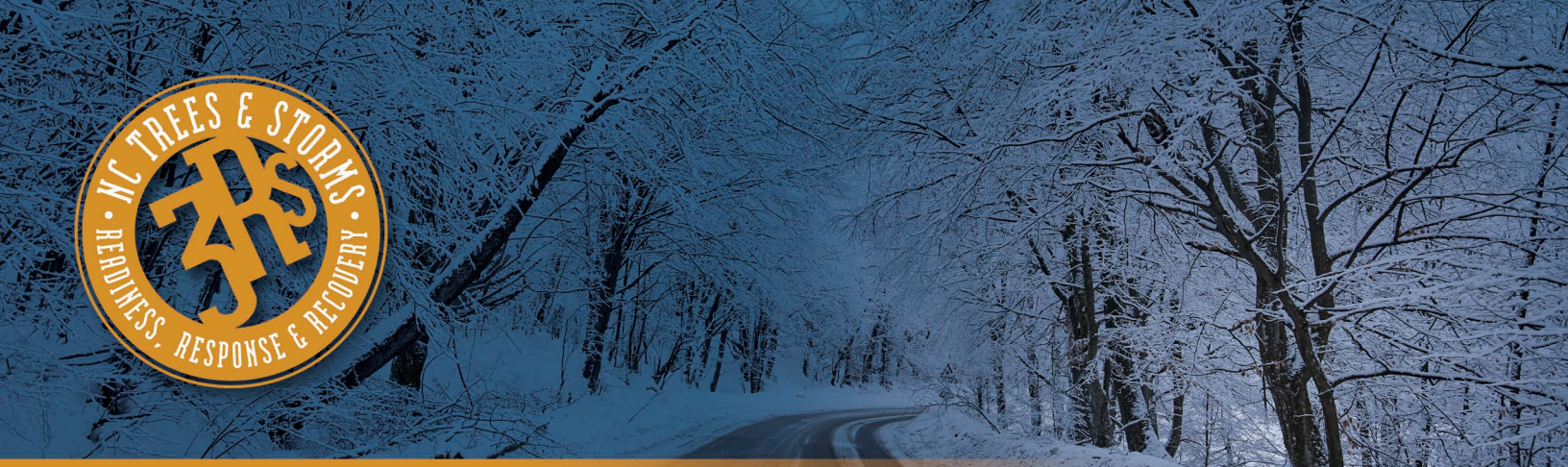


NC Trees & Storms: Response & Recovery

Reclaiming Your Landscape After the Storm

Response & Recovery

In the first brochure in this series, **"NC Trees and Storms: Readiness"**, we provided you with some great tips to help you and your trees become storm-ready. In this publication, we are going to provide you with steps to take after the storm passes. While we hope that most of your trees made it through the storm with little or no damage, it is likely you will need to do some clean-up. So, what should you do now?

Response

It can be overwhelming when you go outside after the storm and see the extent of damage. The winds and rain may have dramatically altered not only your yard but the community as well. The storm may have damaged or devastated buildings; power lines may be down and wooded areas and individual trees may be destroyed. Listen to emergency service representatives to be sure the storm has passed and that it is safe to go outside. There are potentially many hazards that you will encounter, so proceed cautiously!

Never approach any electric lines! Contact your local utility company to report downed wires or trees leaning on wires, and remember that downed cable or telephone lines may be energized and equally as dangerous because they are in contact with electric lines. The International Society of Arboriculture (ISA) provides a variety of certifications for arborists, and one of those is for utility specialists. Many communities have these experts on staff. So, leave any work around utility lines to the professionals!

This tree lost a major stem (leader) during a thunderstorm with heavy rains. Structural pruning when young could have prevented this loss by removing the competing leaders. Sadly, it is unlikely you can retain such a tree as it has lost about 40% of the canopy, but it also has other defects an arborist will factor in when deciding if you need to remove a tree after the storm.

Leave big tree work to the professionals, especially if there are electric lines down. Only qualified line-clearance arborists should work in close proximity to utility lines.

Step One: Assess the damage

Once you go outside look for the following tree issues above and on the ground: hanging damaged branches, broken main stems (leaders), leaning trees, lightning damage, cracks, fallen trees, downed branches, broken or disturbed roots, and thick debris piles. Be careful as you approach these issues, as they can be very dangerous even for professionals to handle.

If large trees have blown over, the storm has broken substantial branches, or there are complicated structural issues with some of your trees one of the best things you can do is to hire an ISA Certified Arborist. They are trained to work with storm-damaged trees. It is best, of course to hire a professional before the storm hits to prepare your trees and minimize potential damage. Doing so can help protect not only your trees, but also your property. If you have hired a Certified Arborist prior to the storm, you will have their contact information at hand and will likely get priority assistance after the storm.

