Maintenance Guidance



Maintenance / Care Instructions for Trees:

Once you choose to install a tree, there are some simple steps that need to be taken to ensure the longevity and health of the tree. Reference the calendar at the end of this document to know when to take on these tasks.

Watering

One of the best ways to ensure the survival and healthy growth of your trees to maturity is to adequately water during the first 2 years after planting. Use the schedule below to water your newly planted trees, but remember, **a heavy rainstorm counts as a watering!**

How to Water

Water the base of the tree, not the leaves. Water inside the mulch reservoir but not only right at the tree trunk.

Do not blast the mulch or soil off the tree with fast flowing water. Instead, turn a hose on a more gentle setting and time how long it takes to fill an empty gallon jug. Multiply that time by how many gallons you need to water the tree.

Alternate option 1: 5 gallon construction buckets with holes drilled in the bottom are an ideal slow watering method.

Alternate option 2: Gator bags are convenient, but remove from around the trunk of the tree when it has finished draining, or it can cause mold growth on the trunk.



Do not overwater your trees- overwatering can lead to leaning, root rot, erosion, and short roots since water is always reachable.

After about 2 years the tree roots will have established themselves in the surrounding soil. Once roots are established, regular watering is no longer necessary. Water your tree if it is wilting. Check during times of high heat and low precipitation. Call a professional if your tree is still wilting frequently.

Deep watering encourages deeper rooting, which leads to increased drought tolerance.

Optional: Chlorinated water kills off beneficial soil life (biota), so if you are using municipal water, allow it to sit in an open bucket overnight to allow the chlorine to off gas.

Newly Planted Trees

- Right after the tree is planted, water it. (The planting crew did this for you, but just so you know if you ever plant a tree.) This removes air bubbles from disturbed soil that can dry the roots.
- Water new trees **5 gallons per inch of caliper**. **Caliper** is how wide the tree trunk is at 6" off the ground.
- In the first two weeks after planting, water three times a week.
- In weeks three and four, water twice a week.
- In weeks five and six, water once a week.
- After six weeks, don't water it until the summer unless it's wilting.

Watering for Wilt

- Water the tree (12.5 gallons / 1" caliper) if it is wilting. Monitor it. If the leaves don't perk back up in a few hours, it likely has heat stress, the leaves died, or more rarely, it has root damage. Call a professional if necessary.
 - Redbuds fold their leaves down during hot temperatures to combat water loss. This is not wilting. Check redbuds in the morning or evening.
 - Heat stress/heat shock wilt is from temperatures fluctuating wildly, such as a 20+ °F change on an 85°F+ day. Mild cases may recover by evening. Check during cooler temperatures. To reduce heat stress, water thoroughly (12.5 gallons / 1" caliper) in the morning if you expect high temperatures during the day.
 - **Heat stress can make leaves die.** Leaves can grow back in about a month. Don't panic that your tree died just yet.
- Once a tree is established (see summer watering), it shouldn't be wilting.
 - Water it anyway if it's wilting.

 This might indicate extreme drought or heat fluctuations (unfortunately this can still affect an established tree, it just takes more to hurt it), root problems (burrowing animal, leaking gas line nearby [this is why we don't plant within 5' of gas lines], construction damage etc), disease, or incorrect habitat (average moisture tree in a new sudden wetland I've seen happen in Howard County MD). Contact a professional if necessary.

Summer Watering

For the first ~1-2 years (see calculation below), during summer months (fourth of July to Labor Day), water <u>once a week 12.5 gallons per inch of caliper</u> (or 10 gallons / 1" caliper for simplicity). Also water the tree if there is high heat outside of that time, such as in June, or the tree is wilting. Watering in the morning or evening is best. See heat stress section above. It won't hurt the tree to water it for extra summers.

- Water trees for as many summers as **inches of caliper** they had when planted.
 - **Caliper** is the width of the trunk at 6" off the ground.
 - So if the tree had **1" or less caliper when planted**, water it for **1 summer**.
 - If a tree had **2" of caliper when planted**, water it for **2 summers**.
 - If a tree had **2.5" of caliper when planted**, water it for **3 summers**.
- The reason you're watering it is that your new tree was either grown in a pot too small to fit enough roots to support it, with frequent watering in a nursery, or it was grown in the ground and then scooped out by machine, losing 50-90% of its root system (ball & burlap trees). Either way, it does not have enough roots to support itself and needs time to grow them back. I year per inch of caliper is how much time it takes.
- After these summer(s) passed, water it if it's wilting, but it shouldn't be wilting once established. See watering for wilt. Contact a professional if necessary.

