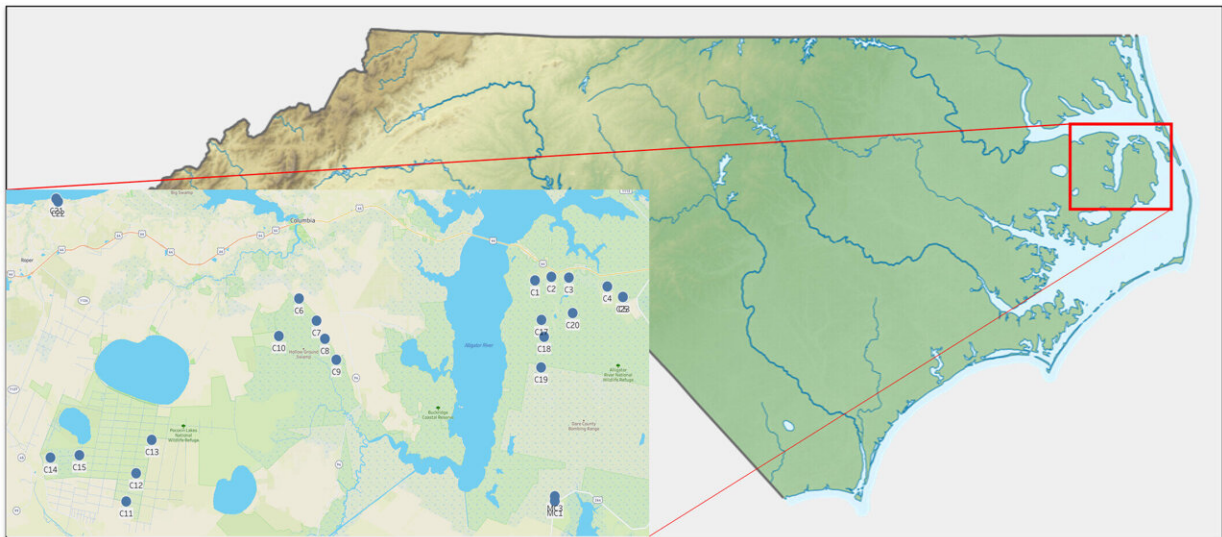


Can a lone wolf affect the environment? Red wolf researchers have surprising data

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Our red wolf study took place in eastern North Carolina, primarily within the Alligator River and Pocosin Lakes National Wildlife Refuges. The inset shows our 25 camera locations. Credit: *Animal Conservation* (2023). DOI: 10.1111/acv.12919

As Ron Sutherland guides his Subaru along the roads of Alligator River National Wildlife Refuge, he keeps his eyes peeled.

A pair of binoculars sits in the cupholder, ready just in case he notices a red smudge dotted against the browns and tans of the refuge's still-working farm fields, everything shaded by a golden sunrise.

"It's 44 degrees. I think a wolf could just be sitting out in the middle of a field chilling," said Sutherland, the chief scientist of the nonprofit Wildlands Network.

Days before, Sutherland and researchers from N.C. State University had published a paper observing a correlation between the red wolf's decline, which accelerated around 2015, and increases in many of the animals the wolves hunt. In the peer-reviewed journal [Animal Conservation](#), the scientists said that correlation suggests that even a small population of red wolves, like the one that persists at Alligator River and nearby Pocosin Lakes in northeastern North Carolina, can have a noticeable impact on the broader ecosystem.

"You kind of expect that they're having an impact on the other species in the area but I think our research really showed that, and it really showed that not having that [apex predator](#) in the ecosystem can have a lot of ecological consequences," said Alexa Murray, an author of the study who was a master's student at N.C. State University at the time.

What the cameras found

Using 25 camera traps, the researchers captured and counted images of various species from 2015 to 2021.

- From spring 2018 to spring 2021, as the wolf population declined, researchers found:
- Populations of deer, which red wolves hunt, remained relatively consistent, increasing slightly.
- Raccoon sightings increased, from about five per 100 days to nearly 20.
- Possum sightings grew significantly, going from about five to more than 30.
- Sightings of potential competition for food like bobcats and

black bears increased, slightly for bobcats and significantly for bears.

The study is careful to note that correlation does not equal causation and expresses "regret" that data does not exist from 1987 to 2012, when the red wolf population was expanding.

Roland Kays, the director of the N.C. Museum of Natural Science's Biodiversity Lab and an author on the study, was surprised by the results, notably the increase in both prey and competition species.

"That they all went up and that it all happened around the same time period was really striking," Kays said. "It really suggests that this isn't just some random factor that we happened to pick up on."

