

## Abstract

**Context:** Poaching of the African elephant for ivory had been on the increase since 1997 when the Convention on International Trade in Endangered Species (CITES) allowed a one-off legal sale of ivory by several southern Africa countries. In Kenya, reports indicate continuous year-to-year increase in elephant poaching since 2003.

**Aims:** The goals of the study were to describe the temporal and spatial patterns of elephant poaching in south-eastern Kenya between 1990 and 2009, and examine relationships between observed patterns of poaching, and human and biophysical variables. The study aimed to answer the following questions: (1) how has elephant poaching varied seasonally and annually; (2) what are the spatial patterns of elephant poaching in the Tsavo Conservation Area (TCA); and (3) what are the relationships between observed patterns of poaching and human and biophysical variables?

**Methods:** The study used elephant-poaching data and various GIS-data layers representing human and environmental variables to describe the spatial and temporal patterns of elephant poaching. The observed patterns were then related to environmental and anthropogenic variables using correlation and regression analyses.

**Key results:** Elephant poaching was clustered, with a majority of the poaching occurring in the dry season. Hotspots of poaching were identified in areas with higher densities of roads, waterholes, rivers and streams. The Tsavo East National Park and the Tsavo National Park accounted for 53.7% and 44.8% of all poached elephants, respectively. The best predictors for elephant poaching were density of elephants, condition of vegetation, proximity to ranger bases and outposts, and densities of roads and rivers.

**Conclusions:** Predictor variables used in the study explained 61.5–78% of the total variability observed in elephant poaching. The location of the hotspots suggests that human–wildlife conflicts in the area may be contributing to poaching and that factors that quantify community attitudes towards elephant conservation may provide additional explanation for observed poaching patterns.

**Implications:** The poaching hotspots identified can be used as starting point by the Kenya Wildlife Service (KWS) to begin implementing measures that ensure local-community support for conservation, whereas on other hotspots, it will be necessary to beef-up anti-poaching activities. There is a need for Kenya to legislate new anti-poaching laws that are a much more effective deterrence to poaching than currently exist.