Abstract

The increased fragmentation of habitat capable of sustaining the life cycle of paradigm species, such as the African elephant, is occurring due to agricultural and urban expansion. In addition to its intrinsic value as one of the largest animals on the planet, the elephant can serve as an umbrella species, whose habitat also sustains a large number of other plant and animal species. Predicting the migration patterns of elephants may offer clues to how to best develop an effective use of resources in the development of protected and managed areas for the conservation of nature. Using habitat preference values developed from a habitat selection framework which uses a combination of elephant GPS point locations with a land cover dataset, a least cost corridor can be developed. Conditional Minimum Transit Cost is used to develop a more realistic passage space between protected areas in southeast Tanzania. The network of protected areas contain some of the last vestiges of east African coastal forest, which contain world class ecosystems of high endemism and species richness. Using the elephant as a flagship species might improve the chances of conservation in this region which contains a UNESCO World Heritage Site and 107 protected areas of various level of management.

Ecological connectivity between protected areas is modeled amongst a network of protected areas. A new strategy - Conditional Minimum Transit Cost - is successfully
employed for modeling least cost movement across a vast protected area network across the southeast Tanzania landscape. Several bottlenecks, areas of concern and areas where increased protection could increase the effectiveness of corridor space are identified. Using the protected area as a surrogate for habitat patches may be problematic, since it does not accurately reflect the landscape as an elephant experiences it. This is most reflected in the results as most corridors with high resistance to movement are those with a greater distance between origin and destination. An analysis that identifies habitat patches of adequate size and using those results as origin and destination nodes is suggested in subsequent iterations of similar analyses.