Certified Arborists will quickly assess which trees need immediate pruning or removal because they pose a serious threat to you or your property, and those that can wait for appropriate treatment later, such as restorative pruning.

This tree was damaged during an ice storm. A Certified Arborist can determine whether the tree poses an immediate hazard and must be removed, or if restoration pruning can repair the tree over time.

This tree fell in the 2009 storm in Raleigh, NC. There was significant root and trunk rot, and instability in the root base that led to the failure of this tree. A professional should have removed it long before the storm! A Certified Arborist can help you determine what trees pose an immediate risk to you and your property and those that you can wait to assess once things calm down.

Step Two: Determine which trees pose an immediate risk

Did the storm compromise the primary structure of the trunk and main stems? Are there numerous major limbs lost? Is over 50 percent of the tree's canopy gone? Has the main trunk been cracked or twisted? Have large limbs broken off, leaving behind big wounds? Are there sound remaining branches left to help form a new canopy? Are there any new cracks present in the branches? Is the tree newly leaning? Have the roots been displaced or visibly broken? By answering these questions, the arborist can determine the next steps. Keep in mind that while a qualified arborist wants to save your trees the damage may be too severe and pose too great a hazard to retain these trees. Your safety will be the arborist's first concern. Healthy, well-maintained trees, younger trees, and wind-resistant species likely withstood the storm well and may only need pruning to remove dead, damaged, or unsafe conditions.

This tree lost more than 50% of its crown and main structural branches during the storm. This tree poses an immediate threat and must be removed.

Response Tips:
To Ensure You are Safe and Your Trees are on the Road to Recovery!

Hire an ISA Certified Arborist

- Do not hire the least expensive company or an uninvited representative that knocks on your door after the storm
- Make sure you hire someone that is part of an established, reputable company
- Be sure the company is bonded and insured, and if possible hire a Tree Care Association accredited company
- Is the job quote competitive? If your work is not an emergency, get more than one quote
- Be sure you understand the scope of work- what all does the bid cover?
  - *Will they remove all debris?*
  - *Will they remove the stumps?*
  - *When will they begin and when will the project finish?*

Recovery

Once you have addressed trees that pose an immediate hazard, it is time to assess the remaining trees. Response activities include pruning to correct any damage, up righting small trees that have blown over when possible, restoring the canopies of severely damaged trees, and planting new trees in place of those that the storm destroyed. Keep in mind that getting your landscape back into pre-storm condition will take some time. It can also be a costly process. However, hiring a Certified Arborist can ensure that only necessary actions are taken and those trees that can be saved will be. In general, trees that you may be able to retain readily are those that the storm

defoliated, broke mainly small limbs, damaged only one or two major limbs, or are decay-resistant species. Once you address the major tree issues, you can decide what new tree species you want to plant to ensure a beautiful landscape in the future.

Step Three: Tree Restoration Process

Some trees may have experienced serious damage, but do not pose a safety concern. For these, you will need to implement a restoration-pruning program. There are, however key factors you must consider that affect a tree's ability to recover. These are tree health prior to the storm, species, age, size, and extent of damage.

Tree health prior to storm

Keeping your trees healthy before the storm hits is one of the most important steps in being ready. Healthy trees have more energy reserves than unhealthy trees, and this allows them to recover from extensive damage. However, you will need an expert to manage these trees, and it will take time. Unhealthy trees or those with preexisting conditions such as insect/disease problems, nutrient deficiencies, root rot and decay are less likely to cope well in a storm. These trees may lose foliage and limbs, blow-over or quickly decline once the storm passes due to low energy reserves.

Tree species

Tree species respond differently to storms. Some are decay resistant (Table 1) and some are wind resistant. Decay resistant trees can experience some damage, but the wounds will resist infection and spread of decay-causing organisms. Wind resistant trees may only suffer from some defoliation and a few broken branches but will likely not blow-over during a storm. This is important when choosing which trees you should focus your efforts on during cleanup, as those resistant to decay will respond better to restorative pruning efforts.

Tree age

Young trees with lots of stored energy can begin the recuperation process very quickly. Their recovery may only take a couple of years, whereas older trees may need many more years to begin forming a new canopy, no matter the amount of storm damage.

Tree size

It is no surprise that larger trees have larger limbs. Not only can these branches inflict much more damage when they break off during a storm, but there will also be larger wounds. It is likely these major limbs were critically important to the tree's canopy; and, it will take longer for an arborist to restore these structural concerns. While a smaller maturing tree also needs time to recover, your arborist may require fewer pruning visits to repair issues.

