

Central Kentucky Backyard Stream Guide

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Vaughn's Branch of Wolf Run Creek, Fayette County, KY.

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Many urban homeowners are not sure what to do about the stream in their backyard. Who owns it? How can I take care of it? What plants are good for my stream-banks? These common questions lead to some confusing answers. This publication is designed to help the homeowner of a backyard stream appreciate this resource, protect personal property, and improve water quality and habitat.

Who Owns What

In Kentucky, we all own the water. A homeowner or municipality may own the land adjacent to the stream or creek, but all citizens of the Commonwealth have rights to the water itself as a natural resource.

Buffer Basics

One of the best ways to reduce the impacts of urbanization on streams is through the use of conservation buffers. Buffers are transitional areas that link adjacent lands to aquatic

environments. They occur along the banks of streams, rivers, and other water bodies and may be called riparian buffers, greenways, buffer zones and/or streamside buffers. These areas ideally have high biotic and structural diversity (provided by plant communities that include trees, shrubs, and herbaceous/non-woody species) and high functional diversity (providing ecosystem services such as nutrient cycling, water storage, and wildlife habitat). Plants in the buffer zone hold soil in place, reduce erosion, and prevent stream-banks from sloughing off. Tree canopy shades the stream, keeping water temperatures cool

in summer months to support aquatic insects and reduce algae growth. A diverse plant community (including trees, shrubs, grasses, and herbaceous perennials) provides the most benefit to the stream and the property owner.

Identifying Problem Areas

In many urban settings, streambanks are maintained or mowed as part of the lawn. Consistent, long-term mowing can result in vertical banks with shallow, sparse root systems that leave streambanks vulnerable to erosion (Figure 1).

Benefits of Healthy Stream Buffers

- Filter stormwater runoff
- Protect streambanks from erosion
- Provide wildlife habitat
- Reduce flood damage
- Improve aesthetic value of landscapes
- Provide shade to streams



Figure 1. Stream exhibiting typical urban stream problems: grass mowed to the edge, eroded banks, and artificial structures (gabion baskets) used to reinforce streambanks.

Vertical streambanks are problematic for a number of reasons. First, they present a safety concern for those working or playing nearby. Secondly, the instability results in soil loss. Vertical streambanks can also threaten roadways, utilities, and other urban infrastructure (Figures 2, 3, and 4). Vertical streambanks negatively impact the function of a stream. Streams naturally move water into the floodplain during high flows but vertical banks prevent streams from accessing their floodplains. This water is then sent downstream where greater flood damage may occur. When streams cannot access their floodplains, the power of flowing water causes streambank erosion to increase. Increased erosion clogs streambeds with fine sediments and smother streambed habitats.



Figure 3. Central Kentucky urban stream located near property boundary. Non-native invasive plants dominate the streambanks.



Figure 2. Eroding, unstable urban streambanks can threaten roadways and stormwater infrastructure.





Figure 4. Eroding streambanks threaten private property and mature trees.

Simple Steps to Assess, Improve, and Maintain the Health of Your Backyard Stream

Step 1: Site Assessment and Evaluation of Your Stream

Take a walk by your stream. Take pictures and make notes of conditions. Observe your stream and the surrounding area by asking these questions:

- Are there places where the streambanks are sloughing off/failing/eroding?
- What materials are in the stream channel (large boulders, rocks, pebbles, sand, bed-rock, large woody debris, discarded appliances, cars)?
- Does your stream look different after a rain-fall event? How so?
 - Does the water level raise and lower quickly?
 - Does the stream get wider?
 - Does the water change colors?
- Where are your property lines?
- What does the stream look like upstream and downstream of your property lines?
- Are there bridges, culverts, drainage pipes, or utilities nearby?
- Is there trash in the stream?
- What plants are growing in the stream, on the streambanks, or in the floodplain?
 - Are they desirable?
 - Are they native?
 - Is one plant species taking over the whole area?
 - Is there a diversity of plant types (e.g. trees, shrubs, herbaceous plants)?
- Are there spaces (e.g. recreation areas, out-buildings) nearby that are threatened?

Step 2: Investigate laws, ordinances, and guidance.

Before you start any type of stream improvement project, it is important to learn about any laws, regulations, ordinances, or guidance that may affect your project. The federal government protects waterways and water quality through the Clean Water Act (CWA), and in some cases jurisdiction is passed to state and local government entities. The type of project you choose will determine what types of permits, permissions, or approvals are needed. More information about permitting is provided in the following sections.

For example, in Lexington-Fayette County, a homeowner interested in planting a stream-side buffer zone must first obtain a permit from the Lexington-Fayette Urban County Government (LFUCG) Division of Environmental Services. Once the permit is granted, the buffer area will be exempt from the weed ordinance but must be properly maintained by the property owner. Also, if any backyard stream work (restoration, native planting, invasive species removal, or construction of fence, walkways, trails, etc.) encroaches on an established LFUCG Greenway, a Greenway Encroachment application must be completed and permission granted from Division of Environmental Services. Contact the local city/county government for specific information.

In situations where work (bank stabilization, earth moving, etc.) is to be performed in or around the stream or floodplain, LFUCG Division of Water Quality engineers can help with permitting review.

Homeowners should never attempt to alter the flow of water in a stream, remove streambed materials, or try to shore up streambanks with concrete or artificial structures. Homeowners trying to “fix” stream problems with homemade remedies or heavy equipment can cause additional streambank erosion or downstream flooding problems and may be subject to fines.

