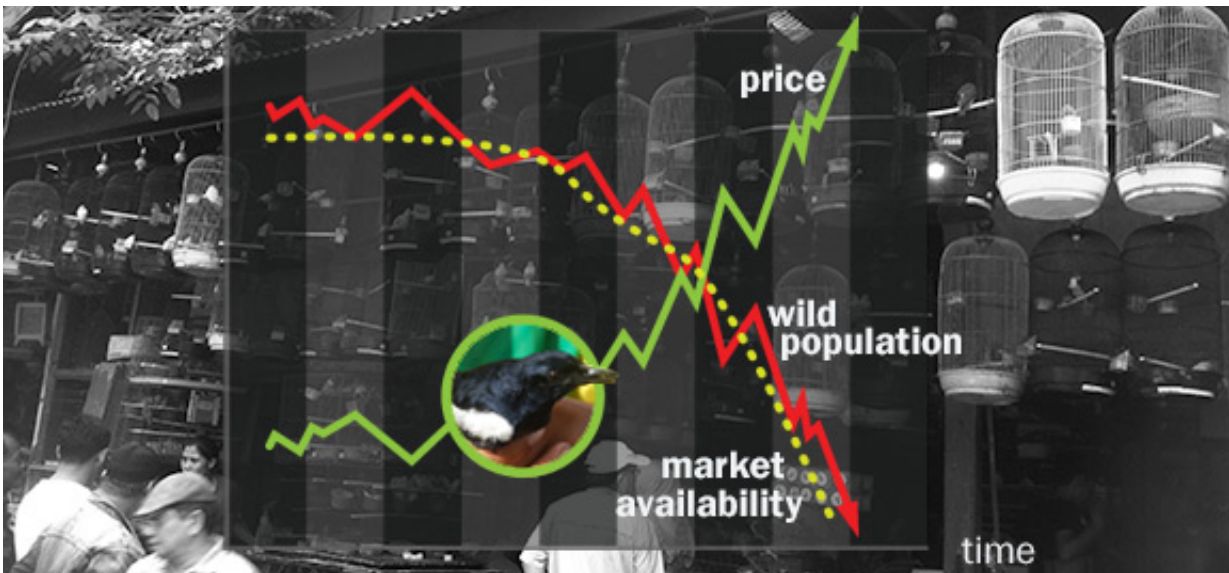


Identifying species imperiled by the wildlife trade may require a trip to the market

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Princeton University-led research found that species that are disappearing as a result of the pet trade can be identified by changes in their market prices and trade volumes -- increasing prices and decreasing availability could mean that wild populations are plummeting. Regular pet-market monitoring could help indicate when a particular species is in trouble so that measures could be taken to monitor and protect its wild population. The Princeton study is the first to consider price as well as market volume in determining if a species is imperiled by the pet trade. Credit: Matilda Luk, Office of Communications

Scientists, conservationists and governments could have a new weapon in their struggle to gauge—and halt—the devastation of the wildlife trade

on populations of prized animals: 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 [researchers](#) at Princeton University found. The researchers studied open-air pet markets on the Indonesian island of Sumatra and found that bird [species](#) that increased in price but decreased in availability exhibited plummeting populations in the wild. The researchers examined bird-market data from 1987 to 2013, and surveyed local ornithologists and expert birdwatchers to confirm that wild populations of the species most prized as pets declined as their price went up and market availability decreased.

The researchers conclude in the journal *Biological Conservation* 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 report. At that point, more sophisticated measures could be taken to monitor and protect that species' wild population.

Lead author J. Berton C. Harris, a postdoctoral fellow in the Program in Science, Technology and Environmental Policy in Princeton's Woodrow Wilson School of Public and International Affairs, said that the researchers' market-based tool would be most effective in countries that host a startling number of species and have big markets for pets, yet have lax-to-nonexistent monitoring and conservation programs.

Market monitoring can be done far more quickly and cheaply than field-based monitoring of wild populations, especially in developing tropical countries where fieldwork requires special expertise and can be difficult

to conduct, Harris said.

