Connecting African Wild Dogs in Zambia

Africa

Atlantic Ocean

Indian Ocean

Kilometers
0   1,000   2,000

Introduction: African wild dogs (*Lycaon pictus*) are the most endangered carnivore in sub-Saharan Africa. Their population is estimated to be at 1,409 mature individuals. They face many threats to their survival, including accidental and targeted killings by humans, rabies, canine distemper, competition with other predators, and most significantly, habitat loss and fragmentation. As human development and agriculture grow, there is less habitat available for wildlife like wild dogs. Furthermore, because they live in low densities and have large ranges, wild dogs are especially vulnerable to habitat fragmentation. This analysis evaluates the habitat suitability of Zambia, which has several separated populations of African wild dogs, to determine possible locations for wildlife corridors to connect the existing populations.
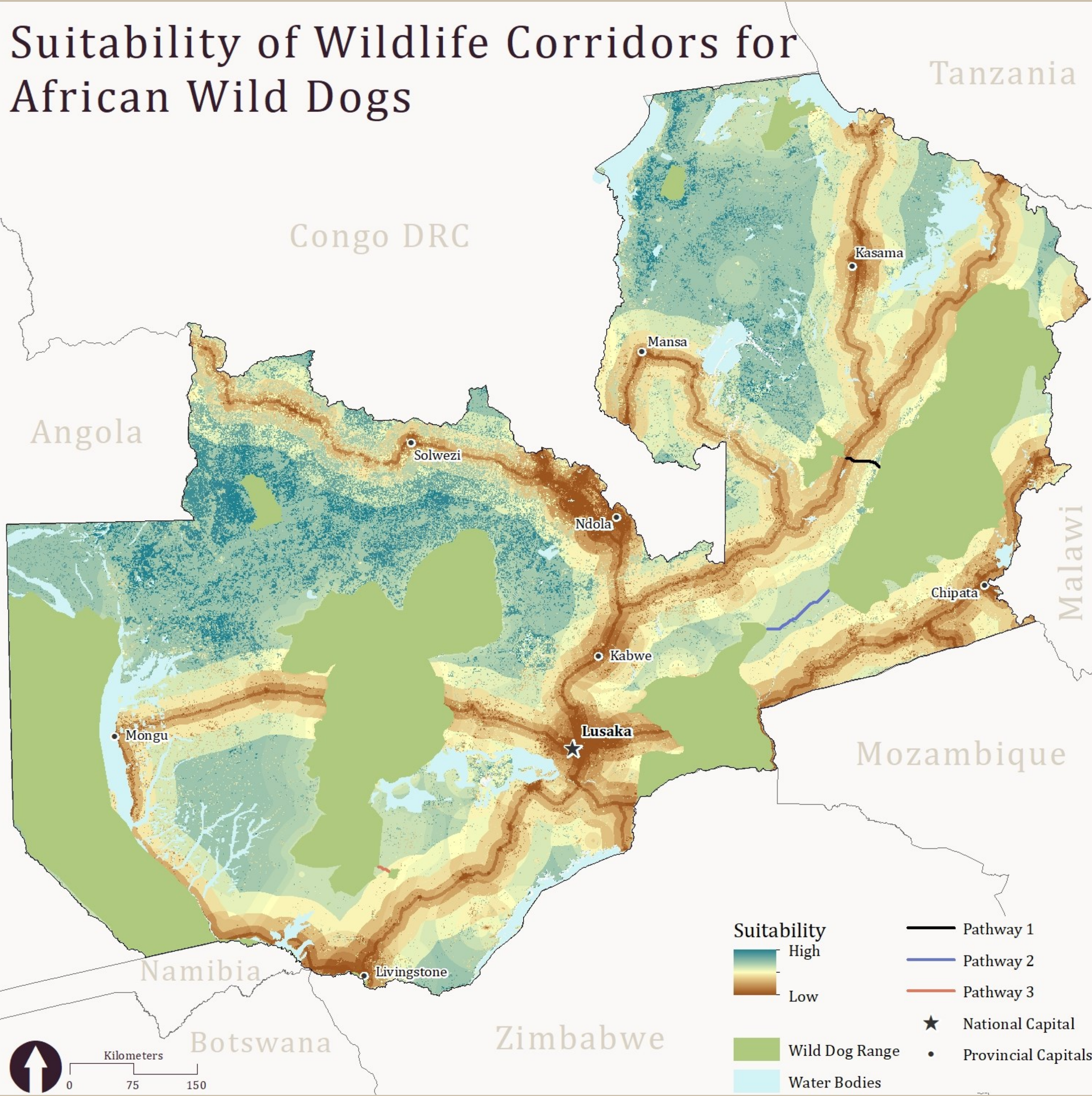
Methods: The suitability analysis included land cover type, proximity to lion territory, roads, and mines, and the density of human population and human conflict. The Euclidean distance tool was used to categorize the distance from lion territory, roads, and mines. These categories were reclassified and given a value of one through five according to the suitability factors chart. Next, the Kernel Density tool was used to determine the density of human conflict, which was then reclassified and scored from one to five. Land cover data was reclassified by land cover type and scored one through five. Human population density was also reclassified based on density and scored one through five. To combine these factors, the scores were calculated into a raster. Land cover, roads, and population data were each weighted at 25%, human conflict and mines were weighted at 10%, and lion territory was weighted at 5%. Based on this raster and the proximity between established African wild dog territory, potential wildlife corridors were determined.

