**Name:**

**Population Modeling in Ecology**

**Spring 2023**

**Week 2 – Open Binomial N-mixture Model**

Complete the questions below and email to [gbarrile@uwyo.edu](mailto:gbarrile@uwyo.edu) with the subject line: **Week 2 Lab Report**

**Table 1.** Metadata for *Koala\_Chlamydia.csv*

|  |  |
| --- | --- |
| **Column** | **Description** |
| Site | The name of the site that was surveyed |
| Year | The year in which a given survey was conducted |
| Primary | Number of the primary period |
| Secondary | Number of the secondary sampling occasion within each primary period |
| Count | The number of koalas observed at a site during a given survey |
| Disease.Prevalence | Percent of koalas infected with chlamydia from those that were sampled |
| Eucalyptus | Percent cover of eucalyptus trees at a given site |
| Time | Time of day when a given survey was conducted |

*Notes:* The population is assumed to be closed *within* each primary period, but open to gains and losses *between* primary periods

Please answer the following questions:

1. How many sites were surveyed?
2. How many surveys per site?
3. What is the site-level covariate?
4. What is the observation-level covariate?
5. What is the yearly site-level covariate?

*Fit a single model with (1) detection probability as a function of time of day, (2) initial abundance as a function of percent cover of eucalyptus trees, and (3) population growth rate as a function of disease prevalence. Then answer the questions below.*

1. Describe the relationship between detection probability and time of day. Was this relationship statistically significant?
2. Describe the relationship between initial abundance and the percent cover of eucalyptus trees at a given site (make koalas the subject of the sentence).
3. Produce a plot showing the relationship between disease prevalence and the population growth rate of koalas. The figure should include the mean predicted line and 95% confidence intervals. The figure should also include a caption describing the figure. Insert the figure and caption here:
4. What was the mean predicted estimate for koala abundance at site B during 2012?