



## Floods and Trees: Helping Your Tree Recover



Floods cause damage to trees in two main ways – physical and physiological. The severity of damage is determined by many different factors, including the tree species, beginning health of the tree, length of flooding event, depth of the water, amount of soil removed or deposited over the tree’s root system and time of year flooding occurs. Generally, broadleaved trees tolerate flooding better than conifers, such as pine, spruce and fir.

Physical damage is easily seen as flood waters recede, but physiological damage is often invisible and hard to measure. Homeowners have to wait until trees begin growing in spring to get some idea of how badly their trees have been affected.

Fortunately, flooding is less damaging to trees when it occurs during the dormant season. According to Dr. John Ball, South Dakota State University Extension Forestry Specialist, during winter and early spring before growth begins, most deciduous trees can tolerate several weeks of flooding if they don’t receive extensive physical damage.

### Physical Damage

Strong flood waters, especially when accompanied by large slabs of ice, cause serious physical damage. Branches are broken and bark is gouged from the tree’s trunk. Water erodes soil around the roots, causing the tree’s root plate to become unstable. Trees can easily be pushed over or pulled from the ground by racing flood waters.

Once waters recede, assess trees. Look for broken branches hanging in the tree, leaning trees or significant bark damage. If broken branches can be reached safely from the ground, remove them, making a clean cut. Do not apply pruning paint or wound dressing to the cut.



Leaning trees are an imminent fall hazard and should be removed in most cases, however, working in large or damaged trees can be extremely dangerous. Contact a certified arborist to have damaged trees assessed and removed. More information - Hiring an Arborist, Nebraska Forest Service, <https://nfs.unl.edu/CommunityForestry/hirearborist.asp>.

Trees may survive bark damage, depending on the severity. Assess how much of the trunk circumference is affected. If 10% or less of the tree's circumference is affected, a previously healthy tree with little to no root damage has a good chance of recovery. If 50% or more of the tree's circumference is affected, removal of the tree is the safest option as disease and decay are likely to create an unstable tree.

Soil erosion or removal by flood waters may leave tree roots exposed. If the tree is still standing and strongly rooted, add soil around the roots to cover them and fill any gaps. It's important to do this before the roots have been allowed to dry out. When applying soil over the root system do not bury the main roots flaring off the trunk. There should be a visible flare at the base of a well-planted tree trunk.

### **Physiological Damage**

How does flooding cause physiological damage to trees? Two main avenues of injury are through oxygen starvation during the flood and soil deposits over the root system afterwards.

*Oxygen Starvation.* Tree roots are mostly inactive during winter dormancy, with minimal functions or growth, until soil temperatures reach a minimum of approximately 32 to 40° F. This is good news, because it means tree roots have a much lower need for soil oxygen while dormant and can more easily tolerate the lack of oxygen caused by early spring flood waters such as we experienced this year. In actively growing trees, the available oxygen in roots is used up within 1-3 hours following a flood.

A lack of oxygen causes roots to stop functioning or growing, and eventually results in root death. Heavy woody roots are more likely to survive a flood than non-woody roots. Root death creates openings for pathogenic fungi to invade the tree. Loss of roots through direct flood damage or disease make the tree prone to drought the following growing season and to wind throw during summer storms.

Flooding also suppresses the growth of mycorrhizal fungi, which need high levels of soil oxygen to grow well. Mycorrhizal fungi are beneficial organisms in the soil that form a relationship with tree roots and greatly expand a tree's root network and nutrient uptake.

*Sedimentation.* Soil deposits over a tree's root system following flood can range from zero inches to several feet of sand, silt or clay. These new deposits bury the original root system deeper in the soil, creating a long-term oxygen deficit. Some trees may be able to respond by sending out



new roots into the upper layers of soil deposits, but others trees will simply decline and die. Even three inches of soil deposits can smother the roots of flood intolerant tree species.

If flood waters have deposited soil beneath trees, remove this material down to the tree's original soil grade in as large an area as possible. This must be done carefully and quickly. Once flood tolerant trees begin active growth in spring, they will soon grow roots into these new soil deposits. Damaging those new roots while removing the soil deposits can kill an already stressed tree.

#### Tree Tolerance to Intermittent Flooding During the Growing Season

- Tolerant – green ash, bald cypress, cottonwood, sycamore, willow
- Intermediate – arborvitae, river birch, boxelder maple, American elm, hackberry, honeylocust, silver maple, bur oak
- Intolerant – chinkapin oak, eastern red cedar, linden, white birch, buckeye, crabapple, Norway maple, pine, redbud, shagbark hickory, spruce, sugar maple, tulip poplar, walnut

#### Long Term Recovery

It is common to see flood damaged trees die within 2-5 years following the event. It's important for homeowners to understand it takes trees several years to fully recover from the effects of flood damage. If a tree is to be saved, it's important to protect it from additional insect or disease damage during this time. Inspect trees periodically throughout the growing season for signs of problems.

Trees have a reduced root system due to root and mycorrhizal fungi death during the flood, so keep them watered during dry summer periods for the next several years as they regrow new roots. Apply a 2 ½ to 3-inch layer of organic mulch in a flat layer beneath the tree. The most commonly used organic mulches include wood or bark chips – cedar, cypress or hardwood- and shredded hardwood.

#### Your Suggestions are Welcome!

Is there a lawn and gardening topic you would like to learn more about? Sarah Browning is an Extension Educator with Nebraska Extension and can be contacted by phone 402 441-7180, by mail at 444 Cherrycreek Road, Lincoln, NE 68528: or by e-mail [sarah.browning@unl.edu](mailto:sarah.browning@unl.edu).

Image from Sarah Browning, Nebraska Extension.



**Sarah Browning**

*Extension Educator*

Nebraska Extension

In Lancaster County

444 Cherrycreek Rd, Ste A, Lincoln, 68528-1591

402 441 7180