Factors	1 Lowest Suitability	2 Low Suitability	3 Medium Suitability	4 High Suitability	5 Highest Suitability
Land Cover	Croplands, urban development	Sparsely vegetated, wetlands	Grasslands, savannas	Shrublands	Forests
Distance to Lion Territory	0-2 km	2-10 km	10-25 km	25-50 km	>50 km
Human Population	>50 per sq. km.	10-50 per sq. km.	5-10 per sq.km.	1-5 per sq. km.	0-1 per sq. km.
Distance to Roads	0-2 km	2-10 km	10-25 km	25-50 km	>50 km
Human Conflict	Highest density	High density	Medium density	Low density	Lowest density
Distance to Mines	0-2 km	2-10 km	10-25 km	25-50 km	>50 km

Results: The suitability analysis revealed that the current African wild dog populations are separated by unsuitable habitat. For Path A, a major road separates two territories. To connect them, a wildlife crossing over the road to allow them to safely cross the road and move between the locations is recommended. Path B joins a small territory to a nearby large territory through fairly suitable habitat. Path C spans a long distance, connecting two larger territories through suitable habitat. These could be composed of protected land. Wildlife corridors like the ones proposed will allow wild dogs to be more resilient and to coexist better with humans. In the future, the ranges of this endangered animal should be considered in national land use planning to avoid further fragmentation.

Suitability of Wildlife Corridors for African Wild Dogs

Tanzania

Congo DRC

Kasama

Mansa

Angola

Solwezi

Ndola

Malawi

Chipata

Kabwe

Kwe

Mongu

Lusaka

Mozambique

Namibia

Livingstone

Botswana

Zimbabwe

Kilometers
0   75   150

Suitability
High
Low

Wild Dog Range

Water Bodies

Pathway 1
Pathway 2
Pathway 3
★ National Capital
• Provincial Capitals

Tufts UNIVERSITY
Cummings School of Veterinary Medicine

Katy Hogan
MCM 591
12/13/19

Land Cover:
African wild dogs prefer forests and are often found in savannas. Areas that are barren or used for farming are the least suitable.

Land Cover Suitability
Croplands, Urban Development
Sparsely Vegetated, Wetlands
Grasslands, Savannas
Shrublands
Forests
★ National Capital
• Provincial Capital

Kilometers
0   175   350

Lion Territory:
Lions compete with African wild dogs for prey, and sometimes kill them, especially the young. So lion territory is not ideal habitat.

Proximity to Lions (km)
0-2
2-10
10-25
25-50
Greater than 50
★ National Capital
• Provincial Capitals

Kilometers
0   175   350

Human Population, 2019:
Conflict with human represents a major threat to wild dogs, so preference was given to areas with low human density.

Human Population
Population / Sq km
Greater than 50
10-50
5-10
1-5
0-1
★ National Capital
• Provincial Capital

Kilometers
0   175   350

Roads:
Wild dogs often use roads to travel and rest, and are vulnerable to road accidents. Roads create barriers between populations.

Proximity to Roads (km)
Value
0-2
2-10
10-25
25-50
Greater than 50
★ National Capital
• Provincial Capitals

Kilometers
0   175   350

Human Conflict, 2015-2019:
Areas with human conflict are dangerous, bring wild dogs into contact with people, and are generally inhospitable for wild dogs.

Density of Human Conflict
Highest
High
Medium
Low
Lowest
★ National Capital
• Provincial Capitals

Kilometers
0   175   350

Mines:
Mines restrict suitable territory for wild dogs because they are unsafe and bring the animals in close contact with humans.

Proximity to Mines (km)
0-2
2-10
10-25
25-50
Greater than 50
★ National Capital
• Provincial Capitals

Kilometers
0   175   350