My Place on a Stream

Lesson Description

Many people purchase property with a creek, pond, or other water body because they enjoy the sound of running water, the sight of lush green vegetation and birds, or the use of the water for irrigation. These areas are irreplaceable resources that are often poorly understood and managed. Creeks and wetlands are important for water supply and recharge, water filtration, wildlife habitat, flood flow conveyance, and more. As private landowners, much of the responsibility for the health of the water body lies with the resident small-acreage owner.

Lesson Objectives

1. Understand the functions of a riparian area.
2. Be able to recognize generic signs of a healthy and an unhealthy stream, and will understand how streams degrade and recover.
3. Understand that any action you take on streams on your property may affect the water body both upstream and down.
4. Be able to inventory your property for areas of concern.
5. Learn various tips for appropriate and inappropriate goal-setting and develop objectives, actions and monitoring tasks for your property.

Module 3, Lesson 4

My Place on a Stream

Lesson Handouts

1. An Introduction to Riparian Proper Functioning Condition Information Sheet
2. Tips for Maintaining Watershed Functions and Avoiding Higher Peak Flows Information Sheet
3. Tips for Managing Livestock Near Streams Information Sheet
4. Tips for Living In or Near a Floodplain Information Sheet
5. Tips for Building or Fixing Roads or Bridges Information Sheet
6. Tips for Controlling Pollution Information Sheet
7. Tips for Enjoying Your Stream or Riparian Area Information Sheet
8. How's My Stream? Assessment Checklist Activity Sheet
9. Stream Home Inventory and Action/No Action Plan Information Sheet
10. How to Tell If a Creek Is Healthy Information Sheet

Supplemental Resources

Managing Streamside Areas with Buffers, Washington County Soil and Water Conservation District

Riparian Restoration, Snohomish Conservation District

What Area Riparian Areas?, Washington State Department of Ecology

Streamside Planting for Western Washington, Cowlitz Conservation District

Homework assignment

1. Complete updating your map and listing your "riparian" inventory.
2. List questions, goals, objectives, and actions for your property.
3. Complete the How's My Stream? Assessment Checklist Activity Sheet.
4. Plan at least one action and monitoring method for your property with a timeline for implementation.

How's My Stream? Assessment Checklist Activity Sheet, page 1 of 3

Place a checkmark next to any statement that is true for your waterway. Beside each checkmark make a note about what you found that was a possible problem. Finding one or more of these signs does not mean that there is a problem, but instead that some detective work will be needed to determine whether action is necessary. Consult an expert(s) for help.

1. Water pollution	☐	There are signs of pollution, including odors, trash, chemical sheens, or soap bubbles
	☐	There is evidence that manure or sewage may be entering the stream
2. Algae	☐	The water is green
	☐	There is green scum or thick forms of hair-like algae
	☐	A heavy, dirty-brownish slimy material is coating rocks and other underwater objects
3. Muddy water	☐	My stream becomes muddy after storms and takes a long time to clear up
	☐	My stream is muddier or cloudier after it leaves my property than it was when it entered my property
4. Barriers to fish or water flow	☐	There are culverts, dams, or other artificial structures in my stream that might block fish passage
	☐	The bridges or in-stream culverts are too small to carry flood flows
5. Ditches and drainage	☐	There are irrigation ditches, tile lines, drainage ditches, storm sewers or other artificial waterways connected to the stream
6. Water management	☐	Upstream dams or irrigation ditches remove so much water that flows are very low or suddenly drop
	☐	Upstream dams or irrigation ditches keep flows high for extended periods, causing erosion