Winter Watering

You do not need to water trees in winter much, as they are dormant. Moist soil helps keep the trees warmer and more protected against cold damage. Water trees once or twice a month if it has not rained or snowed much. This applies even if they are newly planted after the initial watering, if the first six weeks falls during winter.

Watering can be done in the winter only if the following conditions are met:

- The ground is not frozen and there is no snow or ice present.
- The high temperature for the day is at least 40°F.
- Watering can be performed in the morning to allow water to soak in by midday before potentially freezing at night.

Supporting

Your trees are planted with added support in the form of wooden stakes and tree ties, as well as protection in the form of metal fencing. Together, these materials will assist with the upward growth of your tree while protecting it from deer browse, deer rub, and wind damage.

General Tree Support & Maintenance: Two wooden stakes and two tree ties are used to support your trees. Simple maintenance for this support system is outlined below:

- Visual check to ensure support stakes have not fallen over and are still upright. Pound stakes back into the ground as needed.
- Visual check to ensure tree ties are still secured. Tree ties are intentionally installed with some "slack" to allow the tree to sway a little bit in the wind. This natural swaying encourages trees to grow stronger trunks and can be inhibited if tree ties are too tight.

Removing Tree Supports: Tree stake ties should be assessed for removal after **one** year.

- Untie the tree ties one side at a time. Pay attention to see if the orientation of the tree changes significantly when removing each tie.
- Gently hold the trunk and bend the tree a little bit left and right, and see if the root ball is moving visibly. If the root ball moves when the trunk moves, or if a tree begins to lean significantly upon removal of the tree ties, the ties will need to be re-secured to encourage stable vertical growth.
- If the tree stakes are securing a cage or deer net, leave them in place. If stakes are free-standing, after tree ties are removed, begin removing the wooden stakes, taking care to disturb the soil as little as possible.
- Using soil, compost, or topsoil; fill in the cavities left by the wooden stakes.
- Both the wooden stakes and tree ties can be re-used for staking other plants or future tree plantings!

Tree Cages: Each of your trees is surrounded with a piece of 4' tall metal fencing to protect the trees from damage, primarily from deer. Deer are a big threat to newly planted trees because of two behaviors:

- Browsing/eating of the leaves, buds, and young shoots. This can severely stunt the growth of trees and potentially lead to their death.
- Deer rub that occurs annually in the early fall to late winter. Deer rub is when male deer rub their forehead and antlers against tree trunks in order to remove the velvet from their new antler growth and mark territory. This rubbing action can break the trunk of a young tree and cause significant and lasting damage to the protective bark of the tree trunk. A deer's favorite trees to rub are generally between 1" to 3.5" wide at 4.5' off the ground.

Tree Cage Maintenance: Tree cages can protect your trees from deer for years after planting. During this time, maintenance will need to be performed occasionally to ensure the cages do not become a detriment to your trees as opposed to a benefit.

- Tree cages can open! They may be held shut by small pieces of bent tree cage wire. Just unbend it.
- Clear tall grasses and weeds within the cages. This limits root competition with weeds and discourages small animals from nesting inside of a tree cage.
- Visually inspect tree growth inside cages annually. If branches are growing through the cage, they can be pruned or gently pulled into the cage. If branches are left to grow through cage bars for years, the tree may absorb the cage. This strangles branches and can introduce disease.
- Check stakes and ties holding cage closed annually. Are the stakes loose or leaning? Did the zip ties attaching cage to stakes fall off? Fix problems.

Removing Tree Cages: In general, tree cages can be safely removed once a tree trunk achieves around 4 inch diameter at 4.5 feet off the ground (diameter breast height or DBH), and once the majority of leaves are above the height of deer browsing, or more than 5–6 feet high.

- For trees that have side branches covering the entire trunk all the way around from the ground up to 5 feet high (example: sometimes beech), you can ignore the trunk diameter, but still wait to remove the cage until the tree is high enough that a significant portion of its canopy is beyond browsing reach, or many side branches are reaching the edge of the cage. Note that young eastern white pine trees are often like this, but as they age, the trunk suddenly gets longer without side branches and becomes damageable by deer again. Please leave the cage on until 4" DBH.
- For any tree, the cage will continue to protect the tree as long as the cage is not too tight to fit the tree. It is beneficial to leave it on.
- The tree reaching 4" DBH will probably take six or more years. Do not expect to remove your cages fast.

