Is It a Hazard Tree? Check Its Heart…and Cambium

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The actual inspection of an area for hazard trees is not difficult. Many Trail maintainers already take the needed extra time to look up and make a visual assessment of what hazard may loom overhead. The following should familiarize you with some telltale signs that may indicate a hazard tree.

Before going into the field, it is important to collect the right equipment for surveying hazard trees. Here is a list of equipment I recommend:

Field glasses--a good pair of binoculars will allow you to check the conditions of tops in the tallest of trees.

Shovel--A heavy-duty shovel is required for checking the bark surface below the ground for ***Armillaria*** ("shoe-string") fungus or for sampling for cambium killed by ***Fomes annosus***.

Ax--A single-bit ax is ideal for tapping bark and sounding tree trunks.

Increment borer--This is a useful tool for determining the growth rate of trees or checking the thickness of sound wood in tree trunks. An alternative is to use a long twist bit for checking sound wood.

You need to know what to look for, now that you have the right equipment.

You need to check two primary conditions in any survey for hazard trees: heart rot and dead cambium. Let's look at these hidden killers.

Checking for Heart Rot

Generally, heart-rot decay is confined to the heartwood, the wood that lies within the outer living layer of the tree. Since, typically, the presence of conks bears a definite relationship to the amount of decay in living trees, this can be a good clue that heart rot is present. Heart rot also is most prevalent in older trees.

A tree that is living but hollowed out has experienced heart rot. Just because a tree has heart rot does not mean it is hazardous. The rate of recent diameter growth is a useful index of the probable safety of any tree with heart rot or hollowness. Trees that are making good growth will have thicker sapwood than those growing slowly and should be less likely to fail. The condition of callus growth around wounds is also an indicator. If growth of the tree is good, callusing will be good and the bark over the callus will be thin and healthy in appearance. The crown of the tree also will be thrifty.

A couple of tests can be used to check a suspected tree for heart rot. One is "sounding" the trunk by striking it sharply with the poll of an ax. If the tree is hollow or decayed and the surrounding wood is not too thick, the blow will produce a hollow-drum sound distinguishable from the sound produced when striking a tree with no heart rot.

For a better method of testing, sample the lower trunk with an increment borer. If the borer breaks through into rot, the extracted core will give the thickness of the surrounding wall of solid wood and an opportunity to judge the rate of recent growth. If an increment bore is not available, a long twist bit may be used, but it will not provide an indication of recent growth.

The hazard of a tree with heart rot is commonly overrated. A tree can stand for decades, even though hollow or showing rot, and can suffer up to one-third loss in strength--equivalent to approximately a 70 percent loss in total wood diameter inside bark--without materially affecting its safety, if the weakening defect is heart rot uncomplicated by other defects. This standard can be applied most conveniently in the field after finding the thickness in inches of sound wood outside of the rot column or hollow. This table shows the minimum safe thickness for sound wood by diameter of tree inside the bark.

Diameter of tree inside bark	Sound wood thickness
16	2.5
20	3.0
24	3.5
28	4.0
32	4.5
36	5.5
40	6.0
44	6.5
48	7.0
52	8.0
56	8.5
60	9.0
64	9.5
68	10.0

This strength-loss limit is by no means absolute. It is the best working estimate we can use at this time. It is more accurate on conifers and is less accurate on hardwoods because (1) of the difference in basic form between hardwoods and conifers; (2) of the strong influence of leverage limbs play on breaking potential; (3) of the difference in mechanical strength of different hardwood species; and (4) trunk failures, besides those near ground level, are relatively rare except in weak wood species, such as poplars.

Trunk rots that center at some distance from the ground may present a problem. Direct sampling to determine the wall of sound wood is impractical. A decision must be made from indirect evidence: if conks are more than six inches wide, if the area covered by conks is 10 feet or more, and if current growth of the tree is slow.

Checking for Dead Cambium

Checking for dead cambium (the microscopic outside living layer of wood, just beneath the bark, where diameter growth occurs) at the butt of the tree is particularly important when examining decaying oaks. The most practical method for doing this is by tapping the bark on the outside with the poll of the axe. Bark over dead wood soon separates from it and emits a shallow, hollow sound when tapped. If dead cambium is discovered, a fungus is present, and it is often evident that the decay will extend into the roots. This is particularly true if “shoe strings” (a fungus resembling white shoestrings) are found over the bark surface just below ground level. As far as we know, all cases of basal failure of trees from advanced butt and root fungus infections that have resulted in accidents or near-accidents in recreational areas have been in trees with unmistakably large basal hollows and in a plainly decayed condition.

Those hidden killers of trees are the primary ones to keep in mind. However, they are not the only ones. In my final report on hazard trees, I will list other common defects of trees that could result in hazards, and I will present some alternatives for dealing with hazard trees once they have been identified.

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