

CHAPTER TWO

Buffer Landscaping and its benefits

A lakefront buffer landscape is an area of vegetation created near the lakeshore to slow runoff and to trap sediment, excess nutrients, and other pollutants. A landscape buffer serves as a protective area between the lake and human activity such as housing development or agriculture. Buffer landscaping also prevents erosion and stabilizes sloped areas of the shoreline. A landscape buffer can be simple or complex, but the idea is to have some kind of vegetation other than grass along the lakefront. Lakefront buffer landscaping can be called a “living filter”. Plant root systems combined with natural chemical and biological activity in the soil can capture and transform nutrients and other pollutants into less harmful forms.

Buffers Create Sediment Filters

Many pollutants can enter the lake and degrade the quality of lake water and the quality of life on the lake. Storm water runoff comes from rain falling on driveways and lawns, and from patios, rooftops, and especially gutter downspouts. Once this water flow or volume exceeds the absorption ability of the ground and surrounding vegetation, runoff can drain directly into the lake. Runoff water often contains sand, salt, oil, gas, antifreeze, and other pollutants from roads and driveways. Other kinds of pollutants that result from residential and commercial development include pesticides and fertilizers from home lawns and gardens, bird and animal feces, trash, and other debris. Subsurface and groundwater flow can carry effluent from improperly functioning septic systems and soluble nutrients from over fertilized lawns and gardens. Buffer landscapes catch and filter out sediment and debris found in this runoff. Depending on the width and nature of the buffer, 50-100% of the sediment and the nutrients attached to it can be removed from runoff before they reach the lake.

Buffers Capture Pollution

Buffers capture pollution through a combination of physical, biological, and chemical processes. As the velocity of runoff is slowed, debris and sediment that are traveling in runoff are filtered out. It is estimated that 80-90% of phosphorus reaches freshwater lakes and streams adhering to sediment; buffers can capture the vast majority of that sediment.

The longer that runoff is in contact with the soil, the more time plants and soil microorganisms have to absorb and transform pollutants into less harmful forms.

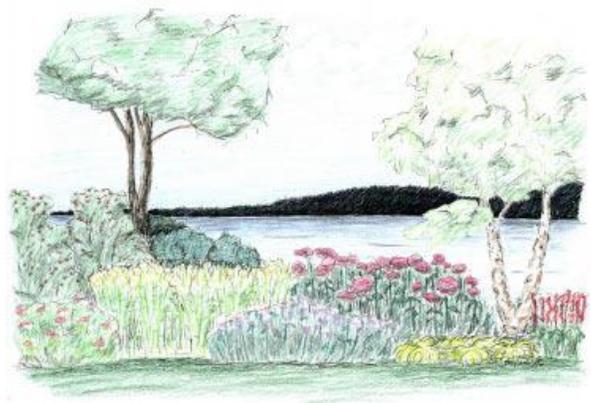
Functions of Buffer landscaping

- Creates a Sediment filter
- Captures Pollution
- Stabilizes banks and prevents erosion
- Provides wildlife habitat
- Slows and controls water runoff

Trees and shrubs have deep and extensive root systems allowing them to absorb nutrients such as soluble phosphorus from subsurface water.

Buffers Stabilize Banks and Prevent Erosion

When the lake was created following the construction of Smith Mountain Lake Dam, a new waterline was formed. The vegetation along the shoreline was exposed to flooding, and the trees and shrubs that could not adapt to wetter conditions began to die off. Without the root systems to help hold soils in place, the shoreline was more vulnerable to erosion from water fluctuations, currents, and wave action from wind and passing watercraft. In addition, land development around the lake led to the removal of much native, deep rooted vegetation that helped anchor the soil.



Some conditions increase the speed and severity of erosion including:

- **Vegetation Removal:** The deep rooted systems of native shrubs and trees help to anchor the soil. Removing this woody vegetation leaves the banks unprotected and more susceptible to currents and damage from runoff and wave action. Replacing woody vegetation with lawns also accelerates bank erosion because the roots of common turf grasses are too shallow to prevent bank erosion. Leaf litter and the stems of plants within the buffer physically slow the pace of surface runoff. The slower the movement of water, the less power it has to erode soil and carry sediment.
- **Wave Action from Wind:** Constant waves and swells created by winds can loosen soil particles on shorelines and cause erosion, especially along points and other areas exposed to the wind.
- **Wave Action from Watercraft:** Shorelines are vulnerable to the wakes of passing powerboats and other watercraft.
- **Overland Runoff:** Unmanaged overland runoff may form deep gullies, and deposit sediment in the lake. Erosion can have a negative impact on the health of the lake as soil, sand, and gravel are carried into the water, leading to sedimentation. Sedimentation is the largest source of non-point source pollution and a threat to water quality because it can:
 - Fill in spaces between rocks and gravel suffocating aquatic organisms, and destroying the habitat of aquatic insects and other wildlife in the aquatic food chain.

- Release nutrients and toxic chemicals that lower water quality, promote algal growth, and harm aquatic wildlife.
- Decrease the clarity of water and limit the growth of beneficial aquatic plants.
- Reduce the desirability of water for swimming and other kinds of recreation.

Buffers Provide Wildlife Habitat

Shoreline areas support a great diversity of wildlife. Waterfront property owners are the first line of defense in protecting the shoreline and supporting the survival of wildlife along the lake.

