



Riparian Buffers

Rationale, Strategies, and Resources for Restoring and Protecting Streamside Corridors

What is a riparian buffer? It is the land next to a river or stream. In its natural state, it has native plants growing on it: trees, shrubs, or tall, coarse grasses; the type of vegetation depends on the climate. As the name suggests, these plants “buffer” the stream from anything that flows into it - polluted water, eroding soil or toxic chemicals. The roots of the plants hold the river banks in place, stabilizing the land and absorbing the water and materials that flow across the land. Also known as “riparian areas,” buffers support both land and water based animals, insects and plants, and are essential in the interrelated web of our natural world.

The width of the buffers is important. Depending on the specific characteristics of a stream and its surrounding areas, the size of buffers can and will vary significantly. Though even a small buffer (i.e. 25 feet) is better than none. The larger the protected area, the more likely it will substantially reduce polluted runoff, provide an effective corridor for wildlife, support fish habitat and ensure many of the ecological functions of the stream. On highly permeable soils or very steep slopes, buffers should exceed 100 horizontal feet.

Buffers can take many forms and serve their function in rural, suburban, and urban areas alike. A greenway along a river, which typically includes a recreational path and sometimes includes paving, can provide some of the functions of buffers by trapping materials that otherwise might flow directly into a stream. Urban greenways and buffers fill critical roles in this way by retaining materials from entering

watercourses. In developed areas, even narrow bands of vegetation can make significant improvements in water quality, habitat, and the environmental health of a river. Urban buffers are especially effective when coupled with pollution and flooding control technologies, such as catchbasin filters, separated storm water/sewer lines and velocity reduction structures. Further, urban greenways and buffers bring a welcome natural character to developed settings, improving the quality of life and scenic nature in an urban area. To be most effective, such buffers should include native vegetation and be as wide as possible.

Unfortunately, too few people understand the importance of riparian buffers. Many people destroy buffers unnecessarily through lack of knowledge. Real estate developers clear plants for better views; road builders bury buffers beneath highways; engineers construct culverts, stream channels and retaining walls over buffers; farmers often cultivate down to the river bank; and homeowners and timber harvesters clear trees right to the water line.

Destroying buffers causes erosion, siltation of riverbeds, downstream flooding, increase pollution, damage to fisheries and recreation, species and diversity loss and reduction of scenic value. Repairing such damage can be extremely costly - often at public expense. The most simple, efficient and low cost solution to many of these problems is to leave a strip of undisturbed natural area along our rivers and streams. *It is far more economical to prevent pollution and destruction of a river than to clean it up after the damage has been done.*

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Ecological Function and Services of Riparian Buffers

Ecological Functions

Buffers and natural riparian zones provide communities with numerous benefits, free of charge:

Reducing Water Pollution

Non-point source pollution is responsible for most water pollution in the United States today. Oils, salt and sand from our roads; fertilizers used on lawns and farms; manure from livestock and other pollution can damage our rivers' health. The most efficient and cost-effective way to keep these pollutants out of our water is to "trap" them by maintaining a buffer of natural plants along our streams and rivers to absorb and filter pollutants before they enter the water. Buffers even appear to remove some pollutants from water flowing down a stream's main-stem.

Reducing Flooding and Drought

During floods, undeveloped land surrounding rivers acts like a sponge, absorbing rising and falling water. Native plants in undisturbed areas help slow flood velocity, store water for future use, and slowly release water over a long period of time. Loss of floodplains and stream buffers increase the change of floods and can worsen flooding when it occurs. Intact buffers also store subsurface water and slowly release it to the stream channels, maintaining baseflow during dry spells.

Controlling and Reducing Erosion

Erosion results in serious environmental and economic damage. Loss of topsoil damages farms, homes and businesses, chokes clean streams, destroys fish and animal habitat, and eventually clogs our harbors and shellfish beds in bays and estuaries. Much erosion can be controlled by keeping a buffer of natural plants along the banks of our streams and rivers to "trap" eroding silt, strengthen and stabilize stream banks, and help keep the water clean. Additionally, leaves, both living on trees and dead on the ground, protect streamside soil from splash erosion (i.e. the scattering of topsoil by raindrops as they hit the ground).

Fish Habitat

Fish need clean water, minimal variation in water temperature, food and shelter. Buffers create and maintain fish habitat. Shade from streamside vegetation reduces water temperature variation. Plant

detritus falling into the water provides hiding and breeding places. Leaves provide food for aquatic insects, the base of the food chain for fish and other animals.

Providing Nutrients

Buffers supply up to 90 percent of the nutrients, in the form of shed leaves and fallen insects, for instream animals.

Animal Habitat and Migration

Riparian buffers are essential to feed, shelter, and provide travel paths to more than 95 percent of all terrestrial species in North America. Further, buffers are essential in the breeding and nesting cycles of many species. Loss of natural buffers limit animals' safe access to water, putting more and more species at risk.

Ecological Services

The above natural functions can be restated anthropocentrically into three categories of ecological services (i.e. natural processes that sustain human life):

Economic Services

- Reducing downstream flooding
- Recharging aquifers
- Supplying surface water in arid regions
- Supporting the productivity of fishes and other harvestable species
- Supporting sustainable yields of timber
- Fueling the recreational and tourism industry

Social Services

- Storing heavy metals and toxins
- Improving air quality
- Serving as natural fences, visual screens and noise buffers
- Recycling nutrients
- Improving the quality of drinking water sources
- Serving as sinks for our excess carbon dioxide
- Storing excess sediments
- Fulfilling recreation and aesthetic needs
- Serving as laboratories for teaching and research
- Offering places for camping, nature study and hunting

Biological Services

- Providing special habitats for rare and upland species
- Serving as corridors for species movements
- Supporting predators of rodent and insect pests

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