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**Individual Based Modeling of the Endangered South African Black Rhino**

**Jessica Margaret Dunn, School of Mathematical and Geospatial Sciences, RMIT University**

Population models developed thus far have shown that the global population of the endangered black rhino will increase faster if animals are translocated from high-density populations to reserves of low density. Previous analyses of this problem have not modeled the new populations appropriately and this may lead to sub-optimal implementation of the translocation policy. To gain a better understanding of this, and the dynamics of small, translocated populations, I have developed and tested an individual-based model of a small rhino population. This model will form the basis of my honours thesis this year.

The individual-based model developed focuses on the translocation reserves rather than the source reserves so density dependence can be ignored. At each time step rhinos are moved from the source reserve to the modeled translocation reserve. Along with an individual-based model I have also developed a Matrix Population Model and a Logistic Model for comparisons. From my model I can now start to make assumptions about the effects of translocating different age groups and social structures that then can be used to help managers and authorities make decisions about translocating rhinos.

The decision to use Excel to program my model was not an easy one because of my unfamiliarity with the Visual Basic language. I decided to use Excel since it is accessible and easy to use by park managers and authorities with little to no mathematical knowledge. All parts of my model and program can be controlled through user-friendly spreadsheets.

The most significant results I have found so far include:

1. Low population numbers at the end of a 20-year simulation while translocating a male/female adult pair can be caused by deaths in the initial population or by long gestation periods.
2. The model compares quite well with a matrix population model; results are slightly higher but not significantly. The results are lower than a logistic model.
3. Translocation of an adult pair initially and annually into reserve for a 20 year simulation results in 10% higher numbers as compared to translocating a sub-adult pair.

Over the next year, I hope to develop and test the model further to give a better understanding of the individual and global population of the endangered black rhino and to develop and test schemes that will optimize their numbers. The scholarship has been a great way for me to learn and research areas of mathematics I was previously unfamiliar with and it has helped me get a good start on my honours thesis. I would like to thank my two supervisors Prof. John Hearne and Dr. Lynne McArthur for their help and guidance for the past six weeks.

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See http://www.ice-em.org.au/students.html#scholarships2007