

STORM DAMAGE TO TREES

Prevention and Repair



Cooperative Extension Service
Kansas State University
Manhattan

Introduction

Two types of storms cause major damage to trees in Kansas: high winds or tornadoes in spring and early summer, and ice and snow storms from October through March and early April.

These storm types cover quite similar areas of the United States. Tornadoes occur most often from northern Texas into Oklahoma, Kansas, Nebraska, Iowa, and Minnesota and then eastward to include states touching a line from West Texas to Central Michigan. Often tornadoes occur in Southern States in conjunction with approaching hurricanes.

A tornado is an intense wind storm covering a relatively small area, while a heavy ice storm can devastate trees and shrubs over thousands of square miles, especially when accompanied by strong winds.

Ice storms occur most often in a broad belt from Nebraska, Kansas, and Oklahoma eastward through the middle Atlantic and New England States. Some of the most damaging storms, however, occur in the Southern States unprepared for severe winter conditions.

An average of 40 to 60 thunderstorm days occur over most of the Midwest with Kansas averaging between 50 to 60 thunderstorm days. Lightning is attracted to tall objects, often a tree. Considerable damage, which may require extensive repair or removal, can occur when lightning strikes a tree.

High winds may damage trees at any time of the year. However, wind damage may be more severe when leaves are on the trees because they increase the surface area exposed to wind. In some areas, sand picked up by high winds has an abrasive effect on trees, shrubs and other plants.

Tree damage from tornadoes and intense storms is unpreventable; however, steps can be taken to minimize damage from ice, wind, and snow. But you must act before the storm occurs. This bulletin suggests how to minimize tree damage. Take stock of your situation now and get the required work done before a storm occurs.

Rapid and proper action is necessary to save storm-damaged trees and keep them in good

health. Safety to lives and property is an important aspect to consider when repairing damaged trees. Be sure to read the section on safety before attempting to do any tree repair yourself.

Getting Ready Before the Storm

Tree Selection

Tree damage from ice and windstorms occurs in all of Kansas but is more frequent and severe in Western Kansas. It is obvious that some kinds of trees are damaged more severely than others by wind and ice. Less obvious is the fact that properly pruned and trained trees come through the storm much better than unpruned or improperly pruned trees.

As a rule, slower growing species are structurally stronger and more resistant to storm damage than fast growing species. Bur oak and hackberry are examples of slower growing trees having a sturdy, wide-angled branching habit that generally resists damage. Fast growing trees such as Chinese elm, poplar, and silver maple are most severely damaged because they have weak structures. Some trees have poor root systems and are easily blown down by wind.

Resistance to Storm Damage

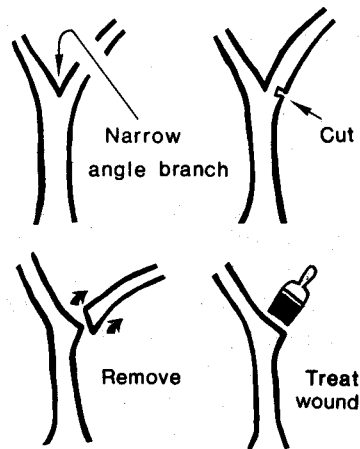
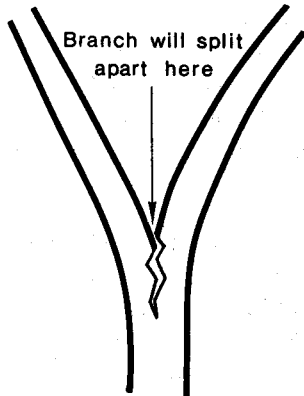
Poor	Intermediate	Good
Chinese Elm	Ash	Oaks
Silver Maple	Linden	Hackberry
Poplar		

Unfortunately, most people plant trees that are fast growing. Not only are these trees more susceptible to storm damage, but also are usually shorter lived and more prone to disease and insect damage.