- **Habitat:** Shorelines are transition zones for both terrestrial and aquatic wildlife. It is especially important to have shoreline vegetation for rare species and for those species such as turtles, amphibians and birds that need both aquatic and terrestrial habitat to complete their life cycles. Turtles spend much of their lives in water but need land as a place to lay their eggs while many salamander and frog species spend most of their lives on land but need water to lay their eggs.
- **Travel corridors:** Wildlife needs travel corridors to move freely from one habitat to another.
- **Food source:** Buffers provide aquatic ecosystems with the basic organic matter that drives food webs for wildlife.
- **Cool water temperatures:** Vegetation along the shoreline shades and cools the water. In general, cooler water is better able to hold life-giving oxygen. Water is cooled to a more natural temperature as it percolates its way through the soil and makes its way to the receiving body of water. Remember: temperature spikes are detrimental to the health and reproductive rates of aquatic creatures.

Buffers Mitigate Land Development and Water Runoff

In forested, non-disturbed land water runoff is slowed by natural vegetation since the tree canopy intercepts falling rain, allowing some to return to the atmosphere and allowing some to gently fall to the ground. The woody debris and leaf litter accumulated on the forest floor act like a rough sponge, slowing down, filtering, and absorbing most of the limited runoff. Slowed runoff gives vegetation, soil, and microorganisms time to absorb and filter most pollutants out of the water before they reach the lake.

- **In forested or rural areas** when rain falls to the ground as much as 50% of it slowly percolates into or infiltrates the soil, while another 40% may reenter the atmosphere as evaporation or transpiration.
- **In residential areas**, the infiltration rate can be reduced from 50% to 35% or less while runoff can increase to almost 50%.

When a shoreline is developed, the soil is disturbed and impervious surfaces such as building rooftops, roads, and parking areas are created. These hard surfaces replace the tree canopy and spongy forest floor and allow water to run off faster. As the storm water runs off at a faster rate, debris and sediment collect at an accelerated rate. As a result, increased runoff delivers increased pollution into the lake. Shoreline vegetation provides the last chance to capture pollutants traveling in storm water. Forested areas can capture, absorb, and store 15 times more rainfall than turf grass.

The Benefits of Buffers for You as the Property Owner

- Once established, buffer landscaping will save you time and money. With less lawn to maintain, less mowing and fertilizing will be required
- Buffer landscaping with a healthy mix of trees will provide you with privacy.
- Properties with mature trees in the landscape may be valued at up to 20% more on the real estate market.
- The wildflowers, perennials and flowering shrubs in buffer landscaping will add color and fragrance to your property and will attract hummingbirds and butterflies.
- Fruit-bearing shrubs will provide berries for people and wildlife.
- Deciduous trees provide shade in the summer and allow solar rays to pass through bare branches in the winter, providing natural cooling and warming.
- Buffer landscaping is a goose barrier and will deter Canada geese from coming up onto your lawn to feed, rest, and defecate.
- Buffer landscaping planted with native plants and trees as the predominant vegetation will be more likely to thrive and will require less time for maintenance and less expense for fertilizers, pesticides, and herbicides.

Responses to concerns you may have about using native trees, shrubs, perennials, and grasses in your landscape

Too much vegetation will block my view of the water. Many native trees, shrubs, and grasses are fairly low growing. With a well-designed landscaping plan, you'll be able to enhance scenic views and increase your privacy.

I like keeping my lawn looking neat and trimmed. Some people are concerned that buffer vegetation will look unkempt. Buffer landscaping is a switch from the look of a manicured lawn, but native trees, shrubs, or grasses at the shoreline can be a low-maintenance landscaping alternative that is aesthetically pleasing in a natural way.

All the weedy growth will attract vermin and snakes. Actually, native shrubs and trees are much more likely to attract beneficial wildlife including butterflies and



songbirds. The secret is to think about the types of wildlife you'd like to attract and then choose native plants that provide food and/or shelter for these species.

It's difficult to find native trees and shrubs at my local garden center. The SMLA buffer landscape committee is a good source of information to point you to varieties that will thrive in your location and to give you information about where you might obtain them.

A bunch of plants won't make much difference. If I'm really going to stop erosion, riprap will work better and last longer. Without a doubt, there are certain locations experiencing severe erosion which require rock riprap. However, riprap only slows erosion from wave action. A good buffer landscape slows erosion from the land side of your property. For maximum benefits establish a buffer zone in addition to hard armoring.

I like including exotic plants in my landscape plan; they're attractive and available. Exotic plants have the potential to become invasive because they are not subject to the same limiting factors that exist in their native habitat. Invasion by exotic plants is second only to habitat destruction as the greatest threat to the natural ecosystems of the U.S. Once exotics become established, they are very difficult to control.

I like turf grass, and I want to use it on my property. Turf grass creates an unnatural landscape when planted along shoreline property. Common turf grasses were imported from other countries. Because these plants are not natural in this environment, keeping a lush, weed-free lawn is almost always costly and labor-intensive and may damage the environment. Although turf grasses do slow runoff somewhat, their root systems are too shallow to provide good filtering. Thus, lawns mowed to the water's edge do little to control runoff. Removing native vegetation and replacing it with turf grass usually results in accelerated sedimentation and pollution of the lake.

Benefits to You

- Less maintenance-less time-less cost
- Greater privacy with mature trees
- Increased property value with attractive landscape
- Increased natural cooling and warming with mature deciduous tree canopy
- Deterrent to migrating geese damage and pollution
- Healthy lake contributing to healthy lake living and recreation

Sources:

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