Additional regulatory information is included in the Bank Stabilization section below.

Step 3: Make a Plan

After making a site assessment, it’s time to make a plan for action. You can choose a passive or active approach to protecting your stream and streambanks.

Passive Approach

If you choose a passive approach, you can establish a no-mow zone and let the vegetation grow naturally as wide as possible horizontally from the water’s edge, with a goal of 25 feet or greater (Figure 5). Existing vegetation as well as seeds in the soil (seedbank) will grow to create a stream buffer. This approach is the easiest and least expensive. However, undesirable plants (such as bush honeysuckle, winter creeper, and other invasive plants)

may take over and require removal. The area may not be aesthetically pleasing for you or your neighbors. The plants may take a while to establish and erosion may continue until deeply-rooted plants mature; the plants that establish may also not be the most effective at protecting the stream. For example, grasses often have shallow root zones that only protect a portion of the streambank. Trees, however, have deeper root zones that can better protect taller streambanks.

Passively established stream buffers still need maintenance. In some cases, mowing once or twice per year may be desirable to limit woody plant establishment but will promote grasses and wildflowers. Mowing in early spring (March-April) is recommended for this strategy. Spot treatment of invasive plants or noxious weeds (e.g. thistles [*Cirsium vulgare*, *Cirsium arvense*, *Carduus nutans*]) may also be needed and should follow the most effective treatment for the targeted plant.

Warning: Passive stream buffer establishment may not be acceptable in some neighborhoods or by some individuals. Local weed ordinances may also prevent this type of stream buffer strategy.

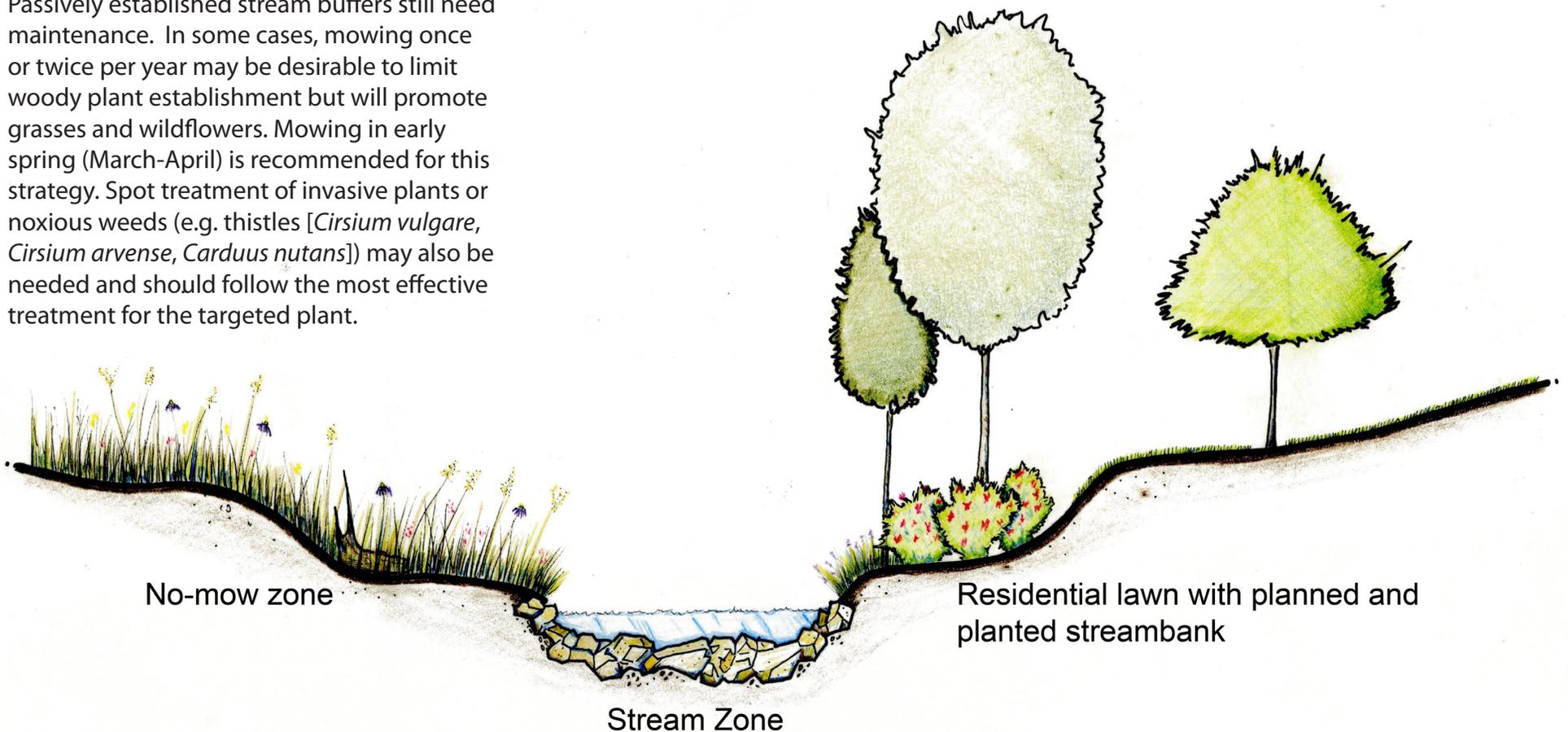


Figure 5. Stream buffers can be established with planned plantings or by creating a no-mow zone.