Concerns about reintroducing wolves

The study had its roots in 2013 and 2014, when there were still about 100 red wolves in northeastern North Carolina. Landowners were raising concerns that ranged from impacts on livestock to worries that the wolves would wipe out the local deer population.

Sutherland, from the Wildlands Network, thought it was important to capture whether wolves actually were degrading the surrounding ecosystem, particularly the white-tailed deer that are prized by hunters.

"We thought that was a testable hypothesis: Where the wolves were, would there still be other wildlife there or would the wolves have sort of cleaned everything out?" Sutherland said, adding that nobody had really tried to capture the ecological impacts of the red wolf as other researchers had done with the gray wolf in Yellowstone.

What Sutherland and the other researchers didn't know was that the

period they were capturing would coincide with a collapse of the region's red wolf population, with wolves dying from illegal gunshot injuries, vehicle strikes and, sometimes, natural causes.

Today, there are an estimated 20 to 22 red wolves in the wild, around the Alligator River National Wildlife Refuge with a handful in the nearby Pocosin Lakes National Wildlife Refuge.

A coalition of animal advocacy groups reached a settlement with the U.S. Fish and Wildlife Service last year in which the FWS agreed to release red wolves bred into captivity into the wild. That move is intended to bolster a wild population that had dwindled to as few as seven wolves in 2020.

Some skepticism of the study

That small population is part of why Mike Phillips, the director of the Turner Endangered Species Fund, expressed skepticism about the conclusiveness of the study's finding. From 1986 to 1994, Phillips worked as the Red Wolf Recovery Program's field coordinator in northeastern North Carolina before moving on to work on the gray wolf recovery in Yellowstone National Park.

The impacts of predators, Phillips said, are clearest when the predator is abundant and persistent. That's difficult in the case of the red wolf, which has been particularly sparse since its population peaked in 2012 and is constantly under threat.

"You've got a big study area in Eastern North Carolina, and you've got about 20 red wolves scattered here and there. I just don't know that these correlations mean much," Phillips, who was not involved in the study, said in an interview.

Doing the same work for about a decade in a period before wolves are reintroduced and then when the red wolf population was larger and more stable could help yield clearer results, Phillips said, pointing to similar research that has been conducted with gray wolf populations in Yellowstone.

One clear advantage both Phillips and Sutherland noted about working in Yellowstone is that it is one of the most studied areas of wildlife in the world, with the park created in 1872. By comparison, Alligator River and Pocosin Lakes became refuges in the 1980s and have been studied much, much less.

"Correlations are important. They can stir our imagination. I am absolutely convinced that predation is an important ecological force and if red wolves were common enough for a long enough period of time, I think they would have ecological effects that would be understandable," Phillips said.

Capturing what would happen to surrounding wildlife as the wolf population grows would be extremely valuable, agreed Murray, the paper's lead author.

"Hopefully they can keep the cameras out and then the population will start to increase again and we can have that data and compare it to what was going on when the population crashed," said Murray, who now works at the California Department of Fish and Wildlife.

Findings about deer and quail

Sutherland is hopeful that the study's findings can be used to dispel some concerns about the red wolf's return to the wild.

He pointed to deer, which were detected more than 12,000 times on the

team's cameras. Every camera detected deer at some point, including the ones where wolf sightings were the most common.

That makes sense, Sutherland said, because wolves depend on the deer to live and are more likely to kill what they can eat rather than wiping out the entire population.

"Rather than being cause for alarm, by returning this native carnivore species, the red wolf perhaps helps bring the ecosystem back into balance, but we certainly haven't caused any huge disruption to the system," Sutherland said.

He is also interested in continuing to research the wolf's impact, starting with a bird whose songs he and researchers often heard on early summer mornings when they were checking their cameras.

Bobwhite quail have seen significant declines over much of the country, including in most of North Carolina. But they are thriving in Alligator River and Pocosin Lakes, leading Sutherland to question whether the red wolf's presence and tendency to prey on raccoons could be protecting the bird.

The quails nest on the ground, often in farm fields like the long rectangles that are preserved at Alligator River. Raccoons and possums often eat the eggs that are tucked into those nests.

Sutherland is exploring whether there's a link between the seemingly strong quail population in Alligator River and red wolves hunting the quail's predators.

"There's no question that the habitat is pretty ideal for quail, but that hasn't always worked in other places where they've done habitat management but don't have this resident [population](#) of large wolves that

are out there patrolling 24/7 and making life difficult for raccoons," Sutherland said.

For his part, Phillips said he is "grateful" that the red wolf's listing under the Endangered Species Act isn't tied to the species' impact on the ecosystem around it.

Instead, Phillips said, "It demands that [red wolves](#) be recovered at some basic fundamental level because they have a right to exist because of their own value, independent of what their ecological value might be."

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