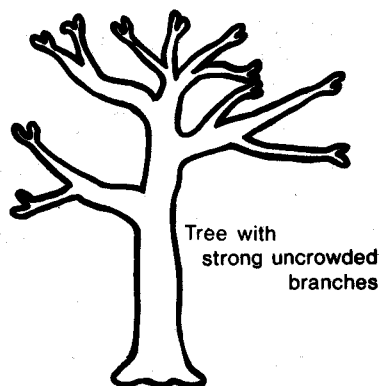
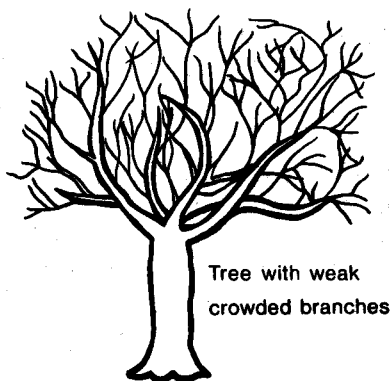
When replacing trees lost to storm damage, or when making other tree plantings, remember that slower growing strong trees actually serve their owners better than fast growing, temporary trees.

Pruning

Correct pruning minimizes storm damage. Chinese elms, for example, produce abundant branches with narrow angle or V-shaped crotches where most breakage occurs.

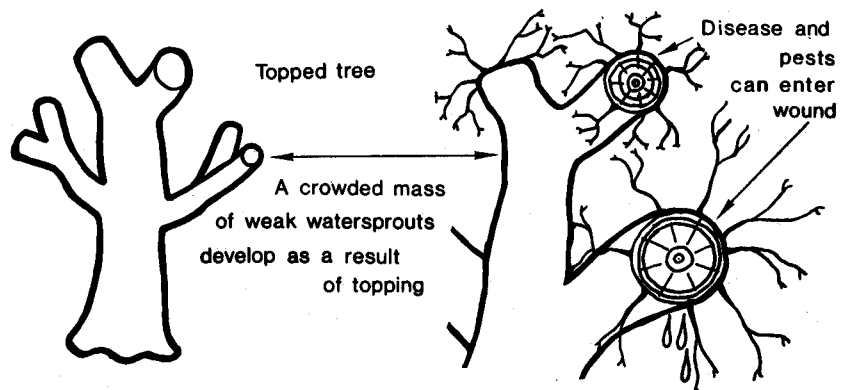


Pruning too much from a tree may also result in excessive growth of water sprouts. The ideal is to prune only a little each year. A young tree given a little corrective pruning each year as it develops results in a strong tree that needs very little pruning when it is large.



A tree with many weak, crowded branches is especially susceptible to storm damage. In this case, the tree should be thinned out so other branches can develop more strongly.

A tree may develop weak growth if pruned incorrectly. A common example is a tree that has been topped or dehorned. The result of topping is a mass of weak watersprouts where one strong branch grew before.



Repairing Damaged Trees

Ice and Snow Damage

Ice accumulates on trees when stable air and low temperature combine with precipitation. Most damage results when wind rises before the ice melts. Sometimes accumulation is heavy enough to break branches by added weight. Often you can remove ice or snow from shrubs and small trees before winds cause major damage by connecting a garden hose to the hot water faucet and melting the ice.

Heavy accumulations of wet snow under stable air conditions also cause tree damage. Evergreens are often damaged because they have more surface for snow to accumulate on. Weak wooded tree species are more susceptible to this type of damage.

After snow or ice damage, collect and remove all branches from the ground. Then remove broken and badly damaged branches from the tree. **Storm damage is not an excuse to top a tree.** Topping will make a tree even more susceptible to future storm damage. Remove only damaged branches.

Hail Damage

Large hailstones or hail driven by wind can seriously damage young trees and older trees with thin bark. For example, hail damage to honeylocust is common in Western Kansas.

Wounds caused by hail are often subject to insect and disease. They also affect tree vigor and health.

Remove broken branches and coat wounds with tree wound dressing. Also coat any severe wounds caused by hailstones. Tree wound dressing is commonly available at garden centers or stores selling lawn and garden supplies.

Flood Damage

Flooding also has its effect on trees. Water standing over the roots limits the available oxygen to the plant. The problem is often compounded when the flood waters deposit a layer of silt on the ground. Moving water often causes considerable breakage and deposits litter in and around the trees.

Trees species vary in tolerance to floods. Some species may succumb after only a few hours while others may survive several weeks of flooding. Vigorous trees are usually more resistant to flood damage than trees in poor condition.

Little can be done to prevent flood injuries other than selecting flood tolerant species and providing them with the essential ingredients to insure vigorous growth. Some of the more tolerant trees include baldcypress, green ash, silver maple, pecan, cottonwood, and black willow.

The chances of survival can be increased by removing any silt deposited around the plant and by draining excess surface and soil water as soon as possible. Broken branches may be repaired in the same manner as discussed in the section entitled "Pruning."