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.

Many developing countries—especially in Asia where pet birds are important status and religious symbols—also host thriving pet markets filled with wild-caught animals that have local, national and international reach, Wilcove said. Asia in general is a global hotspot for wildlife markets, he said.

The researchers' method offers a means to more immediately understand how the [wildlife trade](#) is affecting targeted species, Wilcove said. 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, a past doctoral student in ecology and evolutionary biology who 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—just periodically monitoring species in the wild won't tell us what we need to know. If we wait 25 or 50 years until we have comprehensive surveys of birds in the wild it will be too late for a lot of these species," he said. "Birds in a way are just the tip of the iceberg. We have no reason to believe that some variant of our method wouldn't work for most species in markets around

the world."



Many developing countries -- especially in Asia -- host thriving pet markets such as this bird market on the Indonesian island of Sumatra (left) filled with wild-caught animals. Birds such as the Oriental white-eye (right) 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. Credit: Tomas Busina, Indonesia Species Conservation Program, and David Wilcove, Department of Ecology and Evolutionary Biology

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 overexploited, and then targeted research and

conservation efforts at those species," Roberts said. "This could really help the conservation community focus on the species most urgently in need of protection from animal traffickers."

A lack of information is a chronic problem in protecting animals targeted by wildlife traders, Roberts said, noting that the Princeton researchers found species that are in decline despite those species not being recognized as such. Their work emphasizes the severe impact of trade on animal species, as well as the difficulty of gauging that effect. For instance, the researchers worked with expert birdwatchers, but other types of animals such as turtles and fish do not benefit from the same robust network of observers and enthusiasts, Roberts said.

"The broader issue is that the wildlife trade—beyond just the pet trade—affects thousands and thousands of species, yet for only a handful of species do we have enough information to assess what it is doing to their populations. For the vast majority of species, we really don't know what impact the wildlife trade is having," Roberts said.

The wildlife trade can be a silent killer of sorts. The researchers found that species decimated by trade are not necessarily considered endangered. Nor does the wildlife trade leave cleared forests or other obvious signs of destruction in its wake as activities such as mining or illegal logging often do.

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 and three as declining, the researchers found. In addition, only two species are restricted to old-growth forests, meaning that deforestation is largely not a factor for these birds. Furthermore, the researchers found that six species that are not popular as pets exhibited population increases, meaning that birds they studied are not dying off en masse from causes unrelated to

trapping for the pet trade.

The Princeton researchers further tested 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. Wild population censuses of both species conducted over many years enabled the researchers to study market patterns as the species cascaded toward extinction. Price and market volume increased in tandem as the species became popular and the wild populations began to decline. As demand continued to increase, the price went up even further, but the animals' availability dropped along with the wild population.

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

Monitoring bird and wildlife markets would require collaboration with local experts and conservationists, Harris 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. He ventured into the field with trappers, who range from villagers capturing personal pets to professionals who trap hundreds of birds at a time—but collectively they efficiently drain the species they seek.

"Anyplace we could get to, the trappers had preceded us and taken out at least the most valuable birds," Harris said. "The markets are the dirty part of conservation. 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.

"These are a part of the reason that pet markets aren't recognized as a problem—it's hard and unpleasant to get data," Harris continued.

"People want to do fieldwork in the forest and not deal with this problem."

Wilcove and Harris plan to build on this work by exploring the affinity people have for wild-caught birds over captive-bred birds, particularly in Asia. 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.

"The conservation community has not been able to tackle this issue with the urgency it deserves beyond elephants, rhinoceroses and a handful of charismatic species," he said. "They have to be able to use methods like market-monitoring to identify the species that are getting hammered by the animal trade so that they know how to direct limited resources."

More information: The paper, "Using market data and expert opinion to identify overexploited species in the wild bird trade," was published online in-advance-of-print in May by *Biological Conservation*.

Provided by Princeton University

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