Active Approach

An active approach to stabilizing stream-banks and creating a stream buffer (Figure 6) includes multiple steps after the initial site assessment:

- Creating a planting plan
- Removing undesirable plants
- Stabilizing banks (if needed)
- Installing erosion control after bank stabilization (if needed)
- Selecting desirable plants
- Installing trees, shrubs, grasses, or herbaceous plants
- Maintaining plant communities



Figure 6. Actively managed urban stream buffer with a clear boundary of mowed turf. Photo by Russ Turpin

Step 4: Implement Your Plan

Passive

Establish a no-mow zone by selecting a location that you will no longer mow. You may want to install birdhouses on poles or some other markers to delineate the boundary (Figure 7). If the stream is in an area where other people may see it, adding a sign helps them know this is a naturally managed area.

Active

Create a planting plan. The planting plan will be determined by a number of factors. A few questions to ask when creating a planting plan include:

- What is the project budget?
- How wide will the stream buffer be?
- What type of plants will be included? Only trees? Only shrubs? Only herbaceous? A mixture of all plant types?
- What appearance is desired for the project now? In five years? In ten years?
- Who has influence on the project? What are their desires for appearance?
- Who will be responsible for maintaining the area, and are they willing to assist with a long-term buffer plan (i.e., no mowing or prescribed mowing)?

Removing Undesirable Plants

Stream buffers are often colonized by invasive, non-native, and undesirable plants because these areas may be difficult to



Figure 7. Examples of no-mow zones delineated with markers.

maintain or property ownership and/or boundaries may be uncertain. Common invasive, non-native plants in Central Kentucky stream corridors include bush honeysuckle (*Lonicera maackii*), winter creeper (*Euonymus fortunei*) (Figure 8), garlic mustard (*Alliaria petiolate*), and multiflora rose (*Rosa multiflora*). These species can outcompete native, desirable plants and are difficult to eradicate. Although they may appear to protect streambanks, invasive, non-native plants often have less root structure and are not as effective at erosion control as native plants. They also create monocultures that do not supply adequate food for birds and other wildlife. Controlling undesirable plants is essential to establishing a healthy, functioning stream buffer.



Figure 8. Winter creeper can form a dense groundcover in naturalized stream buffers.

Removal and control of invasive plants requires the right tools: knowledge, proper equipment, appropriate chemical application, and determination. Detailed information and techniques for controlling invasive plants can be found in Kentucky Woodlands magazine's archived Forest Health articles (see Resources section).

Bank stabilization

Bank stabilization may or may not be needed. Removing undesirable invasive plants and replacing native vegetation without grading

the streambanks may be the best or only option. This approach is cost effective and will slow erosion, although land may still be lost. This may be a temporary fix.

Erosion will continue to degrade stream conditions in locations where streambanks are steeply sloping, vertical or overhanging and are not protected by root systems or stabilization structures. Grading streambanks to a 3:1 slope (33.5% or 18°) (Figure 9) or less and installing erosion control measures prior to establishing a stream buffer will provide greater likelihood of protecting the stream.