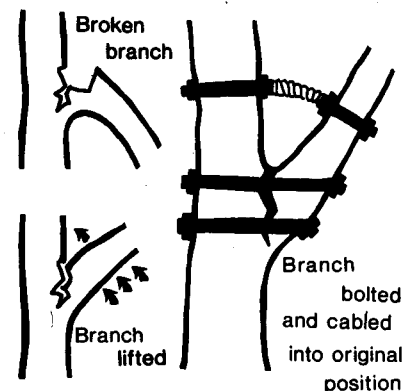
Repair or Remove

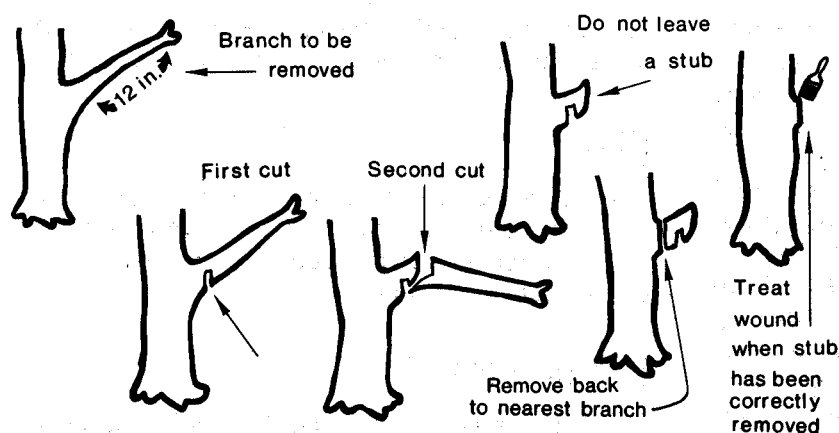
Pruning

After a storm damages trees, the first step is to determine whether they can be repaired or if they will have to be removed completely. Generally, trees can be saved if breakage is confined to the branches. However, if the main trunk is completely broken or if the tree is uprooted, it may be best to remove it completely.

Cabling and Bracing

The first step in repairing trees is to remove or repair broken branches. Often a branch that is broken at a crotch may be lifted into position then bolted and cabled.





Remove broken branches to the nearest branch or to the tree trunk. Never leave a stub.

Remove large branches with three cuts to prevent splintering and peeling.

Make the first cut upward from the bottom of the branch about 12 inches from the next branch. Cut about halfway through or until the saw begins to pinch. The second cut should be 5 to 6 inches further out and continued until the branch falls. The third cut removes the stub cleanly and without peeling.

Shrubs

Snow damage is more common to shrubs than trees because snow depth often equals or exceeds shrub height. Evergreen shrubs are more easily damaged than deciduous shrubs because their foliage is retained during the winter. Often snow damage on evergreens is not apparent until the following spring. A branch broken by snow will retain its green color until spring. At this time many owners blame disease, insects or other problems for the damage.

Heavy accumulations of snow can usually be removed by lightly tapping the branches with a broom. Do this soon after it falls or as it accumulates. Do not use this procedure for snow that has partially melted then refrozen because it will break the branches. The best procedure here would be to spray the shrubs with a hose connected to a hot water faucet.

Often shrubs near sidewalks are damaged with a shovel. Snow from walks or drives should not be piled onto nearby shrubs. Salt used for snow removal will damage shrubs along drives, walks, and streets when the runoff water soaks into the ground. Salt splashed from streets onto shrubs should be washed off with water.

Disposal

Land Clearing

Land clearing after a natural disaster is determined by the:

1. Land value and priority for its use.
2. Equipment available.
3. Type of vegetation.

Land with a high priority for use such as streets or highways will often take precedence over the salvage value of trees. Traffic lanes must be opened as soon as possible to allow for the movement of law enforcement, fire, and medical vehicles.

Equipment such as power saws, tractors, bulldozers, and trucks can be used to move fallen timbers out of the traffic lanes. Large bulldozers can often clear a road without trimming off the roots. Smaller equipment may require removal of the roots and large limbs to facilitate movement.

Different vegetation types require different procedures for cleanup and salvage. Woodlots and forests require experienced personnel to

separate salvagable from unsalvagable timber. Specialized equipment may be necessary to clear large areas efficiently. This equipment probably will not be available outside the forested areas of the United States.

