

# Changes in forest structure affect bees and other pollinators

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Credit: Wikipedia.

Over the past century, many forests have shifted from open to closed canopies. The change in forest structure could be contributing to declines in pollinator species, especially native bees, according to a new study by U.S. Forest Service scientists.

The study shows how common present-day forest conditions affect

pollinators, especially [bees](#). "Bees prefer open forests," says Jim Hanula, a research entomologist at the Southern Research Station (SRS) Insects, Diseases, and Invasive Plants research unit. "We found that total tree basal area was the best predictor for how many bees would be present." Tree basal area describes the amount of space occupied by tree stems within a given piece of land.

Hanula and his colleagues found that in stands with high basal areas, bees were scarce. Bees were also less common in stands with dense shrub layers.

Hanula and his colleagues measured pollinator abundance and diversity across seven types of forest in the Oconee National Forest in Georgia, including dense young pines, thinned young pines, mature open pine with extensive shrub and sapling cover, mature open pine with extensive herbaceous plant cover, mature upland hardwood forest, and mature riparian hardwood forest.

Before becoming part of the National Forest System in 1959, the land now included in the Oconee National Forest was mostly deforested. Its land use history is shared by many other forests in the Southeast, where huge swathes of forests were clearcut during the late 19th and early 20th century. Because of the deforestation, as well as the repeated wildfires that swept through the region, reforestation and wildfire prevention were primary conservation goals throughout much of the 20th century. The new forests that have grown in their place tend to have closed canopies and denser shrub layers than before.

"We found that bees were most abundant in mature pine forests with open canopies with flowers and grasses in the understory which provide long-term, stable habitats for bees." Pollinators were also common in recently cleared patches of forests, but those quickly close and become dense stands of young pine trees that tend to support the fewest bees.

The results have already been incorporated into bee-friendly management principles recently drafted for federal lands. Hanula and co-author Scott Horn, an SRS entomologist, were part of a Forest Service team that wrote and edited the Forest Service best management practices to promote bee health. "We've been studying pollinators for more than 10 years," says Hanula, "and it was great to be a part of something like this that will help guide management and future research."

One of the principles discussed in the report is how open forests benefit bees. Before European settlement, forests in the Southeast were a mosaic of open pine and hardwood, prairies, and woodland savannas. Maintaining open canopy pine forests with diverse herbaceous communities typically requires prescribed fire, and although bee conservation is not a routine management objective, concern over the fate of pollinators is increasing.

Pollinator conservation is highly compatible with other goals, such as maintaining habitat for the endangered red-cockaded woodpecker. Without insect pollination, most plants would be unable to reproduce. "Pollinators are critically important to [forest](#) ecosystems and to people," says Hanula. "Managing for open forests has a number of benefits, and could also help sustain these species for the future."

**More information:** [www.srs.fs.usda.gov/pubs/48343](http://www.srs.fs.usda.gov/pubs/48343)

Provided by USDA Forest Service

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