ARBOR IMAGE
TREE CARE

Beautiful, flourishing trees,for life ...

A TREE OWNER'S GUIDE

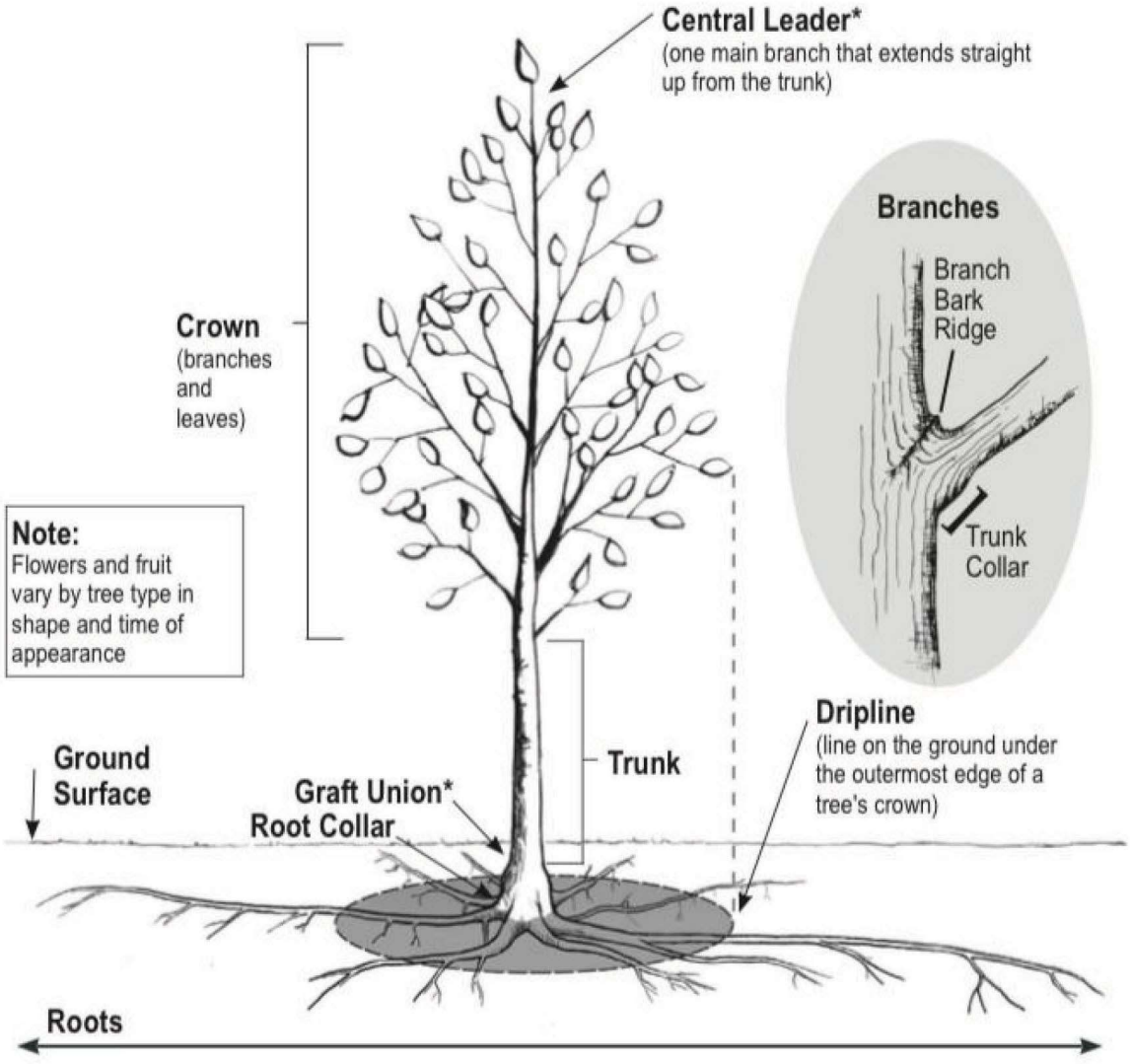
TO BEAUTIFUL, FLOURISHING, TREES FOR LIFE

Web: theArborImage.com

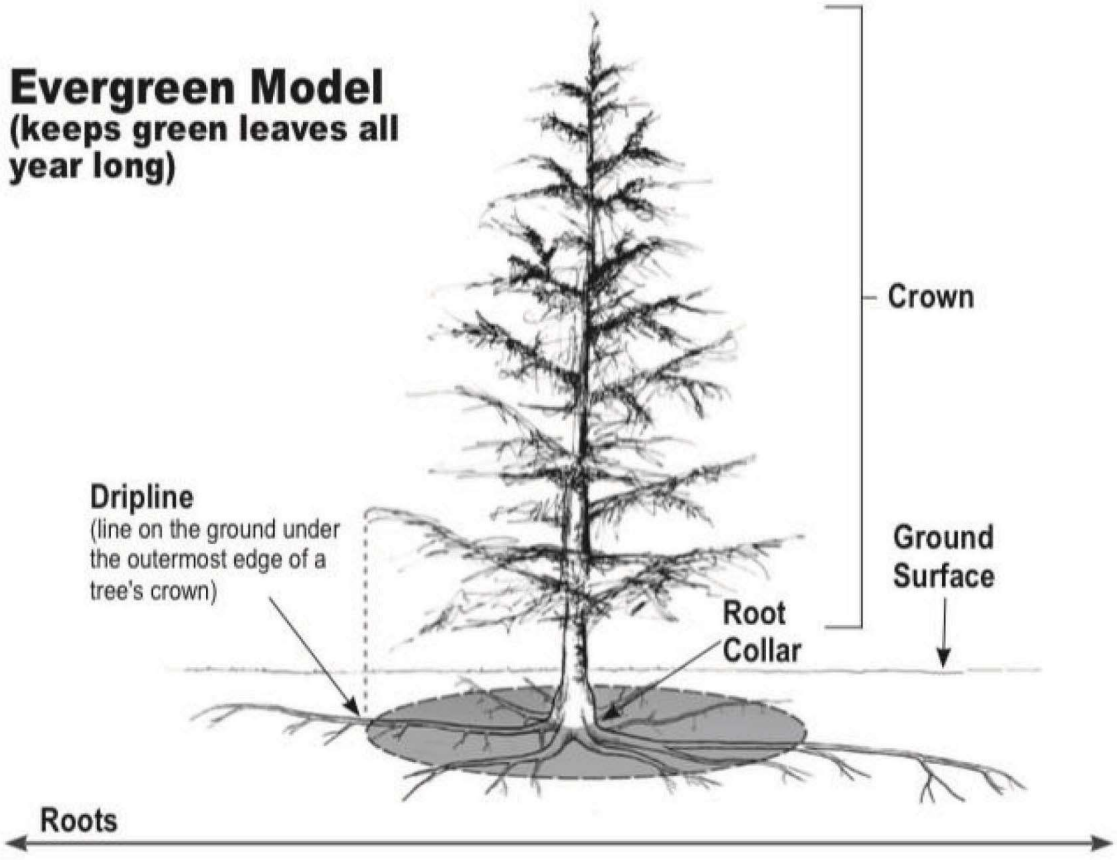
Phone: (405) 815-7959

TABLE OF CONTENTS

Deciduous Model
(loses leaves in the autumn)



EVERGREEN MODEL



TRUNK PROTECTION

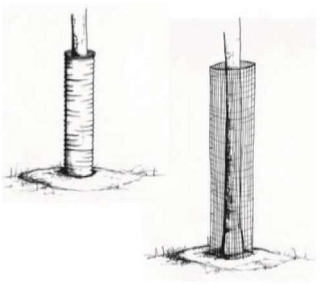
GUARDS/BARRIERS

Young deciduous trees have thin bark that can easily be damaged by animals and equipment such as string trimmers. Rabbits, beavers, and mice like to chew on young bark low on the trunk. Deer also scrape tree trunks with their antlers/necks.

Damage Mitigation

To prevent long-term damage associated with trunk wounding, install "weed eater guards" or "rodent Barriers" for mitigation. Many people use plastic tubing or hardware cloth (stiff wire fencing with 1/4-1/2 inch mesh squares) around the trunk. The tube should be big enough around to allow 1-4 inches of space between it and the trunk. It should be 1-3 feet tall for small rodents and as tall as possible for deer.

Wrap the tube around the trunk, taking care not to scratch the bark. Use a few pieces of wire to keep the tube closed. Push the tube into the ground or mulch less than an inch. Attach it to one or two stakes if necessary.



Timing & Inspection

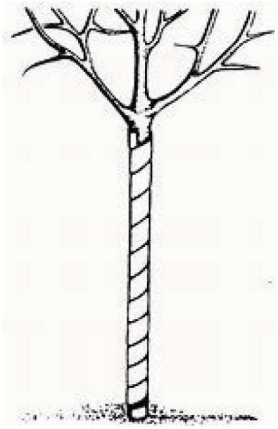
Protection can be applied anytime and left on all year round, as long as it does not touch the bark. Inspect at minimum twice a year. Adjust yearly for tree growth.