Pruning

Prune dead or damaged branches on trees at any time. Any additional pruning to manage shape and size should ideally happen in the dormant season and the younger the better because the bigger branches are the more it damages the tree to take them off, but can be done at any time as well. **Do not remove more than 25% of the canopy during a year.** The main reasons to prune your trees are:

- Removal of damaged or dead branches/stems
- Encourage growth of a single dominant stem of the tree
- Shaping of the tree for maturity

Pruning Terms:

- **Raising** the tree means removing low hanging branches to provide clearance for people and vehicles underneath, or achieve a classic 'lollipop' shape, which not all trees have naturally.
- **Thinning** the tree involves the selective removal of branches and limbs of the tree to improve its structural integrity. This is generally done only if a side branch is rubbing the trunk, or if the tree is stressed and growing vertical branches from the ground (epicormic growth/"water spouts"). Note that in Fig. 2.5, the original tree was fine without any pruning. It's fine to leave a lot of branches in the canopy. That is the tree's natural structure and it will grow faster if it has more leaves. Thinning that extreme is for apple farming.
- **Cleaning** the tree involves removing dead or dying limbs to reduce chance of infection to live branches, and aesthetics. Cleaning is also done for safety reasons to preemptively remove branches that are at risk of falling.
- **Reduction** Shortening the tree because a power line is in the way or something like that. Ideally, you chose a species of tree that does not grow too tall for your space, and you won't need to hire someone to do this. But if you have to, be careful to avoid topping (Fig 2.5).

How to Prune:

Prune dead or damaged branches on trees and shrubs at any time.

- Cut to ¼" beyond the nearest leaf node or intersecting healthy branch, leaving ¼" or branch collar (whichever is larger) in place to not damage the branch it is attached to.
- Make cuts at a 45 degree angle to or perpendicular to the ground so they don't hold water and rot.
- Additional pruning to maintain shape and size should happen after the woody plant has finished flowering. This timing varies from tree to tree.
- Cut a branch to the branch collar, or to a side branch growing off of it that is at least 1/3 the diameter of the branch you are cutting, to avoid topping (fig. 2.5) the tree. Topping is very damaging.
- Do not remove over 25% of a tree's living canopy (branch volume) in a year.
- Do not paint any substance over tree wounds or pruned branches.
- To prevent transfer of diseases, sanitize pruning tools between different individuals by wiping with 70% rubbing alcohol.



Figure 1. Cutting tree branches (USDA Forest Service: How to Prune Trees)



Figure 2. Picture of branch collar (branch shoulder) by Averilp. Do not cut branch within the area circled in red. Look for the angle between the branch and trunk to stop changing. You can cut where the angle stopped changing.



Figure 2.5: Topping: Image courtesy of Washington State DNR

Mature Trees: Once a tree reaches maturity, pruning is usually not necessary. Trees should be assessed about once every year to three years for general health. Check for large dead branches annually and after strong windstorms if the tree is close to a building, and remove as necessary or annually. Since the branches are larger, more precautions need to be taken to not hurt you or the tree.

Three Cut Method: At this point you may want to call a professional. Large branches can be dangerous.

The Three Cut Method is a simple and effective way to prune tree limbs while minimizing potential damage to the rest of the tree. Heavy limbs can often hurt a tree if cut incorrectly by stripping away bark and/or creating an unnecessarily large wound on the tree. Use the method below to protect your trees as your trim large branches. See Figure 1 for details.

- 1. Find a point on the limb about 1 foot from the trunk of the tree to make your first cut. Cut underneath the branch, no more than halfway through the branch.
- 2. Next, make a second cut, this time on top of the limb, slightly closer to the tree trunk. As you make this cut, the tree limb will eventually snap off where the first cut was made.
- 3. Finally, remove the remainder of the limb by making one final cut where the limb meets the **branch collar**.

3 cut method (Can be used for lateral or removal cuts.)



Figure 3. Use the Three Cut Method to safely remove large branches. (From USDA Forest Service: How to Prune Trees)

Further resources: USDA Forest Service How to Prune Trees https://www.fs.usda.gov/nrs/pubs/na/NA-FR-01-95-Rev-2012.pdf

University of Maryland Extension Website with some of the same information but not in a PDF:

https://extension.umd.edu/resource/pruning-trees-home-landscape/

Pest and Disease Management

Deer: Deer can cause significant damage to your young tree. As described above, the tree cages will be your first line of defense against deer browse and rub. There are other techniques you may wish to consider if deer are common in your neighborhood.

- Motion activated sprinklers can be used to scare off deer when they approach your trees.
- Use heavy duty fishing line tied to supports to create a barrier around your trees about 2-3 feet off of the ground. This plays to the poor eyesight of deer and often spooks them when they trip into the wire.
- Pets, primarily dogs, are great deterrents to deer and their smell around your property can sometimes persuade deer to move elsewhere.

