Predicting extinction risk to birds with a model

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(PhysOrg.com) -- Yale University researchers have developed a tool for biodiversity conservation in the face of global change: a statistical model that helps predict the risk of extinction for almost 90% of the world's bird species.

"Our global study confirms and extends existing knowledge about what makes some species more threatened than others," says Walter Jetz, professor of ecology and evolutionary biology and co-author of the research published online October 13 in the *Proceedings of the Royal Society B*.

Several factors such as large body size, specialized lifestyle, slow reproduction and a narrow geographic distribution all increase threats to survival. So does human encroachment. However, it has not been shown before how these factors interact with each other to threaten species' survival.

Using vast amounts of ecological and environmental data, species range maps and even satellite imagery, the researchers developed a model that disentangles the more "static" causes of extinction risk such as body size from human-induced environmental change such as expansion of agricultural lands.

"With the help of satellite images, we can now readily capture regions where humans have had a particularly devastating effect on the landscape," says Jetz.

For instance, the Barred Eagle Owl (*Bubo sumatranus*) a mid-size bird native to tropical southeast Asia, is relatively rare throughout its range and suffers from heavy encroachment by humans. However, because its geographic range is large, the species is not globally threatened with extinction. This contrasts with the case of the Horned Guan (*Oreophasis derbianus*), a larger bird restricted to the Guatemalan and Mexican cloud forests. It suffers similar encroachment, but because its distribution is narrow, it is highly threatened with extinction.

Building on the species Red List or threat assessments provided by the International Union for Conservation of Nature (IUCN), Jetz and co-author Tien Ming Lee, a visiting researcher from University of California, San Diego, have identified key factors that put species at risk. The model, the most comprehensive integration of this sort to date, illustrates how the characteristics of species and variations in their habitats combine to make them more or less vulnerable to extinction.

More importantly, the model opens the door for a more dynamic assessment of threat through real-time monitoring of risk such as land-cover change, the authors say.

“By measuring the relative importance of human encroachment on species threat level, we now have a model that can used for predicting extinction risk in the face of ongoing as well as future change,” Lee says.

“We thus offer an approach for integrating and separating the different risk components that may help us estimate, and hopefully minimize, future extinction risk of biodiversity,” Lee said.

Provided by Yale University