Mapping Elephant Distribution in the vicinity of Tarangire National Park, Tanzania

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Tarangire National Park

- Wildlife migrate on seasonal basis
- Approximately 40 villages surround park boundary
- Maasai people are shifting economic activity from pastoral to agriculture
- North of the park has seen increased agriculture

Elephants in Tarangire National Park

- Elephants are labeled as a Priority 1 species by WCS for studying and conservation
- Rapid increase in agricultural activity has threatened migration routes.
- Loss of five of the nine main migration routes in Tarangire, and a two corridors have been degraded
Study Area

- The park covers an area of 2,850 sq. km
- Extends from Tanzania-Kenya border in the north to the Massai Steppe in the south
- Ecosystem is diverse, but is populated mainly by Acacia woodlands
- Wildlife in Tarangire migrate on a seasonal basis
Mt. Losiminguri
Primary Research Objective
– Identify potential distribution of elephants in vicinity of Tarangire National Park, Tanzania

Ancillary Research Objectives
– Time spent in agricultural fields and near water sources
– Compare time elephants are inside the park to time outside the park
– Determine distribution between day and night
Methods
Landscape Variables for Predicting Elephant Distribution

NDVI Suite

Park Boundary

Rivers

Cultivated Land

Water Bodies

Roads
Landscape Variables:
- NDVI Suite
- Distance to:
  - Cultivated Land
  - Roads
  - Water Bodies/Rivers

Presence Data:
GPS Collar Data for three Elephants

Species Distribution Model

Mahalanobis Typicality

Day 24 hour Night

Recommendations
Results
Typicality for all points

- Potential distribution highest inside park and near water sources
Typicality higher inside the park during the day, and higher outside the park at night.
Conclusions
• Elephants spend majority of the day at northern end of park and are outside the park most of the night
• Elephants typically do not travel north of road B 144
• Encroaching agriculture north of park is primary anthropogenic threat to elephant distribution
• Expansion of park and/or easements of agricultural land are needed in order to mitigate threat to elephant distribution
Scenario One

- Increase park area from 2,850 sq. km to 7,360 sq. km in order to encompass total potential elephant distribution.
Scenario Two

- Increase park area from 2,850 sq. km to 4,570 sq. km in order to encompass areas of highest human-elephant overlap and high potential distribution/low agriculture.
Scenario Three

- 198 sq. km of potential easements in agricultural areas within region of highest human-elephant overlap
Future Research

- Acquire data on town and settlement locations, crop type, elevation, and movement of elephants in southern extent of Tarangire
- Run species distribution model with only dry season movement data and with only wet season movement data
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