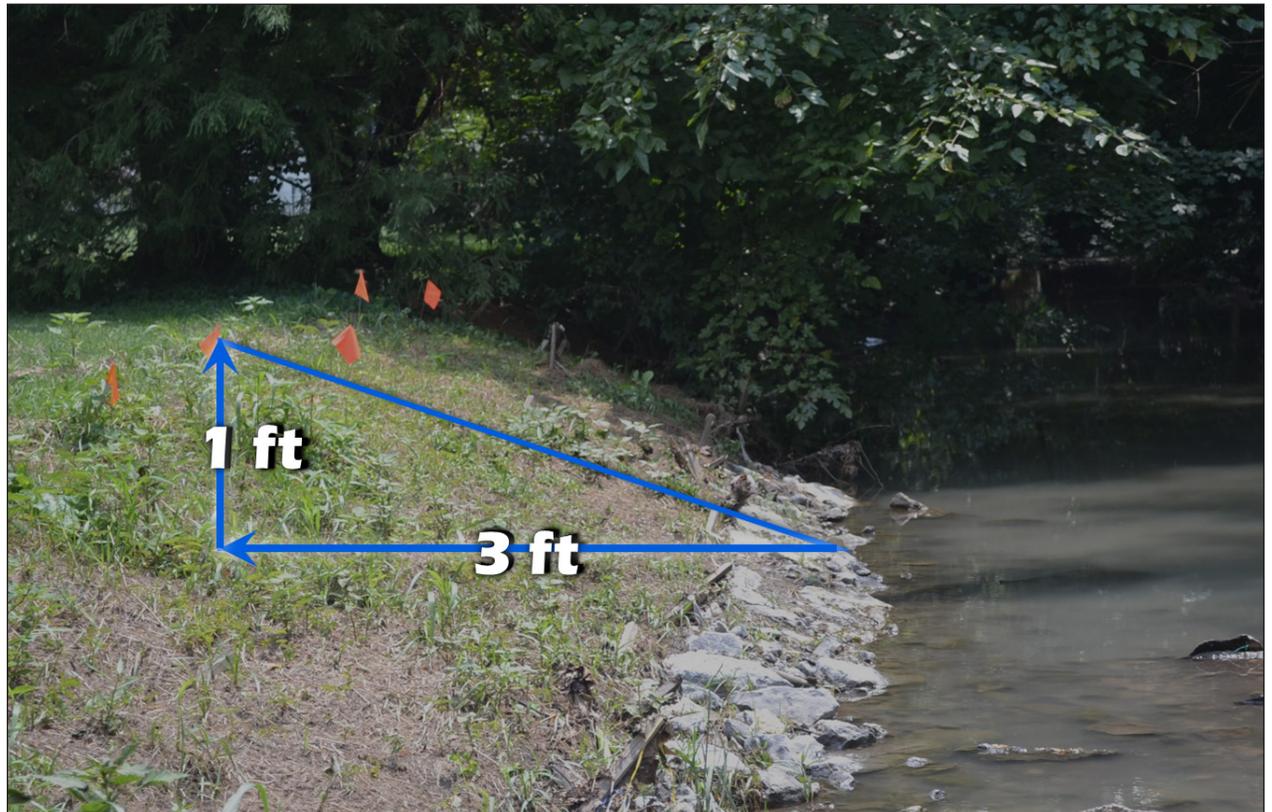


Figure 9. Grading streambanks to a 3:1 slope or less can reduce erosion potential. Measure from ordinary high water mark to top of bank.

However, this approach requires a financial investment and permits and will extend the time required to complete the project. In the end this approach will result in safer, more stable streambanks. When considering bank stabilization measures, it is recommended that you consult with a licensed professional engineer.

Regulations

The Clean Water Act (CWA) regulates the discharge of pollutants into waters of the United States. Two sections of the CWA, Section 401 and 404, are most relevant to streambank stabilization projects. Section 401 covers the impacts of discharges on the quality of U.S. waters and provides for the protection of the physical, chemical, and biological integrity of these waters. It allows states, tribes, and the U.S. Environmental Protection Agency (USEPA) to address water quality impacts resulting from federally approved permits. Thus, state and tribe water quality standards, which may be more stringent than federal ones, cannot be violated by federally permitted activities. In Kentucky, Section 401 of the CWA is administered by the Kentucky Division of Water (KDOW).

Section 404 of the CWA covers the discharge of dredged or fill materials into U.S. waters. The basic premise of Section 404 permitted activities is that no practicable alternatives exist that are less damaging to aquatic resources. Or, if significant damage would occur, then such activities should not be permitted. Thus, the permitting process promotes the avoidance and minimization of impacts.

For impacts that cannot be avoided, mitigation is required to compensate for these impacts. Section 404 of the CWA is administered by the U.S. Army Corps of Engineers (USACE) who runs the day-to-day operations and issues permits related to Section 404 activities. Oversight of the USACE Section 404 programming is provided by the USEPA. In general, the USACE views most homeowner stream enhancement and streambank stabilization projects as good for water resources.

KDOW regulates any development along or across a stream up to one square mile drainage area via KRS 151.250 and 401 KAR 4:060, and therefore will require permitting beyond the 401/404 requirements. There are also local permit requirements for all communities participating in the National Flood Insurance Program (NFIP) via the local Flood Damage Prevention Ordinance.

Permitting

When conducting a bank stabilization project, you may need permits from federal, state and local agencies (Figure 10, Table 1). The permitting process can take several months to complete, so plan ahead. Conducting bank stabilization work without the necessary permits can result in costly fines.

Since the USACE only permits activities occurring on U.S. jurisdictional waters, the first step is to complete a Jurisdictional Determination (JD). The JD helps the USACE determine if your project will impact U.S. jurisdictional waters; if not, a permit is not required from the USACE. Jurisdictional waters include navigable waters as well as those, either

tributaries or wetlands, with a significant “nexus” or connection (hydrologic, ecologic) to navigable waters. This means that intermittent (seasonal) or even ephemeral (flows only in response to storms) can be considered U.S. jurisdictional waters.

For bank stabilization projects, the USACE will most likely issue a nationwide permit (NWP). Nationwide permits are more general permits authorizing activities that have minimal adverse impacts on the environment. NWP 13 authorizes streambank stabilization while NWP 27 authorizes aquatic habitat restoration, establishment, and enhancement activities. If streambank stabilization will occur above the ordinary high water mark (OHWM), a NWP 13 is required; streambank stabilization work occurring below the OHWM requires a NWP 27.

At the state level, the KDOW may require three permits: 401 Water Quality Certification, Permit to Construct Across or Along a Stream, and Kentucky Pollutant Discharge Elimination System (KPDES) General Stormwater Permit (if total project area disturbs 1 acre or more of land). A Section 401 permit is required for a USACE Section 404 permit to be valid. The Permit to Construct Across or Along a Stream is for floodplain management. The goal of this permit is largely to ensure that your project will not increase flooding upstream or downstream. Both the 401 Water Quality Certification and Construction Across or Along a Stream permits may require engineering or survey data; this certified information should be provided by the applicant when completing the state permit application.



Figure 10. Large-scale stream restoration projects require extensive permitting and specialized engineering expertise.



