Fire Recovery

Fires are a bold reminder that we live in fire-adapted ecosystems. As we know, fire can and will occur in all of the vegetation types found in north central Arizona. Our climate provides natural ignition sources (lightning) and ensures that periodic fires can occur here. Human activities increase the risk of ignition and residential development within the wildland urban interface adds complexity to fire management and planning. When you move here, you get the complete package: beautiful views, moderate climate, mostly clear skies, interesting and varied plant communities, wildlife, and *wildfire*. This publication addresses mitigation of two fire impacts: heat damage and/or scorching of trees and protecting burned over soil from accelerated erosion.

Trees that were exposed to high levels of heat may have lost some or all of their foliage. On deciduous trees, new leaves can begin to grow back after the fire or the following year. In evergreens, it is more complicated. The leaves of pines and junipers require lots of resources to create them. These leaves are designed to last several years, so they have a thick cuticle and contain resin to resist herbivory by insects and other grazers. In addition, pine and fir buds were formed the previous year. These buds contain all the leaves that will be produced the following growing season when the bud elongates and matures. When buds are destroyed, the tree suffers.

Trees that had their bark scorched often have damaged cambium tissue. The cambium is where diameter growth occurs. Wood cells (also called xylem where water and minerals are transported upward to the leaves) are formed to the inside of the cambium and phloem (where food is transported downward from the leaves to other parts of the tree) is formed to the outside of the cambium. As the tree increases in diameter, the phloem becomes part of the bark. The thicker the bark, the better the tree is protected from heat scorching. If the cambium is killed in certain areas, diameter growth is stopped and food transport is rerouted. If the entire circumference of the cambium is damaged, then the effect is akin to girdling and the tree can die. This phenomenon is how researchers use slabs taken from fire scarred trees to reconstruct historic fire return intervals.

All that to say that when an evergreen conifer is completely defoliated, it will probably die. It is difficult to know the extent of damage to the cambium. If the tree is still green, then supplemental irrigation may improve its chances of survival. For irrigation, I recommend using soaker hoses placed near the drip line of the tree. Allow the water to go two or three feet deep into the soil and continue through any dry winter periods. If the tree shows signs of life (green foliage) after several months, then it may live to see another fire. Any dead wood can be pruned away the following winter. Do not apply fertilizers or anything other than water. Vitamin B1 and similar products have never shown any measurable positive effects in research trials.

Damaged native shrubs are often killed to the ground. Many of these will resprout from the existing root system to produce a new plant. Of all the conifer species in northern Arizona, only alligator juniper has the ability to resprout from the old root system. If trees and shrubs were killed, then consider replacing them with drought-tolerant, fire-resistive species.

Where fires were extremely hot, the soil itself is often sterilized and can become hydrophobic (water resistant). It takes a long time for these soils to recover and mulching may be the only solution to protecting them. Less severely heated soils can be planted with native grass species to stabilize and rejuvenate them. Here a light application of organic mulch will also aid in stabilizing the soil while creating a microclimate for seed germination. Irrigation will also improve the success of seedling establishment.

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