

Citizen science birding data passes scientific muster

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A Yellow-headed blackbird in the Bear River Migratory Bird Refuge, Utah.
Credit: JJ Horns.

As long as there have been birdwatchers, there have been lists. Birders keep detailed records of the species they've seen and compare these lists with each other as evidence of their accomplishments. Now those lists, submitted and aggregated to birding site [eBird](#), can help scientists track

bird populations and identify conservation issues before it's too late.

Joshua Horns is an eBird user himself and a doctoral candidate in biology at the University of Utah. In a paper published today in *Biological Conservation*, Horns and colleagues report that eBird observations match trends in bird [species](#) populations measured by U.S. government surveys to within 0.4 percent.

Many nations don't conduct official bird surveys, Horns says. "In a lot of tropical nations that's especially worrisome because that's where most birds live." But he's now shown that eBird data may be able to fill that gap.

How eBird works

For birders, eBird is a way to add their observations to a worldwide community and to contribute data to a vast and growing database of which birds have been seen where, and when.

Birders at the University of Utah (notably Kenny Frisch, an assistant horticulturalist who has logged 116 of the 120 known species on campus: see sidebar below) have made the university a local hotspot. And eBird has a system in place to ensure that the data submitted reflects reality. Fact-checkers, including Frisch, are contacted by eBird to follow up on unusual sightings. Ornithologist Çagan Sekercioglu (currently the [fifth-ranked eBirder in the world](#) with 7,273 species observed) says he has been flagged for fact-checking when he identifies species never before seen in an area, and uses his photographs to verify his sightings.



JJ Horns birding in the San Rafael Swell, Utah. Credit: JJ Horns.

How many lists?

Horns' question was whether eBird data could serve as a reliable measure of [bird populations](#). In the United States, he had the luxury of being able to compare birders' lists to the Breeding Bird Survey, conducted annually by the U.S. Geological Survey throughout the United States and Canada. But in South America, the Caribbean and tropical Africa, along with other bird hotspots, government data is absent. eBird users, however, are present all around the world.

Horns compared more than 11 million eBird lists to government data between 1997 and 2016. To account for the range in birder skill represented in the eBird lists, Horns used the length of the birders' lists

as a proxy for their expertise and experience. "Some studies have shown that as you bird for a longer stretch of time you do record more species, but as you bird for more and more years, the number of species you see on any outing increases as well," Horns says.

With additional statistical controls to ensure a good comparison between the eBird and official data, Horns set out to see how many lists were required to accurately track a species' population. The cutoff, he found, was just about 10,000 lists. So, if you have above that number of lists for a country or region, the results suggest, you can be confident that population species trends observed in the lists are a reflection of reality.



Students in an ornithology class birding on the Jordan River Parkway, Utah.
Credit: JJ Horns.

But what about areas that don't have that many lists? Horns says that lists from bird atlases and ecotourism groups can also be used, again with list length as a proxy for birder skill. Sekercioglu is doing his part, having submitted eBird lists following recent trips to Bolivia, New Guinea and Madagascar.

The eBird data is more accurate for common birds, Horns says, simply because they're observed so often. "White-crowned pigeons live only in the Florida Keys," Horns says, "so unless you live in the Florida Keys, you're not going to be seeing them." Also, more lists are submitted for areas closer to cities. "You're not going to have many people out in Utah's West Desert looking for birds but there will be a lot in Farmington Bay, near the Great Salt Lake," Horns says.

But even common birds can be vulnerable. Horns' analysis of eBird data shows significant declines for 48 percent of 574 North American bird species over the past 20 years. Large numbers of a common bird species could be lost before the general public notices, Horns says. "It's those declines in common species that could really drive down functioning of an ecosystem versus declines in rarer species."

Horns' results show the value of citizen science observations by amateurs, although the practice of birdwatching long predates the term "citizen science." Each time birders head out, tripods and binoculars in hand, they are serving as another set of scientific eyes to help bird conservation efforts.

"We hope this analysis can be taken a step further," Horns says, "We can

use it to start monitoring these birds and pick up on [birds](#) that may be declining before they decline so much that it's hard to bring them back."

More information: Joshua J. Horns et al. Using opportunistic citizen science data to estimate avian population trends, *Biological Conservation* (2018). [DOI: 10.1016/j.biocon.2018.02.027](https://doi.org/10.1016/j.biocon.2018.02.027)

Provided by University of Utah

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