

Wild birds

A trip to the market
reveals species imperiled



THE SIGHT OF A SOUTHEAST ASIAN BIRD market rivals the din of one for being overwhelming. Thousands of wild-caught birds are packed into cages that hang from eaves and fill market stalls to the ceiling, lining the paths trod by prospective buyers like a living wall. Taken from fields and forests, these birds are prized for their song, their colors, their spiritual significance or their long-time association with status and wealth. For the people who come to these markets, the birds — young and old, endangered and common — have meaning and value.

But to scientists, conservationists and governments, the wild-pet trade is a destructive yet unmonitored and elusive force on wildlife populations.

Princeton University researchers went deep into the wild-bird markets and trapping operations on the Indonesian island of Sumatra

to document the draining of species by the pet trade. They found there a new and interesting weapon in the struggle to gauge — and halt — the devastation of the wildlife trade on animal populations: the very markets where the animals are bought and sold.

Species that are disappearing as a result of the pet trade can be identified by changes in their market prices and trade volumes, a study led by the Princeton researchers found. The researchers studied open-air pet markets on Sumatra from 1987 to 2013 and found that bird species that increased in price but decreased in availability exhibited plummeting populations in the wild.

The researchers concluded in the journal *Biological Conservation* in July 2015 that a prolonged rise in price coupled with a slide in availability could indicate that a species is being wiped out by its popularity in the pet trade.

Through regular pet-market monitoring, conservationists and governments could use this information as an early indicator that a particular species is in trouble, the researchers reported.

Lead author Bert Harris, who was a postdoctoral fellow in the Program in Science, Technology and Environmental Policy in Princeton's Woodrow Wilson School of Public and International Affairs when the work was conducted, said that market monitoring can be done far more quickly and cheaply than field-based monitoring of wild populations.

One important function of the study is to highlight the pet trade as an emerging threat facing many birds and other wildlife, one that can act independently from other drivers of extinction such as habitat loss, said senior author David Wilcove, a professor of ecology and evolutionary biology and public affairs in the Wilson School.

He and Harris worked with co-authors Jonathan Green, who was a Princeton postdoctoral researcher in the Wilson School and is now at the University of Cambridge; Xingli Giam, who earned his Ph.D. at Princeton in 2014 and is now at the University of Washington; and researchers from the Wildlife Conservation Society and the Indonesian Institute of Sciences.

"Wild birds are being vacuumed out of the forests, gardens and fields of Indonesia and we have to quickly figure out which species are in danger of extinction," Wilcove said. "We've got to change how we tackle this problem."

Carter Roberts, president and CEO of the World Wildlife Fund, said that the researchers' use of wildlife-trade market data to identify endangered species is a "potentially breakthrough idea."

"What I think makes this paper so exciting is that it suggests a two-pronged approach to addressing the threat to biodiversity posed by the wildlife trade: using market data to identify the species that are likely being severely over-exploited, and then targeted research and conservation efforts at those species," Roberts said.

The researchers found that 14 birds popular in Sumatran pet markets were identified by local experts as declining or severely declining — yet, only two are officially recognized as imperiled. In addition, only two species are restricted to old growth forests, meaning that deforestation alone could not explain the declines. The pet trade was clearly a culprit, too. Furthermore, the researchers found that six species that are not popular as pets exhibited population increases. The researchers confirmed their method by studying the cases of two birds that are critically endangered by the pet trade — the yellow-crested cockatoo and the Bali myna.

Existing studies have explored wildlife markets, but only documented a species' market volume, or availability, Harris said.

The Princeton-led study, which was supported by the High Meadows Foundation, is the first to consider price and market volume. Market availability alone can fluctuate for reasons unrelated to a species' wild population, such as a decrease in popularity, he said.

During the course of the research, Harris visited bird markets to gather price and availability data. They are chaotic places where Westerners asking about prices are viewed with suspicion.

"The markets are the dirty part of conservation," Harris said. "They're noisy and smelly. And after someone who looks like me asks about prices two or three weeks in a row, sellers just stop responding."

Wilcove was inspired to conduct the current research after a trip to Sumatra when he noticed a prevalence of wild-caught pet birds. Research has found that 22 percent of Indonesian households own birds.

One bird the researchers identified as declining in the wild, the white-rumped shama, which is prized for its song, can be raised in captivity. Yet people seem to prefer the wild individuals, Wilcove said. He and Harris want to explore how governments and conservation groups can convince people to keep captive-raised birds.

"It's time for some new approaches," Wilcove said. **—By Morgan Kelly**

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Birds such as the Oriental white-eye (above and opposite page) are packed into tight cages where they are at risk of disease. Many Asian and African countries host a startling number of species yet have lax-to-nonexistent monitoring and conservation programs. The Princeton researchers' market-monitoring method can be done far more quickly and cheaply than field-based monitoring of wild populations.