

Get Your Feet Wet: the Essentials of Riparian Areas

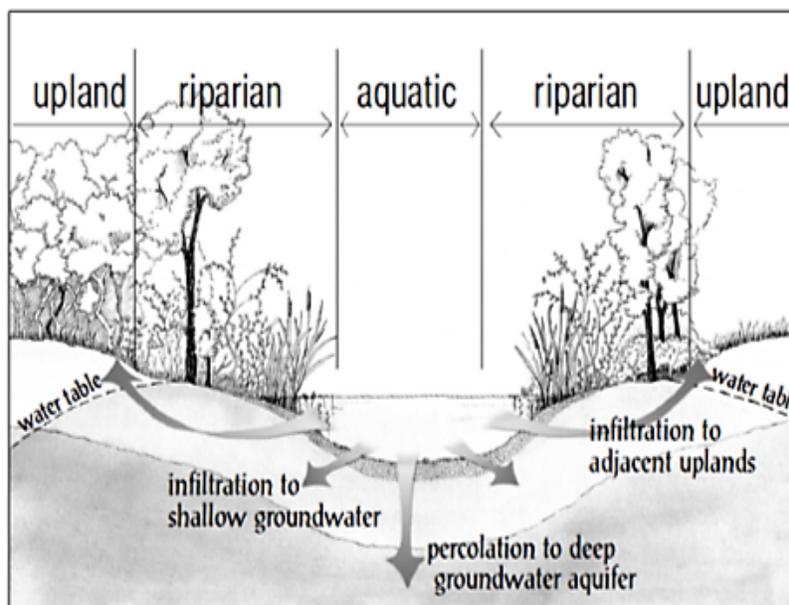
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The Elbow River watershed is comprised of a wide array of environments and ecosystems; it provides a draining pathway for glacial water to feed the Elbow River and all its branches. Within this watershed are riparian areas, which are essential components to the biosphere.

Riparian areas are made up of both aquatic and terrestrial ecosystems that reduce erosion, store and process pollutants, and create habitat for wildlife. Riparian ecosystems also have the capacity to delay and store influxes of water, which can mitigate flooding (Mitsch & Gosselink, 2000; Zukowski et al., 2015). The health of these systems is assessed through species richness and habitat diversity (Naiman, Decamps, Pollock, 1993). Both the public and industries who use

these areas can be better informed through understanding what defines an area as riparian, their importance within the landscape, and how to distinguish healthy from unhealthy systems. This in turn can help to maintain ecological integrity within the ecosystem.



A riparian community is comprised of three main elements: nutrient-rich waters, aquatic and shoreline vegetation and saturated soils. Riparian zones are defined as terrestrial areas immediately alongside and surrounding aquatic zones. These areas are subject to highly fluctuating water tables from the rivers or streams they are near (Mitsch & Gosselink, 2000). The ebb and flow of water levels allow decomposed animal and plant matter to be deposited along the banks, where this material decomposes into a substrate of rich organic black chernozemic soils (Armas, Kim, Bleby, Jackson, 2012). Rich organic soils that retain water are highly productive and support diverse vegetation communities (Cows & Fish, 2018; Naiman & Decamps, 1997). Within riparian areas, willows (*Salix sp.*) and sedges can be found in abundance (Clare & Sass, 2009). With their vastly diverse vegetation and proximity to water, riparian areas are attractive to livestock and wildlife (Cows & Fish, 2018). Not only are they an

important refuge for mammals, birds, and fish but riparian areas also provide us with clean drinking water, thanks to their filtration abilities.

Long-established vegetation and soil can collect and process contaminants that run in from nearby land use. These causes of pollution can range from recreational use to agricultural practices (McIver, 2014). High levels of nitrate or phosphate in our drinking water can lead to harmful effects; however, the climax community vegetation filters out these contaminants from the water. Riparian areas can filter out agricultural waste, such as nitrate-heavy runoff, by up to 56 percent and can reduce total phosphorous from the same runoff by up to 76 percent (Piniewski et al., 2015). Ensuring that these systems are healthy and robust requires continual assessment and monitoring of all key components.

Typical signs of a healthy environment include: increased bank stability, deep-rooted and established native vegetation and the ability to function as a flood mitigation feature on a landscape (ARHMS, 2013; Fleming, Galt & Holecheck, 2001; Macfarlane et al., 2017; Miller, Chanasyk, Curtis, Entz, & Willms, 2011).

Within the Elbow River watershed, healthy riparian areas have been modelled on 11 parameters, six of which relate to vegetation, and the last five relating to soil and hydrology (ARHMS, 2013). These factors were used to classify the riparian habitats within the watershed into three discrete categories: healthy with no problems, healthy and unhealthy (ARHMS, 2013). These basic parameters define assessments of health and fitness. It is critical to understand that all riparian areas are different, and thus require intensive and new approaches when assessing their components. Without appropriate classification and proper management, these riparian areas can degrade and become unhealthy, impacting every creature dependent on these ecosystems.



Due to their location lining the shores of streams, rivers, lakes and wetlands, riparian systems can be subject to frequent selection by ranchers and grazing species. In areas that are heavily selected, healthy components are not always found within a system and in some cases intervention and restoration will be needed. Over time, heavy use in an area can result in compacted soils, decreased bank stability, trampled vegetation and an overall decrease in local biodiversity (Samuelson & Rood, 2011).

The lack of stability and disturbed ground can prevent native vegetation from existing, in return providing ideal areas for invasive weeds such as Canada Thistle and Tall Buttercup (Hilliard & Reedyk, 2014). Soil compaction and decreased native vegetation are main factors of degraded riparian systems. With proper management practices from watershed associations and land users, these critical environments can be maintained.

Riparian areas are terrestrial zones that display intermittent highwater tables and contrast the aquatic ecosystems in a landscape (Mitsch & Gosselink, 2000). Not only do they house an abundance of plants and animals, they also filter out contaminants to provide us with clean water. The health of a riparian system can be distinguished based on land assessments focused on vegetation coverage, amount of erosion, weedy species and type of land use. By educating landowners, developers and the public on their impact on riparian areas, we can improve management techniques and maintain the ecological integrity of these sensitive and essential areas.

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