

From U.S. Forest Service's: *Your Backyard Forest - Prevent Personal Injury and Property Damage from Your Trees*

A tree with structural defects that are likely to cause failure is considered a "high risk or hazardous tree" if it can strike a target. A target can be a vehicle, building, or a place where people gather such as a bench, picnic table, trail, or fire pit. To ensure you have a safe environment in your backyard woods, you should learn to recognize hazardous defects in trees and take corrective actions.

Not all corrective actions should be attempted by you. Simply put, evaluating trees for hazardous defects can be a complex process and either a professional [forester](#) or arborist should undertake many of the suggested corrective actions. You should do only the things that fit comfortably within your skill level and leave the rest to the professionals.

Still, you should have a basic understanding of the inspection process and how to size up your backyard forest to make it a safer to visit and a healthier place for trees to grow. It is especially important to inspect areas where there is potential heavy traffic and where property can be damaged. Your forest needs to be inspected every year and after severe storms. These inspections will allow you to detect defects and correct them before they pose significant risks to personal safety and property

You must inspect the entire tree carefully and systematically. Examine all parts of the tree, including the roots, root or trunk flare, main stem, branches, and branch unions. Be sure to examine all sides of the tree. Use binoculars to see high branches. Consider the following factors:

- Tree condition: Trees in poor condition may have many dead twigs, dead branches, or small, off-color leaves. Trees in good condition will have full crowns, vigorous branches, and healthy, full-sized leaves; however, green foliage in the crown does not ensure that a tree is safe. Tree trunks and branches can be defective and still support a lush green crown.
- Tree species: Certain tree species are prone to specific types of defects. For example, some species of maple and ash in the Northeast often form weak branch unions, and aspen is prone to breakage at a young age (50-70 years) due to a variety of factors, including decay and cankers.

- Tree age and size: Trees are living organisms subject to constant stress. Pay particular attention to older trees, which may have accumulated multiple defects and extensive decay.

High-risk defects are signs of tree failure. Look for seven important tree defects: dead wood, cracks, weak branch unions, decay, cankers, root problems, and poor tree form. These tree defects will be described in the next several sections. *Remember: a tree with defects is not hazardous unless some portion of it is within striking distance of a target.*

- **#1- Dead wood:** Dead trees and branches are unpredictable and can break and fall at any time. Dead wood is often dry and brittle and cannot bend in the wind like a living tree or branch. A dead branch and treetop that is already broken off ("hanger" or "widow maker") is especially dangerous.

Act immediately if . . .

- A broken branch or treetop is lodged in a tree. • A tree is dead. • A branch is dead and of sufficient size to cause injury. Typically this is a branch larger than 4 inches in diameter, but this can vary with branch height. Even smaller branches, falling from high in the tree, can cause serious personal injury.)

- **#2- Cracks:** A crack is a deep split through the bark, extending into the wood of the tree. Cracks are extremely dangerous because they indicate that the tree is already failing.

Act immediately if . . .

- A crack extends deeply into, or completely through the stem. • Two or more cracks occur in the same general area of the stem. • A crack is in contact with another defect. • A branch of sufficient size to cause injury is cracked (typically larger than 4 inches in diameter).

- **#3- Weak Tree Branch Unions:** Weak branch unions are places where branches are not strongly attached to the tree. A weak union occurs when two or more branches grow so closely together that bark grows between the branches and inside the union. This ingrown bark does not have the structural strength of wood and the union can become very weak. The inside bark may also act as a wedge and force the branch union to split apart. Trees with a tendency to form upright branches, such as elm and maple, often produce weak branch unions.

Act immediately if . . .

- A weak branch union occurs on the main stem.
- A weak branch union is associated with a crack, cavity, or other defect.

- **#4- Decay:** Decaying trees are prone to failure, but the presence of decay alone does not necessarily mean failure. Still, advanced decay (soft, crumbly wood with a cavity) is serious. Evidence of fungal activity including mushrooms and conks are indicators of advanced decay.

A tree usually decays from the inside out, forming a cavity, but sound wood is added to the outside of the tree as it grows. Trees with sound outer wood shells are relatively safe. Still, evaluating the safety of a decaying tree is usually best left to trained arborists.

Act immediately if . . .

- Advanced decay is associated with cracks, weak branch unions, or other defects.
- A large branch is decayed.
- The thickness of sound wood is less than 1 inch for every 6 inches of diameter, at any point on the stem.