The bulldozer may be the best larger piece of equipment available, but it is at best a marginal tool. To dig out broken tree stumps requires the removal of large amounts of dirt creating undesirable mounds after burning. In stacking fallen timber, the bulldozer moves a great deal of soil into the windrow which retards burning. A rake attached to the front of the bulldozer allows most of the soil to pass through the teeth as they are pushed through the soil.

When removing trees, give consideration to later removal of the stumps. If bulldozers are used, leave stumps 6 to 10 feet high to allow for leverage. If a stump grinder is to be used, remove the trees at ground level. For immediate action with unusable trees, the high stump technique may be best, then a chain saw operator can shorten the stump for the "stump grinder" if necessary.

Before damaged trees are removed, they should be inspected to determine whether or not they can be salvaged. An Extension horticulturist or forestry specialist can provide information about tree salvage and do inspection work.

If the area to be cleared contains valuable trees, these should be removed prior to clearing. After a tornado or high wind the trees may be splintered and have no salvagable value. Ice storms, on the other hand, may only break off branches and leave the main trunk in salvagable condition. The least expensive method is to leave the material in place where it fell. However, this is usually not practical from either an esthetic view or because of safety problems involved. In virtually all cases it will be desirable to remove the debris.

Burning

Burning trees creates smoke pollution and may be barred in some communities or, as a minimum, a permit may be required to dispose of downed trees in this manner.

If trees are burned, let them dry to the point that foliage has dried and begun to fall. Put debris in large, compact piles for burning. The heat of the fire can be increased considerably by using a large heavy duty blower. Fuel oil may

also be used. Stoke the piles and keep the fire alive until all the woody material is burned.

Burial

Tree debris can be buried, but the cost is high. However, using a pulping machine to eliminate the smaller branches reduces the amount of burial space required.

Erosion Control

An inexpensive method of tree debris disposal is placing the trunks and limbs in erosion gullies on land not practical for terracing. It is also possible to place debris in swamps or low lying areas. In either case, this provides wildlife cover and some amount of erosion control. However, it is dangerous to use a tractor to get debris into gullies. Also, the land owner cannot be sure where the water will go once the gullies or low land is filled up with tree debris.

Pulping Machines

Pulping machines can dispose of smaller limbs and branches and make their disposal much easier. There is some danger involved to the operator. Pulpers require a power unit and truck to haul off the pulp. Pulpers are relatively expensive, but may be necessary in areas which do not allow burning.



Tree Salvage

Landscape trees injured beyond repair normally have little merchantable value other than possibly for fuelwood. Timber buyers are seldom interested in buying trees around developed areas unless they are valuable species and are exceptionally large and free of defects.

Damaged trees in woodlots are frequently slivable for fuelwood and possibly for the lumber market. There are a number of fuelwood markets, particularly in the larger cities and towns. Since the demand is seasonal, many of these markets are active only in the fall and winter. A few larger dealers purchase fuelwood the year round.

Fuelwood purchasers prefer oak, hickory, walnut, locust, ash, and hackberry. Wood that has been cut and air-dried for approximately 6 months is preferred and sometimes required; dealers will sometimes pay a premium for seasoned wood. Hickory is an exception since insects attack it while it's drying.

Fuelwood is usually purchased only on a delivered basis. A few buyers purchase wood cut and stacked at the woodlot. The common measurement unit in fuelwood sales is the standard cord, a stack of wood measuring 4 feet x 4 feet x 8 feet. Typical specifications require that fuelwood pieces be cut in 22-inch lengths and that each cord contains at least 60 percent split wood. Some purchasers prefer to buy by the rick. A rick is a variable unit of measure. It is always 4 feet high and 8 feet long, but the width may vary from 18 to 36 inches, depending upon purchaser preference.

Sawmills may purchase damaged timber in woodlots for veneer and sawlogs if there is a sufficient volume meeting minimum specifications. Timber species most active on the market include walnut, bur oak, soft maple, hackberry, and cottonwood. Other species such as elm, sycamore, and ash are also in demand locally.

Sawlogs should be at least 12 inches in diameter at the small end of the log and 8 feet or more in length. They should also be free of excessive crook, rot, and other serious defects.

Timber may be sold either as standing trees or in the log. However, unless you are familiar with logging practices and price influencing factors, you should sell high quality trees on the stump on a bid basis. Your Extension forester will help you select the salvagable trees and

furnish you a list of buyers. He will also advise you on renovation procedures to insure a productive woodlot. Your county agricultural Extension agent will put you in touch with an Extension forester.

