**Name:**

**Population Modeling in Ecology**

**Spring 2023**

**Week 4 – Closed Occupancy Model**

Complete the questions below and email to [gbarrile@uwyo.edu](mailto:gbarrile@uwyo.edu) with the subject line: **Week 4 Lab Report**

**Table 1.** Metadata for *Hellgrammite\_StreamSurveys.csv*

|  |  |
| --- | --- |
| **Column** | **Description** |
| Date | The date of the survey in d/m/y format |
| Stream | The name of the stream that was surveyed |
| Survey | The survey number at a given stream |
| HGM | Denotes whether a hellgrammite(s) was detected in a stream during a given survey *(1 = detection, 0 = no detection)* |
| RockCover | The percent cover of rocks within a given stream |
| Width | The average width of a given stream in meters |
| Observers | The number of observers that conducted a given survey |

Please answer the following questions:

1. How many streams were surveyed?
2. How many surveys per stream?
3. What are the site-level covariates?
4. What is the observation-level covariate?

*Fit a single model with (1) detection probability as a function of the number of observers that conducted a given survey and (2) occupancy as a function of the interaction between percent rock cover and stream width. Then answer the questions below.*

1. Describe the relationship between detection probability and the number of observers conducting a given survey. Was this relationship statistically significant? Please include a figure with a caption.
2. Describe how rock cover and stream width interact to influence hellgrammite occupancy. Produce a plot that shows the interaction between rock cover and stream width on hellgrammite occupancy. The figure should include a caption describing the figure.
3. How many streams wherein hellgrammites were never detected (i.e., detection history = 000) were predicted to be occupied by hellgrammites?