WINTER TRUNK WRAPS

Winter wraps are a great way to prevent trunk and bark damage on newly planted or susceptible species such as thin barked deciduous trees. The issue stems from the fact that a deciduous tree trunk receives no shade in winter because its branches are leafless and the trunk is exposed. On sunny afternoons, the sun casts its rays upon the trunk and heats it up. Temperatures on the sunny side of the tree can be as much as 77˚F warmer than on the opposite side. This heat causes the dormant cells beneath the bark to become active. When the sun sets, the trunk rapidly cools. The activated cells freeze and burst, causing the bark to crack. Sunscald and subsequent trunk contractions will likely lead to: sunken/discolored areas, the formation of cankers, and splitting/cracking bark.

Damage Mitigation

To help prevent this from happening it is best to wrap trees for at least their first two winters after planting, until their bark develops texture. Sensitive trees mentioned below will benefit a lot from this protection for their first five winters. After 5 years it's best to evaluate each tree on an individual basis.



Deciduous Trees Susceptible to Sunscald:

Young or newly planted trees, those trees suffering from drought conditions, and hardwoods with thin bark. At-risk species include: Poplar, Maple, Sycamore, Ash, Willow, Honeylocust, fruit trees, and Crabapples.

Pro Tip: If you already have damage a great thing to apply to your trunk would be a horticulture oil such as Dormant Oil. Dormant Oil will help seal up wounds preventing pathogen entry and will also suffocate any insect eggs that could be in the wound.

Be Aware: Although many products claim to help trees recover from pruning cuts or breaks in the bark faster there have been none to actually showcase this in trails according to the International Society of Arboriculture. It is not recommended by professional arborists to use sealing paint, paint, foam fillers, caulking, or wood fillers to treat wounds or trunk cavities. Many of these can actually cause lasting harm.

They have small/unstable root balls, the trunk bends excessively when not supported, or the planting site is very windy and trees will be uprooted if they are not supported.

Why Trees Need a Little Wiggle Room

The real reason to stake/strap your tree is to hold the roots steady so that the tree can quickly send out new roots and attach itself into the ground. The natural movement of the stem will stimulate the tree to grow a thicker trunk and hold itself up. If you stake a tree so the trunk cannot move, the tree will 'think' it has a strong trunk and will not send out as many anchor roots. If you then remove the stake, as you must eventually, the trunk will be too weak to brace itself and it could easily snap/topple over. The longer and tighter you leave a tree secured, the more likely this is to happen when the support is removed.

Preferred Strapping Materials

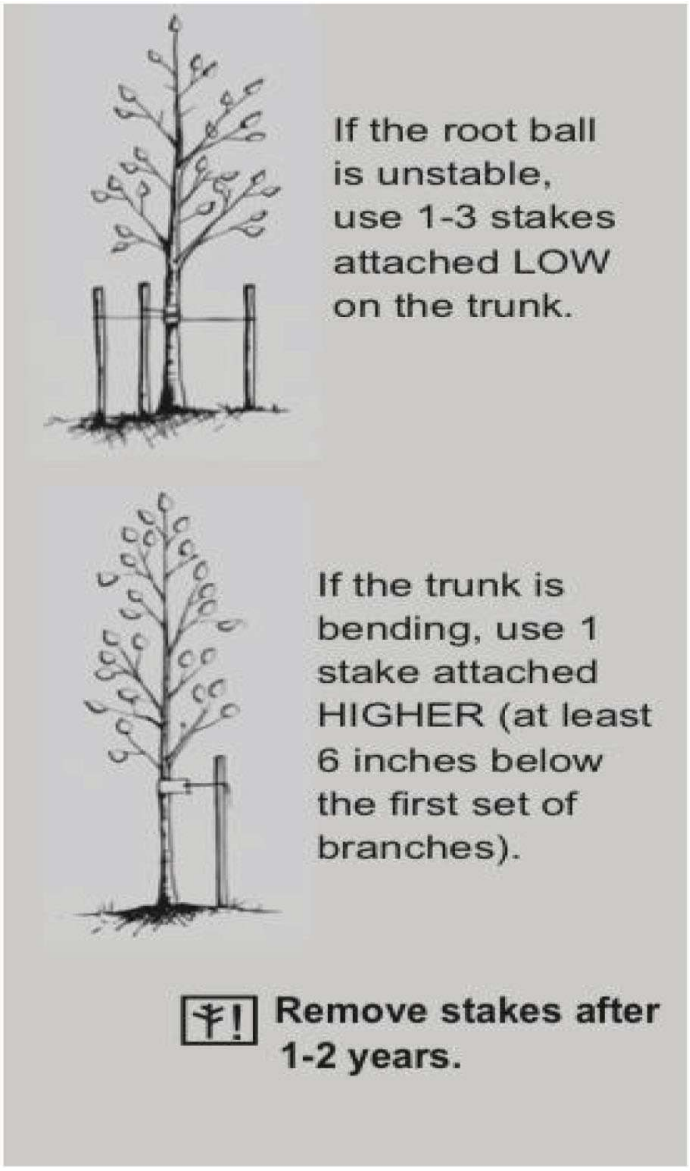
Use wide thin straps, or nylon stockings wrapped around one side of the trunk. The tree should not be tied tightly, with 1-3 inches of wiggle room to sway in the breeze.

Best Practices

Drive the T-post or stakes into the ground outside the root-ball, ideally on 3 sides of the tree. If you have a strong prevailing wind, put 1-2 of the stakes in the same direction as the wind blows. Remember, we only want to hold the roots steady, so you don't need a tall stake. Take hold of the stem low down and move your hand up until the top of the tree is straight. That is the place where you need to attach the tie – don't worry, it may only be a foot above the ground. A good rule of thumb is If the root ball is unstable, use 1-3 stakes attached LOW on the trunk. If the trunk is bending, use 1 stake attached HIGHER (at least 6 inches below the first set of branches).

Timing & Inspection

It's best to check on any straps or support system you have placed on a tree every Spring and Fall to look for signs of strangulation. Adjust any anchors, or straps to allow 1-3 inches of movement in any direction. Remove support systems after 1 year max. The sooner the support can be removed the better.



ENCIRCLING OR GIRDLING ROOTS

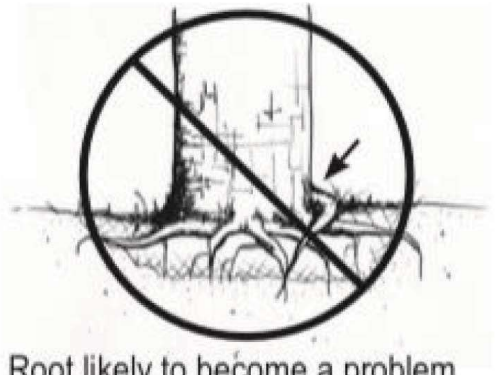
Girdling roots are more common than many people realize, yet they can be deadly. When lateral roots at (or sometimes, just below) the surface of the soil encircle or cut into the main trunk of a tree, the flow of water and nutrients becomes restricted. Affected trunks/stems will eventually become weakened and the tree may die in 5-15 years from the girdling roots alone, or in conjunction with environmental stresses or insect/disease attack. Cultural practices like fertilization, irrigation, and pruning will not offset the slow growth caused by girdled roots. Once identified, they should be treated promptly.

Girdling doesn't just "happen."

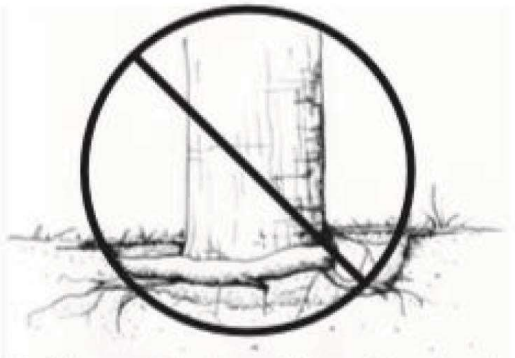
The most common cause is the trees remaining in their nursery containers for too long. The roots can circle the bottom of the pot, having nowhere else to go. When these roots are not loosened during the planting process, they can become girdling roots. Similarly, when a tree is planted in a hole that is too small, the same process occurs: the tree's roots begin circling one another and in time develop into girdling roots. Leaving pieces of the planting container or other debris in the planting hole can also lead to girdling roots down the road. Other causes include heavily compacted soil and close proximity to foundations, curbs and other obstructions, all of which can hinder normal root growth.

Damage Mitigation

The best way to prevent girdling roots – as well as many other problems – is to dig the correct size planting hole. If there are roots encircling the base of the root ball, break these up before planting to allow for normal root development. Water a newly planted tree consistently and inspect the root flare for defects periodically. Girdling roots can be removed, but you may need to consult with a certified arborist to avoid damaging the main stem. In severe cases, girdling roots can compromise the tree's stability and the tree may need to be removed.



Root likely to become a problem (when trunk and root meet)



Problem root already touching the trunk

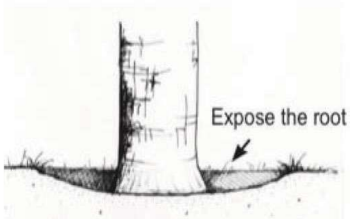
Covering the root collar with soil or mulch encourages encircling roots

ROOT FLARE SUFFOCATION / EXCAVATION

One of the most common reasons issues like girdling roots are not caught in time to treat is because the root flare is buried below mounds of soil, and mulch. Tree's have a natural taper at the bottom in which you can see them "flare" outward like bell bottom jeans.

