

Galápagos faces first-ever bird extinction

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The California Academy of Sciences houses the largest collection of Galápagos bird specimens in the world. A drawer is seen here with specimens from various species and subspecies of Vermilion Flycatchers. Credit: Jack Dumbacher and the California Academy of Sciences

Scientists have discovered a new species of colorful songbird in the Galápagos Islands, with one catch: it's extinct. Researchers from the

California Academy of Sciences, San Francisco State University (SFSU), the University of New Mexico (UNM), and the San Francisco Bay Bird Observatory (SFBBO) used molecular data from samples of museum specimens to determine that two subspecies of Vermilion Flycatchers, both found only in the Galápagos, should be elevated from subspecies to full species status. One of these newly recognized species—the characteristically smaller San Cristóbal Island Vermilion Flycatcher—hasn't been seen since 1987 and is considered to be the first modern extinction of a Galápagos bird species. The findings were published online earlier this May in the journal *Molecular Phylogenetics and Evolution*.

"A species of bird that may be extinct in the Galápagos is a big deal," says Jack Dumbacher, co-author and Academy curator of ornithology and mammalogy. "This marks an important landmark for conservation in the Galápagos, and a call to arms to understand why these birds have declined."

The study examined the complex evolutionary history of Vermilion Flycatchers by using advanced genetic techniques. In the absence of living tissue, the team turned to the California Academy of Sciences, which houses the largest collection of Galápagos bird specimens in the world. Specimens collected and preserved over 100 years ago allowed the team to carry out DNA sequencing and piece together an evolutionary history of the species.

Vermilion Flycatchers exhibit a complex evolutionary history having branched from an ancestral population into twelve recognized subspecies with ranges that span across the Americas and the Galápagos Islands. This study compares their [evolutionary history](#) against the way scientific authorities currently classify the species (and subspecies) to look for any inconsistencies.



Adult male Galápagos Vermilion Flycatcher on Isabela Island, Galápagos
[NOTE]: This species of Vermilion Flycatcher is not extinct, unlike its close relative, the San Cristóbal Island Vermilion Flycatcher. Credit: Alvaro Jaramillo

"Access to museum collections such as the Academy's for pursuing these types of studies is invaluable," says Christopher Witt, study co-author and associate professor of biology at the University of New Mexico. "Preserved specimens can provide the crucial links needed to better understand how life on Earth evolved."

Two subspecies of the Vermilion Flycatcher, both found only in the Galápagos, were determined to be so genetically distinct that the team elevated them to full species status: *Pyrocephalus nanus* (throughout

most of the Galápagos) and *Pyrocephalus dubius* (only on the island of San Cristóbal). The latter—significantly smaller and subtly different in color from the other species—is commonly known as the San Cristóbal Vermilion Flycatcher and hasn't been seen since 1987.

"Wouldn't it be great if the San Cristóbal Vermilion Flycatcher weren't extinct? No one is looking, I'm pretty sure of that," says Alvaro Jaramillo, study co-author and biologist at the San Francisco Bay Bird Observatory. Searches for the San Cristóbal Vermilion Flycatcher have turned up no evidence so far of its existence on the easternmost island of the archipelago, the only place on Earth it is known to have existed. But Jaramillo claims we shouldn't be so quick to give up on future sightings. "At the very least, this discovery should motivate people to survey and see if there are any remaining individuals of the species hanging on that we don't know about."



Young male Galápagos Vermilion Flycatcher on Isabela Island, Galápagos.
[NOTE]: This species of Vermilion Flycatcher is not extinct, unlike its close relative, the San Cristóbal Island Vermilion Flycatcher. Credit: Jack Dumbacher and the California Academy of Sciences

What exactly drove the San Cristóbal Vermilion Flycatcher to extinction remains unknown, but two invasive threats to the archipelago likely played a part: rats and parasitic flies (*Philornis downsi*). Rats often climb into nests to eat bird eggs, while the parasitic fly can kill growing chicks. These invasive species are severely impacting the remaining populations of Vermilion Flycatchers in the Galápagos, with some islands no longer hosting populations that once thrived there.

The Galápagos have been renowned for their species diversity since Charles Darwin—an honorary Academy member inducted in 1872—described the islands' biodiversity in vivid detail through his writings. Despite the lasting connection between Darwin's landmark work on evolutionary biology and the iconic islands, conserving Galápagos biodiversity remains a challenge.

"Sadly, we appear to have lost the San Cristóbal Vermilion Flycatcher," says Dumbacher, "but we hope that one positive outcome of this research is that we can redouble our efforts to understand its decline and highlight the plight of the remaining [species](#) before they follow the same fate."

More information: Ore Carmi et al, Phylogeography of the Vermilion Flycatcher species complex: Multiple speciation events, shifts in migratory behavior, and an apparent extinction of a Galápagos-endemic

bird species, *Molecular Phylogenetics and Evolution* (2016). [DOI: 10.1016/j.ympev.2016.05.029](https://doi.org/10.1016/j.ympev.2016.05.029)

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