THE UPSTATE CHAPTER OF THE SC NATIVE PLANT SOCIETY

SHORELINE BUFFERS *& water quality*

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What is a shoreline buffer?

A shoreline buffer acts as nature's own septic system — an inexpensive, effective, and agreeable means to help treat typical runoff from a watershed and preserve the cleanliness of open water bodies.

Vegetation that is planted or purposely left in place next to a water body serves as a barrier against sediment and other non-point-source pollutants, and is sometimes called a "vegetative shoreline buffer," "filter strip," "conservation buffer" or "streamside management zone."

Whatever we call them, these bands of greenery provide much more than a natural look and sheltered feeling for those humans and wild things living along the shore.

How do shoreline buffers work?

Counteracting non-point-source pollution involves protecting water bodies from loading with excess nutrients, sediment, contaminants, and pathogens.

Riparian buffers shield the ground, prevent erosion, restrain runoff flows, and get the water underground where much of its excess nutrient load (such as substances that breed aquatic algae) can adhere to soil particles or be absorbed by living roots. Sediment is trapped up on the land, where it belongs, and runoff water, is guided into the soil, where nutrients can feed land plants and contaminants are filtered out.

Vegetative buffers provide numerous other environmental advantages beyond their effects on water quality, for example:

Native shoreline vegetation attracts numerous kinds of wildlife by supplying the bulk of their habitat needs — shelter, food, water, safe travel corridors and migration stopovers, and potential nest sites — within a relatively small area. Native vegetation requires **none of the fertilization, watering, and chemical pest controls** that can be detrimental in riparian areas. If buffers are the only interconnected, semi-wild environments in a developing lakeshore or streamside area, they may be key to the persistence of **local populations of birds, mammals, amphibians,** and other animals.

By shading the water, trees growing along the banks of relatively narrow streams reduce illumination and keep algae from growing out of control. They also cool the water and increase the availability of oxygen for fish. Trout and other sensitive aquatic species often depend on shoreline vegetation to maintain a suitable environment.

Natural shoreline vegetation gradually releases bits of decaying leaf litter and other organic matter that serve as food to

some of the smallest aquatic organisms. This supplies energy steadily to the base of the food webs that support fish and other vertebrates — without overloading the system with an excess of rapidly decomposing material.

On low streambank sites, a floodplain buffer strip provides for water storage during times of high flow, reducing the risk of flood damage to structures and other property while accumulating the excess discharge to be slowly released when flows decrease.

The natural appearance of vegetation along the water's edge has more aesthetic appeal than a bare shoreline. Trees and shrubs lend privacy to shoreline homes and shield them from the noise and odors that may result from activities on the water. Even when residents wish to retain a view of a nearby lake or stream, they often prefer to have their vista framed by greenery, punctuated with colorful fruits and blossoms, and visited from time to time by wildlife.

Buffers provide wonderful opportunities for active education and recreation. **Children need more than nature programs and adventure shows** to satisfy their curiosity about their natural surroundings, and all of us can take pleasure and interest in learning about the wild things growing right outside the back door.

Not the least of the advantages of buffer areas is the relaxation they can offer from the drudgery of yard work. Once in place, vegetated buffers should require less maintenance (and therefore less labor, expense, and waste) compared with the mowing, fertilizing, irrigation, and pest control required by a typical lawn.

What should a buffer include?

Great flexibility is possible in the design of buffer strips, and no two buffers need look exactly alike. There is plenty of room for personal creativity! Here are some general considerations:

"If it ain't broke..." Where there already exists a mature, healthy stand of natural riparian forest bordering a water body, it is virtually always preferable to leave it there.

Specialists consider the pre-development native plant community to be the best "reference benchmark" or "target" to use in restoring vegetation, and forests originally protected the banks of virtually all of South Carolina's fresh waters. Leaving forest intact also fosters native wildlife and preserves natural landscape views.

Felling trees and digging holes for new plantings can create bankside soil disturbance and sedimentation even beyond the sort that a buffer is intended to counteract; undisturbed forest, on the other hand, is practically unrivalled in its ability to protect watersheds. Deep canopies of trees break rainfall impact; their roots loosen soil structure, encourage infiltration, take up nutrients, and help stabilize shorelines; and — often the most important element of all — the thick mat of dead leaves and other organic litter that accumulates on a forest floor is one of the best shields there is against surface flow and erosion.

Wherever slopes are steep and surface runoff could be heavy, the value of forest

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cover hinges on this litter layer. To detain surface flows, the layer should be uniformly two or more inches deep and sufficiently compact and conditioned, a state that can take several years to develop. Where flooding, raking, or excessive foot traffic has removed the litter, severe erosion is possible over the exposed surface despite the cover of a well-stocked forest. Trees alone cannot detain surface runoff — which leads to the following indication....