Why It's Important

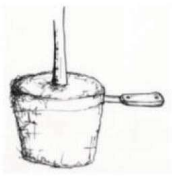
Not only does this excess material on the root flare hinder you from seeing potential root issues but your tree can actually suffocate. The root flare, along with the rest of the roots, are meant to have gas exchange so excess debris on top can suffocate a tree causing deterioration, stunted growth, and weak root systems. By removing the debris build up you can also prevent root rot, decay, and fungal issues because the main trunk of the tree is not meant to stay wet yet moisture build up along the trunk is inevitable if it's buried in mulch/soil.



Damage Mitigation

If your tree looks like a telephone pole at the base then it is important to excavate the surrounding soil until you can spot the root flare. When excavating it is critically important to not tear up the small fibrous roots around the tree.These are your absorbing roots and damaging these will negatively affect the health of the tree. It's best to go slow and remove as much of the built up debris by hand as possible or with compressed air over using a shovel or spade.

Wait until soil conditions are optimal (damp but not muddy, and especially not dry/rock hard). If there needs to be extensive excavation you can use air powered tools, or wet/dry vacs to remove the soil without harming roots.



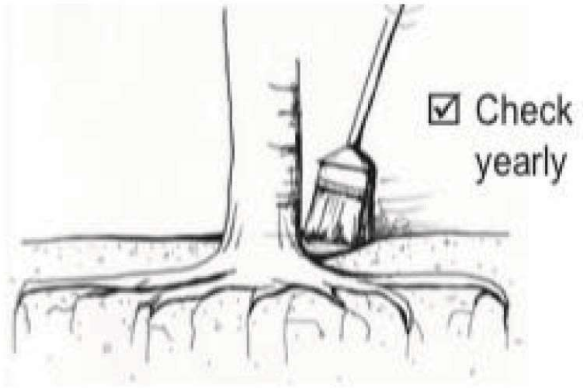
It's also important to cover any exposed segments of roots with compost or top soil. In some cases you may need to excavate a few inches deeper than the root flare then come back and replace with compost on top to adequately cover exposed roots while making sure the root flare stays uncovered.

When to Ask an Arborist

Depending on the tree size and the amount of soil that needs to be excavated it may be best to contact your Arborist who can use specialized pneumatic air tools to safely remove the soil from the root flare. They can also diagnose and correct any root issues while there.

After Excavation

After excavating the root zone water thoroughly to hydrate any dried out or exposed absorbing roots that are near the surface. Then add 2-4 inches of mulch around the root zone, and stay 4 inches away from the tree trunk. Never have more than 4 inches of mulch laid down at a time.



MULCHING

One of the best things you can do in care for your trees is properly mulch around the root zone. Adding mulch to your tree increases water retention by reducing water runoff and evaporation. Mulching will also mitigate temperature fluctuations which helps tree roots and the microbes in the soil. It will also help prevent weed/grass encroachment while adding organic life to the soil. The mulch adds organic life back into the soil as parts of the mulch decompose. Not only this but it will improve soil biology by aerating, adding soil structure, and improving soil drainage over time.

Mulch Ring Size

Maintain a ring of mulch around the tree, the wider the better, not exceeding the drip line of the canopy. For large trees where this amount of mulch is not practical to be added a 3 foot radius ring is the minimum recommended. The recommended mulching depth is 2–4 inches with a 2-4 inch gap between the mulch and the trunk of the tree.

MULCHING MATERIAL

Organic materials like wood chips, compost, pine needles, shredded bark, straw, and leaves are best. Wood chips will take longer to break down and, therefore, will not require replacement as often. Cypress and pecan mulch are also viable options but rubber, stone, and lava rock mulches should be avoided. Hardscape mulches do not have any of the described benefits above, and can actually be harmful to beneficial soil life.

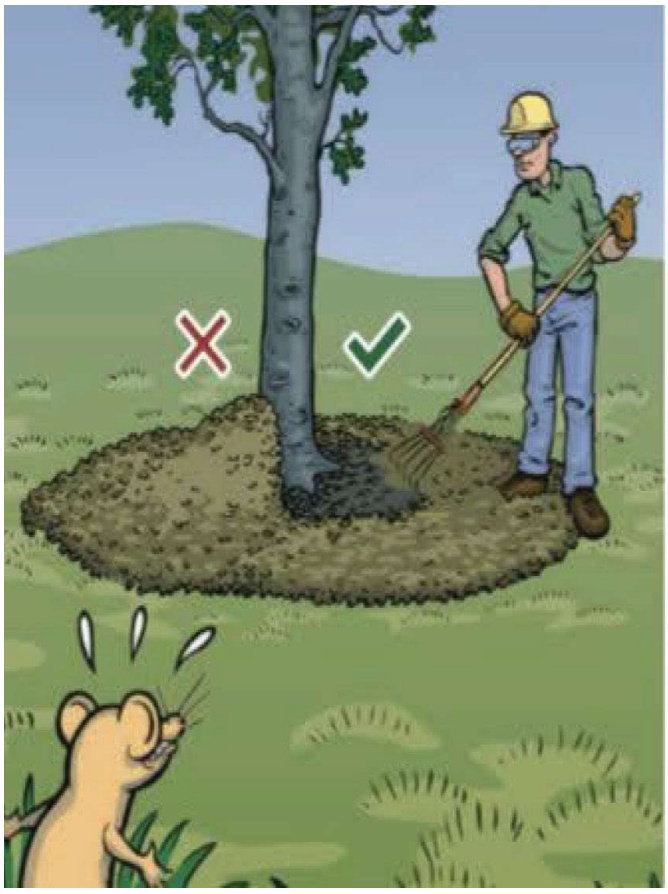
Choose medium-textured mulch material for the best results. Fine mulch might become compacted and hold too much moisture, which then evaporates and never makes it to the plants. On the other hand, coarse mulch is porous and doesn't hold enough water.

GRASS BARRIERS

If grass growing through the mulch has become an issue, weed barriers, newspapers, or cardboard can be placed underneath the mulch for prevention. You should never use herbicides to treat weeds or kill grass underneath a tree because this can poison tree roots.

Best Practice

It's most important to occasionally check the depth of your mulch and make sure it falls between 2 to 4 inches deep. Over time, mulch colors fade due to frequent exposure to sunlight. Regular non-dyed mulch may become a grayish color in one to two months, while dyed brown or black mulches may keep their color for a year or longer. Eventually, all mulches will fade without maintenance. The easiest way to take care of faded mulch is to add a thin layer, or an inch or less, of fresh mulch to cover up the gray mulch. However, before adding new mulch to old layers, examine the existing mulch to discern: how deep are old layers, how long has it been since the last replacement, and is the mulch soggy or decomposing.



How to Know when to Replace

If the old mulch is rotting, it's time to replace it completely. You'll also want to replace mulch if it breaks apart in your hands like dirt because it's no longer effective. Otherwise, try to remove a layer or thin out the existing mulch before adding a new layer. When you have the old mulch layers down to an inch or two, it's safe to add an inch or two of fresh, colorful mulch. Every season, you'll want to mix and turn your mulch a couple of times to break up clustered pieces and make sure it hasn't formed a compacted layer on top of the soil.

Mulch Restoring Dyes / Colorants

One practice that is gaining popularity is to apply a dye to color old mulch to make it look fresh. While this does save time this is typically not recommended for a variety of reasons. The biggest concern is that the old mulch won't be replaced/rotated as it needs to function properly.. Colorants can also be toxic to plants, harmful to soil life, disguise mold, and keep mulch beds matted together. So not only does coloring your mulch carry some risks it also keeps you from receiving all the benefits of fresh mulch.

Timing & Inspection

You'll want to add mulch twice a year, once in the spring and once in the fall. In the spring, add more mulch to either replace old decomposed mulch or to replenish mulch that has washed or blown away, making sure to maintain a thickness of 2-4 inches.

Wait until mid to late spring when the soil is warm and moist to apply new mulch to keep moisture in and help prepare plants for summer heat.

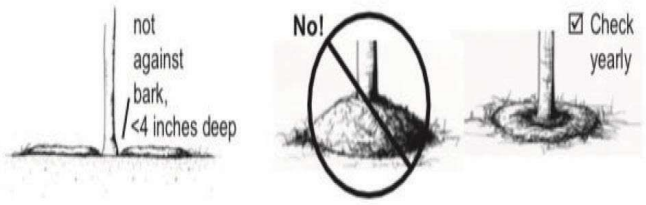
In the fall, apply fresh mulch to insulate plants and protect roots from harsh winter temperatures. Wait until after the first freeze to apply mulch, but add mulch before temperatures get too cold. By adding mulch in the fall, you help reduce the freezing and thawing process which, in turn, reduces the risk of plant injury. Evergreens are very susceptible to winter burn if soil temps are frozen for extended periods of time.

When Planting in Mulch beds

Over time, it can be easy to mix soil with mulch when adding new plants. However, you want to avoid mixing the two, especially if you use hardwood mulch because the mixture can cause plants to dry out. Also, too much decaying mulch mixed with soil can pull nitrogen from the soil. Instead, rake mulch out of the way before planting.

Improper Mulching

Too much mulch can be harmful by preventing oxygen from reaching the roots. Unfortunately, many landscapes are falling victim to a plague of over mulching. If mulch is piled against the stems or tree trunks, pull it back several inches so that the base of the trunk is exposed.



