

# Riparian Zones

## What are riparian zones?



Riparian zones are those areas that surround water bodies in the watershed and are composed of moist to saturated soils, water-loving plant species and their associated ecosystems. These ecosystems consist of complex interactions among the water, soil, microorganisms, plants and animals. Riparian zones may be found surrounding lakes, estuaries and streams and rivers. Wetlands as a whole may also be considered riparian zones. Riparian zones are important transition areas that connect the water with the land, and host a wide array of plant and animal life.

Riparian zones that border streams or rivers are sometimes called stream corridors. Stream corridors link the ecosystems through which the streams flow, by providing transportation highways for wildlife, and facilitating nutrient transfer. If you traveled in an airplane over a natural prairie in the summer, in Saskatchewan for example, the stream corridors would be easily visible as ribbons of green vegetation among an otherwise dry landscape. In coastal British Columbia, on the other hand, the stream corridors are not as immediately apparent from the air, among the lush forested landscape. Nevertheless, they are here. If you circled closer to the ground in the aircraft, or explored on foot, you would notice a change in the vegetation of the forest as you approached a stream corridor.

## Why are riparian zones important?

Riparian zones link ecosystems within a landscape. Landscapes are composed of (often overlapping) patches of different types of vegetation, soil and available nutrients, moisture and light. Disturbances in the landscape, such as fire, pest outbreaks or even the death of a single

tree, create these patches, which provide different types of habitat. This diversity of habitats is important, but so is connectivity between them. Riparian zones allow wildlife to travel between habitat “islands” by providing transportation corridors, and help to circulate nutrients among different ecosystems. Since riparian zones are wetter than the surrounding landscape, they also often resist destruction by fire, and recover more quickly. This helps the landscape as a whole to recover.

To illustrate how riparian zones circulate nutrients, we can consider a single leaf in a forest adjacent to a stream. The leaf falls into the stream, and is carried a few kilometres downstream before it becomes trapped behind a log. Here it is broken down by microorganisms and fed upon by insect larvae. The insects are eaten by fish, which are preyed upon by larger fish, birds and mammals (e.g. raccoons and bears). Mammals often take fish into the forest before eating; uneaten portions of the fish decompose and are absorbed into the soil in the forest. So the nutrients in the leaf have been transferred from the forest to the stream and back to the forest, some distance downstream from where this cycle began. Nutrients can also be transported upstream, for example by salmon that return to freshwater to spawn and subsequently die; their carcasses provide important nutrients to aquatic and terrestrial ecosystems.

The vegetation that grows in riparian zones is specially adapted to wet soil conditions, and can tolerate periodic flooding. This vegetation fills an important niche that connects the water’s edge with dry land, and in so doing accomplishes a number of functions:

- Trees and shrubs that border and overhang streams and lake shores moderate the temperature through shading and the cooling effect of evapotranspiration. This directly benefits fish and aquatic invertebrates, and prevents excess algae growth.
- The roots of plants growing along and near stream banks, lake shores and estuaries provide structure and strength, collect sediment and thus prevent banks and shorelines from being washed away.
- Leaves, twigs, needles and whole trees that fall into water bodies provide nutrients to aquatic invertebrates, which in turn nourish fish.
- Large trees that have fallen into streams help to dissipate the energy of flowing water, protect stream banks and create pools and hiding places for fish.

The animals that live in riparian zones also contribute to the function of these ecosystems. For example, birds and mammals help to disperse the seeds of shrubs and trees. Invertebrates, such as many insects, molluscs (e.g. slugs and snails) and worms help to break down plant and animal matter, making it more readily available as nutrients to other organisms. Salmon fulfill a unique role by connecting the ocean, freshwater and the land, during the course of their lifecycle, which begins and ends in stream corridors. Complex predator-prey relationships between animal species are also necessary to maintain a healthy balance among populations. Healthy riparian zones therefore provide habitat for a huge array of animals. Studies have shown that about 80 percent of wildlife depend on riparian areas in whole or in part.