Follow these steps in salvaging marketable trees:

- a. Select trees for marketing by species, size, and quality. Mark them clearly with paint or crayon.

- b. Estimate the volume of sale trees. Know what you are selling.

- c. Solicit bids from several walnut buyers for all marked trees. Sealed bids are desirable for sales involving large numbers of trees.

- d. Prepare a written contract outlining the sale terms. Written contracts are good business and protect both seller and buyer.

Safety

Working with damaged or fallen timber is not a common occurrence with the average home owner or farmer. Persons unaccustomed to the hazards involved should take special steps to eliminate the possibility of injury or death.

Pruning is a common practice to eliminate diseased or damaged limbs. Ladders are extremely difficult to stabilize when leaning against a tree trunk or limb. Take care to ensure that the ladder will not tilt or slip. The best method is to climb into the tree to prune. Use a safety rope to prevent accidental falling. Falling limbs are another pruning hazard. The butt end of the falling limbs can swing around or bounce hard enough to injure people, even those not directly beneath the limb when it falls.

In urban areas, electric power lines are a shock hazard. Wet limbs or a dirt- or soil-soaked control rope on the pruning equipment can conduct sufficient electricity to be injurious. Leave such pruning up to power company employees. Do not use pruning equipment with metal handles.

If you hire someone to clean up your storm-damaged timber, have sufficient liability insurance to cover your liability in case the workers are injured.

Chain Saws

The chain saw is a dangerous tool. That it is simple to operate makes it all the more

dangerous since almost any adult thinks he can operate it. A simple innocent, careless act can cause the loss of a hand, foot or life.

Remember these things in operating a chain saw:

1. Shut off the motor, even when moving a few feet. It is easy to stumble over limbs and stumps. One miscue and the saw can do tremendous damage to you if it is running.
2. A chain saw is extremely noisy. When it is running, you cannot shout warnings or hear warnings.
3. Clear the area before beginning to saw limbs or trees. Determine the direction the tree is to fall. Do not let it fall into other tree branches. This is extremely dangerous since it is difficult to tell where the tree will go when cut loose.
4. Undercut the tree $1/4$ to $1/3$ of its diameter in the direction you desire it to fall to guide its direction of fall. Make a backcut on the opposite side of the trunk approximately two inches higher than the bottom of the undercut. Cut parallel to the undercut until 2 or 3 inches of holding wood is left. If the tree has not fallen, it should be tipped with wedges driven behind the saw.
5. The tree may jump off the stump. Prepare an escape route to allow you to move far enough to prevent injury should this occur.
6. Always use a sharp saw and don't worry about the chain whipping if it breaks. It will simply fall to the ground when it runs off the guide.

Debris

Windstorms and tornadoes often deposit debris in pastures. Unless this debris is composed of large sections of roofs or buildings, little damage to the grass will occur. Trees and

limbs will not interfere to any extent with grazing or grass production. The owner should be extremely careful, however, to remove lumber with nails in it or pieces of metal that could be consumed by livestock. In many cases, groups of youngsters such as 4-H or Scouts have assisted in pasture cleanup.

Disaster Assistance

Each county has a USDA Disaster Committee to assist the State Disaster Committee. It is composed of the county ASC Committee chairman as chairman, the county agent and Farmers Home Administration supervisor as members.

This disaster committee has the responsibility to forward information to the State committee when a disaster occurs or is about to occur. After the disaster committee has made an investigation, the Secretary of Agriculture may declare an emergency area in which disaster assistance may be offered. Contact your local ASCS office, because the types of assistance available change periodically.

The Small Business Administration can provide loans for individuals or business concerns. Apply to any SBA Office or bank which cooperates with the SBA.

The American Red Cross may provide grants of funds for emergency care and individual family rehabilitation assistance. Need, not loss, is the basis upon which assistance is given. Apply to the local Red Cross chapter.

Some natural disasters are severe enough that low interest rate loans are made available through the Farmers Home Administration. Individuals with woodlands affected by damage from a natural disaster should contact their local FHA office to determine their eligibility for such a loan.

RICHARD L. JEPSEN

Extension Specialist, Rural Civil Defense

LARRY D. LEUTHOLD

Extension Specialist, Ornamental Horticulture

WILLIAM L. LOUCKS

Extension Forester, Environmental Forestry

Cooperative Extension Service



Kansas State University



Manhattan

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