



Cultivating Riparian Forests

A Guide to Establishing Your
Trees & Shrubs





Dear Landowner,

Thank you for deciding to restore a forested buffer that will provide benefits to you, your local wildlife, and the surrounding waterways.

The purpose of this guide is to help you to care for tree & shrub plantings within your buffer, and reach your project goals, including restoration of habitat, nutrient management, erosion control, and so much more.

In this guide, you will find a suggested timeline for tree care, information on invasive plant ID and treatment, and other tips to aid in the success of your planting. If you are struggling with any of the recommended tasks or have identified problems that are too big for you to handle alone, please reach out to us or your local District for help. We are all in this together!

**Sincerely,
The Upper Susquehanna Coalition**



LATE WINTER

1. Check your tree shelters to determine if any maintenance is needed prior to the growing season



Over the winter, tree shelters and supports can come loose or fall over. Re-secure tubes & stakes, and make sure that tubes are pushed down 1-2 inches into the ground. Any debris inside the tubes, such as leaves, dead grass, or old bird nests, should also be removed.

2. Begin checking tree width to determine if shelter needs to be adjusted for growth

While shelter is critical for survival of a young tree at the time of planting, shelters can damage trees as they begin to outgrow tubes. Once the trunk or stem is snug in the tube (e.g. 2 fingers cannot fit inside tube), tubes can be split open at the perforation along the side and left in place partially open to protect against buck rub. Not all trees will grow and mature at the same rate, so *be sure to continue checking tree growth throughout the growing season.*



LATE WINTER

3. Take note of any browsing by herbivores

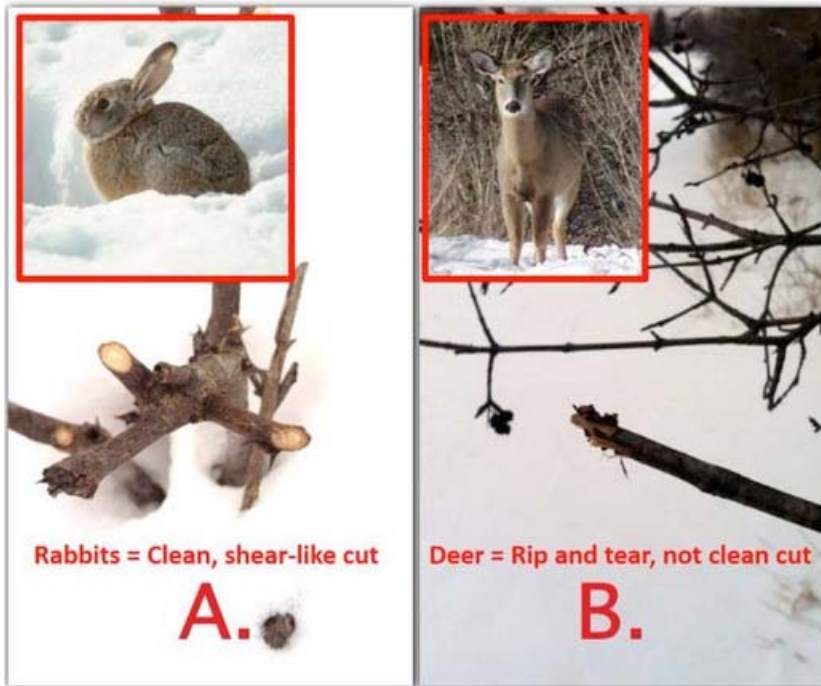


Photo courtesy of GrowingDeer.tv

Look high for deer browse, and low for small mammals such as rabbits, voles and mice.

If lots of trees & shrubs have herbivore damage, consider adding a fence or other physical protection around your buffer, and making sure that all tubes are pushed 1-2 inches into the ground.

4. Develop a plan for mowing and maintenance in the spring

Mow your buffer 1-2 times per year.

If you will be mowing your own buffer, check that your equipment is in working order and ready to use. If you will be contracting a neighbor or landscaper to mow your buffer, get in touch with them now and make a plan for mowing.



EARLY SPRING

1. Begin to manage competing vegetation through mowing, weeding and mulching

Mowing and weeding the area around your trees will reduce competition for resources, and also make regular maintenance and surveying more easy to complete. Aim to mow your buffer before June 1st.