Simple Steps for a Well-Planned Backyard Stream Ecosystem

- 1. Use a grid sheet to document what exists in your yard next to the stream.** This is an inventory of buildings, vegetation, gardens, paths, soils (rocky, sandy, clay), utilities, and anything else of concern in the area. Use this inventory to make decisions about what to keep and what can be moved or cut down (such as invasive species). When drawing and inventorying your yard, be sure to keep things at the right measurements, or scale, to make creating a design much easier in later steps.
- 2. List any activities you would like to incorporate into the area, as it is still your property and can be used.** Things such as a fire pit, bocce court, or garden spaces are all examples of floodplain uses. Items to avoid here include expensive patio work, buildings, and anything else that can be ruined by floodwaters. You should include in this list plantings for bank stability and floodplain buffers.
- 3. Design the site. Combine your inventory and desired items to develop spaces that fit your needs.** Begin by doodling shapes that are approximate in size to the space you need for each item, then tighten those shapes until you have created spaces that flow and work. Do this multiple times until you are satisfied with the design result. Small tweaks to the design can make a lot of difference. This step will require multiple sheets of paper.

4. Basic design concepts to help you create an aesthetically pleasing space:

- Try to identify spaces that you would like on your grid paper first. This may be a sitting space, a viewing space, or a space to put something that is an accent.
- Shape spaces using plant material. For instance, would a row of tree trunks provide the shape of the space you want, or would a hedge do better (the answers will help in determining plant species and selection)?
- Most ecosystems include trees, shrubs, and herbaceous (non-woody) types of vegetation. All three provide a diverse root system and habitat.
- Try not to pack the area full, this will make it look too busy and not designed or planned.

5. Tricks to help with the planting plan:

- Choose plants that suit your preference in color, seasonal interest, texture differences, and shape.
- Mass the same species plants together for large swaths of color (typically in groups of 3-5)
- Think in three dimensions. Horizontally, a foreground, middle ground and background and vertically, the floor (ground layer), walls (shrub layer), and ceiling (tree canopy).
- Use internet available plant calculators to estimate the number of plants required to fill a space for herbaceous planting material.
- Remember, trees and shrubs will grow. Plan for a mature size.

6. Select plants from the list supplied. Consider the amount of sunlight needed and sun angle directions.

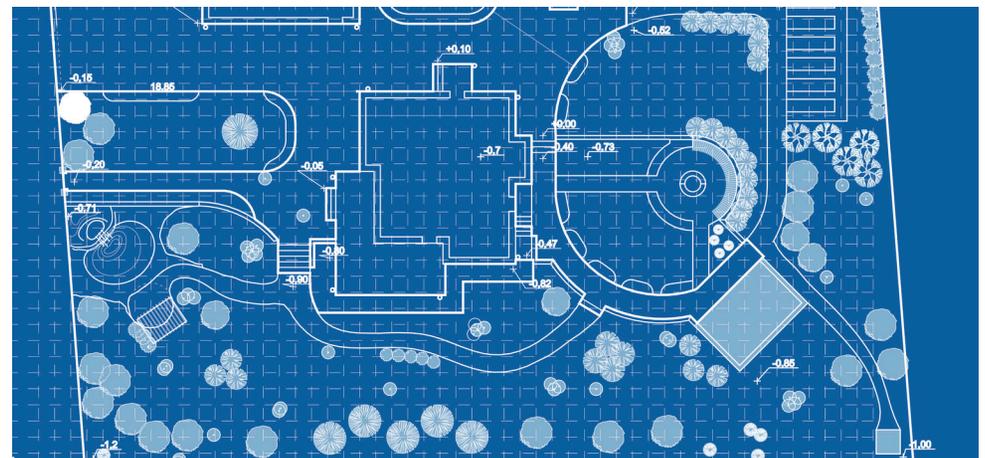


Table 1. Permitting requirements for streambank stabilization and/or stream enhancement projects.

Agency	Permit	Purpose
U.S. Army Corps of Engineers (USACE)	Jurisdictional Determination (JD)	To determine if your project will impact U.S. jurisdictional waters.
	Section 404 Nationwide permit (NWP)	To minimize impacts of discharging dredged or fill materials into U.S. waters. NWP13 authorizes bank stabilization (activities outside ordinary high water mark, no channel realignment). NWP27 authorizes aquatic habitat restoration, establishment, and enhancement activities (stream restoration).
Kentucky Division of Water (KDOW)	Section 401 Water Quality Certification (WQC) ¹	Commonwealth’s review and authorization of federal Section 404 permits. To minimize impacts of discharging dredged or fill materials on the quality of Kentucky’s waters.
	Permit to Construct Across or Along a Stream ¹	To ensure your project will not increase flooding to upstream or downstream lands. Required for activities in the 100-year floodplain.
	Kentucky Pollutant Discharge Elimination System (KPDES) General Stormwater Permit	To minimize impacts of stormwater, particularly sediment in stormwater runoff, on water quality. Required if total project area disturbs 1 acre or more of land. May require a Stormwater Pollution Prevention Plan (SWPPP).
Local authority	Will vary depending on local jurisdiction. Lexington-Fayette Urban County Government (LFUCG) requires a Land Disturbance Permit and Erosion Sediment Control (ESC) Plan Checklist	ESC Plan is the SWPPP. Representative from LFUCG must visit site to review ESC Plan prior to permit issuance.

¹ Same form is used to apply for either one or both permits (Section 401 Water Quality Certification and the Permit to Construct Across or Along a Stream).

