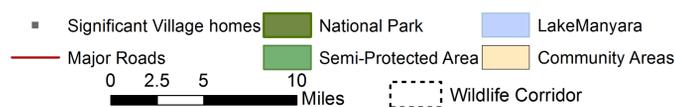
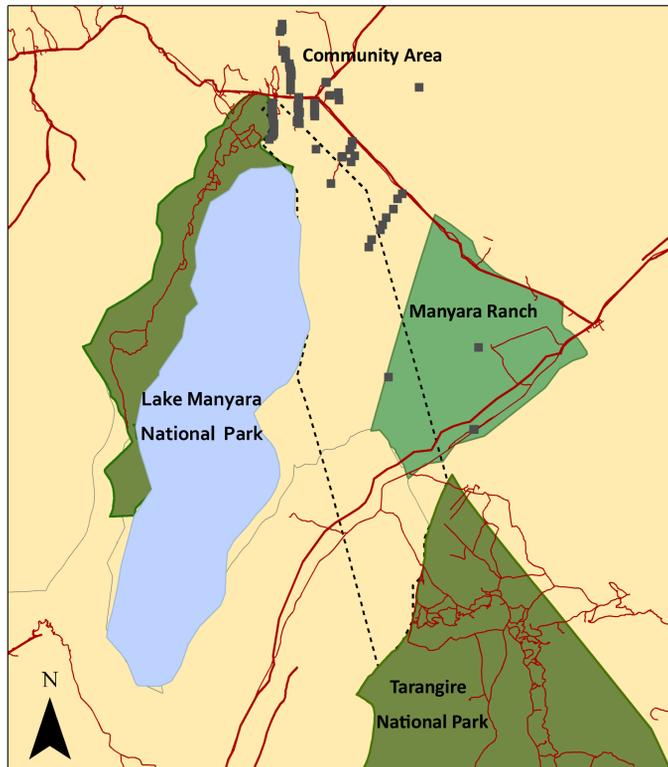
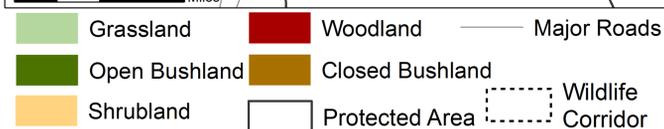
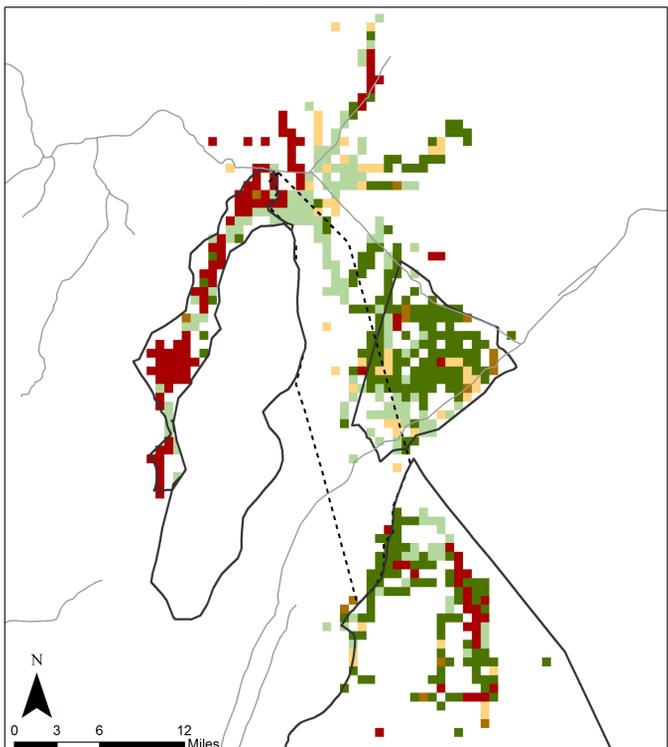


