Week 13 Activity: GLMs

Now reconsider the willow tit dataset and consider modeling not just the presence / absence of birds, but directly modeling the number of birds observed in each spatial region.

```
birds <- read.csv('http://math.montana.edu/ahoegh/teaching/stat491/data/willowtit2013_count.csv')
head(birds) %>% kable()
```

siteID	elev	rlength	forest	bird.count	searchDuration
Q001	450	6.4	3	0	160
Q002	450	5.5	21	0	190
Q003	1050	4.3	32	3	150
Q004	950	4.5	9	0	180
Q005	1150	5.4	35	0	200
Q006	550	3.6	2	0	115

This dataset contains 242 sites and 6 variables:

- `siteID`, a unique identifier for the site, some were not sampled during this period
- `elev`, mean elevation of the quadrant in meters
- `rlength`, the length of the route walked by the birdwatcher, in kilometers
- `forest`, percent forest cover
- `bird.count`, number of birds identified
- `searchDuration`, time birdwatcher spent searching the site, in minutes

1. Data Visualization Create two figures that explore `bird.count` as a function of forest cover percentage (`forest`) and elevation (`elev`).

2. Model Specification Using a Poisson regression model, clearly write out the model to understand how forest cover and elevation impact bird count.

3. Priors Describe and justify the necessary priors for this model.

4. Fit MCMC Fit the JAGS code for this model.

5. Summarize inferences from model Talk about the model and discuss which and how predictor variables influence the observed bird count. Create figures that show your fitted model for elevation and/or forest coverage.