

## Isotopes and GPS Reveal Secrets of Elephant Migration and Diet

*Fortunately, isotopes are a very useful tool ... even for environmentalists*

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Elephant conservation is fraught with difficulty. Though the behemoths are endangered, the land set aside for them is insufficient. When they move beyond their sanctuaries in search of food they inevitably run into trouble, often from farmers trying to protect their crops. A new technique for observing where elephants are going and what they're eating could inform ways to manage them more effectively, and thereby reduce their conflicts with humans.

Geochemist Thure Cerling of the University of Utah and his colleagues analyzed isotopes of carbon and nitrogen found in the tail hair of seven Kenyan elephants that were fitted with GPS collars and tracked for nearly two years. The collars revealed the movements of the animals; the isotopes disclosed their diet. The researchers found that six of the elephants spent most of their time in the arid lowlands of the Samburu National Reserve, where they ate mostly trees and shrubs. During the rainy season, however, they dined on the newly available grasses. The seventh elephant, named Lewis, had a different tactic. He lingered in Samburu during the wet season, but then headed for Mount Kenya's Imenti Forest, located 25 miles away, during the dry season. While in the forest he repeatedly raided subsistence farms under cover of darkness, feasting on corn. "Diet is very important for bull elephants," says team member Iain Douglas-Hamilton of Kenya's Save the Elephants Foundation. "If they are to succeed in sexual contests for females, they need high-quality food to build up their strength, hence the reason for high-risk crop raiding."

Unfortunately for Lewis, Douglas-Hamilton notes, this risk did not pay off: the elephant was shot multiple times, probably because of the raiding, and died in Samburu a year after completion of the research. Perhaps as a result of this study of which he was a part, other elephants may be spared a similar fate. "Tracking stable isotopes in an elephant's diet--when combined with actual tracking of movements using high-tech remote sensing--provides a powerful new tool for conservationists," Douglas Hamilton asserts. "It allows us to understand possible elephant motivation and, from this, to see how management plans can be focused on understanding their basic needs for space." A report detailing these findings is being published online this week by the Proceedings of the National Academy of Sciences.