Battle For Pasture: Potential for cattle to exclude zebra and wildebeest in Tanzania's Semi-protected areas



Vegetation



Results

Cattle, wildebeest, and zebra all have very similar habitat preferences as seen in the Jacob's index test. All three appear to prefer woodland and grassland habitats the most, and tend to avoid habitats with less grass for grazing like closed bushland and shrubland. The densest sightings of the all three were focused around their preferred vegetation type, grassland or woodland. Despite similar preferences, visually there is not a considerable amount of overlap between the most dense sightings; less dense sightings do overlap. In the semi-protected area, the hotspots are very close, but appear separate for the most part.

The highest density of cattle were seen closest to the community areas to the north east of the parks. Wildebeest and zebra on the other hand were more frequently confined to the parks or seen densely in a grassy-open-bushland type habitat in the semi protected area. In general, wildebeest and zebra were observed more frequently further from the community area. In terms of the wildlife corridor, all three were observed in what is considered an area important for migration, though much of the area between the parks can be considered a corridor. Again, cattle was seen more frequently in the section of the wildlife corridor closest to the community area.



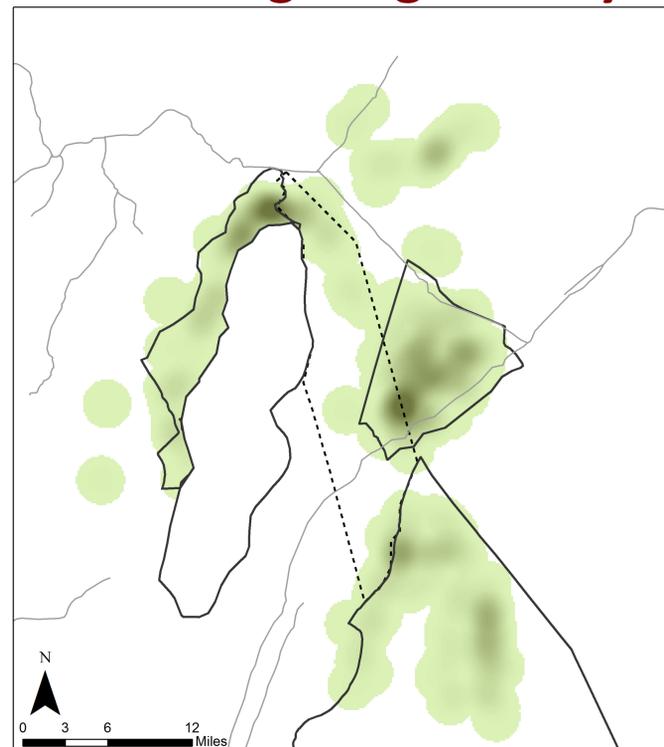
Introduction

Northern Tanzania's national parks are slowly becoming the only place where wildlife can live freely, with minimal human impact. Communities are expanding at a rapid pace, restricting the available habitat for iconic large mammals and diminishing their historically large ranges. Migratory species like wildebeest and zebra depend on migratory corridors and available habitat to expand into during the wet-season. Agricultural expansion is threatening these areas; it is fragments and isolates previously interconnected ecosystems. As more land is dedicated to farming, range for wildlife and livestock is diminished. Wildlife is left with even less as livestock is often prioritized. Migration and habitat-connectivity is important to the ecology of the Tarangire-Manyara Ecosystem. In the TME, Lake Manyara National Park, Tarangire National park, and semi-protected areas are surrounded by developing communities. The agriculture and livestock of these communities threaten to competitively exclude local wildlife.

Cattle in particular have the potential to compete with wildebeest and zebra. All three are grazers meaning they feed on grasses. Wildebeest and cattle are primarily short grass feeders while zebra can graze on a variety of grass types. This allows Wildebeest and Zebra to graze together but there s potential for conflicts can arise when cattle are introduced. Understanding if cattle compete with wildebeest and zebra is important to conservation and future land-use decisions.



