparian species of your region. Observe what grows well in your area. Work with a native plant nursery and choose the best plants for your site.
- **Remove invasive species** such as Armenian or Himalayan blackberry, Japanese knotweed, and purple loosestrife, where feasible. These plants limit the regeneration and growth of native species. Invasive species are often successful at colonizing disturbed areas, but are inferior to natives in terms of riparian function. Local regulators may require a permit and replanting plan to remove invasive species.
- **Replant areas of bare ground.** Soil can quickly erode from bare patches, sending sediment into streams. Plant a mixture of native shrubs, trees and grasses to establish a fully vegetated site and discourage invasive species. Never leave bare earth exposed to winter rains. While plants are getting established, place temporary silt fences, straw bales, or compost mounds on bare areas to stop overland runoff, and spread a heavy layer of loose straw 2 to 6 inches deep along bare spots.
- **Check regulations for forested areas.** If your stream is forested, review *Forest and Woodlands: Protecting an Ecosystem*, EM 9245, *catalog.extension.oregonstate.edu/em9245.* The Oregon Forest Practices Act governs activity around streams in forested areas.

Keep it clean

- **Don't throw debris over the stream bank** or pile leaves or manure in the riparian zone. These materials, when added to a stream, will lower oxygen levels as they decompose. This type of dumping is a form of water pollution, and violators could be cited.
- **Don't use pesticides, herbicides or fertilizers** within riparian zones. These substances can degrade water quality. In some instances, such as when managing invasive blackberry and knotweed, it may be OK to carefully apply herbicides that are approved for use in aquatic applications. Ensure that application rates in adjacent areas, such as pastures, follow label instructions and are not excessive. Note that in hot weather many herbicides can volatilize and spread far beyond the intended location. Always follow directions on the label.

Photo: Rachel Werling, © Oregon State University

Use a planting plan to restore native vegetation after removing invasive blackberries. At this restoration site, colored flags indicate different species of native plants.

Leave it natural

- **Protect wildlife habitat:** Wildlife love diversity. Encourage diverse native plant growth with multiple layers of vegetation, including low plants, shrubs and trees. The native plants that grow in riparian areas provide shelter and a wide variety of nuts, berries, nectar and insects for food.
  - **Birds.** Riparian areas provide critical migratory and breeding habitat for many bird species. With diverse plants and access to water and food, stream corridors are often especially rich in bird life. If you plan to improve your stream by removing invasive species such as blackberry, be sure to plan your work outside of the bird breeding season; even invasive blackberries can serve as nesting habitat.
  - **Fish.** Trout and salmon need cool, clear water, streambeds with rock and gravel, and in-stream habitat structure such as logs and overhung banks. Trees and shrubs along streams provide shade and help maintain cool water. Many areas are experiencing changes in temperature ranges, including warmer summers. Shade is an important resource for the future of our streams and fish.
  - **Beavers.** Beavers are considered a "keystone" species. That means their activities play a crucial role in supporting the functions of riparian ecosystems that help fish, wildlife habitat, stream flows, and water quality. You may not want a beaver to harvest a prized tree or to cause a road to flood, but finding ways to tolerate or work around their activity is good for streams. Consider installing strong wire fencing around prized trees and plantings where beavers are active.

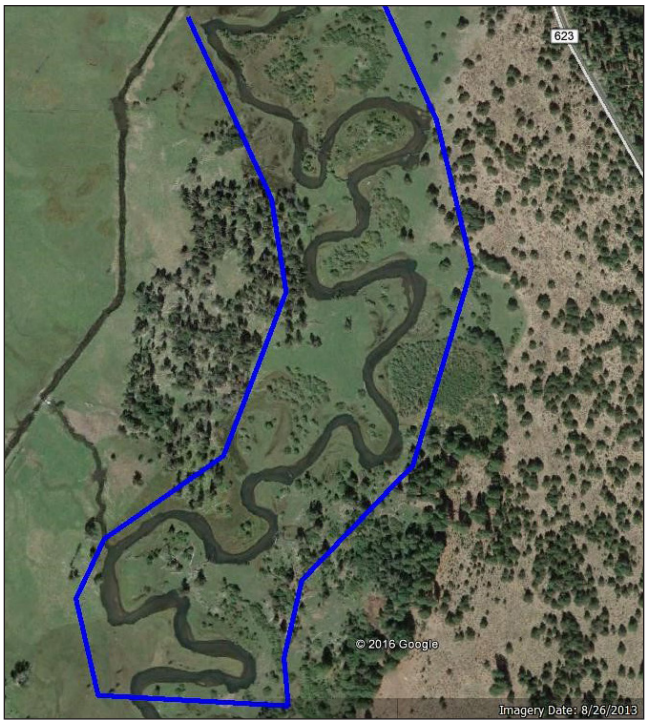

Image: Google Earth

The Wood River winds through Klamath County, Oregon. Protecting the meander belt from human use allows a stream to take its natural course. This protects water quality and reduces the chance of damage to property from flooding and erosion.