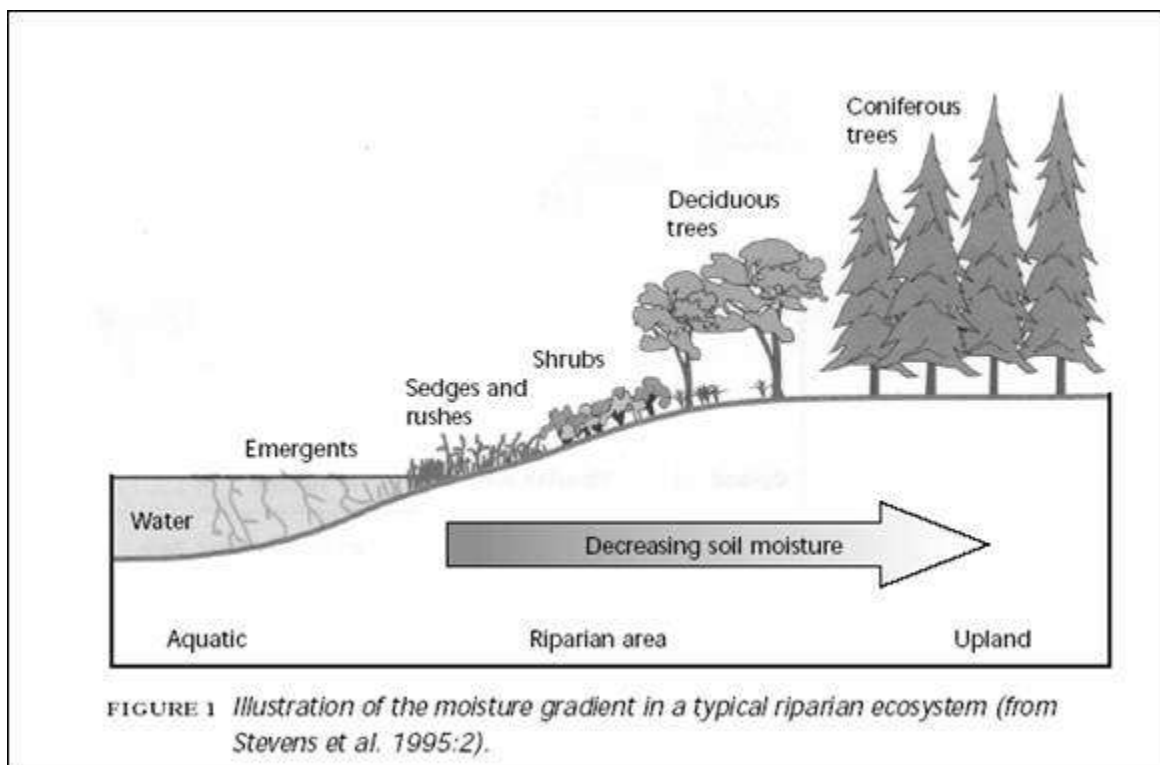
A similar percentage of people live near and use riparian areas. Historically, people depended on the wildlife, plants and drinking water that could be found in abundance in these areas. Large

cities have grown up around many of these sites, and even modern society depends on the products and services of riparian zones.

## What types of wildlife and plants live in riparian zones?

Some of the many types of plants commonly found in riparian zones in south coastal British Columbia include:

- Herbaceous and aquatic plants, such as rushes, sedges, cattails, Skunk Cabbage and pond lilies, that grow in and immediately adjacent to the water.
- Shrubs such as willows, Red-osier Dogwood, Hardhack and Salmonberry, which grow next to the water along banks;
- Trees such as Western Redcedar, Black Cottonwood and Red Alder, which can grow some distance back from water bodies, but require moist soils.