The process of protecting trees during construction is not always easy, but the benefits can be substantial. Larger trees provide aesthetic beauty, financial value, and benefits to the environment and quality of life.

Construction damage to trees may take many years to impact the tree and can be deadly. Small injuries accumulating over time can start a hard-to-reverse decline.

To ensure that trees will survive and thrive after construction, it is important to work with an Arborist from the beginning of the planning phase through to the end of the post-construction phase of the project.

The sooner and more involved an Arborist is in the project, the greater chance of maintaining or improving tree health and survival.

HOW CONSTRUCTION CAN DAMAGE OR KILL TREES

Root Damage: Grading, trenching, paving, altering drainage patterns, and adding or removing soil within a tree's critical root zone damages tree roots. If too many roots are damaged, the tree will be affected.

Soil Compaction: Heavy construction equipment increases soil density (compaction), slowing root growth, limiting water penetration, and decreasing oxygen needed for root survival

Physical Injury to Crown and Root Collar: Construction equipment can break branches, tear bark, and wound the trunk. These wounds weaken the tree and allow the entry of decay-causing fungi. The base of the tree and its root collar are especially vulnerable to damage from machinery, soil, or debris placed over the lower trunk.

Heat and Chemical Damage: Bark and foliage are easily damaged by the heat from running machinery and burning material. When spilled fuels and runoff from vehicles seep into the soil, soil chemistry changes and root growth and function are reduced.

Removal of Supporting Trees: Closely spaced trees grow as a community, supporting and protecting each other. Removing some of the trees exposes the remaining trees to sunscald stress or structural failure.

Scaping Organic Layers: Often when new buildings are to be constructed the area is scraped to level. This destroys the nutrient rich organic layers of the soil that are only 4-12 inches deep. It takes decades for nature to reproduce even a single organic layer, leaving trees utterly depleted of a host of essential nutrients.

HOW TO MITIGATE CONSTRUCTION DAMAGE

Planning and Design Phase

Ensure an Arborist is involved early in the planning phase of construction. Minor design changes can result in significant reductions in tree damage and make a great difference in whether a tree will survive. There are many options an arborist might suggest during the planning and design phase to protect trees.

Pre-Construction Phase

Prior to the start of work establish a Tree Protection Zone where tree protection fences should be installed. If machinery must come close to a tree trunk, an arborist can recommend how the trunk can be

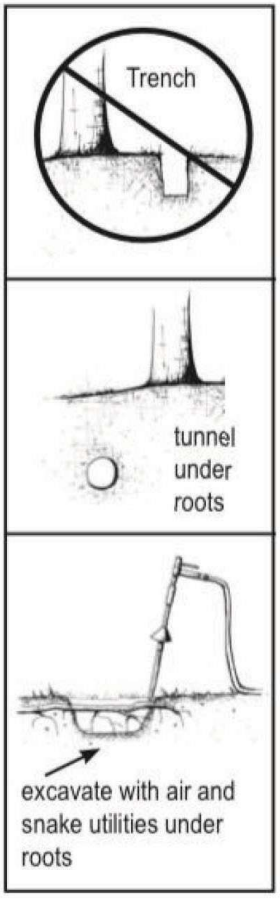
protected from damage with additional protection materials. If there will be trenching, grading or other excavation near trees that may damage roots, an arborist can prune roots out of the way before excavation, or cleanly cut them before any damage is done. Roots that are ripped out take a significant time to heal vs roots that are cleanly pruned. If there is significant root loss or if construction is done during dry periods, an arborist can develop a temporary irrigation system. Arbor Image can also help create a plant health care program that will monitor and treat stress, diseases and insect pests throughout all phases of construction.

Construction Phase

During the construction phase, trees and any required protection zones must be monitored regularly. Construction plans may change often and your arborist should be looped in to make adjustments to protect trees as the project changes.

Post-Construction Phase

At the end of the project, installation of new plantings, irrigation, lighting, and planting soil are often made close to existing trees. These new changes in a tree's environment can have a devatating impact on the tree. Despite the best tree protection plans and intentions, construction can result in unintended damage that may take years to become apparent. Our Arborist can develop a post-construction maintenance plan to help trees recover and adapt to their new environment.

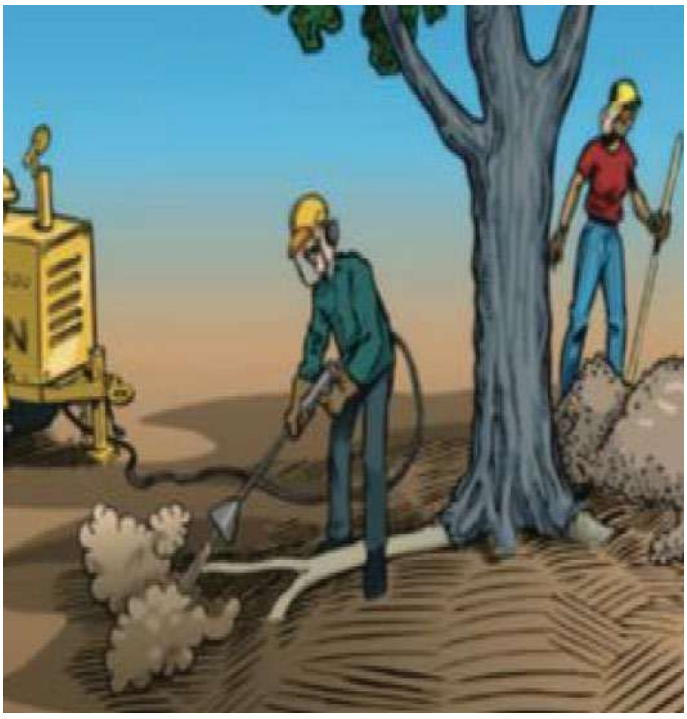


TREATING TREES DAMAGED BY CONSTRUCTION

Construction can be devastating to surrounding trees if measures are not taken. Remedial treatments may save some trees, but immediate implementation is critical. An Arborist can assess tree viability and risk potential to recommend treatment options for construction-damaged trees.

Improving Aeration of the Root Zone

Soil compaction and grade changes can reduce soil oxygen and limit water movement in the tree's root zone. If soil aeration can be improved, root growth and water uptake can be enhanced. Aeration of the root zone can improve root health and water and mineral uptake. One effective aeration method employs a high-pressure, air-excavation device, which disperses soil with minimal damage to roots. This process alone can be beneficial, or it may be combined with incorporation of soil additives and top dressing with organic mulch.



Tree Fertilization

Fertilization should be limited immediately following construction damage. Salts associated with quick-release fertilizers can draw water out of roots and into the soil. Excess nitrogen can stimulate top growth at the expense of root growth. It would also be prudent to limit deicing salts, and herbicides usage around trees.

Treating Trunk and Crown Injuries

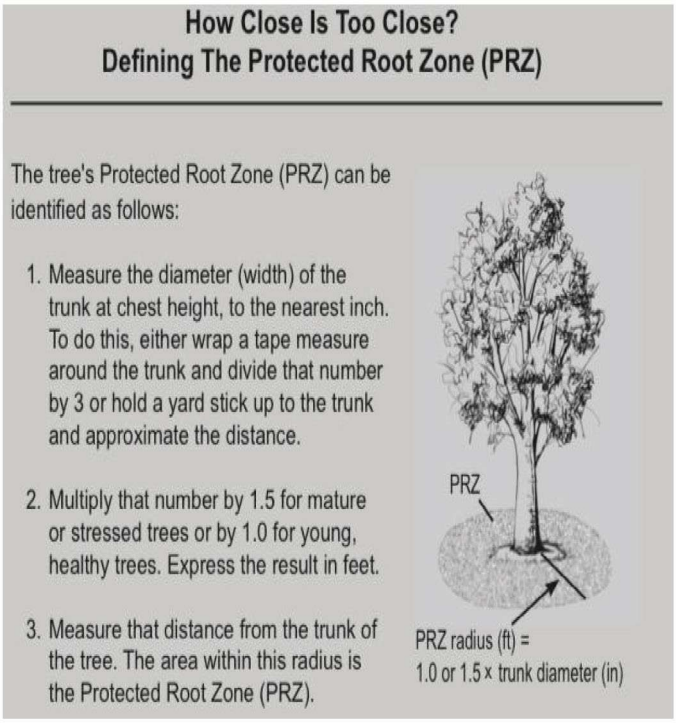
Remove split, torn, or broken branches. Remove dead or diseased limbs from the crown. Generally do not reduce tree canopies to compensate for root loss. There is no conclusive research to support the practice of routine thinning for reducing water stress. Often the bark may be damaged on the trunk or lower branches. Remove the loose bark. Jagged edges can be cut away with a sharp knife. Be sure not to cut living tissues.

Wound Dressings Research has shown that wound dressings and sealants do not reduce decay or speed up wound closure and rarely prevent insect or disease infestations. Most experts recommend not using wound dressings. If a dressing must be used for cosmetic purposes, use only a thin coating of a nontoxic material. It would be best to use a horticulture oil such as dormant oil to seal wounds from pathogen entry and suffocate any insect larvae that have burrowed into the bark already. This should be done after all construction and corrective pruning has taken place.

