

# Decades-long effort revives ancient oak woodland

October 29 2020, by Diana Yates

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Remnant populations of flowers such as violet wood sorrel and yellow stargrass, pictured, began to increase dramatically as the buckthorn was cleared. Credit: Stephen Packard

Vestal Grove in the Somme Prairie Grove forest preserve in Cook

County, Illinois, looks nothing like the scrubby, buckthorn-choked tangle that confronted restoration ecologists 37 years ago. Thanks to the efforts of a dedicated team that focused on rooting up invasive plants and periodically burning, seeding native plants and culling deer, the forest again resembles its ancient self, researchers report in the journal *PLOS ONE*.

Now, shooting stars and wild hyacinths bloom at the base of mature oak trees each spring. Appalachian brown butterflies and other native insects, salamanders, birds and reptiles have returned to reclaim the territory. Native plant biodiversity is comparable to the region's best remnant woodlands that were not as degraded by overgrazing of deer or lack of fire.

The level of success achieved in this 7-acre woodland is rare in restoration ecology, the scientists say. Most such efforts are hamstrung by limited financial resources, expertise, personnel and time. Many plant restoration interventions focus on only one technique—such as brush removal or burning to kill [invasive plants](#)—and fail to address the other factors that can undermine their efforts.

"Even very expensive vegetation restoration projects fail to meet their conservation goals more often than not," the researchers write. "In addition, long-term studies of management impacts are rare."

"We feel like we don't have a minute to spare from our stewardship, so it's hard to take time to collect data," said study co-author Karen Glennemeier, an ecologist with Habitat Research LLC. "But monitoring the ecosystem is essential for understanding the impacts of our management."





Regular controlled burns eliminated most nonnative plants and gave fire-adapted natives an opportunity to flourish. Credit: Stephen Packard

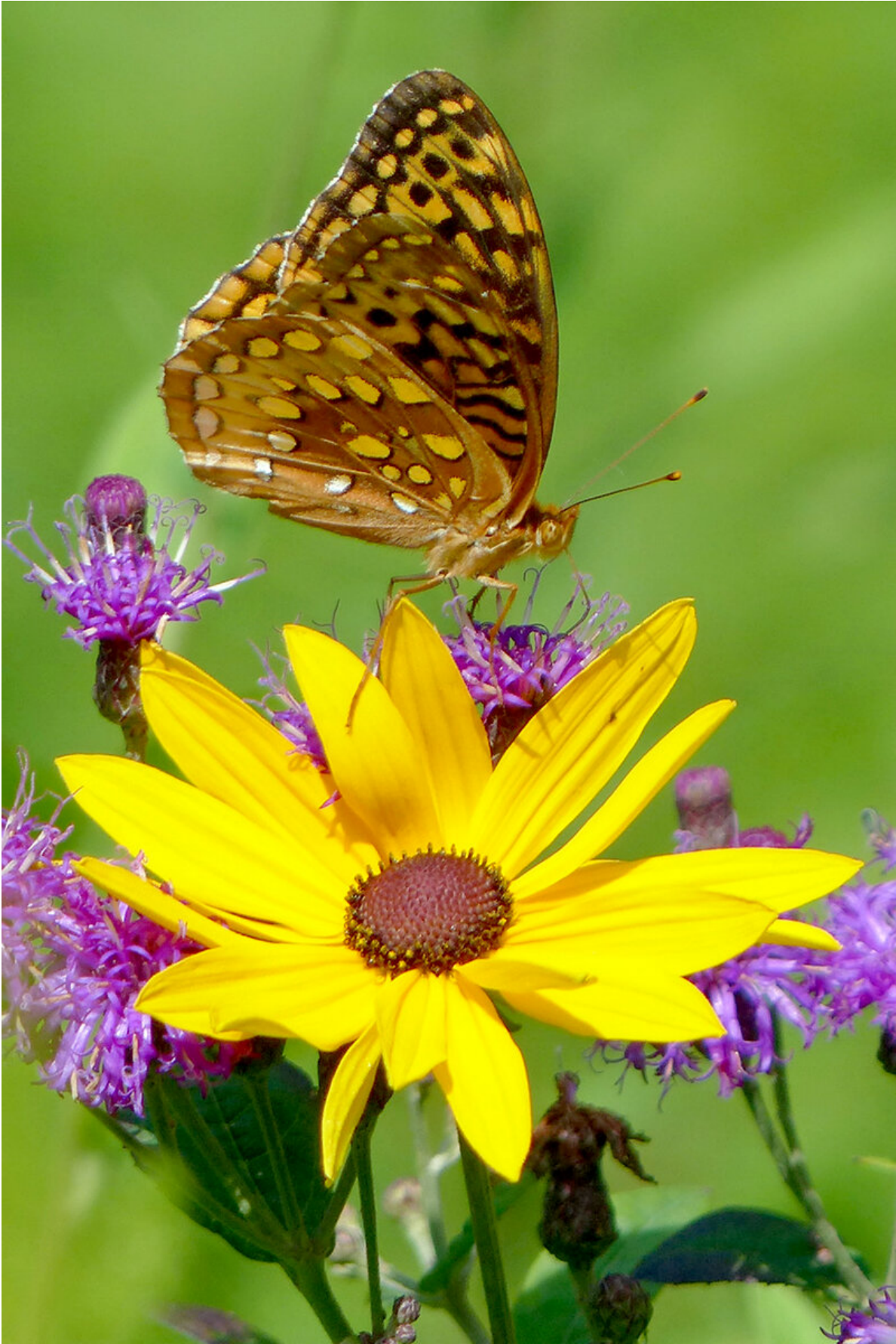
"Once we destroy a [natural area](#), it has proved disturbingly difficult and expensive to bring it back," said study co-author Greg Spyreas, a research scientist at the Illinois Natural History Survey who focuses on plant ecology and botany. "This study shows you how to do it."