*(adapted from Stream*A*Syst, OSU, 2000)*

How's My Stream? Assessment Checklist Activity Sheet, page 2 of 3

7. Watershed	☐	The watershed of my stream has been greatly altered by roads, urbanization, agriculture, logging, fire, fire control, weeds, etc.
	☐	The upstream or downstream riparian areas have been altered so that floods rarely cover the floodplain
	☐	The upstream or downstream riparian vegetation is too weak or sparse to withstand a 25- to 30-year flood without excessive erosion
8. Flood and erosion-control structures	☐	There are dikes, levees, berms or riprap along the stream
	☐	The stream has been straightened
9. Floodplain	☐	There are buildings, elevated roads, or other artificial structures that deflect flood flows
	☐	Hazardous materials, junkyards or heavy equipment are stored within the 100-year flood plain
10. Channel condition	☐	The channel is much wider and shallower in areas with weakened vegetation or poor floodplain access than it was in the past
	☐	Meanders have cut downstream, or the channel has been straightened
	☐	There is a headcut (a waterfall or rapid in erodible bed material) below an upstream area that is in good condition
	☐	There are deposits of gravel, sand or silt that keep getting larger, are not revegetating, or are in the middle of the channel
	☐	There are areas where the banks are high, vertical, and rarely wet by streamflows
11. Changes after high flow events	☐	After high flow events, there are dramatic changes to the stream, such as pools that have filled in, stream-bank erosion, or a change in the location of the channel

How's My Stream? Assessment Checklist Activity Sheet, page 3 of 3

12. Floodplain protection	☐	There are areas of bare soil along the stream that may come into contact with water during high flows
13. Vegetation	☐	The permanent vegetation within the riparian area has been disturbed by heavy grazing, landscaping, building, tilling, etc.
	☐	The streamside area has very little plant cover and a lot of bare soil
	☐	There are very few trees or shrubs along the stream, even though similar areas have many trees or shrubs
	☐	Trees or shrubs are not reproducing, and only old ones remain
14. Type of streamside plants	☐	There are areas invaded by weedy plants such as thistle, cheatgrass, scotch broom, purple loosestrife, etc.
	☐	Streamside vegetation is primarily one or only a few species, or is composed of plants that grow away from moist streamside soils
	☐	Stream-bank plants have root systems that are too weak to withstand high stream flows
15. Beavers	☐	Beavers or beaver dams have been removed from areas that traditionally sustained them
	☐	The supply of trees and/or willows etc. needed by beavers at a dam have been lost or diminished
16. Other concerns	☐	List other concerns here

Stream Home Inventory and Action/No Action Plan Information Sheet

1. Learn from watershed groups or other sources of local expertise about streams and floodplains in your area. Learn if possible how your stream handled the energy of floods in your setting (broad or narrow floodplains, beaver dams, woody vegetation, herbaceous stabilizing wetland vegetation, meanders, rocks and pools with riffles, and /or coarse woody debris, etc.)

2. Walk your property or neighborhood stream and its watershed to identify places of accelerated soil erosion during runoff or high flow events. If the watershed is too big, use a car, air photos, or a local expert. Note places where land use has removed or significantly weakened the vegetation, or use the “How’s My Stream?” Assessment Checklist Activity Sheet. If you have a stream or pond on your property, identify the major plants along the bank and learn if they are important in stabilizing banks against erosion.

3. Visit the stream during high flow or think back to identify where on the bank the water surface reached during the normal high flow for an average year. Determine if the water surface was on or very nearly on a floodplain surface that had been formed by the stream.

4. Note projects structures, or activities that occur within the stream or its floodplain that would alter the form or roughness of the channel, the flow of water, or the stability of stream banks.

5. List questions from the above tasks about which you need more information or an expert opinion.

6. List your goals and objectives for your stream and floodplain. Goals are broad statements such as: Encourage natural recovery. Objectives are specific statements of accomplishment such as: Allow the stream to become lined with willows.

7. List actions to stop, including those you have previously considered or done that you would no longer consider appropriate, given your current goals and objectives.

8. List actions to accomplish that you believe would be important for your objectives.

9. Describe how you could monitor progress to learn if the desired (or undesired) changes have occurred.

How to Tell if a Creek is Healthy Information Sheet

The potential of every creek is different. However, below are some signs you can generally use to tell if your creek is in reasonable condition or if something may be amiss. Creeks may be healthy and not exhibit all the signs listed below, or as little as one or a few of these signs may potentially indicate high risk.