Mulching Apply a 2-4 inch layer of organic mulch over a tree's root system to enhance root growth. Mulch helps condition the soil, moderate soil temperatures, maintain moisture, and reduce competition from weeds and grass. The mulch should extend as far out from the tree as practical for the landscape site. (See "Mulching" section for more information.)

Irrigation and Drainage One of the most important tree maintenance procedures following construction damage is to maintain an adequate, but not excessive, supply of water to the root zone. Water trees as needed, especially during the dry months. A long, slow soak over the entire root zone is the preferred method of watering. Avoid frequent, shallow watering or overwatering. If the soil is poorly drained, the irrigation level should be reduced to avoid saturating the soil, or drainage should be improved.

Cabling and Bracing If branches or tree trunks are likely to fail, you may be able to install cables or bracing rods. If cables or braces are installed, they must be inspected regularly. The amount of added security offered by the installation of support hardware is limited. Not all weak limbs are candidates for these measures.



It is best to contact your Arborist if you suspect salt damage or if you would like to discuss ways to mitigate salt damage on trees.

DEICING SALTS

Many trees and shrubs can be disfigured and killed by road salt (Sodium Chloride or Calcium Chloride). Sodium Chloride is used primarily since it's less expensive but it's also more damaging to plants. Late season applications of salt are more harmful to trees since there is less time to leach salt from the soils near root zones. The worst damage occurs to trees planted near heavily salted roads or walkways with high traffic. This is especially true when they lie downhill, downwind, or have poor drainage.

Salts damage Trees in Two Ways:

First is direct contact with foliage (spray zone damage) which is typically seen on evergreens along roadways. Secondly through chemical modification of the soil where plants uptake salt ions through the root system which then reaches toxic levels and scorches the foliage. Uptake of the salt ion also slows tree growth and increases stress by interfering with nutrient availability.

How to Mitigate Deicing Salt Damage

Reduce salt application rates, lower the throwing distance, and apply before roads freeze. Use a less harmful product such as CMA or Ice anTM, and mix in inert materials like sand. Wash salts off foliage with fresh water soon after exposure. Avoid piling snow containing salt around plants or where runoff will affect plants. Raise the planting site, or block off the trees from the road with a barrier. Improve drainage or adjust grade, so salt is easily leached away from trees.

SALTY FERTILIZERS

Oftentime people believe that if a tree is wilting or lacking color that they need to water or fertilize. When you are on a membership program with Arbor Image we handle all fertilizing needs of your treescape. Fertilizer is not a remedy for landscape problems except if there is a nutrient deficiency. Fertilizing a declining or injured tree or shrub will not return it to good health unless a soil test indicates nutrient deficiencies. One reason that fertilizing should be left to a professional Arborist is that many consumer fertilizers are incredibly heavy in salts, lack basic soil nutrients, and have a horrible delivery method such as granular spreading. Salt burn can also occur when fast release nitrogen fertilizer is used damaging essential absorbing roots.

How to Recognize Salt Damage on Trees

Winter: Look for "witch's brooms" (clusters of twigs growing out of branch ends) on deciduous trees, yellow tips on evergreen needles.

Early Summer: Look for marginal leaf scorch on deciduous trees, and yellow, brown, or fallen needles on evergreens–especially on the side toward the road.

Other problems: Salt damage can produce the same symptoms, so examine the whole plant and site carefully to rule out other causes.

How to Treat Salt Damage

Leach salts from soil in the root zone area by repeating applications of fresh water after the ground is no longer frozen. This is probably the most effective way to reduce soil salinity problems. Incorporating organic matter like compost, compost tea, gypsum, biochar, humic acids, or activated charcoal has been found to reduce salt damage but is a slow recovery process.

Leaching salts will also leach soil of nutrients so contact Arbor Image in order to help replace all the lost nutrients and microorganisms.

HERBICIDE DAMAGE

Applying "weed and feed" to your lawn might injure or kill your tree! Some combination weed killers and lawn fertilizers will injure trees. Do not use anything that states it will kill broadleaved weeds (most deciduous trees are broadleaved). It is best to contact your Arborist if you suspect herbicide damage or if you would like to discuss ways to mitigate salt damage on trees.

TYPES OF HERBICIDES

Herbicides are normally separated into two general categories: selective and nonselective herbicides.

Selective Herbicides

When applied correctly, many herbicides are selective. That is, only certain types of vegetation will be killed. Selective Herbicides do have the potential to become nonselective (soil sterilants) when deliberately or accidentally applied at high rates.

In some cases, the manufacturer intended these selective chemicals to be used either selectively or non selectively depending on the application rates applied.

Ideal Selective Herbicides: Pre Emergent herbicides are typically safe to use near trees because they are very selective in what they keep from germinating. The use of selective herbicides with a short-term residue is ideal in the landscape when a herbicide has to be used.

Non Selective Herbicides

Sometimes called soil sterilants because they destroy all vegetation to which they are applied. Not all nonselective herbicides are soil sterilants but many are.

Not an Ideal Herbicide: Common over the shelf chemicals such as glyphosate will kill all vegetation. Examples of common glyphosate compounds are typically weed & grass killers like RoundUp, Ortho, and Spectracide.

RECOGNIZING HERBICIDE INJURY

Leaf chlorosis

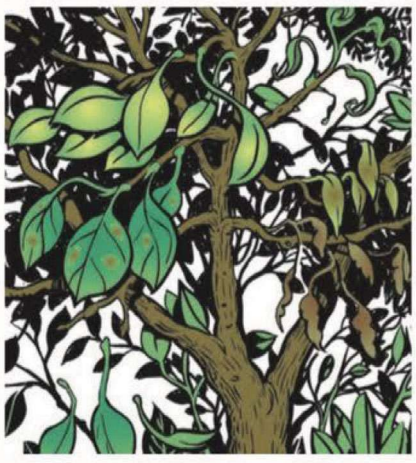
A common symptom of herbicide injury in plants. While this could be a nutrient deficiency in the soil they rarely result in rapid death of trees that herbicides are capable of producing. Herbicide-induced chlorosis differs from nutritional chlorosis by a bright yellow to white interveinal space contrasted with sharply defined secondary bright green veins. Nutritional chlorosis, however, displays a shaded or gradual fading of green from the yellow interveinal space to the green midrib without secondary veins.

Foliar Spotting

May be a result of herbicide spray drift. Also, burn may occur where cupped foliage maintains direct contact between herbicide spray droplets or granules on plant foliage. It is essential that any herbicide residue be washed off the foliage of nontarget plants promptly after application.

Overall Necrosis

Death of tissue is caused by a number of products and can occur in advanced stages of herbicide poisoning due to gross misapplication of chemicals. This symptom is often an extension of the chlorosis and/or foliar spotting mentioned earlier.



Twisted or curled leaves may indicate viral infection, insect feeding, or exposure to herbicides. The size and color of the foliage may tell a great deal about the plant's condition.

Epinastic Growth

is foliage or stems that are abnormally twisted, cupped, or otherwise distorted. These symptoms often indicate some type of phenoxy herbicide damage. Chemicals of this type are root and shoot absorbed and can cause injury in several different ways. Spray drift, root uptake, and volatilization may all occur in this category. Symptoms are like those seen on dandelions or other weeds soon after application of a broadleaf weed killer to the lawn. Commonly grown woody plants in Oklahoma, such as redbud and grape, are two of many species very sensitive to minute amounts of phenoxy herbicides.

Whole Tree Symptoms

Some trees will show a spiraling injury pattern. In these cases, abnormal or dead growth spirals from the base to the top of the plant. This has been reported as a very distinct and obvious pattern indicating a root absorbed chemical. In other species, as much as half of the plant can be markedly affected, while the remainder appears healthy. This could be a sign that spray drift has occurred and the side of the tree affected was in the path of the wind-carried chemical. When one half of a tree or shrub has been affected by a herbicide, the symptoms often closely resemble those of vascular wilt diseases.

Difficulty in Diagnosing

Many herbicide injuries mimic symptoms exhibited by a pathogen, insect, or abiotic stress. Proper diagnosis often requires a team approach that combines expertise from arborists, horticulturists, plant pathologists, and entomologists.

HERBICIDE DAMAGE MITIGATION

Contact your Arborist

before applying fertilizers, pesticides, or herbicides. If you are on a membership program through Arbor Image we handle all fertilizing, and tree pesticide applications as a part of even our most basic programs.

If it is determined that herbicides must be used recommendations can be made about which types to use for desired outcomes and tree safety. Typically pre emergents (selective) herbicides are safe when correctly applied.

When Applying Herbicides

Apply carefully avoiding spray drift, when winds are below 10 mph. Be mindful of over application of product, it is best to test small areas first, and do not use the highest labeled rate until you have experience using said product successfully. Keep the proper identification of all herbicides used for future reference, maintain separate containers at all times, and keep all the chemicals used on the property in a designated safe area.

Be Aware

Herbicides are designed for efficient use, often in low doses, with the assumption they will be used with reasonable care. Therefore, some of the latest herbicides will cause phytotoxicity in minute amounts.

HERBICIDE TREATMENT

Root Barriers

When it is determined that a tree is actively growing into a contaminated site, its roots must be severed from the chemical source in the soil. Creation of a root barrier with neoprene, vinyl or polyethylene will prevent translocation. Even a cement barrier will work. The barrier material must retain its integrity for a number of years and be inserted from the soil line to at least 30 inches deep.