Weed mats, plastic mulch and/or organic mulch can also be used to suppress weeds temporarily. Plastic mats can be removed after one year, or prior to deterioration. Weeds around the base of the tree can serve as habitat for rodents, which can damage the root system.

EARLY SPRING

2. Plant more trees!



The best time to plant a tree is in the early spring prior to bud break while still dormant.

Contact your local Soil & Water Conservation District for assistance with purchasing and planting new trees.

To plant a bareroot tree or shrub:^{1.}

1. Before carrying bareroot plants to your site, place them in a bucket lined with wet paper towels to keep roots moist.
2. Dig a hole deep enough for the seedling's entire root system.
3. Using your hands, cover the seedling with soil. All roots should be buried, with the seedling standing upright.
4. Check the seedling's soil line to make sure it is even with the ground. Firmly pack the soil around the entire seedling.
5. Water generously as needed.



SPRING - SUMMER

1. Continue to monitor & adjust tree shelters and stakes, removing as needed when trees are large enough



Be careful when checking tubes in the summer, as wasps like to nest in the tree tubes!

Keep count of plant deaths when doing regular checks, so that dead plants can be replanted in the fall.

2. Provide new plantings with water if conditions are dry

Young trees are sensitive to drought stress. If conditions are very dry, water new plantings weekly.



Woody Plant ID

In order to properly diagnose problems with your trees and shrubs, it can be helpful to first identify them to a genus or species level. Here are a few terms and characteristics you can use to identify your plants using a key or guide:



Opposite leaf arrangement-
leaves grow directly opposite each other from the same node

Alternate leaf arrangement-
leaves are staggered along the main stem



Compound-
many smaller leaflets attached to midrib, one node at the base

Simple-
singular complete leaf, one node at base



Palmate- leaf is wider, often palm-shaped. Veins extend directly from petiole to edges of leaf

Pinnate- leaf is elongate, feather shaped. Veins extend from midrib to edges of leaf



An online dichotomous key tool for identifying plants can be found at: <https://gobotany.nativeplanttrust.org/dkey/>

SPRING - SUMMER

3. Invasive species monitoring and control

An invasive species is defined as an organism that is not native to a particular area, and that causes harm to the environment, economy, or human health.

Recently disturbed areas are especially susceptible to invasion by non-native species, since plantings are not established enough to cover the ground and prevent spread of invasive plants.

To develop an invasive species control plan, first identify target species and decide on your management goals:

- 1. *Eradication***- *eliminate all invasive plants and the seed bank from an area*
- 2. *Containment***- *prevent infestations of invasive species from spreading to uninfested areas*
- 3. *Suppression***- *reduce the size, abundance, and/or reproductive output of an invasive plant population below the threshold needed to maintain native species or ecosystem functions*



Invasive Species Identification - Common Terrestrial Species

Once you identify your target species, you can develop a management plan that is informed by the life cycle and habits of your species. A few common invasive plant species are shown below. Scan the QR code to access a more complete list of common invasive plants found in riparian areas in the Northeast.



JAPANESE KNOTWEED
(*Fallopia japonica*)



Jan Samanec, State Phytosanitary Administration, Bugwood.org

HONEYSUCKLE
(*Lonicera* spp.)



Chris Evans, University of Illinois, Bugwood.org

MULTIFLORA ROSE
(*Rosa multiflora*)



Rob Routledge, Sault College, Bugwood.org

TREE OF HEAVEN
(*Ailanthus altissima*)



Jan Samanec, Phytosanitary Administration, Bugwood.org

SPRING - SUMMER

4. Assess your trees for disease and pest damage



Oak wilt - Photo courtesy of Wisconsin Department of Natural Resources

Signs of disease and pest pressure may include damage to bark, leaves, and roots. For assistance identifying and managing pest and disease issues, contact your local Soil & Water Conservation District, or local Cooperative Extension. Some common disease and pest identifiers are shown on the next page.