Protect the ground first! A dense, continuous cover of ground-level material is often the most essential part of a buffer because it works right where the fate of water is decided. Depending on the condition of this layer, water running down a slope either travels swiftly, channeling its muddy way toward a water body, or is impeded and slowed, spreading out in a low sheet that can gradually sink into the ground. Walking around outside during a hard rainstorm — and stopping to compare the movement of water across covered patches to its flow over bare ground — is one convincing way to discover the significance of this precaution.

The deep roots of woody plants can contribute much to a buffer by taking up excess nutrients, if their installation does not require too much soil disturbance; but newly planted trees and shrubs without appropriate ground cover between them do little to protect water quality, especially on slopes.

Other than a robust forest floor, one of the most functional ground covers for buffer areas is a thickly growing meadow of native perennial grasses and herbs. Tall grass stems and thick root mats "sieve" and detain water and allow it to seep slowly into the soil, providing the first barrier against its contaminants entering nearby waters. Where such cover already exists, it is important not to clear it away without a ready replacement; and when beginning to plant a buffer on bare soil, a top priority might be to establish a lush growth of native grasses and herbs.

Thoroughly mulching the ground around woody plantings with wood chips, pine straw, or leaf compost can act like a forest floor in stopping runoff, as long as an adequate thickness is maintained. Mulch is not normally as resistant to trampling as rooted plants are, though, and it is prone to be washed away by river currents wherever periodic flooding is a possibility.

Minimize areas of turf in the buffer. Not all grass is the same, when it comes to buffering water bodies. Even though combinations of native moist-site grasses such as Chalky Bluestem, Bushy Bluestem, Silver Plumegrass, Switchgrass, Eastern Gamagrass, Sweetgrass, Soft Rush, or River Oats would make handsome and effective buffer strips, many standard lawn management practices are undesirable at the shore of a lake or stream.

If a proposed buffer strip already contains an established cover of close-cropped turf grass, the optimal solution is not to take a drastic step like sod removal or herbicide use that can expose or contaminate large areas of soil near the water's edge. A more gradual transition might be achieved, for example, by mowing far less often to let a meadow-like growth develop, removing any clippings to compost them away from the water, and sowing or plugging in small patches of colorful wildflowers and other native meadow plants. One could also allow trees and shrubs to seed in naturally; or carefully interplant seedlings of woody species that will ultimately build up a litter cover and shade out the grass.

How far away from the edge of a lake or stream should a vegetated buffer strip extend?

There is no single, universal answer to this question except: The wider, the better! Although it would be impossible to cover all of the possible situations in a single rule of thumb, nearly everyone agrees that:

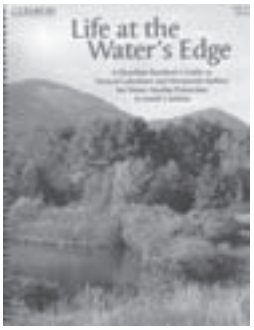
- the wider a buffer strip is, the more successfully it will protect water quality;
- a minimum width to leave vegetated and keep free of fertilizers and other chemical use should be at least 30-50 feet along each side of a water body;
- sloping ground needs wider vegetated strips to intercept runoff and prevent erosion, with several extra feet of undisturbed ground cover added to the width of the strip for each additional degree of slope;
- special situations may require added width—expanses of wetlands along floodplains should remain with their native plant cover, for example—and
- other benefits call for further extensions: results of wildlife research indicate the need for forested strips 300 to 700 feet wide to best foster bird and mammal populations.

Why isn't my lawn a suitable buffer?

An often-asked question! Lawns are normally kept closely clipped, and unless they are heavily fertilized they may have thin patches, limiting their effectiveness at arresting runoff and filtering sediment. Grass roots can help absorb nutrients, and they bind the soil and improve its structure as far down as they penetrate, but this is often not very far. Many common turf grasses do not root deeply when kept mowed, and shallow rooted plants edging a water body can also lead to shoreline erosion.

A vigorous, bright green carpet of grass usually demands incessant applications of chemicals that should not be used near bodies of water. Fertilizers leaking into a lake or stream can cause algal bloom whose decay robs the water of oxygen, while many pesticides are harmful to fish and other aquatic animals.

For the same reason, the soil beneath heavily treated turf grass may come to have fewer earthworms and other tunneling organisms than the ground beneath natural vegetation, where the cavities of these animals help water percolate into the ground. In addition, a mowed lawn has almost no wildlife value: no cover and no food value at any level in the wildlife food chain.



Overall, a cover of turf grass provides a far less effective buffer than a native meadow or a riparian forest, with a whole lot more effort and expense!

— condensed and adapted, with permission of Clemson University Public Service, from ***Life at the Water's Edge, A Shoreline Resident's Guide to Natural Lakeshore and Streamside Buffers for Water Quality Protection in South Carolina****, edited by Lin Roth, Ph.D., and published by Clemson University Public Service Publishing. This award-winning book includes chapters on designing, establishing, and maintaining vegetative water-course buffers, lists of recommended plants, as well as discussion of the importance of what's at stake: the health of our watersheds.* www.clemson.edu/psapublishing