Extent of damage

The more damage (large or many wounds and extensive canopy loss), potentially the more time it will take a tree to recover. Be patient! Inspect trees yearly to determine if they are sprouting or declining. Vigorous sprouting means the tree is likely on the road to recovery, and an arborist can begin pruning for structure and future form.

Table 1:
Trees species with moderate to high ability to resist decay
(arranged alphabetically by botanical name)

Common name	Botanical name
red maple	*Acer rubrum*
sugar maple	*Acer saccharum**
musclewood (blue beech)	*Carpinus caroliniana**
catalpa	*Catalpa speciosa*
thornless honeylocust	*Gleditsia triacanthos var. inermis*
black walnut	*Juglans nigra*
crape myrtle	*Lagerstroemia spp.**
pines	*Pinus spp.*
white oak	*Quercus alba*
red oak	*Quercus rubra*
live oak	*Quercus virginiana**
black locust	*Robinia pseudoacacia*
yew	*Taxus spp.*
American elm	*Ulmus americana*
lacebark (Chinese elm)	*Ulmus parvifolia*

** Also has moderate to high wind resistance*

Step Four: Recovery takes time — so be patient

As you now know, healthy older trees can recover from a storm even if they sustained major damage. A restoration-pruning program may take from two to five years or longer for large, severely damaged trees.

Keep in mind, some trees may lose all their leaves during the storm but are not dead. Of course, the greater the wind speed, the more leaves a tree will lose. Some trees, such as live oak, lose their leaves early on during the storm, which may be to help reduce wind resistance. If, however, there are no new leaves by spring or early summer, your tree (no matter the species) is likely dead and you should remove it. Take note that while a tree can produce an entire new canopy after foliage is lost, it "steals" stored food reserves (sugars and starches) and it takes time to rebuild those stores. This can weaken the tree over time and cause stress, but there are things you can do to help out your trees. These include proper water and fertility management, yearly inspections to manage new growth and remove dead limbs, and watching out for any insect/disease problems.

An ice storm severely damaged this tree, but did not cause any serious structural issues. A Certified Arborist performed restorative pruning. The tree developed new growth. This growth can be trained into a new canopy over time.

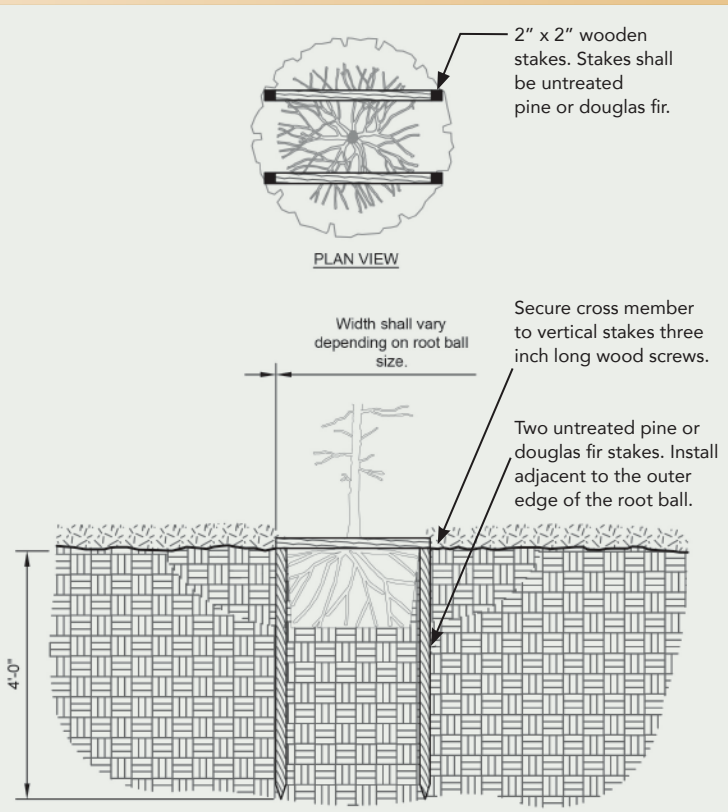
This tree was damaged during a storm many years before. A Certified Arborist performed some restorative pruning, selecting key branches that have begun to form the new canopy.

