



# OHIO

# STREAM MANAGEMENT GUIDE

## Forested Buffer Strips

Guide No. 13

Trees along streams are so vital to the integrity of streams in climates like Ohio's, they are given the name "forested buffer strips." This Ohio Stream Management Guide is designed to give landowners, land managers and volunteer groups general guidance on the creation, protection and enhancement of forest areas along streams.

### BENEFITS PROVIDED BY FORESTED BUFFER STRIPS

Streamside forests nurture Ohio's streams. The stream and its adjacent land (riparian area) together form the most vital and diverse feature of Ohio's landscape. Without trees in this land-water transition zone, streams typically become wide and shallow, habitat is degraded and water quality drops.

Riparian ecosystems with forest vegetation:

- remove pollutants from stream flows during periods of over-bank flow;
- reduce water temperatures by sheltering and shading;
- provide wildlife habitat and protect and create aquatic habitat;
- provide detritus (leaves and woody debris), which is the basic source of energy for the stream ecosystem; and
- reduce streambank erosion through the high durability of tree root mass.



Figure 1. A forested buffer strip as seen from the air.

### THREATS TO FORESTED STREAM BUFFERS

**Encroachment** — Meandering ribbons of trees often show up on aerial photos. Clearing trees has historically occurred last along streams and rivers leaving forested riparian strips winding through farm fields and suburbs. From a stream management perspective, we are fortunate that these areas are rough, steep and subject to flooding, making them generally less desirable for intensive land uses. However, most forested buffer strips only remain today because of decisions made independent of stream benefits.

Until the importance of riparian areas is understood, forested buffer strips will be extremely vulnerable to encroachment as adjacent land uses become more intense. In fact, a major cause of buffer strip loss and stream degradation continues to be encroachment.

**Overuse** — Stream-side areas are often popular recreation areas, but overuse can reduce the integrity of the buffer through soil compaction and vegetation loss. High use can coexist with water quality objectives and damage limited by establishing trails and stabilized access points to the stream. Trails parallel to a stream should be set away from the banks. Provide viewing and lounging access to the stream through branches of trail which access the inside of meander bends. This



Figure 2. A forested buffer between a stream and other land uses

will minimize impacts and leave the critical vegetation on the outside banks undisturbed.

**Grazing** — Forested buffers are degraded by livestock. Not only is vegetation and soil damaged on the banks and uplands areas, but livestock trample and degrade the stream channel. Typical impacts include wide shallow channels with less cover, less shade, increased nitrates, increased turbidity, compacted soils and poor ground cover and understory. One Ohio study cited a 40% reduction in soil loss after livestock were fenced from a stream.

## PROTECTING STEAMSIDE FORESTS

**Define the Buffer Strip Width** — Riparian areas are definitive land forms. They are transition zones between channels and uplands where the land influences the stream and the stream influences the land. It is in this zone that 'buffer strips'

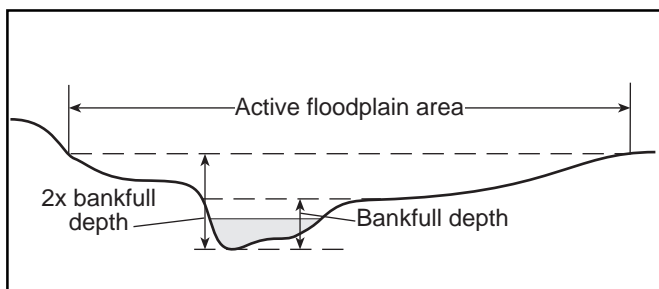


Figure 3. Buffer strip width defined by the active floodplain

of forest vegetation have special importance for the quality of streams. Riparian areas correspond very well with the active flood plain. The active floodplain is the area that would become flooded if stream levels rose above the maximum bankfull depth (see Figure 3). Estimations of riparian area boundaries may also be based on floodplains identified on federal Flood Insurance Rate Maps. Lastly, county soil survey reports list soils 'subject to frequent flooding' which may help delineate some riparian areas.

It is not always feasible to base buffer strip width on the riparian area. For example, highly entrenched channels may have a riparian area hardly wider than the channel itself and in other places floodplains and riparian areas may be so extensive that encroachment is inevitable. For these conditions a generic minimum standard may be useful. One such standard is based on a dimension equal to two and one-half times the bankfull channel width or 50 feet, whichever is less (see Figure 4). This distance is then measured away from the bankfull channel to arrive at

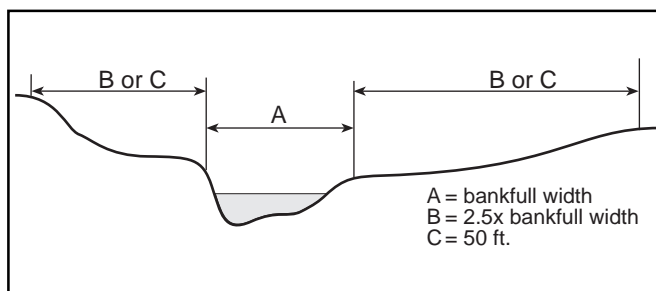


Figure 4. Buffer strip width defined by a minimum standard

the standard buffer width.

**Fence livestock from the stream** — Stream fencing is a practice which keeps livestock away from the stream channel. Stream fencing projects often include stock tanks and water lines. Assistance for fencing livestock from streams may be sought through:

- Ohio State University Extension, Grazing Coordinator, 614/ 397-0401.
- USDA-Natural Resources Conservation Service (NRCS), Grazing Coordinator, 614/ 653-1559.
- County offices for the NRCS and local Soil & Water Conservation Districts, listed under County Government in local phone directories.

