**Name:**

**Population Modeling in Ecology**

**Spring 2023**

**Week 12 – Multi-state capture-recapture model to estimate survival and dispersal rates**

Complete the questions below and email to [gbarrile@uwyo.edu](mailto:gbarrile@uwyo.edu) with the subject line: **Week 12 Lab Report**

During our capture-mark-recapture study of boreal toads, we recorded the density of aquatic predators (e.g., tiger salamander larvae, predaceous diving beetles) at each pond during each year. Predator densities represent the number of predators per cubic meter of pond. Data on predator densities can be found within the data folder for this week in the file entitled ‘**Predator\_Density.csv’**.

Investigate whether predator density at a given pond influenced the dispersal propensity of boreal toads. For instance, were boreal toads more likely to disperse from a pond when predator densities were higher?

You will need to add the predator density data directly to the design data for *Psi* (i.e., transition probability). Then, using the same model structures for capture probability and survival that we used in class, model *Psi* as a function of predator density (univariate model).

Check out the beta coefficients of the model that you fit. Is there any evidence that predator density influenced dispersal rates? If yes, how so?

Create a plot that displays the relationship between predator density and the probability of dispersal between ponds. You cannot use *covariate.predictions*() for this. You’ll need to obtain the real estimates for dispersal and add the covariate values to that data frame. Plot the mean estimated dispersal probabilities and the 95% confidence intervals. Insert your plot into this document and include a descriptive figure caption.