Signs of a healthy creek:

- Water temperature is steady and water is clear and free of excess algae or odors. (What is right varies with the landscape setting).
- Natural variations in flow cycle.
- Stable banks that have little erosion; the stream balances erosion with deposition and revegetation.
- Areas of pooling water in slower stretches and fast-running water over shallow rocky areas.
- A meandering stream channel (rather than straight, deeply-cut banks) in broad flat valleys away from mountains.
- Ample room for creek water to spread out during floods. (What is right varies with the landscape setting.).
- Rock and gravel of sizes that fit the landscape setting.
- Trees, shrubs or densely rooted herbaceous plants such as sedges and rushes that stabilize banks, provide habitat for wildlife and keep water temperatures steady.
- A variety of native riparian (wetlands) vegetation, rather than monocultures (one type of vegetation), upland (dryland) vegetation or weeds.
- Abundant varieties of fish, wildlife and aquatic insects.
- Presence of some natural organic materials, such as leaves, branches and other debris, that support the aquatic food chain and provide hiding and breeding places for fish and other aquatic animals.

Symptoms of an unhealthy creek:

- Poor water quality, evident from excessive algae, sediment, animal or human waste, or other contaminants that have been detected through lab tests.
- High water temperature due to exposure to excess sunlight or unnatural low flows.
- Reduction in water flows for extended periods of time.
- Loss of the natural meandering creek channel (a straightened channel).
- Incising (downcutting) of the creek bed and large amounts of erosion along banks.
- Uniform water velocity with an absence of pooling and fast water.
- Deposits of fine sediment on the bed so that rock and gravel are covered or the spaces are filled.
- Trash and debris in the creek that would not be found there naturally.
- Too little coarse woody debris from trees to provide roughness, catch sediment or form pools.
- A lack of diversity in the vegetation and animal species.
- Banks that lack healthy riparian vegetation.
- Monocultures (a single species), especially of weeds or other invasive species.
- Lack of fish and other aquatic wildlife, or reduced populations.
- High density of building in the floodplain surrounding the creek.

An Introduction to Riparian Proper Functioning Condition Information Sheet

Riparian or wetland areas function properly when adequate vegetation, landform, or large woody debris is present to:

- Dissipate stream (or wave) energy associated with high waterflows, thereby reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid floodplain development;
- Improve floodwater retention and ground-water recharge;
- Develop root masses that stabilize stream banks against cutting action;
- Develop diverse ponding and channel characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and
- Support greater biodiversity.

The functioning condition of riparian-wetlands areas is a result of interaction among geology, soil, water, and vegetation.

When a riparian area is in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation, they are called “functional-at-risk.”

Nonfunctional areas are those not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, supporting greater biodiversity nor providing other uses. The absence of certain physical attributes, such as a floodplain where one should be, indicates nonfunctioning conditions.

Proper Functioning Condition is a flexible assessment tool for any kind of stream that uses interdisciplinary knowledge to understand what’s appropriate in each place. It is based on the premise that each stream has its own potential to respond to management and restoration efforts or processes. Furthermore, some streams are limited in their recovery because of political, social or economic limitations that cannot be removed (for example, moving an interstate highway to improve riparian conditions).

The generic definition, as applied by an interdisciplinary team, avoids the problem of answers that are too patently simple. Yet, in most every situation, hydrology, riparian vegetation, and soils and landform are the elements of stream health. Learning which attributes are causing problems focuses attention on management actions that fit the needs.

(In each western state, an interdisciplinary and interagency training cadre, with the assistance of a National Riparian Service Team at the Prineville, Oregon BLM Office, teaches Riparian Proper Functioning Condition Assessment for cooperative riparian restoration.)

Tips for Maintaining Watershed Functions and Avoiding Higher Peak Flows Information Sheet

1. Retain vegetation of the type that covers soil and protects it from raindrop splash or accelerated erosion.

2. Don’t concentrate water in or on roads, ditches, gutters, drains, gullies, rills, or pipes.

3. Disperse water from roads, ditches, gutters, drains gullies or rills and pipes.

4. Retain natural fire frequency. Prevent the accumulation of fuels that enhance the risk of very hot fires.

5. Manage the land to encourage vegetation that will prevent frequent fires. Frequent fires prevent woody plants from successfully re-establishing and reproducing. Each fire exposes bare soil to erosion.