Photo: Rachel Werling, © Oregon State University

Logs, branches and other natural material in rivers, such as this scene in Neil Creek near Ashland, Oregon, provide critical in-stream habitat for fish and other wildlife.

In-stream habitat structure

A healthy stream for fish and wildlife contains leaves, branches, and logs. This organic material provides important food and habitat for aquatic organisms, from fish to mayflies. While too much material may cause a flooding hazard under certain circumstances, in most cases, it helps to dissipate the destructive erosive power of high water. When possible, let logs stay in streams.

- **Respect the meander belt.** Natural streams and rivers meander and change their courses over time, especially in flatter terrain. For many reasons, people often want to use or develop the areas next to streams. This frequently leads to problems with flooding, erosion and decreased water quality. Where possible, respect your stream's historic meander belt to minimize conflicts. Limit building in riparian areas. Incision or downcutting of streams can occur when streams are straightened or if water runoff from the surrounding landscape is excessive.
- **Design culverts and bridges** to accommodate high water flows and allow for fish passage in fish-bearing streams.
- **Design roads with care.** Roads can be a major source of erosion, sediment and pollution runoff into creeks. Is your road design mitigating possible negative impacts on nearby water bodies? See other publications in this series in the OSU Extension Catalog, *catalog.extension.oregonstate.edu,* for additional information.

Manage livestock and grazing

Grazing livestock in riparian areas can result in increased erosion, increase of noxious weeds, decreased streambank stability and decreased water quality from nutrients and pathogens in streams. These steps can help reduce problems:

- **Consider fencing livestock out of riparian zones.**
- **Develop off-channel water sources** in upland areas where adequate forage is available to draw livestock away from the stream area.
- **Manage grazing practices.** Maintain the growth of shrubs, trees and other plants that help stabilize banks. Timing and rest are critical. Avoid riparian grazing during the rainy season. Allow adequate time for plants to rest and regrow. Avoid season-long grazing; move livestock frequently.
- **Study up.** If you use your creek for irrigation or have pasture in the riparian area, be sure to review pasture guidelines in the Rural Resource Series, available in the OSU Extension Catalog, and be familiar with the Agricultural Water Quality Management Act regulations that apply to your activities.

Follow the rules

Understand the regulations applying to your stream and its beneficial uses. Does it have fish? Is it a drinking water source? Is it used for irrigation? Recreation? Navigation?

Photo: Rachel Werling, © Oregon State University

Diverse riparian vegetation protects water quality and provides habitat.

Many counties have riparian ordinances that prohibit the removal of riparian vegetation within a certain distance of streams, rivers and other waterways. You may need a permit to remove invasive species.

The Agricultural Water Quality Management Act regulates potential water pollution from farms and ranches under the Clean Water Act.

The Oregon Forest Practices Act regulates forest management activities and practices affecting water quality on forestland.

Individual municipalities may have their own riparian ordinances.

Resources

If you have more questions, contact your local county Extension office, Soil and Water Conservation District, watershed council, Oregon Department of Fish and Wildlife office, the Oregon Water Resources Department and their watermaster, or other local resources.

- U.S. Department of Agriculture Natural Resources Conservation Service Riparian Systems, *www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010137.pdf*
- *Riparian Health: Evaluating the Health of Riparian Areas, an Overview.* Extension Foundation. *www.extension.org/pages/55552/riparian-health-evaluating-the-health-of-riparian-areas-an-overview#.VdzNBUa1Z1A*
- *Polluted Runoff: Nonpoint Source Pollution.* Environmental Protection Agency. *water.epa.gov/polwaste/nps/wetlands.cfm*
- The National Pollutant Discharge Elimination System: An Oregon NPDES pesticide general permit is required for certain pesticide applications in, over, or near water. Contact the Oregon Department of Environmental Quality for information. *oregon.gov/oda/programs/Pesticides/Water/Pages/NPDES.aspx*
- *Guide to Oregon Permits in Riparian Areas.* Be sure to verify the most up-to-date regulations with the proper governing body. *oregon.gov/dsl/WW/Documents/water_related_permits_user_guide_2012.pdf*

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

This material is based upon work supported by the National Institute of Food and Agriculture, under award number EW18-015 through the Western Sustainable Agriculture Research and Education program. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

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This publication will be made available in an accessible alternative format upon request. Please contact puborders@oregonstate.edu or 1-800-561-6719.