Identifying Common Tree Diseases and Pest Problems

ANTHRACNOSE - a common fungal pathogen that can be fatal for dogwoods and sycamores



Photo courtesy of Missouri Botanical Garden

OAK WILT - a fungal pathogen that affects oak trees, fatality for red oaks can occur within a few months of infection



Photo courtesy of Michigan State University Extension

HEMLOCK WOOLLY ADELGID (*Adelges tsugae*) - a non-native insect that targets and kills eastern hemlock trees. The insects themselves are very small and hard to see, but can be identified by the white egg sacs on the undersides of needles



Teresa Link, Onondaga County Soil & Water Conservation District

EMERALD ASH BORER (*Agrilus planipennis*) - a non-native species of beetle, targets and kills ash trees. Leave distinct D-shaped exit holes in trees and cause bark to fall off



Kenneth R. Law, USDA APHIS PPQ, Bugwood.org



Elizabeth McCarty, University of Georgia, Bugwood.org



Leah Bauer, USDA Forest Service Northern Research Station, Bugwood.org

Pest Spotlight: Spongy Moth

Based on 7/4/21 Conservation Corner article by Adam Chorba, Forest Specialist, Bradford County Conservation District

The European Spongy Moth (*Lymantria dispar*) was first introduced to the US in 1869, and is now found across the Eastern US. Spongy moths are defoliators and will consume over 300 different species of trees and shrubs, posing a threat to most of North America's forests.



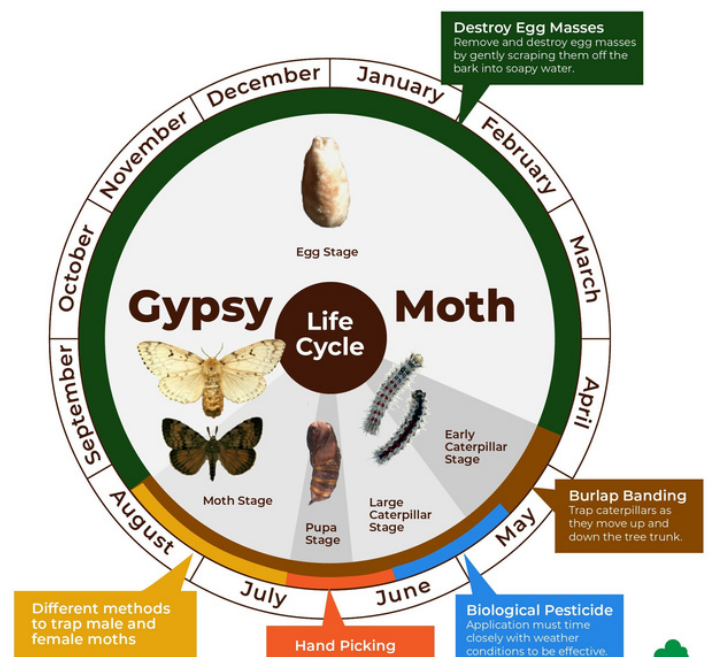
Photo by USDA APHIS PPQ , USDA APHIS PPQ, Bugwood.org



Connecticut Agricultural Experiment Station, Bugwood.org

Spongy moths have four stages of life: egg, larva (caterpillar), pupa (cocoon) and adult (moth). Females lay a mass of 100-500 tan, fuzzy eggs typically hidden near the base of trees. The eggs remain over winter and hatch in the spring often in correlation with the tree's blooming stage. Once hatched, the larvae feed for 6-8 weeks and pupate in a protected area for two weeks. Then emerge in moth form, when they will mate and start the cycle over.

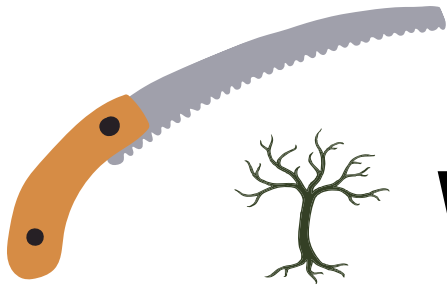
The egg stage and larval stage are the best times to do population control. Egg masses and caterpillars can be crushed, burned or soaked in soapy water. Certain biological pesticides like *Bacillus thuringiensis*, commonly known as Bt can be applied at early stages of the caterpillar's cycle. Pesticides can be very effective with little to no effect on non-target species if applied properly.



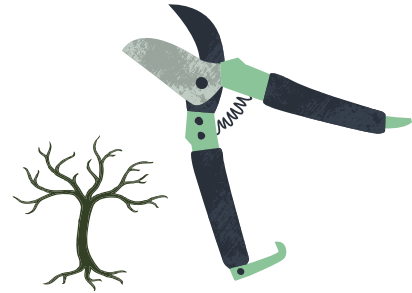
Photography Credits:
USDA APHIS PPQ - Oxford, North Carolina; USDA APHIS PPQ, Bugwood.org
Tim Tinger, Virginia Department of Forestry, Bugwood.org

Keep your trees healthy & attract birds to naturally manage pests.