The KPDES General Stormwater Permit focuses on how you will manage stormwater from your project site such that it does not negatively impact water quality. Sediment is one of the most common and high impact pollutants to streams, especially during construction activities, so it is important that you address how to prevent the transport of sediment into your stream while the project is under construction through the development of a Stormwater Pollution Prevention Plan.

Once federal and state permits are obtained a local permit must be obtained from the floodplain coordinator in your community. (Note: Local floodplain coordinator may be the sole job of one individual or could be one part of an individual's job, depending on the community.) Some communities may have higher standards for flood protection than state and federal guidelines. For example, if you are in Lexington, you need to complete a Lexington-Fayette Urban County Government (LFUCG) Land Disturbance Permit/Erosion Sediment Control Plan once you have obtained the necessary federal and state permits. Before this permit can be issued, a representative from LFUCG must visit the site to review your sediment and erosion control measures.

Once you have received any needed permits, it is very important that you read the conditions (terms) of the permits to ensure you are in compliance at all times. If you have questions, it is important to clarify those before you begin construction. If changes are needed to the project during construction, be sure to notify the agencies who issued the permits.



Figure 11. Erosion control blanket made of natural fibers.

Construction

Stream buffers are often used as corridors for utilities. Prior to construction, it is important to call Kentucky811 (1-800-752-6007) to have the locations of all utilities clearly marked. This is a free service. You have a legal responsibility to call Kentucky811 before you dig. Before you make the call, mark your access and excavation locations in white landscaper's paint. Doing so will help the utility companies focus on your project area. Also, install any required erosion control measures and post, in a weather-proof container, any required permits.

For bank stabilization projects, at a minimum, you need equipment to dig, transport/haul, and grade. The size or scale of your project will determine the types of equipment needed. Commonly used types of equipment for digging include backhoes and excavators; for transport, dump trucks and trailers; and for grading, skid steers. Equipment can be rented daily, weekly, or monthly. It is important to use operators experienced in bank stabilization projects.

Since bank stabilization projects produce excess soil, you need to identify a disposal

location, whether that be onsite or offsite. Keep in mind that excavated soil occupies more space. To reduce costs, look for opportunities to grade the excavated soil into the existing upland landscape.

During construction, be prepared for the unexpected. It is not uncommon to find unmarked utilities, so dig with care. Be prepared for rapid changes in weather such as the sudden onset of a thunderstorm. Construct your project in phases so that at the end of a work day, it can withstand a large downpour. Try to conduct grading and soil removal steps during drier months to reduce soil and sediment runoff into the stream.

Following construction, use erosion control measures such as jute or straw blankets (Figure 11). Use only erosion control blankets consisting of natural fibers. Avoid erosion control blankets with plastic. The plastic can trap and kill wildlife by entanglement.

Plant Selection

Designing for a combination of trees, shrubs, and herbaceous plants will create a streamside buffer zone that provides diverse root systems to hold soil in place, the ability to absorb excess nutrients, and differing vegetative heights to provide varied wildlife habitat (Figures 12, 13, and 14). Choosing the right plants is imperative so one must select those that will thrive in the harsh conditions ripari-

an zones offer, namely flooding and drought. Buffer zones fluctuate quite quickly, going from dry conditions to flooded conditions in hours. These plants can also experience high intensity sunlight or be completely shaded. An understanding of the natural elements of your site will be required before you select plants. See Simple Steps for a Well-Planned Backyard Stream Ecosystem in this publication for design tips.

Creating a planting plan using a site inventory will help narrow species choices from the hundreds of plants available. A professional landscape designer can help design a planting plan or with plant selection. Alternatively, you can design one yourself. Ask your local nursery about your plant choices; as local experts they can be excellent resources. Determine your project limiting factors such as budget, personal plant preferences, sun requirements, or other constraints. Consider the viewshed (area visible from a specific location) from your house toward the stream and design plantings accordingly if a certain view of the stream is desired. Frame that view using vegetation and screen other views that are unwanted. Access to the stream is another consideration and you may want to install a footpath.

Basic design considerations include vegetative textures, layers, and color. Some plants offer a soft, wispy texture (e.g. ferns, soft rush,

various grasses) while others may provide a sturdy, rugged texture (e.g. sycamore, oak-leaf hydrangea). A mixture of textures can add visual variety and can be strategically placed for balance. Group plants in masses to create a strong visual impact. Consider plant structure and appearance in all seasons, not just during the active growing or flowering season. Remember to place plants according to their water and sunlight requirements in areas where they will receive those requirements.

The plant lists that follow include wetland plants (for planting in or very near the water's edge), moisture-tolerant plants (for planting right on the streambank, six inches to five feet from the water's edge), and moderate-to-dry soil tolerant plants (for planting more than five feet from the water's edge). Vertical layers can be achieved by planting large trees nearest the stream (this will also provide much-needed shade for regulating stream water temperature), an understory of shrubs and small trees, and an herbaceous layer of grasses and wildflowers.



Figure 12. Streamside buffer in a public park two years after planting. Edges planted with containerized native plants to establish visual boundary with color interest; native plant seed mix used throughout remaining streambank areas.



Figure 13. Streamside buffer in a private park approximately 10 years after establishment using no-mow zone and selected tree planting.



Figure 14. Streamside buffer in a public park established using existing trees, no-mow zone, and native containerized plants.

Wetland Plants

These plants can handle saturated soil conditions and standing water; may be planted in or very near the water's edge (Figure 15).

