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Where are all the birds?

Startling new figures on rate of extinctions say 12% of species to be in peril by 2100

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The world's birds are disappearing in greater numbers than previously calculated, and the number of extinctions will grow even more dramatically by the end of the century, according to a grim study published today in the journal *Proceedings of the National Academy of Sciences*.

The study, the most thorough analysis of global bird species, says 12 percent of existing species -- about 1,250 -- are threatened with extinction by 2100.

Up until now, scientists had documented the extinction of about 130 bird species since the year 1500. But the study's authors -- from Stanford University, Duke University and the Missouri Botanical Garden in St. Louis -- say the more accurate estimate is about 500 extinctions out of more than 10,000 known bird species. That would be about one extinction per year over the last 500 years.

And that rate is 100 times higher than what was considered natural before human influence, the study said.

Over time, humans have cleared land for agriculture and other uses. They've hunted birds for food and sport. And they introduced other dangers, such as non-native birds, rats, snakes and diseases. Predictions of increased extinctions over the next century are based on these continuing threats as well as anticipated habitat loss linked to global warming.

Scientists say the decline of both the diversity and abundance of birds portends problems for the planet. Birds play a part in seed dispersal, plant pollination and insect control.

Critically endangered birds -- including the California condor and about 12 Hawaiian species -- are seen as most at risk of extinction.

The new study's extinction calculations include previously unknown bird species only discovered as fossilized remains as well as bird species missing for scores of years but never officially declared extinct. It also takes into account species wiped out by humans before modern scientific description began in the mid-1700s.

Local species may have disappeared without a trace, and the more fragile small bird species "may easily have gone extinct without leaving a record," the study says.

"The extinctions all have to do with people in one way or another," said Peter Raven, president of

the Missouri Botanical Garden, one of the world's three major botanical gardens. Raven began studying plant and animal extinctions 40 years ago at Stanford University.

The predominant threat to species now is habitat destruction, the study said. Brazil, where habitat loss has been severe, has 89 species at risk of extinction, including 13 species identified since 1980, according to BirdLife International, a British nonprofit registry of bird species.

Many scientists, including Harvard University entomologist E.O. Wilson, believe that Earth is in the middle of a mass extinction comparable to the one 65 million years ago that wiped out two-thirds of land species, including the dinosaurs.

"That's about the magnitude of what we expect to see during the 21st century," Raven said.

Since 1975, there have been 20 extinctions of wild species, six of which involve species that now survive only in captivity.

Conservation efforts have spared an additional 25 species from extinction, the study said.

In a separate study scheduled for publication, Stuart Butchart, global species program coordinator for BirdLife International, and colleague Alison Stattersfield also credit modern conservation efforts for saving two dozen bird species.

The Butchart group released a paper last month that also increased former extinction numbers. It also added that many missing species, such as the hooded seedeater of central Brazil, haven't been seen since the 1800s but haven't been declared extinct by the IUCN, also called the World Conservation Union.

At the California Academy of Sciences, the curator of birds and mammals, Jack Dumbacher, said the new extinction estimates are disturbing.

"Birds are an important component of our ecosystem. They keep mice and rats in control and eat insects that attack crops. They are food for other organisms and create habitat for other organisms. They disperse seeds and pollen. There are cases on islands when birds go extinct that the trees also go extinct," Dumbacher said.

He spoke of birds' tremendous economic value, not only as protectors of crops but also as sources of meat, eggs and fiber. Bird watching is a multimillion dollar industry of tours, magazines, books and nature-based travel.

"That's the way a lot of people learn about wildlife," he said.

In addition to Raven, authors of the new study include Stuart Pimm, Duke University professor of conservation ecology; and Paul Ehrlich, president of the Center for Conservation Biology and Bing

Professor of Population Studies at Stanford University.

Gone since 1500

About 500 of the planet's bird species have become extinct since about 1500, according to a study published today. That includes many species of birds from what is now the United States. Here are some of the country's now-extinct birds and where they once lived:

Passenger pigeon, east of the Great Plains; last captive bird died in 1914 in the Cincinnati Zoo

Carolina parakeet, Eastern United States; last captive bird died in 1918 at the Cincinnati Zoo

Santa Barbara song sparrow, Santa Barbara Island; last observed in 1967

Labrador duck, Northeastern United States; last specimen collected in 1875

Black mamo, Hawaii; last specimen collected 1907

Source: World Conservation Union

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