

To catch a poacher: GIS, drones can improve elephant conservation

May 18 2016



Penn State researchers investigated ways to increase elephant conservation by identifying common geographical characteristics among poaching locations. They then created flight paths for drones that would survey the high-risk poaching areas, which is a technique local conservation agencies can use to optimize their efforts. Credit: US Fish and Wildlife Service

Applying a suite of geographical information system (GIS) tools can improve monitoring for elephant poaching, according to Penn State researchers. Investigating Tsavo, a region in southwest Kenya that is home to that country's largest elephant population, the researchers tried to identify methods that local conservation groups could use to reduce poaching.

They sought to understand geographic similarities among elephant poaching locations, analyzing the geographic features of 156 known locations occurring in the 8,150-square-mile area in the Tsavo region. Nearly 69 percent of poaching instances occurred within 1.5 miles from a road and 62 percent occurred within 2.5 miles from lakes, rivers or other water features, the researchers reported in the current issue of *Tropical Conservation Science*.

"We know that elephants need water, and it makes sense that poachers would exploit that by looking for elephants in those [areas](#)," said Michael Shaffer, who conducted this research while a student in the master of [geographic information systems](#) program taught through Penn State World Campus. He graduated and is now an engineering assistant for a water district in southern California. "At the same time, poachers need roads for quick access into and out of elephant habitats. These locations seemed intuitive, but we were trying to confirm how statistically important they were."

Finding high-risk poaching areas was critical, the researchers said, as recent studies show that conservation efforts focused on high-value areas are more effective than patrolling the entirety of vast habitat regions. Elephants routinely travel 20 to 40 miles in a day, making their habitat one of the largest for terrestrial mammals. To monitor the region, the researchers proposed that conservation groups employ the use of unmanned aerial vehicles—drones. They found that more than 85 percent of poaching incidents occurred in areas of open, low shrub or

savannah areas, and these areas could be monitored with drones.

"The idea of using a drone in an area where it's challenging to do conservation work is coming up more and more because, in the case of Africa, where you've got multiple large animals that move long distances day to day, the idea of trying to monitor them and protect them is daunting," said Joseph Bishop, instructor, John A. Dutton e-Education Institute, Penn State. "Using drones doesn't cost as much as using a helicopter, and it also keeps people out of danger from being attacked by poachers."

After completing their habitat analysis, Shaffer and Bishop identified high-risk areas for poaching throughout the region and made recommendations for locations of surveillance or guard stations, which would help conservation agencies optimize their efforts. Then, the researchers created efficient flight paths for drones, starting at locations with the highest potential poaching risk.

"Using basic GIS, we wanted to help conservation planners model areas of coverage that drones with different types of cameras could effectively monitor. We identified the time required to cover areas for each drone in order to help people choose the correct equipment for regions they need to monitor," said Shaffer.

Though this study focused on the Tsavo region, the researchers said these techniques could be applied to other geographic regions as well.

"We were pairing a habitat model for elephants with likely access points for poachers, taking into consideration the starting point for ground patrols and rangers who would need to respond if alerted to [poaching](#)," said Bishop. "Every land area has its own challenge, but this same basic approach can be used virtually anywhere."

Provided by Pennsylvania State University

Citation: To catch a poacher: GIS, drones can improve elephant conservation (2016, May 18)
retrieved 25 April 2024 from <https://phys.org/news/2016-05-poacher-gis-drones-elephant.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.