

# Flock together: Sparrows drift from favored spots after losing friends

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Losing long-lasting flockmates may drive a golden-crowned sparrow to stray from its favorite overwintering spot, a new study says, suggesting that friendly, familiar faces help anchor it to familiar spaces.

Led by ecologists at the University of Nebraska–Lincoln, the study found that a golden-crowned sparrow returning to California after a winter migration—one that can stretch as many as 3,000 miles—resettled an average of just 90 feet away from the center of its previous year's range.

But golden-crowned sparrows appearing for at least their third consecutive winter began to drift from their preferred locales when their closest flockmates failed to rejoin them down south—hinting that, even for sparrows, home is where the heart is.

"The fact that they come back to this winter site and then hang out with the same individuals—and it's important for them to be with the same individuals—is kind of a crazy thing that we're still wrapping our heads around," said lead author Annie Madsen, who earned her doctorate from Nebraska in May.

Madsen and her colleagues undertook the research hoping to untangle the knot of what she called a "chicken-and-egg question." Many animals, including the golden-crowned sparrow, share space with members of their species. In many cases, they also spend time around and interact with those neighbors. Golden-crowned sparrows, for instance, have adopted what are called fission-fusion networks, spending minutes or hours congregating in small groups before dispersing, only to later reassemble with different members of the larger flock.

The challenge for ecologists: figuring out how much animals are interacting with their own because they happen to value the same territory—especially one rich with food—versus sharing that space

because they value the [social bonds](#) and benefits of the friends they find there. Which ties, in other words, actually bind?

"Are they coming together because of a resource? Are they coming together because of social partnerships? And as they come together for resources, do they gain social partners? Or are they using social partners to find resources? It's a complex question," Madsen said, "that's really hard to get at.

"But we wanted to know if there was some kind of directionality here, if there was one of those forces that took precedence. Do they care about this one specific patch of bushes, which is a really nice patch that they come back to every year? Or is it their friends, their flockmates, that they're coming back to spend time with?"

As the overwintering site for thousands of golden-crowned sparrows fleeing the cold of Alaska and western Canada, an arboretum at the University of California, Santa Cruz seemed as fitting a place as any to investigate. From 2009 to 2019, the combination of multi-colored leg bands and diligent observation by scores of researchers and volunteers helped map both the [geographic distribution](#) and social networks of individual sparrows.

The more consecutive winters a golden-crowned sparrow spent in Santa Cruz, the less its average range shifted from the prior year, with the sparrow seeming to home in on and develop an affinity for a particular site. On its own, that finding might have pointed toward certain spots boasting certain features that were ultra-appealing to the species.

But that decade of data also allowed the team to identify the equivalent of each sparrow's closest friends, or the 10% of fellow golden-crowned sparrows it was most likely to be spotted with in a given year.

An average sparrow, Madsen and her colleagues discovered, was liable to lose about 52% of its favored flockmates across however many years it migrated to Santa Cruz. And in the years that its closest social contacts did fail to return, the shift in a sparrow's home range tended to reverse course, flitting not closer but instead farther from its prior center.

To Madsen and her colleagues, the finding suggests that a sparrow's loyalty lies not just with a locale, and the resources it might offer, but with the fine feathered friends it comes to expect will be there to greet it. When the latter wanes, a sparrow's ties to a specific location appear to wane, too.

That's all the more telling, Madsen said, given that resources are generally less scarce, and [real estate](#) less prized, when overwintering than when seeking mates and raising a handful of hatchlings in the summer.

"It's really interesting that they're coming back to such specific sites on their wintering grounds, where it doesn't seem like it wouldn't matter that much—especially since, at an arboretum, they have pretty cushy lives," said Madsen, now a postdoctoral researcher at the University of California, San Diego. "There are nice bushes everywhere. My collaborators lay out millet seed piles so that they can study dominance behavior, so there's food everywhere. And yet (the sparrows) are still coming back to these really specific places within the arboretum.

"Whether it's more this social cohesion—individuals staying together because they prefer to be together—or maybe partially that they're trying to avoid dominance interactions with other individuals, it does seem like there's something there. There's something to having familiar flockmates that is important."

There was more. The team discovered a quantitative quirk that bolstered the case for the magnetism of friendship: The loss of flockmates didn't

seem to much affect the home ranges of golden-crowned sparrows that were returning for only their second winter in Santa Cruz. Though it's not definitive, Madsen said the discovery could indicate that second-year sparrows hadn't developed as many close contacts, or as tight-knit of bonds, as sparrows that had been coming back to California for at least several consecutive winters.

"Some of these relationships are being built up over multiple years," Madsen said. "And as one [sparrow](#) is returning again and again, not only are they maintaining friendships with all of the flockmates that do return, they also make new friendships. They gain new flockmates from new immigrants, from first-year birds that are coming into the population. So they're building lots of social capital."

The paper is published in the journal *Proceedings of the National Academy of Sciences*.

**More information:** Anastasia E. Madsen et al, Loss of flockmates weakens winter site fidelity in golden-crowned sparrows ( *Zonotrichia atricapilla* ), *Proceedings of the National Academy of Sciences* (2023). [DOI: 10.1073/pnas.2219939120](https://doi.org/10.1073/pnas.2219939120)

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