

Leaf litter and soil protect acorns from prescribed fire

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U.S. Forest Service scientists have found that prescribed fires with the heat insulation of leaf litter and soil can help restore oak ecosystems.

Forest Service researchers are helping land managers find the best time to use prescribed fire when oak regeneration from acorns is a concern.

"Acorns inside the [leaf litter](#) or in the soil are for the most part protected from fire," says Cathryn Greenberg, Forest Service Southern Research Station (SRS) researcher and lead author of the study published in July in the journal [Forest Ecology and Management](#). "However, when acorns lie on top of the leaf litter, even low intensity surface fires will kill most of them."

Prescribed fire is increasingly used as a tool in oak ecosystem restoration, with the goal of reducing competition and creating light and seedbed conditions that help [oak seedlings](#) germinate and flourish. Forest Service researchers are helping land managers find the best time to use prescribed fires when oak regeneration from acorns is a concern.

To see how fire affected acorns, researchers placed nuts on the leaf litter surface, inside the duff (leaf litter plus smaller fragments of plant material), and underneath the duff, about 2 inches into the soil. The temperature of the [prescribed burns](#), measured just above the surface of the leaf litter, ranged from less than 174° F to almost 700 ° F.

After the burn, researchers retrieved the acorns and placed them in ideal

conditions for germination. "Almost all the acorns that were on the leaf litter surface and exposed to fire died," says Greenberg. "However, acorns in the duff or in the soil were better protected from [high temperatures](#), and generally unaffected by low intensity fires."

When acorns fall to the forest floor they don't stay on top of the leaf litter too long. Squirrels, jays, chipmunks and mice bury acorns, or they settle into the litter because of weather, falling leaves and gravity. Once acorns are blanketed by leaf litter or soil, low-intensity burns are usually safe. However, [land managers](#) should consider the timing and size of acorn crops, as well as the forest floor condition when determining the timing and frequency of prescribed burning.

"Frequent burning that reduces litter and duff depth could compromise the availability of 'safe sites' where acorns are insulated from high fire temperatures," says Greenberg.

More information: Access the full text of the article:
www.srs.fs.usda.gov/pubs/40794

Provided by USDA Forest Service

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