• Use store bought deer repellents, or alternatively, create your own homemade repellent using hot peppers, garlic, pure soap (any soap without detergents works), and water. The soap will help the mixture adhere to leaves when applied. Blend 5-10 hot peppers, a couple cloves of garlic, and 1 teaspoon of soap in half a gallon of water until liquefied. Once the blend has settled, strain through a cheesecloth into your container of choice and spray onto plants as needed and after rains. Store your homemade pepper spray in a cool and dark place when not in use.

Disease: Little discolorations on leaves are usually harmless. Optionally remove leaves once they fall in autumn if you see this and throw them away. If you see a twig swelling abnormally in the middle, prune beyond that area and sanitize your pruner. Contact a professional if the tree seems stunted, a lot of the tree is covered in black mold, or the majority of the leaves look so affected they're nonfunctional.

Insects: Your native tree supports hundreds of species of insects, birds, and mammals. They're supposed to be eating it, and the tree will be fine.

• If over 50% of the canopy is covered in one species of insect and/or the tree seems to have stunted growth or a lot of damage, contact a professional.

Voles/Mice/Rodents: Less of an obvious nuisance than deer, field rodents can cause a lot of damage to your trees if left unchecked. The largest threat rodents pose to young trees arises from their desire to nest at the base of the tree and chew on the bark and roots. The most effective way to prevent rodents from nesting at tree bases is to keep weeds and grasses from encroaching on the trunk of the tree. Regular weeding and mulching will greatly reduce the chances of rodents nesting near your trees. A visual inspection of your trees should be done regularly if you suspect rodents are a problem. Look for damage to the bark like that seen in Figure 2.



Figure 4. Typical damage to tree trunk caused by rodents.

Cleaning:

Removing Leaves

- Rake leaves as necessary in the fall. If desired, a layer of leaves can be used instead of mulch, or a layer of leaves can be left under a thinner layer of mulch.
- Some species of beneficial insects such as fireflies and luna moths overwinter in fallen leaves.
- If the tree has visible disease on leaves, dispose of leaves in the trash or compost, do not let those sit under the tree.

Removing Debris

Check branches and surrounding ground for windblown trash and remove as necessary.

Removing Weeds

Weeds near the base of the tree can take a significant amount of water away from young trees. Remove them.

Removing Vines

- If a tree is young or near a building, cut all vines.
- Invasive species vines can strangle (girdle) the tree, cause branches to break from weight, damage bark, and/or cut off light access.
- Native species vines can generally live on mature trees without much damage, but can still cause branches to break.
- Cut vines as high as you can reach and again at ground level. They will wither and fall off tree branches eventually.
- If vine is tight on the tree, be careful to cut only the vine.
- Do not pull entire vines off trees, as this can break branches, damaging the tree and potentially causing branches to fall on you.

Mulch:

Raking and Removing

Use a leaf rake to loosen any compacted mulch. If adding new mulch, remove old mulch first if new mulch would make it deeper than 2"-3". If the mulch has white mycelial growth, don't worry, that's normal. Mushrooms break down dead wood into compost that feeds your tree.





Figures 5A and 5B. Correct mulching technique graphic and photo (with deer cage on a young tree)



Figure 6. Incorrect 'volcano' mulching technique leading to circling roots strangling the tree. [Photo by NY State IPM Program at Cornell University]

Replacing

• Mulch helps the tree in multiple ways but isn't strictly necessary. You can choose not to mulch, just be careful not to run into the tree with a lawn mower

or weed whacker. However, mulch will make your life a lot easier while the tree is in a tree cage because it suppresses weeds.

- Tree leaves and woodchips are good cheap mulch alternatives. Tree leaves are what the tree would naturally have as mulch in the wild, and leaf litter houses beneficial insects over winter such as fireflies.
- Maintaining a mulched area around the tree keeps the roots insulated from drastic temperature changes and provides a protective buffer between the tree trunk and lawn trimming activity. Use shredded hardwood mulch in a layer about 2-3 inches deep in a ring that extends from 3 inches away from the base of the tree to the drip line, or a ring to the edge of the tree cage. It should be the shape of a shallow donut, not a volcano. See Figures 5 and 6. Avoid mulch or soil touching the bark to prevent bark and circulation system rot, pest damage, and roots circling the tree and cutting off circulation (girdling). If desired, sprinkle a very thin vanity layer of mulch within that 3" soil circle around the tree, but only ½" or so thick, just enough to hide the soil, not enough to touch the bark.
- You should be able to see a root collar (Figure 5 red outline) sloping gently to the ground, and maybe a little bit of support roots. If the tree trunk is making a 90 degree angle to the ground or mulch when it enters the mulch, it is buried too deep, uncover.
- Do not bury roots that have been exposed long enough to have above ground bark. This can cause roots to rot and introduce disease into the tree. This bark is the same color as the tree trunk and is hard. Underground roots change color and have a softer bark.

