



# Extension Extra

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## What to Do About Flood-damaged Trees

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Spring and summer rain sometimes causes widespread flooding. While much attention is focused on the loss of buildings, roads and crops, trees also are adversely affected. Unlike many crops, however, flood damage to trees may take longer to be noticed.

### How are trees affected by flooding?

Tree growth is affected when the surrounding soil is temporarily flooded by the overflow of streams and rivers or the soil is saturated by heavy and persistent rains. The primary affect of all flooding is the rapid depletion of the soil oxygen. The upper six inches of a typical undisturbed soil has an abundance of oxygen. The tree roots responsible for absorbing water and nutrients occur in this horizon. When flooding occurs, the soil has less oxygen for root respiration and the process becomes anaerobic, which produces toxic compounds in the roots. The absorbing roots begin to die, reducing absorption of water and nutrients which results in less photosynthesis (the process trees use to manufacture food).

### What are the symptoms of flood injury?

Flood injury symptoms include the following:

- leaf browning and wilting,
- premature fall color,
- twig and branch dieback, and
- with severe flooding, the tree may die.

These symptoms may occur during or after flooding. Some trees may take several years to die from flooding injury while others may slowly recover.

### What determines whether my tree will be injured?

The response to flooding depends upon the season, depth and duration of flooding and the age and health of the tree species affected.

**Season of flooding** – The most potentially damaging flood time is late spring, just after the leaves have fully expanded. At this stage of growth, food reserves are low and the stress may kill a tree. After spring, flood tolerance increases with the season. During the winter or early spring, before tree growth begins, most deciduous trees can tolerate several weeks of flooding.

**Depth of flooding** – There are three flood levels:

- Saturated soil, but no standing water.
- Water covering the ground and lower tree trunks.
- Water covering the leaves.

Flood intolerant trees can be injured by saturated soil conditions. Flood tolerant and intermediate tolerant trees are usually injured only if water covers the ground. Almost all trees are injured if water covers the leaves. If only the lower branches are submersed, these may die while the remainder of the tree survives.

**Tree species** – Not all trees react the same to flooding. Some species, typically those found along rivers, can adapt to a flood condition. Tolerant trees can withstand 80 days or more of saturated soils, intolerant trees generally can not survive more than 30 days and often much less. Death can

occur after only a few days of saturated soils for very intolerant species such as cherries. An individual tree's tolerance depends on its age and health. Older and healthier trees can withstand a longer duration of flooding than younger or weak trees.

### How can I help my tree after the flood?

After the flood waters have receded, inspect the tree for mechanical injury. During the flood, tree trunks or branches may have been damaged by floating debris. Prune broken branches to prevent disease infection. With a sharp knife, carefully remove broken and torn bark.

Do not apply pruning paint to the pruning wounds or exposed trunk wood. Pruning paint will not speed the recovery and can increase, not reduce, the chance of infection. The only exception to this rule is American elm. This tree should receive a very light coating of paint on wounds to reduce the possibility of elm bark beetles from attacking.

If the flood has deposited sediment around the tree, remove this material and restore the original grade as far out as possible. Even three inches of new soil can smother intolerant tree roots. This must be done carefully. Some flood tolerant trees survive by quickly growing roots into the new layer of soil. If the tree has already grown roots into the new soil, do not try to restore the original grade. This activity may kill the tree.

It may take several years for a mature tree to recover from a single year of flooding. During this recovery time, the tree is very vulnerable to attacks from insects and diseases. Inspect your tree several times during the growing season and identify and control any pest problems. In addition, speed the recovery of the tree by fertilizing. Apply fertilizer in mid-fall at a rate not exceeding 1 pound of nitrogen per 1000 square feet of ground area. Higher rates of nitrogen fertilizing may further weaken the stressed tree.

### Trees and their relative tolerance to Intermittent flooding during the growing season.

Species	tolerant	intermediate	intolerant
arborvitae		x	
ash, black	x		
ash, green	x		
aspen		x	
basswood			x
birch, river		x	
birch, white			x
boxelder		x	
buckeye			x
cherry			x
cottonwood		x	
crabapple			x
elm, American		x	
elm, Siberian			x
hackberry		x	
honeylocust		x	
maple, Norway			x
maple, silver		x	
maple, sugar			x
mountain-ash			x
oak, bur		x	
pine (most)			x
spruce (most)			x
sycamore	x		
redcedar, eastern			x
Russian-olive		x	
walnut, black			x
willow, black	x		



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