

New study analyzes why endangered parrot population isn't recovering

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A pair of Puerto Rican parrots at their nest on the island's Luquillo National Forest. Fewer than 45 birds remain in the wild, making this one of the world's most endangered species. (Courtesy U.S. Fish and Wildlife Service)

The population of wild Puerto Rican parrots, among the most endangered birds in the world, has languished for decades, with several dozen remaining birds unable to break through the bottleneck that prevents their numbers from growing.

A new study by an international team led by a biologist at the University

of California, Berkeley, sheds light on the factors influencing the stalled growth of this parrot's population and, in turn, provides an analytical tool that could help pinpoint the biggest factors hindering the recovery of other endangered species.

"This is the first time a framework has been developed to integrate simultaneously the multiple factors impacting the decline of a species," said Steven Beissinger, professor of conservation biology at UC Berkeley's Department of Environmental Science, Policy & Management and lead author of the paper. "The Puerto Rican parrot's wild population has only increased, on average, by about one bird a year, and it can't seem to get out of that funk."

The research, published in the May issue of the journal *Ecological Monographs*, not only highlights the various challenges to the parrot's recovery, but identifies the factors hindering population growth.

Despite intense conservation efforts over the past three decades, the Puerto Rican parrot's population, which once flourished throughout the island, has languished at 30 to 40 individuals in the wild, with one year seeing a low of only 13 birds.

The parrot today can only be found in Puerto Rico's El Yunque National Forest on the northeast part of the island. The wild Puerto Rican parrot population is often supplemented by birds released from captive breeding programs, which house another 150 or so parrots.

The parrot's population began its dramatic descent towards the end of the 19th century as extensive deforestation destroyed much of its habitat. Additional stresses have come from poachers smuggling the birds out of Puerto Rico for the pet trade, competition for nesting sites with other birds and, significantly, hurricanes. The researchers also considered whether the low population numbers have been affected by inbreeding,

which reduces the genetic health of the population.

"Our tool helps diagnose why the population has grown so slowly by combining different kinds of analyses and population models in an integrated framework, and sorting out which factors have the greatest impact," said Beissinger.

"Such information could help prioritize conservation and research efforts in the El Yunque National Forest," said study co-author Joseph Wunderle Jr., research scientist at the U.S. Forest Service's International Institute of Tropical Forestry.

The model integrated 30 years of data on the Puerto Rican parrot, which was listed as an endangered species in 1967.

After testing the range of hypothesized factors impacting the Puerto Rican bird's struggle to increase its population growth rate, the researchers found that hurricanes play the largest role in hindering the parrot's recovery. In 1989, for example, Hurricane Hugo cut the population of Puerto Rican parrots down from 47 to 22 birds.

"Since hurricanes are relatively infrequent occurrences, it was surprising how important they were. These events are having a long-term impact, the frequency of hurricanes is expected to increase with global warming," said Beissinger.

The Puerto Rican Department of Natural and Environmental Resources is trying to establish a second population of wild Puerto Rican parrots elsewhere on the island. "This will help act as an insurance measure against further environmental disasters," said Beissinger. "But without understanding why the existing wild population has grown so slowly, the new population may get stuck in the same bottleneck."

The study found that after hurricanes, the next largest factor in the parrot population's bottleneck is the failure of mature adult birds to mate and breed. "More research is needed to understand this 'social dysfunction' that is causing individuals of breeding age to hold back from finding a mate and nesting," said Wunderle.

Lower priority factors, according to the study, include the availability of nesting sites and the failure of eggs to hatch once laid.

"People have assumed that predation on adults was a key factor in the parrot's decline, but we didn't find as much support for that in our study," said Wunderle.

"The factors that are most important in keeping the parrot numbers in a bottleneck can change from one year, or even one decade, to the next," added Beissinger.

Beissinger noted that in the 1980s, low rates of hatching success were a major factor in the population bottleneck and, prior to that, nest predation was important. Concerted efforts by the U.S. Fish and Wildlife Service to guard parrot nests have since alleviated some of that pressure.

"The approach we developed has real generality," Beissinger pointed out. "For example, it could be used to analyze the current salmon crash in California, which is blamed on water diversion, global warming, habitat destruction and myriad other factors. If we want to be efficient in our efforts at species recovery, it is important to know what factors to target in order to have the biggest impact."

Other authors of the paper are J. Michael Meyers, research wildlife biologist for the U.S. Geological Survey at the University of Georgia's Warnell School of Forest and Natural Resources; and Bernt-Erik Saether

and Steinar Engen, both professors at the Norwegian University of Science and Technology.

Source: UC Berkley

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