Combine Wildebeest and Zebra Sighting Density



Methods

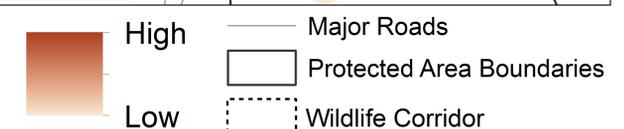
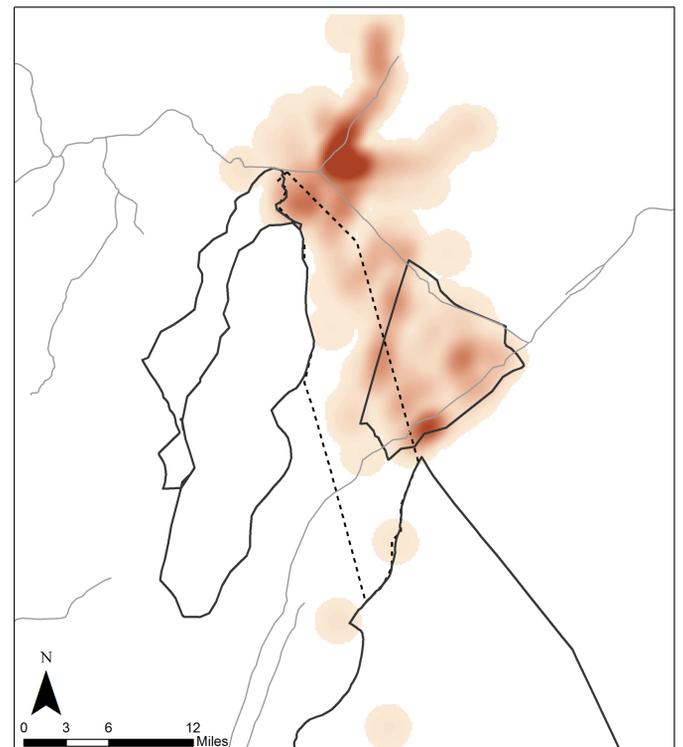
Data points were collected in the two National Parks, the semi-protected area, and the community area through driven transects 2 km long, with 500 meters in-between transects. Data represents 3 years of transects in which species type and local vegetation type were recorded at every given GPS point. The data is restricted to the roads and areas accessible by car in the 4 study areas. Data was collected by students studying at the School for Field Studies, located in Rhotia, Tanzania.

GPS data was geo-coded into points using Arc GIS. Information about species, including buildings, and vegetation was then selected for to create the maps.

A polygon fish net was created and the geo-coded points were then joined to it to create the vegetation map. For circumstances when multiple points fell within a single cell, the most common vegetation type was assigned to that cell.

Kernel densities was used to generate the sighting density maps of cattle and wildebeest plus zebra. Jacob's index for habitat preference was calculated using the frequency of observation in each vegetation type. Again, using the filed data collected for each wildlife sighting at a given GPS point

Cattle Sighting Density



Discussion and Limitations

There is potential for cattle to competitively exclude wildebeest and zebra. Already, the community area appear to be excluding zebra and wildebeest where a low density of the two species were observed and a considerably higher density of cattle was observed. As the community expands in the future, this potential exclusion should be taken into consideration given the proximity of the wildlife corridor. Farming is not permitted in the semi-protected area, which is likely a reason all three species were observed there. Similar semi-protected areas should be established in the area between the parks to create a bridge of protected land between them. If the community grows and agriculture expands into the corridor, the two national parks could be considerably isolated from one another without a bridge of protected land.

Further studies on the exclusion potential of cattle and other livestock should be conducted in respect to all major wildlife species. This study was limited by the fact that all of the data points were confined to observations from a road. If distance from the road could be incorporated into future data sets, studies would be able to paint a better picture of the current interactions between cattle, wildebeest, zebra, and wildlife livestock interactions in general