Step Five: Stand up and stake small fallen trees

Standing up small trees that blew over should be a priority right after the storm to minimize root drying. Arborists experienced in storm-damage mitigation found that trees larger than 4 inches in diameter often blow over again when the next storm comes along. Therefore, it may be most cost effective to replace these trees rather than trying to stand them up again. This is in part because large severed roots (greater than 1 inch in diameter) are less likely to regenerate to produce new roots. Also, these larger roots may be more likely to have decay and can therefore make the tree unstable in the future. Definitely give newly planted trees a chance by quickly replanting them. If you cannot get to them in the first few days after the storm, then put wet burlap or mulch over the root system to keep it moist.

While there are many staking methods out there, with trees blown over in the storm, the best way to stake them is illustrated in Figure 1 (Developed by the University of Florida and the Urban Tree Foundation). For larger trees with an expansive root system, you may consider using 2 inch by 4 inch boards rather than the 2 inch by 2 inch boards indicated in the diagram. This staking method is very successful because the stakes are holding down the portion of the tree that needs held down- the root system! This staking allows the tree to move normally above ground, building a strong trunk taper and greater wind resistance in the future.

You will need to pay close attention to water needs for these newly "replanted" trees. Water about three times per week (unless it rains) for the first several months. Water slowly and deeply to the entire root system. You can do this with a slow running hose moving it around the entire surface area of the root system. You should apply about 2 to 3 gallons of water per every inch of trunk diameter. For example, if the tree is 3 inches in diameter then you should apply about 9 gallons of water at each irrigation period.



Although this is a newly planted tree, the tie down idea is similar to that in Figure 1. The landscape contractor used 2 inch by 4 inch boards, tied down with nylon strapping attached to metal auger anchors (not visible). This is a great method to use when standing up trees the storm has blown over.

Step Six: Plant new trees where possible to replace those lost

If a tree has to come down, plant something new in its place to build a greener future. Trees offer countless environmental, economic, and social benefits. However, to continue to enjoy these benefits, we need larger maturing trees that take some time to get big. There is no better time than now to get started. Locate your trees to help reduce energy costs, protect your home, and reduce stormwater runoff.

Be sure to obtain high quality nursery stock. High quality nursery stock has the following characteristics: 1. the canopy is balanced and the leaves are healthy appearing, 2. shade trees have a single main stem (leader), 3. the trunk and branches are clear of any injury, 4. there are no signs of disease or insects, 5. there are no large or improper pruning cuts, 6. there are no obvious trunk girdling roots, and 7. the trunk flare is obvious at the top of the root ball and not buried in the potting media (container-grown plants) or soil (ball and burlap produced plants).

For bigger projects, hire an established, licensed landscape contractor to help you select the right plants and install them correctly. There are many resources available for learning more about properly planting trees and the best species for North Carolina. Check out the following websites for more information:
NC State Extension—Proper Tree Planting Techniques
https://plants.ces.ncsu.edu/
https://www.ncufc.org/

As we discussed in the "NC Trees and Storms: Readiness" brochure it is critical for you and your trees to be storm-ready. There is no way to guarantee that a tree can withstand the storms that will come along. Predictions indicate that storms in the southeast are likely to be more intense than they have been in the past. So preparing your trees for the inevitable storms will become even more important. For more information on how to get your trees storm-ready, check out the accompanying brochure "NC Trees

This willow oak, has a straight, single main stem (leader), and good branch spacing. There are no trunk or branch injuries, and a good trunk taper. This would be a good tree to choose!

and Storms: Readiness". Once the storm has passed, the goal is to make your property safe. Remove hazardous trees and branches first, then with the help of a Certified Arborist assess remaining trees and implement restorative pruning where possible. More mature, larger trees provide much greater benefits than younger trees, and so deserve serious consideration for retention and recovery. These decisions, however, are not always straightforward and hiring a qualified expert is your best bet.

For more information on trees and tree care, visit the following websites:

- www.ncforestservice/gov/Urban/Urban_Forestry.htm
- www.ncufc.org

Response & Recovery Tips

How to Proceed Once the Storm Passes

- Contact the power company if a tree has taken down an electric line, and DO NOT under any circumstances approach downed wires; even if they are T.V. or telephone cables as they can be in direct contact with electric lines
- Remove trees or branches that pose an immediate risk first!
- Do not attempt to do tree work over your head or use a ladder to get into a large tree
- Only operate a chainsaw if you know how to do so safely
- If work is beyond your capabilities hire a Certified Arborist
- Replant and stake fallen trees (under 4 inches in diameter), and irrigate properly
- Remove broken, dead or cracked branches
- Do not remove a lot of live wood unless branches are cracked to help tree maintain its energy stores

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To learn more about what you should do once the storm has moved on, please visit the NC Urban Forest Council, NC Forest Service, and NC Cooperative Extension websites, along with Trees are Good, the National Arbor Day Foundation, and many others for more information and guidance.

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