Pruning Trees for Disease and Pest Control



Why prune trees?



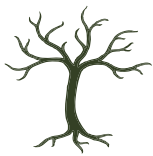
Pruning can improve tree health by removing dead or diseased branches, and encourage flower & fruit development. You may also wish to prune your trees if branches hang over your house, sidewalks, parking areas, or anywhere else that falling limbs could injure people or damage property.



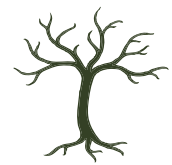
How to prune trees



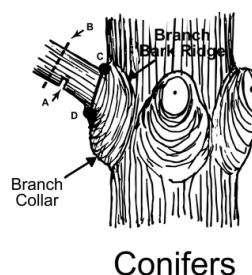
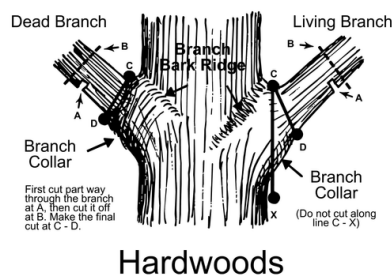
Use the correct tools, including pruning/lopping shears and small saws, and make sure they are clean and sharp. Make pruning cuts close to the branch collar at the base of the limb. Remove large limbs first, starting with the top of the tree. Remove diseased, broken or dead branches, and any limbs along the trunk that are larger in diameter than the trunk.



When to prune trees



Pruning in late winter, just before spring growth starts, is ideal since fresh wounds are exposed for only a short period of time before new growth begins the wound sealing process. To avoid oak wilt disease **DO NOT** prune oaks from April to October. To avoid spread of bacterial disease, do not prune apple trees, including flowering crabapples, mountain ash and hawthorns in spring and summer. In general, avoid pruning when conditions are wet, as this increases the risk of fungal infection.



For more information on pruning, visit

<https://chemung.cce.cornell.edu/resources/pruning>

FALL

1. Tree shelter maintenance and mowing

One last mow of the buffer should be done in the fall, since any taller weeds left around trees can potentially knock trees down during the winter when heavy with snow. Aim to mow in September.

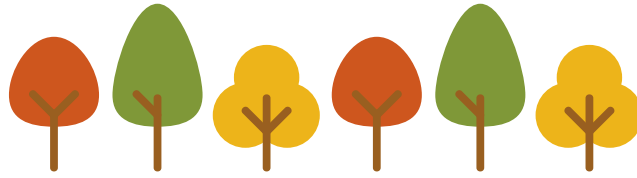


2. Plant more trees!



Fall is also a great time for planting trees. Once trees are dormant, they can be moved and planted with less disruption than if they were planted during the growing season. Contact your local Soil & Water Conservation Office for assistance with purchasing and planting new trees.

To plant a potted tree or shrub:^{1.}



1. Dig a hole as deep as the soil height of the pot and twice as wide, making sure the soil from the pot reaches the top edge of the dug hole.
2. Tap all sides of the pot gently to loosen the plant, and then ease it out of the pot. Avoid yanking the stem.
3. Loosen any rootbound plants by gently pulling the roots away from the packed soil.
4. Place the plant straight up in the hole with the leaved area pointing toward the sky and roots in the hole, making sure the tree is straight.
5. Check that the soil from the pot is level with the ground.
6. Fill the remaining space around the plant with soil, and bury all roots. Firmly pack the soil around the plant to ensure there are no air pockets below the surface.
7. Water generously as needed.



WINTER

1. Nice work this season- keep an eye on your buffer over the winter, and pick back up in the spring!



Thank you for all your hard work helping to reforest the waterways of the Upper Susquehanna watershed. We appreciate your help keeping our buffers beautiful and healthy!

Buffer Work/Observation Log

Use this space to keep track of buffer maintenance activities and other general observations about tree and buffer health

Date:	Work done:	Notes:

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Use this space to keep track of buffer maintenance activities and other general observations about tree and buffer health

Date:	Work done:	Notes:



Special thanks to:



Department of
Environmental
Conservation



Agriculture
and Markets



Chesapeake Bay Stewardship Fund



Contact your local Soil & Water Conservation District
for technical assistance, or:
bufferteam@u-s-c.org