6. Retain and manage riparian vegetation and coarse woody debris (logs, branches, roots etc.) that provides roughness and stability to stream channels.

7. Retain meanders in a channel or otherwise prevent channel incision. Any event that causes a stream to lose access to its floodplain greatly increases water velocity, erosion and downstream flood peaks.

8. Avoid compacting the soil with intense grazing when soils are moist, or by driving on meadows, off-road, etc. Compacted soil reduces infiltration and soil water storage.

9. Eradicate invasive weeds when the first invader is noted and before populations expand and become problematic. Some weeds will not adequately protect soil. Invasive weeds compete with native plants that are important for soil stabilization.

10. Make sure watershed management decisions are handled by an interdisciplinary team that considers at a minimum the soil, hydrology and vegetation interactions.

Tips for Managing Livestock Near Streams Information Sheet

1. Water livestock away from the stream banks if possible. Use nose pumps or some other device.

2. If livestock are watered at the stream, limit their area of access and harden it with rock large enough to stay in place during a flood.

3. Where livestock routinely cross a stream, or in a more appropriate location, harden the banks and bed by sinking in rock large enough to stay in place during a flood.

4. If livestock graze on stream banks, limit their access to a fraction of the growing season through planned rotation grazing.

5. Avoid grazing stream banks when soils are moist and malleable.

6. Avoid grazing pastures when soil is moist and compactable. Wet and dry soil compacts less than moist soil.

7. If the use is season-long, limit forage utilization to maintain a 3-inch to 6-inch stubble height along the bank.

8. Limit livestock consumption of willows or other woody plants that are needed to dissipate stream energy. To allow a young stand protection from hedging, keep half of each year's available shoots ungrazed.

9. Build fences away from the stream so that floods will not wash them out or cut their banks away.

10. If fences must cross the stream, build them so that floodwaters can pass without catching debris at the fence.

11. Place salt, other chemicals, feed, and supplements out of the floodplain or as far away from the stream as possible.

12. Graze to keep pastures healthy – see Module 5, Lesson 2.

13. Keep corrals or feeding areas and other animal handling facilities out of the floodplain, or as far away from the stream as possible.

14. Provide a well-vegetated buffer between the stream and any unvegetated areas that may erode soil or collect manure.

Tips for Living In or Near a Floodplain Information Sheet, page 1 of 2

1. Don't.

2. If all your property is in a floodplain, sell (or gift it) it for open space.

3. If you retain ownership of the open space in a floodplain, don't build on it; sell (or donate) the conservation easement.

4. If you must build on it, put the building on stilts or make the bottom level flood-compatible space, such as carports, garages, unfinished storage areas, etc.

5. If you must fill an area to raise your house above the flood level, keep the raised area small. The flood map will change because of your filling. Also, the 100-year floodwaters will deepen after the watershed is developed or when upstream neighbors increase the speed at which water flow though their streams.

6. If you must fill an area to raise your house above the flood level, only elevate areas that are already high and well away from the actual stream bank.

7. Leave the stream-side area in natural vegetation, even if that may increase flood level. The higher water will move more slowly and thus will cause less damage.

8. Disperse the water running off your house and driveway rather than draining it quickly to a stream, ditch, or gutter. Detention basins or French drains allow water to slowly pass.

9. If your neighbors insist on a levee or an engineered floodway, suggest strongly that it be set back from the edge of the stream, leaving the stream room to flood and move over a wide area through time.

10. If your stream comes with trees, shrubs, snags, big rocks, or dead wood in or near the water, leave them for the stream to use for energy dissipation. Clean out trash such as sawn firewood, boards, litter, shopping carts, etc.