- **#5- Canker:** A canker is a localized area on a stem or branch of a tree, where bark is sunken or missing. Cankers are caused by wounding or disease. The presence of a large canker increases the chance of the stem or branch breaking near the canker.

Act immediately if...

- A canker affects more than half of the tree's circumference.
- A canker is physically connected to a crack, weak branch union or cavity.

- **#6- Roots:** Trees with root problems may blow over in windstorms or even fall from the weight of the tree's leaves in summer. Root problems can be caused by severing or paving-over roots; raising or lowering the soil depth over roots; traffic over the roots; or root decay. Dieback, dead wood in the crown and off-color or smaller than normal leaves are symptoms associated with root problems. These above ground symptoms may serve as your best warning.

Act immediately if . . .

- A tree is leaning with recent root exposure, soil movement, or soil mounding near the base of the tree.
- More than half of the roots under the tree's crown have been cut or crushed.
- Advanced decay is present in the root flares.

- **#7- Poor tree form:** Trees with strange shapes are interesting to look at, but may be structurally defective. Poor tree form often results from many years of damage from storms, unusual growing conditions, improper pruning, topping, and other damage.

Act immediately if . . .

- A tree leans excessively.
- A large branch is out of proportion with the rest of the crown.

Finding multiple defects in a tree should be your red flag when evaluating its potential to fail. Multiple defects that are touching or are close to one another should be carefully examined. If more than one serious defect occurs on the high-risk tree's main stem, you should assume that the tree poses a very high level of risk and corrective actions should be taken.

If a high-risk tree situation exists, there are four recommended options for correcting the problem:

- move the target
- prune the tree
- convert the tree to a wildlife tree or
- remove the tree

Moving the target is often an inexpensive, effective, and simple treatment for correcting a high-risk tree. Easily moved items like play sets and swings, vehicles, and picnic tables can be placed out of the reach of the hazardous tree with little effort and expense. If the target cannot be moved and a high-risk situation exists, consider blocking access to the target area until the hazard can be eliminated.

A defective branch or branches may cause a high-risk situation, even though the rest of the tree is sound. In this case, pruning the tree branch or branches solves the problem.

Practicing proper tree pruning is excellent “preventive medicine” for reducing the occurrence of defective, high-risk trees. By pruning properly, early in a tree’s life, you can prevent or correct many of the problems that cause trees to fail as they mature.

Improper pruning techniques can worsen the problem, and may ultimately result in the formation of cracks, decay, cankers, or poor tree architecture that lead to very high risk situations. (See [How to Prune Your Young Trees](#) for more information.)

Creating Wildlife Habitat - This corrective action is often overlooked. Corrective actions should be selected with safety in mind while preserving a portion of the tree intact to provide wildlife habitat. One option is to reduce the height of a tree to the point that it would no longer strike a target if it should fail. Remove major branches that are defective, and leaving a portion of the tree intact for wildlife habitat. If a tree must be removed for safety reasons, consider leaving the tree on ground to create wildlife habitat.

Remove the Tree - Before removing a tree, carefully consider whether the effects of removing the tree could result in reduced property values. [Tree removal](#) should be considered as the final option and used only when the other corrective actions will not work. Tree removal is inherently dangerous and is even more serious when homes and other targets are involved. Removal of very high-risk trees is usually a job for a professional arborist.

Cabling and Bracing - Cabling and bracing do not eliminate all the safety risks associated with a highly defective tree, but when done correctly by a trained arborist, it can extend the time a tree or its parts are safe.

Done incorrectly, it creates a more serious hazard. Cabling or bracing is not recommended for a high-risk tree unless the tree has significant historic or landscape value, the cabling or bracing is done by a trained arborist, is regularly inspected, and properly maintained.

Evaluating and treating high-risk trees can be a complicated process, requiring a certain level of knowledge and expertise. I have outlined some of the basic problems that may alert you to a hazardous situation, and suggest some possible ways to correct them.

A professional forester or arborist should be consulted when undertaking many of the suggested corrective actions. When in doubt about how much risk a defective tree poses, or how to best treat it, consult a forester or arborist. You may wish to contact your local Cooperative Extension Office for educational assistance and to

inquire if a listing of qualified consulting foresters or arborists is available for your area. Otherwise, consult your phone book under "Arborists" or "Tree Service."

Remember that trees do not live forever. Design and follow a backyard landscape plan that includes proper tree selection and a cycle of [tree maintenance](#) and replacement.