TigerSTAT: Background Research Activity Lab

Introduction to TigerSTAT

The Bol'shaya Koshka (Russian for big cat) Reserve is a newly created animal reserve that was uniquely developed to help endangered species prosper. This 10,000 acre wild animal reservation was selected because an abundance of Siberian tigers have been found in the area. The diverse terrain of the reserve provides a wide variety of habitats for many different species of animals.

Since the tigers in this area are much more abundant than any other area in the world, they are starting to draw a significant number of researchers to the region. Your primary responsibility will be to help these researchers as they study the tigers and then incorporate the results of their research into a system to identify the best management practices for this reserve.

An important component of monitoring endangered species is to understand the age distribution of the population. Shifts in the distribution could indicate potential issues in sustaining the population.

While the exact age is not known for most of the tigers in your reserve, the age of some tigers are known. To estimate the age of a tiger that is captured on your reserve, you will need to compare characteristics of the captured tiger to the ones that live on the research zone (whose ages are known).

When data is collected as an indirect measure for the variable of interest, it is often called ***proxy data***. For example, in their 2004 paper, Whitman, et. al. describe how the color of a lion's nose can be used to estimate it's age. Your mission is to go into the Bol'shaya Koshka reserve and gather sample data on tigers. Then, using your sample data, you are to establish a simple linear regression model to estimate the age of a tiger based on the available ***proxy*** variables.

Before collecting data to develop a model, it is often important to learn more about the issues, factors, and possibilities for models that have been used or proposed in the past. Thus, this lab is focused on research prior to collecting or analyzing data on the tigers in the Bolshoy Kosha reserve.

TASK #1: Background material

Read the 2004 Nature article by Whitman et al., "Sustainable trophy hunting of African lions". The article can be found at:
http://www.cbs.umn.edu/sites/default/files/public/downloads/Sustainable_trophy_hunting_of_African_lions.pdf
(if this link does not work, go to the lion research page http://www.cbs.umn.edu/lionresearch and the article is then under the current project section "Trophy hunting" link).

TASK #2: Questions based on background reading

Answer the following questions in preparation for class discussion

1. Why is estimating the age of a lion a worthwhile question? Is this also true for tigers?
2. What are some of the difficulties associated with estimating the age? How can you address them in collecting data on tigers?
3. In the section of the article about the age estimation, what support do the authors provide for the validity of their model? What are some issues with their data/model?
4. What are a few approaches to estimation for lion ages? Which of these are possibly useful in estimating the age of a Tiger? What *proxy* variable(s) did the author's use in their model?
5. How could you test to see if your model produces good estimates for a lion's (Tiger's) age?
6. How precisely would you expect to predict ages of lion's based on the model in the article? How could you improve the precision of the model?

TASK #3: Questions about tiger data collection

Answer the following questions in preparation for collecting data:

7. What are some important characteristics of the tiger sample you collect to build a model for age? What are some problems that could impact the quality of data collected on tigers?
8. In collecting data on real tigers, what issues would you want to consider? How difficult do you think getting a decent sample is?
9. In practice, the age of all tigers in the preserve would not be known initially. How could this be overcome?
10. What strategies will you use to collect your sample in the game?