Animals that live in riparian areas include:

- Thousands of species of insects including mayflies, caddis flies, stonefly nymphs, water beetles, whirligigs, water striders and water boatmen
- Crustaceans such as copepods, amphipods and crayfish
- A wide variety of freshwater and anadromous fish (sea-going fish that return to fresh water to spawn)

- Amphibians such as the blue-listed Red-legged Frog (*Rana aurora*), Pacific treefrog (*Hyla regilla*) and Northwestern Salamander (*Ambystoma gracile*)
- Birds such as American Bittern, Great Blue Heron, Northern Pintail, Northern Harrier, Short-eared Owl, Mallards, Canada Geese and Redwinged Blackbirds
- Mammals such as mice, shrews, raccoons, river otters, squirrels and bears

## How do people use riparian zones?

People have long relied on riparian areas for the abundant food, water and material resources they supplied. Riparian areas also provided transportation corridors for travel by boat, and were often the only flat land areas suitable for building roads, farms and cities. For these reasons, many riparian areas are among the most densely populated of urban regions.

Although this development has allowed many of the comforts of urban life, it has come at a price: the loss of riparian areas threatens the survival of hundreds of species worldwide, as well as the continued function of their associated ecosystems, upon whose services we rely. Some of the vital ecosystem services performed by riparian areas include the following:

- Healthy riparian zones help to filter and purify water for drinking, irrigation and recreation.
- The vegetation and soils in riparian zones soak up and store water during high rainfall events, and help to prevent floods.
- Stream corridor vegetation gives stability to stream banks, preventing property damage due to erosion and/or flooding.
- Many of the animal species that depend on riparian areas are commercially important for food harvesting and/or wildlife viewing. These include Cutthroat Trout and other angling fish, salmon, bears, birds and deer.
- Riparian areas help to regulate greenhouse gases by producing large volumes of trees and other vegetation that take up and sequester carbon dioxide.
- Complex interrelationships between microorganisms, plants and nutrients in riparian areas help to break down contaminants that we discharge into the environment.

Furthermore, riparian areas are focal points for education, recreation and aesthetic appreciation. Properties that border or contain riparian areas are usually sold for more money than those that do not. This is indicative of the high appreciation people have for water and greenspace. The good news is that riparian areas can be compatible with development when they are incorporated into planning, and protected to some degree. Stream corridors make excellent linear parks or greenways, and wetlands may be preserved within housing developments and even used to help purify runoff from paved surfaces.

## What threatens riparian zones?

- Riparian areas are threatened by large-scale destruction with expanding urban, agricultural and residential neighbourhoods.

- They are also directly and indirectly impacted by logging. Deforestation of riparian vegetation can lead to significant increases in water temperature, algae blooms, erosion and sedimentation. Logging roads, if not carefully designed, can also cause erosion and sedimentation.
- Impervious surfaces in urban areas can destroy riparian areas as more water flows quickly into streams and other water bodies.
- Construction activities, if not carefully monitored, can cause excessive sediment to be washed into water bodies, where it can smother fish spawning beds and injure aquatic life.
- Shoreline modification through hardening (i.e. with protective walls) and vegetation removal around lakes and wetlands reduces riparian habitat (see altered shorelines).
- Invasive species such as Reed Canary Grass and Purple Loosestrife threaten riparian areas by out-competing native plants and generally providing inferior wildlife habitat and food. They may also substantially alter the natural hydrology of streams and wetlands, for example by clogging up water channels.
- Pollution from automobiles, industries, household chemicals, fertilizers and sewage threatens riparian areas. Toxic chemicals may kill off beneficial plants and animals, and excess nutrients can cause algae blooms that rob the water of oxygen.

## **How can I help protect riparian zones?**

- Help to preserve riparian areas on your property. If you are planning a new development or a modification of your property, try to preserve riparian areas such as wetlands whenever possible.
- Preserve and maintain a buffer of native vegetation along streams and shorelines on your property; this will help to prevent erosion and provide wildlife habitat. See shoreline development for more tips.
- Reduce or eliminate fertilizer and pesticide in your garden. Even if you do not live adjacent to a riparian area, substances from your property can be washed into near or distant water bodies. See natural gardening techniques for more information.
- Keep hazardous substances (e.g. motor oil, paint, pesticides, solvents) out of riparian areas by disposing of them at an appropriate facility (see the CRD recycling guide).
- If you own a farm (even a hobby farm) and/or keep livestock such as chickens, horses, sheep or cattle, learn how you can protect riparian areas through sustainable agricultural practices.