Trees

- Black willow (*Salix nigra*)
- Swamp white oak (*Quercus bicolor*)
- Bald cypress (*Taxodium distichum*) – for general horticultural interest but not for true ecological restoration in Central Bluegrass

Shrubs

- Buttonbush (*Cephalanthus occidentalis*)
- Swamp rose (*Rosa palustris*)

Herbaceous

- Soft rush (*Juncus effuses*)
- Fox sedge (*Carex vulpinoidea*)
- Common hop sedge (*Carex lupulina*)
- Rose mallow (*Hibiscus lasiocarpus*) or swamp rose mallow (*Hibiscus moscheutos*)
- Cardinal flower (*Lobelia cardinalis*)
- Swamp milkweed (*Asclepias incarnata*)
- Southern blue flag (*Iris virginica*)

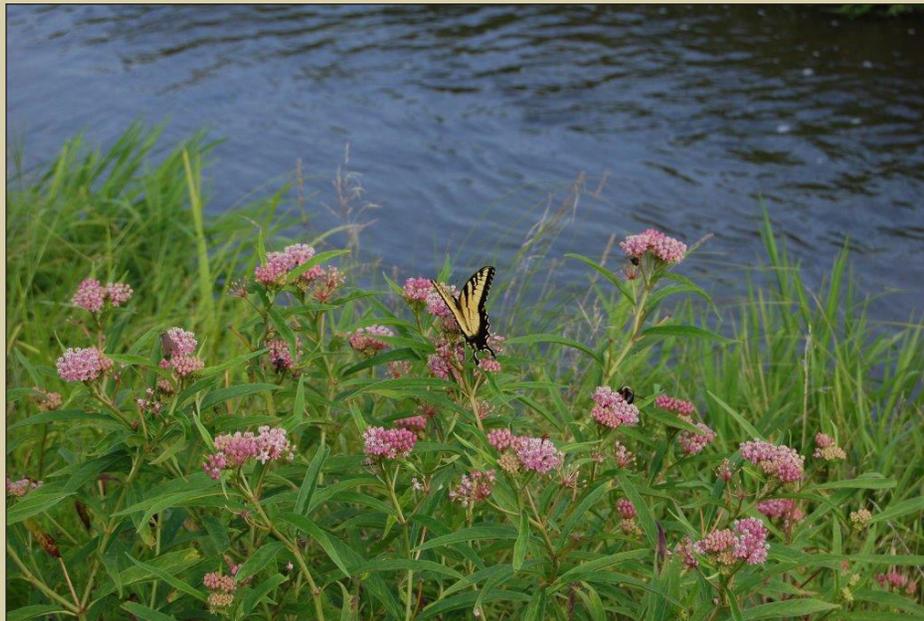


Figure 15. Black willow transplanted as a stake in a planted stream buffer (top left); soft rush in a planted stream buffer (top right); swamp milkweed in a natural growth stream buffer (bottom).

Moisture-Tolerant Plants

These plants can be planted right on stream-bank, 6 inches to 5 feet from the water's edge (Figure 16).

Trees

- Sycamore (*Platanus occidentalis*)
- Boxelder (*Acer negundo*)
- Bald cypress (*Taxodium distichum*) – for general horticultural interest but not for true ecological restoration in Central Bluegrass

Shrubs

- Silky dogwood (*Cornus oblique*)
- Roughleaf dogwood (*Cornus drummondii*)
- Winterberry (*Ilex verticillata*) or possumhaw (*Ilex decidua*) – Deciduous shrubs with red berries for winter color and general horticultural interest (must have male and female plants to produce berries); native to Kentucky but not specifically Central Bluegrass
- Buttonbush (*Cephalanthus occidentalis*)

Herbaceous

- Common wood sedge (*Carex blanda*)
- Great blue lobelia (*Lobelia siphilitica*)
- Cardinal flower (*Lobelia cardinalis*)
- Swamp milkweed (*Asclepias incarnata*)
- Joe-pye weed (*Eupatorium fistulosum*) – can get tall

Grasses

- Switchgrass (*Panicum virgatum*)



Figure 16. Great blue lobelia in a natural growth stream buffer (top left); cardinal flower in a planted stream buffer (top right); roughleaf dogwood (white berries in August) (bottom) in a planted stream buffer.

Moderate-to-Dry Soil Tolerant Plants

Plants these in areas more than 5 feet from the water's edge (Figure 17).

Trees

- Redbud (*Cercis canadensis*)
- Sycamore (*Platanus occidentalis*)
- Boxelder (*Acer negundo*)

Shrubs

- Silky dogwood (*Cornus oblique*)
- Roughleaf dogwood (*Cornus drummondii*)
- Spicebush (*Lindera benzoin*)
- Arrowwood viburnum (*Viburnum dentatum*)
– for general horticultural interest, but keep in mind, some material sold may not be native

Herbaceous

- Purple coneflower (*Echinacea purpureum*)
– for general horticultural interest, but not truly native in Central Bluegrass
- Wild bergamot (*Monarda fistulosa*)

Grasses

- Bottlebrush grass (*Elymus hystrix*)
- Big bluestem (*Andropogon gerardii*)
- Little bluestem (*Schizachyrium scoparium*)
- Switchgrass (*Panicum virgatum*)



Figure 17. Sycamore in a natural growth stream buffer (top left); little bluestem in a planted stream buffer (top right); wild bergamot in a planted stream buffer (bottom right); redbud in a natural growth stream buffer (bottom left).

