Camera traps reveal that tropical forest protected areas can protect biodiversity

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Biodiversity in tropical forest protected areas may be faring better than previously thought, according to a study publishing in the Open Access journal *PLOS Biology* on January 19th. The study, "Standardized Assessment of Biodiversity Trends in Tropical Forest Protected Areas: The End is Not in Sight," was based on data gathered by researchers with the Tropical Ecology Assessment and Monitoring Network (TEAM). Started in 2002 by Conservation International (CI), TEAM grew to a coalition in 2009 that includes CI, the Wildlife Conservation Society and the Smithsonian Tropical Research Institute.

TEAM researchers monitored 244 species of ground-dwelling mammals and birds in 15 protected areas spanning tropical regions in Central and South America, Africa and Southeast Asia. They analyzed more than 2.5 million pictures captured by more than 1,000 camera traps and found that 17% of the animal populations they monitor increased in number while 22% remained constant and 22% decreased. The Wildlife Picture Index Analytics System was developed in partnership with Hewlett Packard Company.

The results of this study verify the effectiveness of protected areas. Overall, the number and distribution of species in these areas did not decline during the timeframe of the study, strongly suggesting that biodiversity did not decline overall, despite other reports of intense species decline in tropical forest protected areas.

"At a time when environmental concerns are taking center stage, these

results show that protected areas play an important role in maintaining biodiversity," said Jorge Ahumada, executive director of the TEAM Network and a co-author of the study. "Our study reflects a more optimistic outlook about the effectiveness of protected areas. For the first time we are not relying on disparate data sources, but rather using primary data collected in a standardized way across a range of protected areas throughout the world. With this data we have created a public resource that can be used by governments or others in the conservation community to inform decisions."

Researchers caution that wildlife losses could still be occurring in the protected areas that were studied. They observed declines in numerous populations and many other populations were not captured often enough on camera to make an informative assessment. This research does not speak for unprotected tropical forest areas, which may have higher rates of species decline due to differences in management and may be threatened by increased pressure from humans.

Forests in the tropics and beyond provide many critical ecosystem services for people, including providing food and fresh water; oxygen via their metabolic process; and absorption of carbon from the atmosphere. The species these forests contain also provide important ecosystem services like seed dispersal, pollination and invasive species control, and help to support an intricate food web. Loss of species in forests can jeopardize the important ecosystem services that 1.6 billion people globally rely upon.

"Species loss is especially high in tropical regions where most species live and where biodiversity threats are severe," said Lydia Beaudrot, a professor at the University of Michigan and a co-author of the study. "Protected areas, such as national parks, are the cornerstone of species conservation, but whether protected areas really sustain animal populations and prevent extinction has been debated. This is particularly

true for tropical areas, which are oftentimes understudied and for which there is a lack of high-quality data."

The data from the study is already being used to inform management of the protected areas that TEAM monitors. In Uganda's Bwindi Impenetrable Forest, TEAM researchers identified a decline in the area occupied by the African golden cat, recognized as a vulnerable species by the International Union for Conservation of Nature. Park managers noticed that these locations were heavily trafficked by eco-tourists and so redirected travelers to alternate trails. Since these management actions went into effect, there has been an increase in sightings of the African golden cat.

Monitoring animal populations and species diversity using TEAM's standardized methods provides a first look at overall forest health and how the species in those forests are faring. The Wildlife Monitoring Solution developed by the TEAM Network enables scientists across the world to study rare species across large areas of forest of 100 km2 or more. TEAM hopes to extend this standardized approach to other geographic areas as a solution to measure changes in on-the-ground biodiversity and ecosystem health outcomes.

Started in 2002 by Conservation International (CI), TEAM - the Tropical Ecology Assessment and Monitoring (TEAM) Network - grew to a coalition in 2009 that includes CI, the Smithsonian Tropical Research Institute and the Wildlife Conservation Society. TEAM has collected and made publicly available more than 2.5 million photos from camera traps in tropical forests across the planet. With support from Hewlett Packard Enterprise, formerly Hewlett Packard Company, the TEAM Network is now able to analyze this global data set in near real-time and provide data-driven insights for improving natural resource management.

 More information: Beaudrot L, Ahumada JA, O'Brien T, Alvarez-

Loayza P, Boekee K, Campos-Arceiz A, et al. (2016) Standardized Assessment of Biodiversity Trends in Tropical Forest Protected Areas: The End Is Not in Sight. *PLoS Biol* 14(1): e1002357. DOI: 10.1371/journal.pbio.1002357