Published December 2019

Worksheet 1: Resource assessment for streams and riparian areas

Use this checklist of characteristics to assess your water systems. Use extra paper if necessary.	Yes	No	Not sure	N/A
Stream type: What is your stream like?				
Runs all year (perennial)				
Runs seasonally (intermittent)				
Has defined channel but only runs during a storm event (ephemeral)				
Beneficial uses: Is your stream used for/by these?				
Fish-bearing				
Other wildlife				
Irrigation				
Domestic use				
Recreation				
Livestock grazing in or near riparian zone				
Others (navigation?)				
Riparian vegetation/buffer strip: Are these beneficial conditions present?				
Diverse, dense cover of trees, shrubs, and other plants along stream				
Width of buffer is adequate (meets regulations, provides functions critical for beneficial uses)				
Stream is shaded				
Woody material present (logs and sticks, debris jams)				
Wildlife or signs of wildlife present				
Water quality: Are any of these concerns present?				
Obvious signs of pollution (oil, odor, etc.) in water				
Water is muddy during or after storms				
Water is muddy even in the absence of storms				
Heavy algae growth				
Muddy/polluted runoff from adjacent land directly into stream				
Streamside area: Are any of these concerns present?				
Steep, eroding banks				
Problems with invasive species				
Bare areas of soil in floodplain				
Lawn mowed down to edge of bank or streamside				
Waste material (raked grass, manure, junk) present in floodplain				
Stream is incised (down-cut in the landscape, does not spread out in floodplain at high flows)				
Infrastructure: Check for these potential concerns				
Buildings in floodplain				
Buildings in meander zone				
Bridges not adequate for stream flow				
Culverts not adequate for stream flow				
Culverts not adequate for fish passage (fish barriers)				

Worksheet 1: Resource assessment for streams and riparian areas

Use this checklist of characteristics to assess your water systems. Use extra paper if necessary.	Yes	No	Not sure	N/A
Follow the rules: Which apply to your stream or riparian area?				
County and/or city ordinance				
Agricultural use rules				
Forest ractices rules				
Other rules				

Review your responses above. Are there areas of concern or that require improvement? List below.

1.

2.

3.

4.

5.

Review which beneficial conditions are present.

1.

2.

3.

4.

5.

How would you characterize the overall condition of your stream and riparian area?

☐ Excellent ☐ Fair ☐ Poor ☐ Not sure

For the above questions, review the column "Not sure." List topics to investigate further.

1.

2.

3.

4.

5.

Worksheet 2: Management activity assessment for streams and riparian areas

Use the checklist of management practices below to identify activities you incorporate in your stream and riparian areas. This is a checklist of things to consider; be sure to know which specific regulations apply to your activity in your area. Use extra paper if necessary.	**Already present/ doing**	**Completed**	**Need to do**	**Consider**	**N/A or not feasible**
Create and maintain a vegetated buffer strip					
Leave native riparian vegetation intact					
Remove invasive species, such as blackberries					
Re-establish trees and shrubs if appropriate for site					
Leave no bare soil; plant native grasses, forbs, etc., in bare areas					
Don't maintain lawns or remove native vegetation within the buffer					
Allow native species to re-colonize riparian zone					
Keep yard waste and other contaminants out					
Don't pile or deposit leaves & other debris on bank or in stream					
Locate compost piles and other organic material away from riparian zones					
Avoid application of pesticides/fertilizer in riparian zones					
Keep animal waste/manure out of riparian/aquatic zone					
Leave it natural					
Respect the meander zone (infrastructure kept out of meander zone)					
Avoid building in the riparian zone/next to stream					
Size culverts and bridges to accommodate high flows and allow fish passage					
Maintain logs and other natural woody material in riparian/ aquatic zone					
Manage livestock and grazing to minimize impacts					
Carefully manage grazing to avoid damaging streambanks and riparian plants					
Consider fencing riparian zone					
Avoid direct runoff of muddy pastures or manure into stream					
Follow the rules: Do your practices comply?		**Yes**	**No**	**Not sure**	**N/A**
County and/or city riparian ordinance					
Agricultural water quality management rules					
Forest practices rules					
City rules					

Results

Review the results of Worksheets 1 and 2. Consider any resource concerns and healthy conditions identified in Worksheet 1, and practices that you checked in the “Need to do” and “Consider” columns in Worksheet 2. What are the most important potential follow-up actions? List and briefly describe these below.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.