

Elephant Sanctuaries: A model suitability analysis for wildlife reserves

The Asian Elephant is an environmentally and culturally important species throughout South and Southeast Asia. Unfortunately, threats such as habitat loss, degradation, and fragmentation – all due to human expansion – are causing population decreases; since 1986, the Asian Elephant has been designated as an endangered species. India is home to most of the world's remaining Asian Elephants, with an estimated population of 30,000. One way to protect these elephants is to create more wildlife conservations to preserve their habitat. This project demonstrates how to identify the best locations for the development of new elephant sanctuaries in India.

3) Human density was determined by examining the population distribution in all cities and towns in India. Many large cities such as Kolkata is the east, Mumbai in the west, New Delhi in the north, Bangalore and Chennai in the south and Hyderabad in the center, are easily identifiable.

4) The road density was determined by how many individual roads (only paved roads were considered) are within 93 kilometers of each point on the map. The far south and far north are the most densely paved areas, while the northeast has noticeably fewer roads.

Finally, these four factors were compiled to identify the best locations for elephant conservation. In determining suitability, the inputs were weighed as follows: elephant range (40%), habitat suitability (30%), human density (20%) and road density (10%).

It should be noted that several parts of this analysis were based on a subjective notion of suitability. The selection of inputs, the classification of values within each factor, and the final weighing of factors would all benefit from consultation with elephant and wildlife conservation experts.

Method

Within each of the following four input factors, land was assigned a 1 -5 value to represent its suitability for elephant preserves.

1) The elephant range was defined based on distance from locations where elephant presence has been confirmed (5). As distance increases from these zones, areas are classified as less likely to have elephants. Ranges includes area within 14 km (4), within 24 km (3), within 50km (2), and above 50 km (1). Elephant populations are found in the north, the south-west, the northeastern coast, and the far-east.

