Missouri Streams Fact Sheet

RIPARIAN CORRIDORS

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What is a riparian corridor?

Figure 1

The riparian corridor is the part of the floodplain closest to the channel and is greatly influenced by the stream. The stream and corridor interact with each other in a way that is mutually beneficial. When a stream floods, rich soil is deposited in the land surrounding the channel, which saturates the soil, improves soil fertility and increases the level of the local water table. All of these things benefit trees and vegetation in the riparian corridor. A continuous corridor of natural vegetation does many things to help maintain a healthy, stable stream ecosystem, making the riparian corridor very important. Riparian forests and prairies help a stream's biological diversity and productivity by influencing water quality, *flow regime*, physical habitat and sources of food energy. Changes in one or all of these factors will be reflected in the quality of aquatic and riparian communities.

While deeply rooted native grasses can provide a fully functional riparian corridor for some small *low-gradient* streams, a healthy riparian corridor on Missouri streams is generally densely forested with a shrub and grass understory (Figure 1).

Riparian Vegetation and Water Quality

Riparian corridor vegetation, or lack thereof, affects many elements of water quality. The four most important water quality components affected by the riparian corridor are nutrient loading, sediment loading, water temperature and dissolved oxygen levels in the water.

Riparian corridors that are forested or covered with native, unmowed grasses not used for grazing can serve as a buffer for the stream by trapping sediment and pollutants carried in surface runoff

before they enter the stream. A vegetated riparian corridor also can intercept and retain nutrients, such as phosphorus and nitrogen, and help keep the stream's food web and algal growth in balance. If too much algae grows in the stream, the large blooms can reduce dissolved oxygen to levels that can stress or kill aquatic life. The buffering effects of riparian corridors are sometimes limited by *gullies* that allow runoff to bypass the riparian zone, robbing it of potential nutrient filtering opportunities. Factors such as soil type, vegetation, slope and others all can affect the buffering capability of riparian corridors.

Figure 2

Healthy riparian vegetation can also improve streambank stability because the roots of plants and trees hold the soil and help reduce streambank erosion. Streamside forests shade small stream channels and moderate daily and seasonal water temperatures (Figure 2). High water temperatures can directly stress or kill fish and reduce the amount of oxygen in the water, potentially harming other aquatic life.

Riparian Corridors and Streamflow

Ideally, native grass and forested riparian corridors should start at the headwaters and continue all the way to the mouth of the stream. This continuous corridor of natural plants and trees along the entire length of a stream provides many benefits. In the healthiest riparian corridors, the types and ages of plants vary between stream reaches to produce a wide range of food types and habitat conditions for both terrestrial and aquatic wildlife.

Riparian prairie or forest floor both act like sponges, absorbing both precipitation and runoff. This sponge-like action of riparian corridors helps to reduce flood peaks, recharge the water table, and maintain base flows by storing excess water. Base flows are necessary to keep streams flowing between storms and to help reduce daily variations in water temperature, which could jeopardize the life of the stream.

Riparian Forests and Stream Habitat

Riparian forests affect the physical habitat of the stream channel in several ways. Trees and roots sticking out of streambanks and large woody debris can reduce the power of streamflow, which slows water velocities and can improve bank stability and reduce erosion. Tree roots are very effective at stabilizing banks that aren't too tall. Since streambank erosion usually originates at the

toe, or bottom of the bank, tree roots can be less effective at protecting banks where the rooting depth is much less than the bank height (Figure 3). Tree roots also cannot always hold the banks of a stream if it is unstable because of major watershed alterations that cause significant changes in flooding, sediment load or the steepness of the channel. However, without trees and vegetation, the damage could be much greater and occur at a faster rate.

Figure 3

Riparian forests also provide a source for woody materials that end up in the stream channel and serve as cover for stream fishes, habitat for macroinvertebrates and microbes, sunning spots for turtles and perches for many bird species.

Large woody debris from the riparian corridor also diversifies important stream habitat characteristics like current velocities, *substrates*, and water depths. For example, large trees that fall in the channel and are deposited along the outside bends of a stream can create pool habitat when high flows scour the substrate around the trees (Figure 4).

Figure 4

A well-vegetated riparian corridor dissipates the power and erosive force of overbank floods, captures sediment and woody debris carried by the stream during high flows and provides high quality habitats for a variety of wildlife species.

Riparian Corridors as Fish Food

Trees, leaves, twigs and other organic materials produced in the riparian corridor eventually make their way to the stream channel. These materials then become the foundation of the food web in many headwater streams. The organic materials are slowly eaten by *microbes* and *macroinvertebrates*, which then become food for other aquatic organisms. Bigger debris from trees also helps to trap smaller food materials and retain them in the stream channel for stream life.

How big is the riparian corridor?

The size of riparian corridors can vary with the size and shape of the stream channel, frequency of flooding, local topography and soil type. A riparian corridor that includes a minimum 100-foot wide forested strip of land on each side of the channel can provide most of the functions needed to protect stream health of all but the largest Missouri streams. Narrower corridors (Figure5) can be used to partially protect a stream, but they do not provide all of the benefits of a wider corridor (Figure 6).

Figure 5

Figure 6

Poor Riparian Corridors

Streams with little or no corridor experience both biological and physical changes that can create a hostile environment for the stream life living in them. The environment includes many negative aspects:

- greater temperature fluctuation
- increased sediment from streambank erosion and overland flows
- less woody debris for habitat and food production
- higher velocities
- and increased amounts of pollution, among other effects.

All in all, streams benefit from healthy riparian corridors and so do the terrestrial and aquatic wildlife that use them. People can also benefit from healthy riparian corridors because of the corridor's ability to protect land from erosion, keep water clean and support diverse ecosystems.