Soil Removal

Small areas of contaminated soil should be removed and disposed of according to local ordinances. This is impractical in large areas, but is the only sure way to solve the problem.

Alternatives to Soil Removal

Larger areas of soil are treated successfully only after determining what chemical was applied. Phenoxy type herbicides may be diluted with large quantities of water.

When soil sterilants are suspected, however, do not irrigate. The chemical could be further moved damaging additional trees and shrubs in its path. When chemicals are organically based, an activated charcoal may be effective in adsorbing the chemical and rendering it less harmful in the soil.

Contacting Manufacturer

Regardless of the product involved, it is a good idea to call the manufacturer. It is difficult to reverse contaminated soils under the best of conditions; therefore, prevention is paramount to ensure healthy plants in the landscape.

Consult an Arborist on Herbicide Injury

Arborists will be better able to assist in detecting and remedying any herbicide contamination when they are well informed of the specific case. Try to present the following information:

Provide the date or estimate when possible herbicide applications occurred. Discuss the rate and report all other chemical applications such as fertilizers, insecticides, fungicides, etc. and their respective rates and formulations. Take photographs when possible and note the date taken. Note weather patterns in past weeks that could have contributed to the problem.

Calculate the time lapse between any chemical applications and first signs of injury in the nursery or landscape. Provide a list of specific plants affected.

Diagnostic Samples

Arborists can submit samples of affected plants (leaves, twigs, etc. while they are still alive) and are able to make observations specific patterns of injury to the plants themselves and patterns of injury throughout the landscape.

VISUAL INSPECTION

Tree health can be difficult to determine, but checking your tree routinely may help you notice problems as they appear. While it takes a trained eye and experience to diagnose even common tree ailments most people can spot potential issues. As the tree owner you most likely see your trees more often than anyone else so this section will be focused more on what to look for and not necessarily going over common health issues.

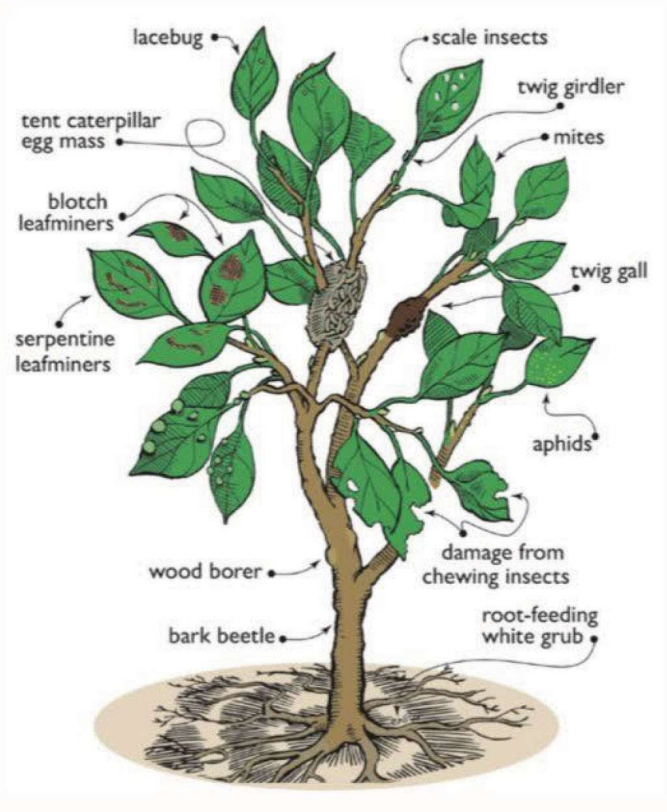
When monitoring health

On visual inspections look closely at the tree crown, trunk, and the rootzone. It would be difficult to go over all the possible ailments, and causes for declining health which is why the most important diagnosis step is first noticing there is an issue. Second is contacting your arborist. Arbor Image can help you establish what is normal for your specific tree species, the current season, and the local climate.

Tree Crown: Look at branch tips and tree tops. The current year's branches will typically be smaller in diameter and a different color (typically lighter in color). Also inspect the size, color, and distribution of the leaves. Are any leaves misshapen, speckled, curling, wilting, or off color for the season. Look at the whole crown for differences between branches, broken limbs, stubs, cracks, crevices, or sections of deformity in the crown. Check for abnormal growth, crossing limbs, and assess canopy air flow.

Trunk: Look for cavities, fungal spores, white washed bark, sun scald, bark breakage, decay, damaged or peeling bark, sap excretions, insect or bird holes, rodent damage, deer rubbing, string trimmer damage, splits in the bark, and any abnormal growths

Rootzone: Begin at the base of the tree looking for twine strangulation, rodent damage, string trimmer damage, and mulch/soil depth against root flare. Also inspect the base of the tree to see if there is decay, fungal spores, moisture build up, and discoloration. Look around the root zone and note the water saturation level, inspect for surface roots, encroaching grass, ground disturbance, and other plants located in the vicinity.



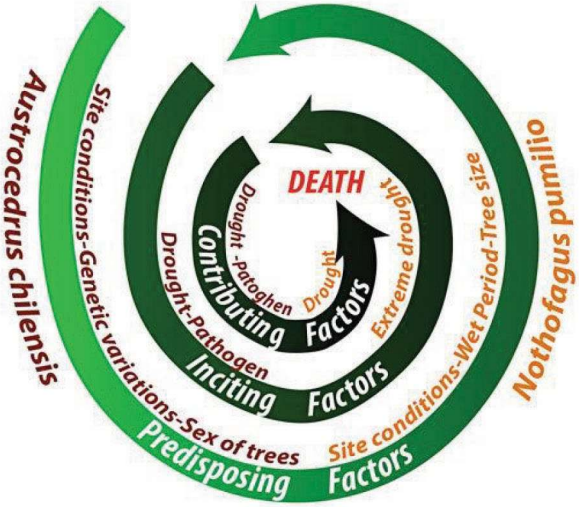
4 TYPES OF TREE HEALTH DECLINE

Chronic Stress: Usually by a single event or a constant stress factor that never gets resolved like lack of water, recurring/incurable diseases, harmful insects, over watering, lightning strike, or adverse sunlight for its species. Typically this type of decline is due to improper tree selection per the site, or not knowing the specific tree species preferences for care. Less frequently it could be a natural disaster that is the cause.

Drastic Injury w/ Secondary Pest:

A major, short-term event such as severe storm damage, or construction disturbance that weaken the trees vitality enough that opportunistic pathogens and insects can invade. They prevent recovery and deteriorate the health of the tree over time. Neither of the two factors would cause decline alone.

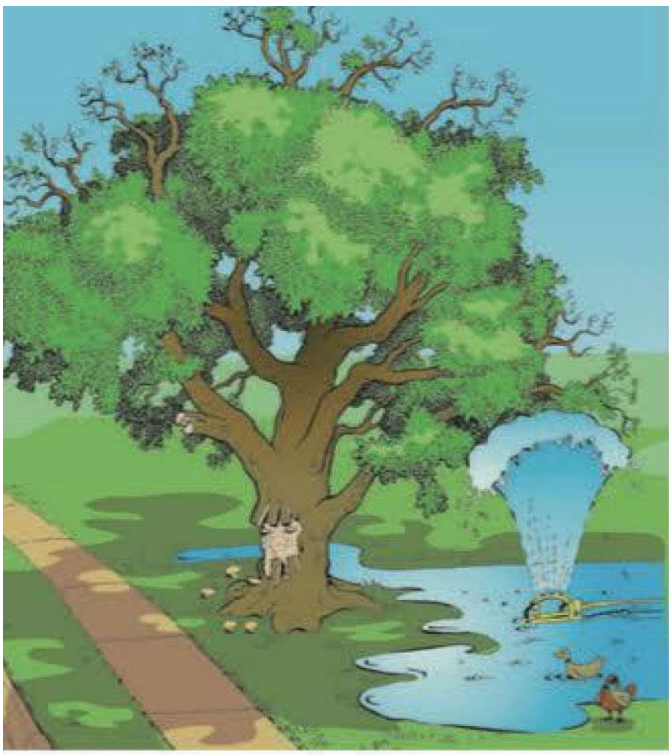
Multi Facet Factors: This has been called the death spiral and it is when there are predisposing factors that weaken a tree, inciting factors that result in the initial signs of decline, and contributing factors that finish off the tree. There can be multiple predisposing, inciting, and contributing factors so a regular consultation with an arborist can be very beneficial in curtailing a death spiral before it is set in motion. The key is recognizing and treating your trees' predisposing factors. Then having an Abrosit take immediate action when symptoms of decline are present.



Cohort Senescence: Which is simply trees that will reach an aggregate biomass that cannot be sustained by a given site, and deteriorate with age at about the same time. This is not nearly as common as the other types of tree health decline but it can happen the older a tree gets.

HOW TO BATTLE TREE HEALTH DECLINE

The best way to help your tree is to first take preventative care. Preventative care entails keeping your trees pruned well. proper watering, improving soil health, and managing pest outbreaks. and secondly is to be very vigilant in monitoring tree health to stay on top of treating secondary pests (insects/fungal). Thirdly is to dial in your care of the tree to meet its tree species preferences. Usually this entails working with your Arborist. With proper ongoing care such as regular deadwood pruning, fertilization, pest control, and minimal changes to the tree sites environment you can prolong the lifespan significantly.



