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Protecting small, old-growth forests fails to preserve bird diversity

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- A research team led by Jeffrey Brown, a doctoral student at Rutgers University in the U.S., used data spanning a 40-year time period to study bird populations in Mettler's Woods, a 64-acre old-growth forest within the Rutgers-owned William L. Hutcheson Memorial Forest in the state of New Jersey.
- Mettler's Woods is one of the last uncut stands of oak-hickory forest to be found in the United States. It would, on its surface, appear to provide ideal habitat for many bird species. But nine birds known to historically inhabit the forest no longer nest there, and many other species have lower populations than expected.

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Forest in the state of New Jersey. White oak trees in the Hutcheson Memorial Forest, which was permanently protected from development and recreation in 1955 and placed on the National Park Service Register of Natural Landmarks in 1976, have been alive for 235 years, on average. The old-growth forest is surrounded by more than 500 acres of young forest abandoned agricultural fields now being reclaimed by plants. Mettler's Woods is one of the last uncut

stands of oak-hickory forest to be found in the United States. It would, on its surface, appear to provide ideal habitat for many bird species. But nine birds known to historically inhabit the forest no longer nest there, and many other species have lower populations than expected. According to the study, which was published in the journal Biodiversity and Conservation this month, the missing species include the ovenbird (*Seiurus aurocapilla*) and the American redstart (*Setophaga ruticlla*), which were once common sights in the forest. “All of the evidence suggests that the forest has become less suitable habitat for several bird species over time, despite having protected status,” Julie Lockwood, a study co-author and professor in Rutgers’ Department of Ecology, Evolution, and Natural Resources, said in a statement. “In particular, migratory birds and those that nest on the ground were the most likely to be lost from the forest, while a few other groups such as woodpeckers have become more common.” The rose-breasted grosbeak (*Pheucticus ludovicianus*). Photo Credit: Matthew Sileo. These findings are crucial because we know almost nothing about how effective protected areas are at staving off species extinction in smaller temperate forests, Brown and co-authors write in the study. The importance of old-growth forests for bird diversity, especially in the tropics, is better understood, however. For instance, a 2018 study of bird communities in 49 forest fragments in the mountains of southern Costa Rica found that abundance and diversity of forest specialists and insectivores declined by half in small forest fragments, but only when there was little old-growth forest remaining. The authors of that study concluded that old, complex tropical forests support a wider diversity of birds than second-growth forests, writing: “To maintain tropical forest biodiversity, retaining old-growth forest within landscapes should be first priority.”

Nearly half of bird species extirpated

Jeff Swinebroad, a former Rutgers professor, led a research team that captured and banded birds every year between 1960 and 1967 in Mettler’s Woods (Swinebroad has since passed away). For the present study, Brown and team built on that initial dataset by performing similar banding annually from 2009 to 2015. This allowed them to examine how bird populations in the old-growth forest have fared over the past four decades. “We found that nearly half the species found in the forest at the time of initial protection are now extirpated, and that yearly forest species composition is highly dynamic,” Brown and co-authors write in the study. “Ground nesting and migratory species were more likely to be extirpated than were canopy breeders, cavity nesters, and year-round residents.” The authors note that previous research has shown that a dramatic increase in invasive plants in the old-growth forest has resulted in a more open forest floor compared to previous decades, when the forest floor was thick with vegetation. At

the same time, the population of white-tailed deer also grew, causing the plants beneath the forest canopy to be over-grazed. These factors likely led to less suitable habitat conditions for the ground-nesting and migratory birds that have largely disappeared. (A deer-proof fence was erected around the forest in 2015 in an attempt to prevent continued over-grazing.) To some extent, the authors add, these findings are consistent with broader regional population declines. “However, a substantial number of species declined in abundance within the forest while experiencing no regional declines, or even regional increases, in abundance,” they write. “Our results reinforce that even with protected status, small forest fragments may not provide the conservation benefits that protection is meant to provide.” Expanding the network of protected areas in forests around the world is one of the chief strategies being deployed to preserve the world’s biodviersity, but Brown and colleagues say that forests must be carefully monitored and managed in order to maintain their ecological integrity. “We argue that there must be a greater emphasis on monitoring and managing protected areas to achieve conservation goals,” Brown said. The indigo bunting (*Passerina cyanea*). Photo Credit: Matthew Sileo.

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