Mulch Resource: https://extension.umd.edu/resource/mulching-trees-and-shrubs/

Inspection (and correction of minor problems)

Ideally, inspect your tree at least once a year, in a season when the leaves are on. If you don't see these problems, your tree has a clean bill of health :). Howard Ecoworks offers tree inspection as well, see Tree Health Questions below for that.

You're going to be looking for:

- Deer Cage
 - Is it damaged?
 - Is it on securely? Are the stakes stable or wiggling?
 - Are the zip ties holding the stakes still on?
- Dead Branches
 - How do I tell if a branch is dead?
 - Has no alive leaves on it for months during a season it should have them.
 - Does not have plump, alive leaf buds. Leaf buds may crumble.
 - Branch brittle when bent gently.

- Branch may be a different color than the rest of the bark.
- Branch may have grown outwards but be bending back inwards toward the tree, and the tree has not recently been wrapped for transport.
- If gently scratching a small area, bark is hard, possibly difficult to scratch, and scratches are not green right under the bark.
- Canopy
 - Do you see a lot of dead branches or dead branch tips? (See: Pruning)
 - Do you see large dead branches that are a hazard to people or structures? (See: Pruning)
 - How much of the canopy has green leaves? If over 25% of the canopy is dead, the tree has a lot of dead branches near the top not near the bottom, or 12" or more of the top of the trunk died, consider contacting a professional. You can also wait a year to see if it recovers.
 - If the leaves just fell off a tree in summer, see the watering section. Wait a month and see if they grow back.
- Leaves
 - Do the leaves look odd? Wilting? (See: Watering)
 - Holes, black spots, mold, brown areas, yellow or pink in summer when it isn't new leaves, curled up, etc? (See Cleaning: Leaves and Pests: Disease, and call a professional if the tree seems to not be growing well. Yellow/pink is a light or nutrient problem.)
 - Are there insects damaging 50% or more of the leaves? (See: Pests)
- Trunk
 - Is there damage to the trunk?
 - This is likely from deer or mowing. Please stop the source of damage. If it's from a sapsucker, you might be out of luck but you can try putting a deer net around the tree in addition to a cage.
 - Cleaning a bark wound is called **tracing**. Removing loose, dead bark and making a smooth wound helps the tree seal over it faster. This is optional.
 - Is over 50% of the circumference of the trunk missing bark? Consider getting a professional to check the tree. It is likely to be stunted or become unstable.
- Base/Roots
 - The root collar/root flare should be visible. (See: Mulching)
 - If the tree trunk goes perpendicular 90 degrees into the soil, it is buried too deep in mulch or soil, unless the tree is very young and still has a taproot.
 - Dig around the tree until you find the root collar or the beginning of roots. Remove excess soil/mulch.
 - Do you see any roots with gaps or holes in the soil around them, or roots newly above ground after a storm?
 - This usually means the tree is new and the stake or ties are too loose, letting it wiggle too much in the wind. Secure stakes and

stake ties, or contact a professional. If a mature tree is doing this, definitely contact a professional.

- Are any roots above ground circling the tree instead of going outward?
 - If it's a large root circling less than 25% of the tree, leave it.
 - If it's a small root, prune it like a branch.
 - If it's several roots or large roots, contact a professional.
- Do you see mushrooms growing on the tree? Contact a professional.

Tree Health Questions:

If you want more information about tree health, here are some good resources:

The Davey Tree Expert Company's website Arborist Advice

University of Maryland Extension: <u>https://extension.umd.edu/programs/environment-natural-resources/program-are</u> <u>as/home-and-garden-information-center/ask-extension/</u>

If you need further assistance, contact <u>info@howardecoworks.org</u>. Howard Ecoworks also offers fee for service tree health assessments: <u>https://www.howardecoworks.org/tree-health-assessment</u>

HEW's Maintenance Program

Howard EcoWorks also offers a fee-for-service maintenance program for all the Bay-scapes/conservation landscapes, rain gardens, and tree planting projects we install. Prices will vary depending on the number and size of the gardens/trees planting. If this fee for service program is of interest to you, please fill out the <u>maintenance request form</u> on our <u>website</u> or contact <u>info@howardecoworks.org</u> for more information.