SETTING PROPER EXPECTATIONS

All Trees Eventually Die

Trees are living organisms, and like other living things, they are subject to injury, disease, and death. Different tree species have different life spans. Under normal forest conditions, a red maple (Acer rubrum) may live about 100 years, while a white oak (Quercus alba) averages 300 years.

Right Tree Right Place

Not only do trees have vastly different lifespans but are often not placed in the most optimal conditions. For example, native dogwood trees are naturally adapted to grow in the forest understory or in partly shaded areas. Because of their showy spring flowers, they are

often planted and grown in full sun areas. Under these conditions, dogwoods become more susceptible to drought and environmental stresses that will eventually lead to a shorter lifespan. In order to have flourishing trees the right tree must be placed in the right place for any chance of success.

Trees Don't Typically Die Overnight

Trees usually decline over several years, entering a slow death spiral. A death spiral is when multiple consecutive harmful events over long periods of time eventually exceed the ability of the tree to survive. Some events can affect trees for over a decade with little outward signs until energy stores built up in the roots have been depleted. Once a tree has entered a death spiral, little can be done to remediate the situation.

ADDITIONAL RESOURCES / ONLINE RESEARCH

Be Careful to Diagnose

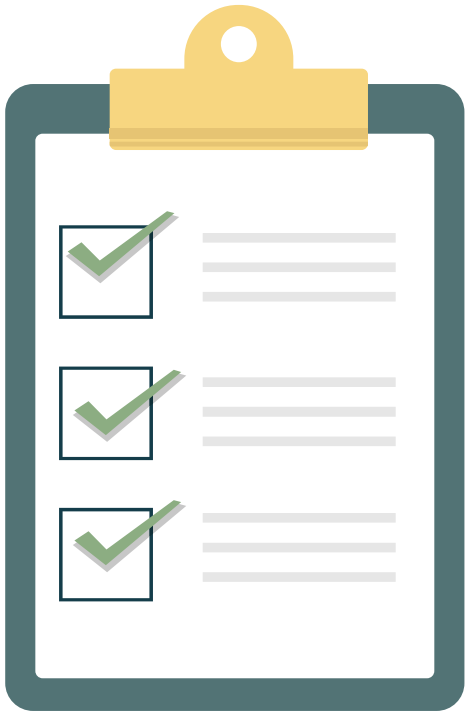
One of the most harmful things you can do to a tree is incorrectly diagnose your tree issues. This can be very easy to do because there are a vast array of tree health issues that have the same symptoms. Treatments should be prescribed in response to a diagnosis and not a hail mary remedy thrown at a guess. With this being said, consulting local university extension sites, entomologist, tree pathologist, certified arborist, and urban foresters should be done regularly as the needs arise.

Arbor Image Tree Care

At Arbor Image we keep a resource page stocked with many articles discussing common issues, proper tree care techniques, and keep an extensive FAQ section for troubleshooting common questions. The majority of what you will find on our resource page has been accumulated from credible sources such as International Society of Arboriculture, or written by Certified Arborist. The resource is found at "TheArborImage.com/resources/". You can always call or text us at (405) 815-7959. Or submit a consultation request at TheArborImage.com. We are staffed with ISA certified arborists who have been providing care in your area.

Fact Sheets

Utilizing published online fact sheets can be a good source of information. When researching information it is very important that the fact sheet is taking into account your very specific tree, your local geography, your trees' onsite conditions, and the current season. All fact sheets are labeled as "Fact Sheet" and usually have a printer friendly pdf. You can find these by typing "ext" or "fact sheet" at the end of your google search. We highly recommend using fact sheets from sources local to you. Using treatments advised in google blogs, or gardener message boards has led to much regret so please be careful of unauthoritative sources.

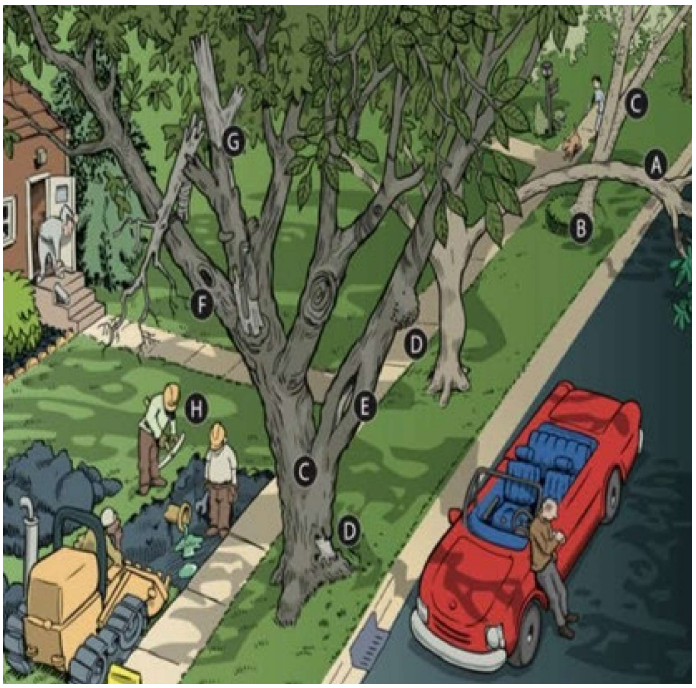


TREE SAFETY CHECKLIST

Trees are an important part of our world and offer a wide range of benefits. However, trees can also be liabilities. While there is no such thing as a completely safe tree, the benefits of trees far outweigh the risks. By understanding and addressing the risks associated with trees, you can make your property safer and prolong the lives of your trees.

This chapter provides some tips for identifying and managing common defects associated with tree risk. However, evaluating the seriousness of these defects is best done by a professional arborist. Regular tree care performed by Arbor Image will provide an opportunity to identify trees that have defects and unacceptable risk levels. Once the risk is identified, steps may be taken to reduce the likelihood of an incident or damage.

If you select yes to any of the Common Tree Risk's please call us for a consultation.



Check List

Common Tree Risk	Yes or Unsure	No
Large Dead Branches		
Detached or Hanging Branches		
Fallen Branches on Ground		
Loose Bark on Trunk		
Cracks or Splits on Limbs		
Gnarled or Bad Trunk Taper		
Unusual Growth / Developments		
Cavities, Decay, or Rot		
Mushrooms at base or around the rootzone		
Topped or Heavily Pruned by utility companies		
Disturbed rootzone such as construction, changes in soil level, added pavement, ground movement, or lawn installations		
Leaves developed unusually in color or size		
Bugling branches due to swings, hammocks, or ziplines		
Branches or limbs within 15ft of utility lines		
Long outstretched Limbs hanging over buildings, or valuables		
Abnormal Leaning or weight distribution		

TREES AND UTILITY LINES

Additional consequences can result from trees that fall onto utility lines. Not only can these trees injure people or property near the lines, but they can also hit a conductor and cause power outages or surges, fires, and other damage. A tree with potential to fall into a utility line presents a very serious situation. Never attempt to remove branches or any tree part from or near power lines, and never go near downed power lines! These lines are especially dangerous, as they could still be conducting electricity. If you see tree parts in contact with utility lines, call your local electricity provider.

COMMON DEFECTS IN RESIDENTIAL TREES

The following are defects or signs of possible defects in urban trees:

Poor taper: Branches or stems with their weight concentrated near the end are more prone to failure.

Root failure: Cracks or separations in the soil may indicate soil heaving from excessive movement of the roots. This can be a warning sign for failure, especially if the tree is leaning.

Codominant stems (split trunk): Can often be failure points. Multiple branch attachments at one point on a stem can also be considered a defect.

Externally visible defects: Includes cankers and wounds. Each could be minor or the start of a significant problem; further investigation may be warranted.

Cracks or splits: Watch for longitudinal cracks or splits on the trunk, major branches, or branch unions.

MANAGING TREE RISK

Arbor Image can help homeowners manage trees and provide treatments that may help reduce the risk associated with certain trees. An arborist familiar with tree risk assessment may suggest one or more of the following:

Prune the tree and remove the defective branches. Inappropriate pruning may weaken the tree. Pruning work is best done by a professional arborist.

Cable and brace the tree. Provide physical support for weak branches and stems to increase their strength and stability. Such support is not a guarantee against failure.

Provide routine care. Mature trees need routine care in the form of water, nutrients, mulch, pruning, and, in some cases, nutrients, as dictated by their structure and the season.

Remove the tree. Some trees with unacceptable levels of risk are best removed. If possible, plant an appropriate new tree as a replacement. Recognizing and reducing tree risk not only increases the safety of your property and that of your neighbors, but also improves trees' health and may increase their longevity.

TREE PRUNING

Pruning is the most common tree maintenance procedure. Although forest trees grow well with only nature's pruning, landscape trees require a higher level of care to maintain their structural integrity and aesthetics. Pruning must be done with an understanding of tree biology because improper pruning can create lasting damage or shorten the tree's life. This is why we highly recommend using our professional arborist at Arbor Image before undertaking large trimming projects.

3 Main Reasons to Prune

The main reasons for pruning trees are safety, health, and aesthetics.

Pruning for safety involves removing branches that could fall and cause injury or property damage, trimming branches that interfere with lines of sight on streets or driveways, and removing branches that grow into utility lines.