11. If your stream is narrow and meandering and floods frequently, remember that it depends greatly on stream-bank vegetation to keep the banks stable. The banks will move slowly by the process of erosion and bank building to keep the same basic stream form and pattern.

12. If your stream no longer overflows onto its floodplain every year or two as it used to, watch out! After incision, streams erode banks as they create a new floodplain. This is a natural process of recovery, and ultimately leads to renewed stream health and stability. So, keep your house or other valuables out of the way. In the very long term, the stream and flood level may rise to the old floodplain level.

13. If you must protect a bank from erosion that cannot be tolerated, even if it gives back a floodplain to the stream, get outside help to consider all upstream and downstream effects of your project. Make sure you get the needed permits.

Tips for Living In or Near a Floodplain Information Sheet, page 2 of 2

14. Avoid straightening the channel, using concrete near a channel, dredging, smoothing land surfaces that water flows over or against, or obstructing flow with an in-channel dam. If you must do so, hire a reputable engineering firm to consider all upstream and downstream effects of your project and make sure they get the needed permits. If your project negatively impacts your neighbors, be prepared for the consequences.

15. If you build a pond or sediment detention basin, do so away from the stream channel so that it will not have to handle floodwaters and sediment coming from the watershed. Also, make sure that it includes a well-armored spillway and follows proper pond engineering practices, etc. (See USDA NRCS. 1997 (revised ed.) Ponds – Planning, Design, Construction).

16. Do not drain or fill a wetland. Draining or filling wetlands without required permits may result in heavy fines.

17. Make sure land uses in a floodplain are flood-compatible, such as parks, recreation, open spaces, agriculture, wildlife habitat, parking lots, etc.

18. Make sure that all land uses are compatible with local stream ordinances.

Tips for Building or Fixing Roads or Bridges Information Sheet

1. Outslope roads so that they distribute any subsurface water from the upslope area that the road forces to the soil surface.

2. Outslope roads to distribute any water falling on the road surface.

3. Surface roads with gravel that does not erode with tire traffic under the impact of falling rain. Surfacing material should allow water to run off or infiltrate without puddling to avoid erosion.

4. If a road concentrates water above the road and moves it through a culvert, armor the drainage way to make sure the concentrated water does not cause erosion on soil that cannot resist the force of this much flowing water.

5. Keep raised roads out of floodplains. Most roads in floodplains have been elevated to keep them dry. This reduces the floodplain area, deepening and accelerating flood flows.

6. Keep simple “two-track” roads out of floodplains. During floods, the stream may capture roads that are not elevated, because their smooth, straight and steeper surface allows accelerated flow and roadbed erosion.

7. Where roads must cross floodplains, construct them to allow floodwater passage over a wide area. Do this by lowering the road to floodplain level except at the bridge where the water is deep, or by providing many culverts with armored collection areas and downstream dissipation aprons.

8. Where roads must be elevated, consider making a causeway by elevating the road on stilts or by making a very long bridge that spans the floodway.

9. Where a bridge or culvert will accelerate water and cause incision, armor the upstream bed to prevent the incision from becoming a headcut. Dissipate the energy below the bridge or culvert with a plunge pool or engineered structures.

10. Get help from experts to consider all upstream and downstream effects of your project. Make sure they obtain needed permits before beginning projects.

11. Build culverts and bridges big enough for the rare events. The 100-year flood has a 1 percent chance of occurring in any given year, even after a recent flood.Consider fish passage when designing culverts. The culvert should be sufficiently sized to allow for water depth, volume of flow, and velocity levels that will permit fish passage.

