UC SANTA BARBARA

THE Current

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INCREASING BIODIVERSITY IS NOT ALWAYS BEST

Biodiversity worldwide may be decreasing, but at smaller scales it is increasing or at least changing in composition, suggesting the need for a dramatic shift in the current focus of ecological research. These changes may undermine the functioning of local ecosystems, according to an article in December's American Naturalist.

The authors - Dov F. Sax, assistant research scientist at the University of California, Santa Barbara; Steven D. Gaines, director of the Marine Science Institute and acting vice chancellor for research at UCSB; and James H. Brown, professor of biology at the University of New Mexico - studied data collected on oceanic island land birds and plants. Records from islands are useful because they present discrete areas where additions and subtractions of species can be accurately determined.

The article, "Species Invasions Exceed extinctions on Islands Worldwide: A Comparative Study of Plants and Birds," documents the fact that "land birds have experienced massive extinctions on oceanic islands, with many islands losing more than half of their native species," said Gaines. "On these same islands, however, many exotic bird species have become established, such that the total number of land bird species has remained relatively unchanged." (Exotic species are those that are native to one region and have been introduced to another; they can reduce diversity by causing extinctions of native species. However, they also increase diversity by adding to the total number of species in a region.)

Lead author Sax said, "We may be headed for a sort of biotic homogenization, with the same species everywhere. Lose a parrot, get a starling; no one wants that."

Gaines said that while few native plant species have gone extinct, vast numbers of exotic species have become established, according to the island data. As a result, the number of plant species has increased greatly - approximately doubling the total number of species on islands.

Sax pointed to New Zealand, where about 2,000 species existed in the wild with fewer than 10 going extinct. An additional 2,000 species have been introduced. "This is a massive change in the flora of the islands," said Sax.

"This constancy or increase in diversity on islands, however, does not imply that these changes are good," said Gaines. "To the contrary, they indicate a massive and underappreciated change to native systems that could have severe implications for ecosystem functioning, patterns of local diversity, and future losses of native species."

"Ecosystems serve to clean the water and the air," said Sax. "It's important to study how exotic and local increases in diversity affect ecosystem services."

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