Pruning for health involves removing diseased or insect-infested wood, thinning the crown to increase airflow and reduce some pest problems, and removing crossing and rubbing branches.

Pruning for esthetics involves enhancing the natural form and character of trees or stimulating flower production.

Proper pruning, with an understanding of tree biology, can maintain good tree health while enhancing the aesthetic and economic values of our landscapes. It can encourage trees to develop a strong natural structure and reduce the likelihood of damage during severe weather.

How Often

Beginning 2 years after planting, prune lightly every year or every other year. After 10 years, frequency of pruning depends on the type of tree and amount of shade the canopy receives. Do not remove more than 25 percent of the tree's live branches (and therefore leaves) at any one time in a given year.

Tree Type	First 10 Years	10+ Years After Planting
Fruit Trees	Once every 1-2 years	Once every 2-3 years
Deciduous Trees	Once every 1-2 years	Once every 2-3 years
Evergreen Trees	Only as needed	Once every 3-5 years

Best Practice

Pruning lightly and more frequently is better than pruning heavily and less often. Evergreen trees need pruning more often if they are diseased or their branches need to be raised up from the ground.

Removal of the following can be done on any tree type every year: Broken, dead, and rubbing branches. Branches sprouting from the base of the trunk can also be pruned yearly.

Time of Year

Most light, routine pruning to remove weak, dead, or diseased limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth and wound closure are maximized if pruning takes place before the spring growth flush. Some trees, such as maples and birches, tend to "bleed" if pruned early in the spring. It may be unsightly, but it is of little consequence to the tree.

Heavy pruning of live tissue just after the spring growth flush should be avoided, especially on weak trees. At that time, trees have just expended a great deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at that time can stress the tree. A few tree diseases, such as oak

wilt, can be spread through pruning wounds and provide access to pathogens (disease causing agents). Susceptible trees should not be pruned during active transmission periods.

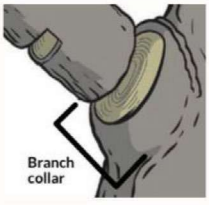
Winter is the best time of year to do heavy pruning because branches are easy to see, diseases cannot be spread, and there is minimal stress to the tree. But for most trees, pruning can be done at any time.

Exceptions are trees that are prone to fire blight or oak wilt. Trees susceptible to fire blight include mountain ash, apple, crabapple, hawthorn, pear, flowering quince, and pyracantha. Trees susceptible to oak wilt include most oaks. To minimize disease infection of these types of trees winter pruning and properly disinfecting tools is the best practice.

How Much Should Be Pruned

The amount of live tissue that should be removed depends on the tree's size, species, age, and pruning objectives. Younger trees tolerate the removal of a higher percentage of living tissue better than mature trees. Generally, no more than 25% of the crown should be removed at once in a calendar year, and even less of a percentage of crown for mature trees. Removal of a single, large-diameter limb on a mature tree can create a wound that may never be able to close. Care should be taken to meet pruning objectives while maintaining long term health

Making Proper Cuts



Pruning cut location is critical to a tree's growth and wound closure response. A correct pruning cut removes the branch just outside of the collar. Do not make cuts flush to the trunk. Trunk tissues above and below a flush cut branch often die, creating dead spots. If a collar has grown out on a dead limb, make the cut just beyond the collar. Do not cut the branch collar.

When a long branch needs to be shortened, prune it back to a secondary branch or bud. Cuts made between buds or branches may lead to stem decay, sprout production and misdirected growth.

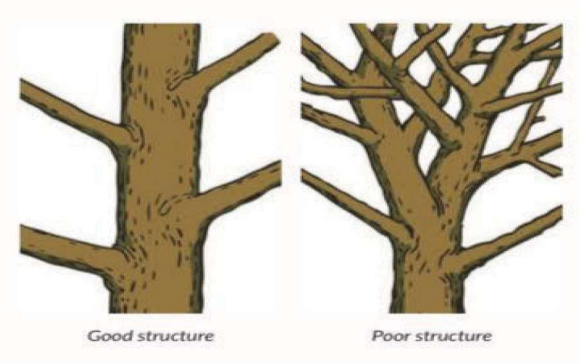
Deciding Where to Cut

The goal is to establish a strong, central trunk with sturdy, well-spaced branches. This form mimics tree growth in forests where outward branching is limited by neighboring trees. Some tree species develop some or all of these attributes naturally. Others may require more frequent attention.

Sufficient branch spacing and balance, both vertically and radially, is important. The space between permanent branches should be approximately 3% of the tree's eventual height (for example, 1.5 feet spacing for a tree that can grow to be 50 feet tall)

The height of the lowest permanent branch is determined by the tree's intended function and location in the landscape. The road side of a street tree may be raised to 16 feet to accommodate traffic. In most other situations, 8 feet of clearance for a mature shade tree is sufficient. Trees used as screens or windbreaks, however, usually branch low to the ground. This would most often be your evergreens in the landscape.

Most young trees maintain a single dominant, upward



growing trunk, called a "leader". Do not prune back the tip of this leader or allow secondary branches to grow taller than the main leader. Sometimes, a tree will develop two or more nearly equal size leaders known as codominant stems. Codominant stems can lead to structural weaknesses, so it is best to remove or shorten all but one of the stems when young. A tree's secondary branches contribute to the development of a sturdy, well-tapered trunk.

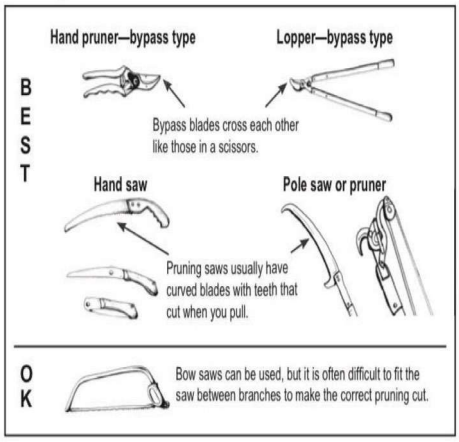
When pruning, be sure not to remove too many branches. Leaves and supporting branches are major sites of food production and storage. Eliminating too much canopy can "starve" the tree, reduce growth, and increase stress.

Wound Dressings

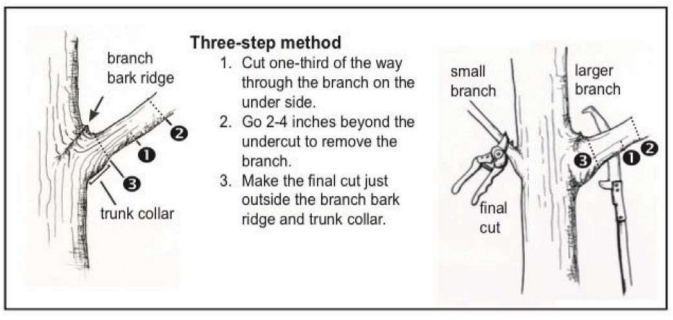
Research has shown that wound dressings and sealants do not reduce decay or speed up wound closure and rarely prevent insect or disease infestations. Most experts recommend not using wound dressings. It would be better to use a horticulture oil, instead of wound dressing, such as a dormant oil to seal wounds from pathogen entry and suffocate any insect larvae that have burrowed into the bark already. This should be done after all pruning has taken place.

Pruning Tools

Small branches can be cut with hand pruners. Scissor-type or bypass-blade hand pruners are preferred over the anvil type because they make cleaner, more accurate cuts. Cuts larger than one-half inch in diameter should be made with lopping shears or a pruning saw. Hedge shears should be used on hedges only.Clean cuts heal faster so make sure your tools are sharp.



Anytime you encounter limbs that are bigger than 3" in diameter or high enough to require a ladder you should contact your arborist at Arbor Image for your pruning needs. Tree trimming is one of the most dangerous professions in the country, and results in many fatalities every year. You should only use professionally trained arborists for the safety of you, your tree, and everything else that is in the vicinity.



Pruning Young Trees

Pruning a young tree saves money. Removing small branches is fairly easy compared with waiting until limbs are large, when pruning can be costly and a bigger risk to the tree. Correctly pruning a tree when it's young will help it develop a strong, well-balanced crown. Poor pruning can cause lifelong damage for the tree. When a tree is damaged it must grow over the damage and the wound is contained within the tree forever.

For younger trees, the objective is to improve tree structure so the tree will be strong and not interfere with its surroundings as it matures. Prune to have the following:

1. Branches that are well-attached to the trunk: Branches with a branch bark ridge (bark pushed out at the point where the branch attaches to the trunk) are less likely to break off in wind or heavy ice or snow. Branches that are less than half the diameter of the trunk are also less likely to break off in storms.
2. One central leader: Most trees will be strongest if they have one central leader (instead of multiple). Unless your tree is an arborvitae or fruit tree, choose one leader to keep, and prune off, or subjugate the competitors.
3. Good spacing between branches: Vertical space between branches should eventually be 12 inches for fruit or small-statured trees and 18 inches for medium- and large-stature deciduous trees. Try to space branches equally around the tree.
4. Ground Clearance: between the ground and first branch As a tree grows taller, branches remain at the same height. Branches located low on the trunk may get in the way of sidewalk paths or lawn mowing as the tree gets bigger. Over time, gradually remove low branches.
5. Good Crown Height: The crown of a deciduous tree should be at least 60 percent of the total tree height.

See "Pruning" p. 18.