Tips for Controlling Pollution Information Sheet

1. Keep garbage, pest and animal wastes, and yard wastes out of roadside ditches, storm drains and waterways. Never dump debris of any type into a creek!
2. Never dispose of household wastes such as paint thinner, motor oil, or pesticides down household drains or stormwater drains. Storm drains often empty directly into the nearest water body.
3. Follow label instructions when using fertilizers and pesticides. Homeowners who overapply waste money, may damage plants or animals they value, can pollute air, water and soil, and may encourage pesticide-resistance in pest species.
4. If you have a septic tank, have it pumped about every three years on average.
5. Avoid hosing down paved surfaces and washing your car in the driveway or street. Even “biodegradable” soaps may be toxic to fish and wildlife.
6. Avoid diverting or damming the creek. Water diversions and dams reduce water flow, often increase water temperature and affect vegetation and wildlife.
7. Pave only where necessary. It increases runoff during storms and peak flows, resulting in flooding and erosion. Encourage water to soak in and recharge soil moisture.
8. If you have livestock, exclude them from entering drainage ditches, creeks and streams or manage them carefully to avoid overgrazing or trampling problems.
9. If you have livestock, collect and compost or dispose of the waste from corraled animals to prevent runoff into surface or groundwater supplies.
10. Also control pet access to creeks and riparian vegetation. Dog and cat feces add excessive nutrients and bacterial pollution to water, which decreases water quality, causes unpleasant odors, and can also cause human health problems. Cats and dogs can be aggressive wildlife predators.
11. Maintain a buffer of natural vegetation between pastures or paddocks and creeks or ponds.
12. Stabilize erosion-prone areas of your property and control erosion by planting ground covers or native vegetation. The use of native or adapted vegetation reduces the cost of yard maintenance, requiring less water and fewer chemical fertilizers.
13. Check your rain gutters and other pipes to see where they drain. Make sure they do not carry water directly into the creek.
14. Compost household organic wastes if you have the space on your property, or begin a community compost program. By producing “garden gold,” you’ll save money and reduce the use of fertilizers that can leach into streams, ponds and groundwater.
15. Learn about your local watershed and how it is interconnected with your immediate neighbors, the surrounding valleys, and ultimately the outside world.
16. Minimize tillage in agriculture and garden areas and leave crop and garden residue in place or till it under to add organic matter and soil tilth.

Tips for Enjoying Your Stream or Riparian Area Information Sheet

1. Relax near the sights and quiet sounds.
2. Learn about and enjoy the wildflowers and other plants.
3. Plant vegetation that attracts wildlife.
4. Learn to identify birds and other wildlife.
5. Orient windows, decks, etc. to see the beauty.
6. Go fishing.
7. Go hunting.
8. Go hiking.
9. Camp out.
10. Gather wild edibles.

My Place on a Stream Glossary, page 1 of 3

Aggradation: The process of building up or elevating a stream bed or floodplains by depositing sediment.

Bank armoring: Coarse, erosion-resistant materials such as large rocks, that protect underlying finer and more erodible material.

Channelization: The practice of straightening a waterway to remove meanders and make water flow faster. Sometimes concrete or riprap is used to line the sides and bottom of the constructed channel.

Coarse woody debris: Logs, branches, or tree limbs that have or could become part of the fabric of a channel, causing water to mix and slow in velocity, and sediment to become stored in the valley bottom.

Degradation: The process of a stream cutting deeper into the streambed.

Deposition: The process by which eroded sediment settles out of the water column onto the floodplain or the stream bed or banks.

Dredge: To mechanically remove accumulations of sediment or other materials from within a stream channel or other water body, often for the purpose of channelization.

Engineering: Designing or creating a designed structure. In streams, engineering often creates a new form, different from what was natural or pre-existing.

Ephemeral stream: A stream that flows only in response to storm events, not from groundwater discharge.

Erosion: The wearing away, detachment and movement of soil and rock materials, generally by wind or water, through natural and/or unnatural causes. The group of natural processes that loosens or dissolves and removes soil or rock materials.

Floodplain: 1. (geomorphology) The land bordering a stream, built up of sediments from overflow of the stream, and subject to inundation when the stream is at flood stage. 2. (hydrology) The area flooded by an event of some specific return frequency.

Flood insurance: An insurance program often required for those living in the path of 100-year floods.

Gully: A channel that has downcut so that water no longer floods over adjacent lands except perhaps in very rare and big floods.

Headcut: A place where water in a channel falls over the edge of a somewhat **erosion**-resistant material and onto material that is so erodible that the location of the falls moves, or cuts, headward up the channel.