Step 5: Maintain Your Landscape

Plant communities will change over time, and some level of maintenance will be required. The amount of maintenance will depend on the desired appearance of the stream buffer. A manicured plant community will require more time and labor than one that is allowed to become more naturalized over time.

Just as in Step 1, take a walk by your stream. Visit your stream at least once each season and after storm events. Pick up trash/litter that might have washed from upstream. Take pictures to document the vegetation and take notes of stream and plant conditions. Visually assess your plants. Have any desirable plants died or been damaged and need replacing? Look for and remove undesirable plants (non-native, invasive species). Prune

trees and shrubs as needed, and trim and remove previous year's growth from perennials in late winter/early spring as desired. Look for erosion or other damage from storm events. Consider planting deep-rooted plants or installing erosion control blanket and re-seeding for severely eroded areas. Finally, take pictures to document your project. Each year plant communities will change, just as the stream itself may change.



Plant Installation

For detailed information on common methods for planting trees, shrubs, and grasses see UK Cooperative Extension publication **ID-185: Planting a Riparian Buffer**.

RESOURCES

Plant Calculator:

- **Wiegands Nursery:** <http://www.wiegandsnursery.com/plant-calculator/>

Where to Buy Native Plants (Lexington/Central Kentucky):

- **Kentucky Native Plant Society:** <http://knps.org>
- **Wild Ones:** <http://lexington.wildones.org/sourcesforplants/>
- **Springhouse Gardens (stocks native sedges):** <http://www.springhousegardens.com/>
- **Highland Moor – Dr. Bob McNeil (retired UK professor):** <http://highlandmoor.com/index.htm>
- **Michler’s Gardens and Greenhouses (has native sedges in inventory):** <http://www.michlers.com>
- **Roundstone Native Seed:** www.roundstoneseed.com
- **Ironweed Native Plant Nursery:** <https://www.ironweednursery.com>
- **Dropseed Native Plant Nursery:** <http://www.dropseednursery.com/index.html>
- **Jesse Higginbotham Technology Trust and Dunbar Memorial Garden:** <http://www.jessehigginbotham.com/home.html>
- **University of Kentucky Horticulture Club**
Contact: Shari Dutton, (859) 257-4209, sdutton@uky.edu, hortclubuk@gmail.com
- **Kentucky Division of Forestry (source for native tree seedlings):** <http://forestry.ky.gov/statenurseriesandtreeseedlings/Pages/default.aspx>

Backyard Stream Stewards Program

- **Friends of Wolf Run:** www.Wolfrunwater.org

Invasive Species Removal:

- **Kentucky Woodlands magazine’s Forest Health articles (Bush honeysuckle, winter creeper, garlic mustard):** http://www2.ca.uky.edu/forestryextension/publications_foresthealth.php

- **Miller, J.H. 2003. Nonnative Invasive Plants of Southern Forests:** A Field Guide for Identification and Control. USDA Forest Service, Southern Research Station. http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs062/

Urban Riparian Guides from other Southeastern states:

- **Hartup, W., B. Lord, W. Patoprsty, M. Woodward, and S. Woofter. 2015. Small-scale Solutions to Eroding Streambanks. North Carolina Cooperative Extension.** Available online at <http://forsyth.ces.ncsu.edu/wp-content/uploads/2015/07/online-BYSRGuide2015.pdf?fw=no>
- **Tennessee Department of Agriculture Urban Riparian Buffer Handbook:** <http://www.tn.gov/assets/entities/agriculture/attachments/UrbanRiparianBufferHandbook.pdf>

Regulatory and Permitting Resources:

- **U.S. Army Corps of Engineers, Louisville District, Louisville, KY: (502) 315-5733 or** <http://www.lrl.usace.army.mil/Missions/Regulatory/Forms.aspx>
- **Floodplain Management Program:** <http://water.ky.gov/floodplain/Pages/default.aspx>
- **Water Quality Certification Program:** <http://water.ky.gov/permitting/Pages/KYWaterQualityCertProg.aspx>

General Permits:

- **Kentucky Division of Water, Frankfort, KY: (502) 564-3410 or** <http://water.ky.gov/permitting/pages/generalpermits.aspx>
- **Lexington-Fayette Urban County Government, Lexington, KY: (859) 425-2255 or** <https://aca3.accela.com/lexky/>

REFERENCES

Agouridis, C.T., S.J. Wightman, C.D. Barton, and A.A. Gumbert. 2010. ID-185 Planting a Riparian Buffer. University of Kentucky Cooperative Extension Service. <http://www2.ca.uky.edu/agc/pubs/id/id185/id185.pdf>.

Campbell, J. A Guide to Plants of the Central Bluegrass. http://www.bluegrasswoodland.com/uploads/Central_Bluegrass_Flora.pdf. Accessed November 5, 2015.

Kentucky Exotic Pest Plant Council: <http://www.se-eppc.org/ky/>.

Public Water of Commonwealth: <http://www.lrc.ky.gov/Statutes/statute.aspx?id=2083>.

FURTHER READING

Available at <http://www2.ca.uky.edu/agcomm/pubs.asp>.

AEN-122: Restoring Streams

AEN-124: Streambank Erosion

HENV-202: Planting Along Your Stream, Pond, or Lake

ID-185: Planting a Riparian Buffer

IP-73: Living Along a Kentucky Stream

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