**Establish a Legal Easement** — One of the best ways to protect riparian areas is to establish legal easements, also known as conservation easements. Easements allow you to protect your streamside forests without giving up ownership. An easement is a legal agreement that protects a land's conservation value by restricting certain actions which can be taken, even by future owners. Among other things, riparian protection easements can prohibit or restrict timber harvesting, pesticide spraying and development in the buffer strip. The landowner may receive or waive compensation. The easement is held by a legally qualified conservation organization (such as a land trust) or a government agency. Conservation easements can be tailored for each landowner and situation, so may differ from property to property.

The following private organizations and public agencies are among those who can provide you information or assistance in creating a legal easement:

- The Trust for Public Land, 612/ 338-8494
- American Farmland Trust, 202/ 659-5170
- Land Trust Alliance, 202/ 638-4725
- The Nature Conservancy, 614/ 717-2770
- Ohio Department of Natural Resources, Division of Natural Areas and Preserves, 614/ 265-6460
- Ohio Department of Natural Resources, Division of Soil and Water Conservation, 614/ 265-6637
- Soil and Water Conservation Districts, listed under County Government in local phone directories

**Erect Visual Barriers** — Easements alone are only lines on paper which have proven to be ineffective against encroachment. One study found that 90% of easement protected forested buffers had been encroached upon to some extent, with 45% severely degraded. Visual barriers such as fences or signs appeared to be most effective at stopping encroachment.

## REFORESTATION METHODS

**Allow Natural Regeneration** — Simply establishing a preservation area or “no-mow” zone may be enough to allow natural forest regeneration if there are some trees nearby to provide a seed

source. This may not work in areas without trees which have been farmed or have managed turf. Areas with intrusive species or dense turf may require some site preparation to improve regeneration potential.

**Transplant Woody Plants** — A number of sources for trees exist including commercial nurseries, the ODNR Division of Forestry, and compatible sites where you obtain permission to harvest plants. A list of flood tolerant tree species is found in Guide No. 08, *Trees for Ditches*. Planting dormant cuttings such as willow posts and stakes is discussed in Guide No. 07, *Restoring Streambanks with Vegetation*.

A combination of tree planting and natural regeneration may be a good choice for certain areas. For example, natural regeneration may be adequate for the majority of a buffer strip but trees may need to be planted adjacent to the stream to expedite streambank stabilization or to restore a tree canopy over the stream.

### Species Selection:

- It is best to use a diverse mix of tree and shrub species with an emphasis on native species.
- Species should be mixed randomly across the site.
- In areas of partial shade, use a large proportion of shade-tolerant species.
- Ideally a mix of dominant tree species, understory trees and shrubs, and herbaceous plants should be planted.
- In open areas, it may be useful to mix hardier pioneer species (two-thirds) with later successional species (one-third) in recognition of the difficult environment for new plants.

<b><i>Pioneer Species</i></b>	<b><i>Later Successional Species</i></b>
Cottonwood	Swamp white oak
Box elder	Pin oak
Red maple	Black walnut
Ash (green)	Silver maple
Red osier dogwood	Hawthorn
Gray dogwood	Black haw viburnum
Silkey dogwood	Maple leaf viburnum
Sycamore	

**Stocking Rates** — Common reforestation stocking rates are 600 -1,000 seedlings per acre or 500 containerized stock per acre. If planting in the fall or in high use areas, seedlings are generally not recommended. Seedlings are best planted after the ground thaws and before April 14.

**Soil Preparation** — Depending on soil conditions, the site may benefit from pre-planting preparation, including lime and/or fertilizer, and disking or plowing.

**Stabilization** — A cover of annual grains such as wheat, rye or oats at 1 to 1 1/2 bushel per acre may need to be planted to temporarily stabilize soil during the establishment period. Perennial grasses are not recommended because of their competition with woody vegetation.

**Maintenance** — Within the first two years, monitor at least monthly during the spring and summer. Once per month in the fall and winter should be adequate. On these monitoring visits check the planted sites for soil moisture, competing vegetation, mulch and pruning needs; maintain as needed. Fertilizing is not recommended during the first two years of plant growth.

**Competing Vegetation** — Competing vegetation is a critical factor to monitor for during the first two years. Minimize competition from weeds and grasses through hand weeding where feasible, or mowing, mulching and use of selected herbicides.

#### References:

- Mecklenburg, Dan, 1996, "Rainwater and Land Development, Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection," Ohio Department of Natural Resources.
- Lewis, S., J. Kopec, D. Rice, 1991, "Ohio's Streamside Forests: The Vital, Beneficial Resource," The Ohio Department of Natural Resources, Division of Natural Areas and Preserves.

~

This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. The overview Guide listed below, is intended to give the reader an understanding of the functions and values of streams. For more information about stream management programs, issues and methodologies, see *Guide 05 Index of Titles* or call the ODNR Division of Water at 614/265-6739. All Guides are available from the Ohio Department of Natural Resources. Single copies are available free of charge and may be reproduced. Please contact:

ODNR Public Information Center  
1952 Belcher Drive Bldg. C-1  
Columbus, Ohio 43224-1386  
614/265-6605

The guides are also available on-line as web pages and PDF files so you may print high quality originals at your location. You will find the guides on-line at:

<http://www.dnr.state.oh.us/odnr/water/pubs/onlnpubs.html>.

Prepared by the Ohio Department of Natural Resources, Dan Mecklenburg, Division of Soil and Water Conservation, principal author. Input from staff of several ODNR divisions, and local, state and federal agencies are used in the development of the Ohio Stream Management Guides. Funding for the production of the Ohio Stream Management Guides is provided in part through a federal grant under Section 319 of the Clean Water Act.

Guides are available on-line at: <http://www.dnr.state.oh.us/odnr/water/pubs/onlnpubs.html>



An equal opportunity employer--M/F/H.  
Printed on recycled paper 