Headgate: A structure designed to divert a measured amount of water from a channel into an irrigation ditch.

Incision: Process of the channel cutting into the bed of the valley.

Levee: A berm or wall that keeps a stream away from some portion of its floodplain when the stream flow exceeds channel capacity.

My Place on a Stream Glossary, page 2 of 3

Livestock: Cows, horses, sheep, goats, llamas, or other animals that are kept for pleasure or economic gain.

Meander: An S-shaped curve or bend in a stream. Meanders help reduce the velocity of water in a stream by decreasing slope, or fall per unit distance.

Natural restoration: The reformation of natural features through natural processes such as erosion, deposition, and revegetation.

Natural tendencies: Changes that occur within natural channels or ones recovering on their own from disturbance.

Perennial stream: A stream that flows year-round.

Pesticide: Chemical used to kill pests, generally formulated for a specific pest. The responsibility falls on the person doing the application to have correctly identified the pest and used the pesticide correctly – ALWAYS READ THE LABEL. A chemical used to kill or damage pests of any kind. An herbicide is a type of pesticide used to kill plants or weeds.

Piecemeal engineering: Engineering that does not consider off-site effects and is not part of an integrated plan.

Riparian vegetation: Vegetation that is adapted to the moisture conditions adjacent to a stream.

Riprap: Stones or some energy-absorbing engineered material used to armor a stream bank or channel by blanketing its surface.

Roughness: A feature that mixes water and slows its average velocity or dissipates energy by creating friction.

Sediment detention basin: A pond that allows water to stand relatively still while sediment settles out.

Stream power: The ability of a stream to transport particles out of the watershed. This depends on stream slope and discharge.

Water quality standards: Specific numerical or narrative limits placed on the concentration of various constituents in water, or on other physical or biological characteristics of aquatic systems. The standards are based upon the beneficial uses of the water.

Watershed (drainage basin): An area of land that collects rain and/or snowmelt and discharges much of it to a stream, river, or other water body, or to groundwater.

Watershed condition: The ability of a watershed to capture, store, and safely release water to a stream.

Wetland: An area of land that is saturated at least part of the year by water. Wetlands are delineated with specific criteria related to their hydrology, soils, and vegetation. Wetlands associated with coastal salt water include salt marshes, tidal basins, marshes, and mangrove swamps. Inland freshwater wetlands include swamps, marshes, seeps and bogs (lentic wetlands) and streams, rivers, and springs (lotic wetlands).

My Place on a Stream Glossary, page 3 of 3

Wildlife habitat: The place in the landscape where wildlife are supported because of specific characteristics such as the type and structure of vegetation, food, water, etc. For example, some riparian wildlife habitats are favored by certain birds due to the presence, size, structure, and abundance of willows.

Willows: Shrubs or trees of the genus *Salix*. They are known for their water-loving habit, their common long, pointed, and narrow leaf shape, and their unique but not showy flowers.

Web sites for further information

Washington Department of Fish and Wildlife Stream Habitat Restoration Guidelines
http://wdfw.wa.gov/publications/01374/wdfw01374.pdf

Cows and Fish: Alberta Riparian Habitat Management Program: http://cowsandfish.org/

NRCS-USDA Stream Corridor Restoration:
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/ndcsmc/?cid=nrcs143_009158

National Riparian Service Team (BLM and FS): http://www.blm.gov/or/programs/nrst/index.php

River corridor and wetland restoration – U.S. Environmental Protection Agency:
http://water.epa.gov/type/wetlands/restore/index.cfm

WSU Extension Native Plants, Identifying, Propagating and Selecting: http://pnwplants.wsu.edu/

Riparian Restoration: A Collection of Landowner's Perspectives:
https://fortress.wa.gov/ecy/publications/publications/0410068.pdf

Streamside Planting for Western Washintgon: http://www.co.thurston.wa.us/tcweeds/docs/streamside-planting-guide-for-western-washington.pdf

WSU Stormwater Center: http://www.wastormwatercenter.org/