

ST 506 Sampling Animal Populations  
Homework Set 8 2008  
Due October 21, 2008

Q1. I want you to consider the black duck radio telemetry survival data which is in a Table in the Lecture 13 pdf. The table gives the number of survival days and column 3 an indicator 1 for death and 0 for right censored.

First I want you to calculate the Mayfield (or Trent and Rongstad ) estimator of daily survival and its SE and 95 % CI.

Then also calculate the 63 day total survival estimate with a 95 CI based on the previous CI. Note-You do not need to have the SE of the total survival estimate to do this.

The KM estimate for the 63 days to be discussed later is 0.5865 with SE 0.0754 (last two columns in table). Your estimate should be similar to that. Is it similar and is the CI similar?

Source: Pollock, K. H., Winterstein, S. R., and Conroy, M. J. (1989). Estimation and analysis of survival distributions for radio-tagged animals. *Biometrics*, **45**: 99-109.

Q2. For the same data set. Group the Black duck data into 9 weekly intervals (days 1-7, 8-14 etc up to 57-63) and calculate the weekly death rate (hazard rate) due to hunting and due to natural causes (treat the other causes as right censored in each case). The survival times are given in the Table exactly to the day and the causes of death are given in the figure.

Also calculate the Standard Errors of the hazard rates. Plot the two hazard rates vs. time on the same graph to see how they differ over time. You would expect them to have different patterns because they are such different death processes.

Also plot the two marginal KM curves (First, if hunting is the only mortality source and second, if natural mortality is the only mortality source).