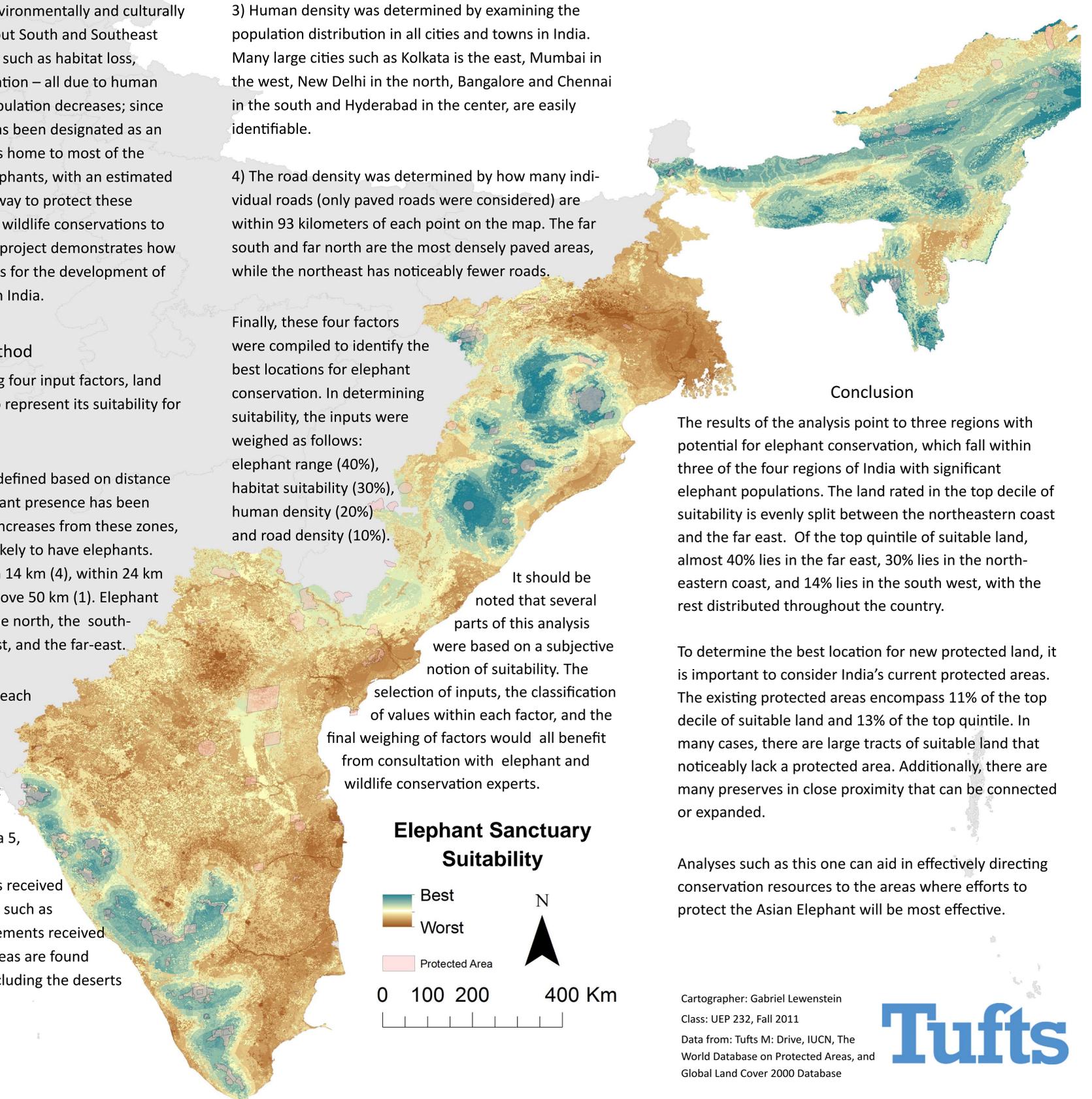
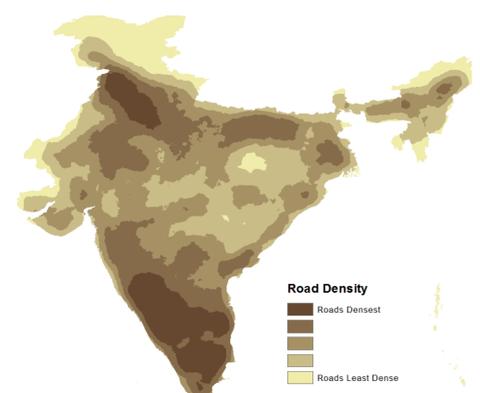
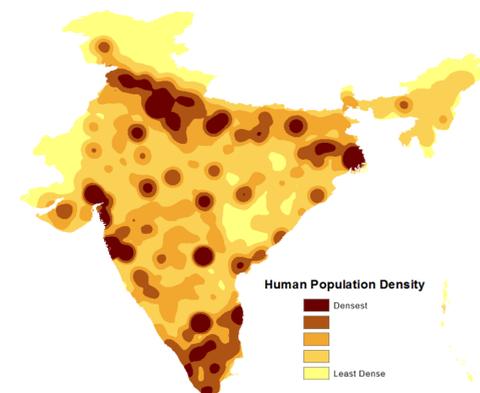
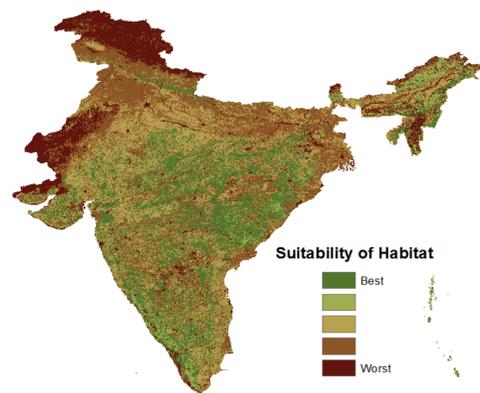
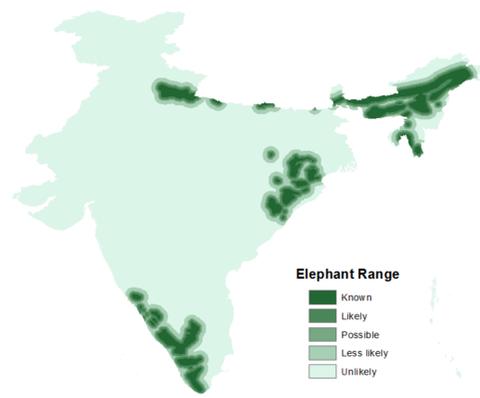
2) For suitability of habitat, each land cover was assigned a value based on elephants' preferred environment. For example, ideal elephant habitats such as tropical evergreen forests received a 5, acceptable habitats such as temperate broadleaf forests received a 3, and unsuitable habitats such as barren land or human settlements received a 1. Potentially habitable areas are found throughout the country, excluding the deserts in the northwest.

Conclusion

The results of the analysis point to three regions with potential for elephant conservation, which fall within three of the four regions of India with significant elephant populations. The land rated in the top decile of suitability is evenly split between the northeastern coast and the far east. Of the top quintile of suitable land, almost 40% lies in the far east, 30% lies in the north-eastern coast, and 14% lies in the south west, with the rest distributed throughout the country.

To determine the best location for new protected land, it is important to consider India's current protected areas. The existing protected areas encompass 11% of the top decile of suitable land and 13% of the top quintile. In many cases, there are large tracts of suitable land that noticeably lack a protected area. Additionally, there are many preserves in close proximity that can be connected or expanded.

Analyses such as this one can aid in effectively directing conservation resources to the areas where efforts to protect the Asian Elephant will be most effective.



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 Data from: Tufts M: Drive, IUCN, The World Database on Protected Areas, and Global Land Cover 2000 Database