"Collaboration was key to this success," said study co-author Stephen Packard, a restoration ecologist and land steward of Somme Prairie Grove. "The Cook County Forest Preserve District, which owns the land, assembled a team of staff, contractors, volunteers and a variety of research and conservation organizations."

This team slashed and burned a dense thicket of buckthorn trees, thinned native tree density to give the oaks a chance to reproduce, harvested seed from [native plants](#) and scattered that seed in autumn for many years. Dozens of "citizen-science" volunteers led the most detailed work while hundreds of recreational conservationists joined the effort each year.

"Staff, contractors and volunteers all helped burn the woods, on average, once every two years," Packard said. The volunteers hand-weeded invasive garlic mustard, but didn't bother with most other weeds. The thinning of trees and ground vegetation allowed more sunlight to penetrate to the forest floor and promoted the restoration of natural woodland grasses and wildflowers.





Native insects, like this great spangled fritillary, make use of the restored flowering plants, including ironweed and sweet black-eyed Susan. Credit: Lisa Musgrave

"We initially feared that [alien species](#) might be impossible to control over large areas," Packard said. "Instead, with regular controlled burns and reseeded of diverse species, most of the nonnative species dropped out by themselves. They couldn't compete against the natural richness that we had thought of as so fragile."

The researchers used several measures of ecosystem health to assess the quality of the restoration. Most reflected positive changes over time. One of the metrics, known as the cover-weighted Floristic Quality Index, was very responsive to changes in ecological health.

The restoration work began in 1983 but was halted from September 1996 to July 2003 as a result of political wrangling over management of the property. The FQI showed steady improvement in the health and biodiversity of the woods until the hiatus, when the property began to revert to its degraded state.

"The effects were immediate," Packard said. "Years of work on the site could be seen slipping back into nonnative species dominance, and diversity and native plant community health crashed rapidly."



The team burned the landscape roughly every two years. Credit: Stephen Packard

When the [restoration](#) work resumed in 2003, the recovery began again. Biodiversity and the conservation quality of the surviving flora increased, surpassing previous levels.

"Today, many people love to stroll through these restored woodlands, enchanted by their diversity and beauty," Packard said. "Because of what we've learned from this and similar experiments, much larger areas are now being restored more quickly and at less expense."

"The opportunity to walk around these woods give you a sense of what Illinois once looked and felt like," Spyreas said. "That, to me, is



priceless."

**More information:** Karen Glennemeier et al. Dramatic long-term restoration of an oak woodland due to multiple, sustained management treatments, *PLOS ONE* (2020). [DOI: 10.1371/journal.pone.0241061](https://doi.org/10.1371/journal.pone.0241061)

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