

Ribbons of Green: Riparian Areas of Arizona

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When looking at the Arizona landscape you can see ribbons of green, up in the high mountain region of the ponderosa pines to the southern desert shrublands. These ribbons, the riparian areas, are distinctive, unique and have always been attractive to humans and wildlife, although these areas make up a relatively small portion of the landscape. It is estimated that in the Western United States only 2% of the land area is riparian. Their relatively small area and many human and wildlife uses often lead to competition for this resource among various stakeholders.

But what makes these areas distinctive and unique compared to the surrounding landscape? There are three main factors: i) water, ii) soils, and iii) vegetation (Figure 1). These three factors are interconnected and interrelated to each other. So let's look at each of these factors in more detail.

Water is the most important factor, the driving force of the riparian areas. Riparian areas are located along surface water bodies such as streams, rivers, lakes or ponds. In semiarid and arid regions, water is the most limiting factor to the survival of human, wildlife, and plant populations. As water is limiting in these regions, so are riparian areas and this is not a coincidence. Although greater water availability than that in the adjacent uplands is necessary to support the riparian area, definitions differ on how long surface water needs to be present before an area is considered riparian. Some argue that to be defined as "riparian," the area must be adjacent to perennial (having water year around) or intermittent (having water most of the year) water bodies. Others extend the definition to include ephemeral water bodies that flow only in response to precipitation events or snowmelt. This is a debate

that is very important for semiarid and arid regions like Arizona, where more than 90% of streams are ephemeral, a percentage much higher than in most other states. But to really understand the influence of water we need to discuss the other two factors.

Riparian **Soils**, have greater water availability (higher moisture) compared to the surrounding landscape because they are so close to a surface water body. Processes such as erosion and deposition frequently disturb these soils because they are adjacent to a surface water body. As a result, riparian soils are poorly developed compared to the surrounding upland soils and considered young. These processes of erosion and deposition are driven by flood events. Floods erode sediments from stream banks and floodplains, but also rejuvenate floodplains by the deposition of sediment and nutrients. If you look at an exposed stream bank, you can see different layers of soil material and rocks that were deposited by past floods (Figure 1). The variation in the size of sediments generally corresponds to different local flood magnitudes.

Riparian **Vegetation** is a very distinctive feature in comparison with the surrounding landscape. In general, riparian vegetation is denser, taller and in many cases has very different plant species composition. This is the result of greater water availability (higher soil moisture) and the unique riparian soils. With greater water availability these areas can support more plants that grow faster and to a larger size. The wetter soil conditions, young soils and frequent disturbances (e.g. flooding) also lead to different plant species occupying these areas. Many of these species are pioneer species that occupy areas first after a disturbance event. Common

woody species include cottonwoods, willows and alders and the invasive non-native salt cedar.

Understanding the factors that make these areas unique, and even more importantly knowledge of the processes that drive riparian areas, are essential to manage and conserve them. Properly managing these areas is critical in semiarid and arid Arizona, where the acreage of riparian areas remains the same in the face of a rapidly growing human population and the subsequent increased demand for this resource.

Want to learn more about riparian areas?

1. The educational web-module "Arizona's Riparian Areas" available at <http://cals.arizona.edu/extension/riparian/> and
2. The University of Arizona Cooperative Extension publication "Understanding Arizona's Riparian areas" available at: <http://cals.arizona.edu/pubs/natresources/az1432.pdf>.

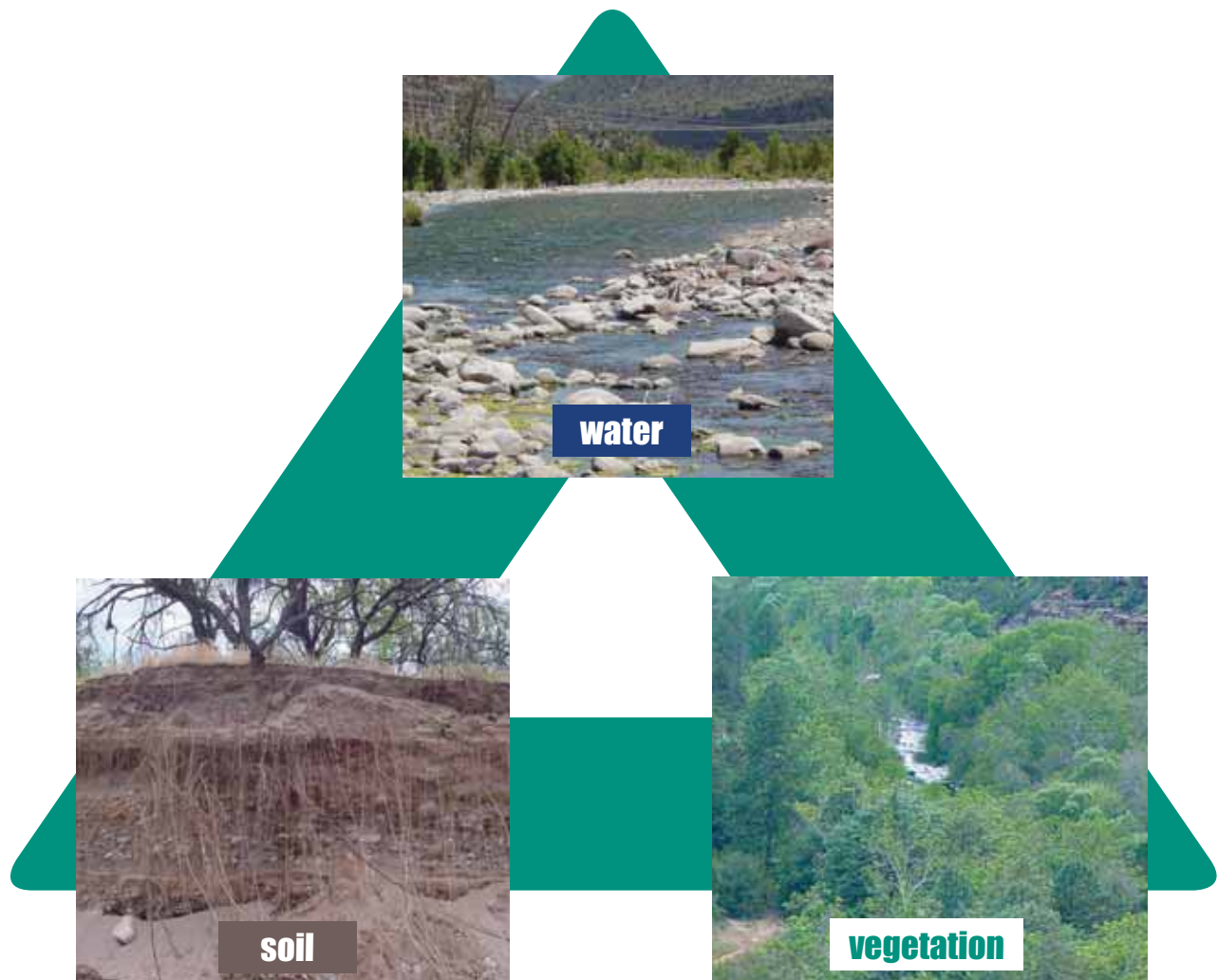


Figure 1. Water, soil and vegetation characterize the riparian areas compared to their surrounding landscape (photos courtesy of George Zaines and Doug Green).