Biological Stats 2: Lab 4

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Within your class Project, open a new R markdown file. Save it. (name it lastname_lab4.Rmd or something similar)
At the top of the markdown file, add comments with your name and lab 4.
Work in pairs or individually.
Submit your .Rmd file via myCourses before Tuesday next week.

Lab Exercise 1/4: RIKZ Poisson GLMs

1. Fit a poisson model to RIKZ species richness that includes NAP, and exposure and week as categorical variables (`factor`).
2. Extract the model coefficients and their 95% confidence intervals.

3. Plot the deviance residuals versus the linear predictor.

4. Compare the results of this model with a model for RIKZ species richness that only included NAP as a covariate using deviance and AIC.
5. **BONUS** Show how AIC changes when each linear predictor term is dropped from the model, and show the results of chi-square tests that compare these reduced models to the original model. (*hint* see the help for `?add1`).
6. **BONUS BONUS** Fit a model for species richness that also includes salinity, temperature, and grain size, and perform backwards selection using AIC to obtain a 'best' model. How do the results compare to the other models? What is the appropriate set of variables to use?

Exercise 2/4

Add a new column to `penguins` called `study_year` that contains:

- "Year 1" if the year is 2007

- "Year 2" if the year is 2008
- "Year 3" if the year is 2009

Starting with `penguins`, only keep observations for chinstrap penguins, then only keep the `flipper_length_mm` and `body_mass_g` variables. Add a new column called `fm_ratio` that contains the ratio of flipper length to body mass for each penguin. Next, add another column named `ratio_bin` which contains the word "high" if `fm_ratio` is greater than or equal to 0.05, "low" if the ratio is less than 0.05, and "no record" if anything else (e.g. `NA`).

Lab exercise 3/4 - Sea lion Pups

- Read in the data from `SSLpupcounts.csv`.
- Convert the data from wide format to long format.

- Print the top 10 rows of the new long format data.

- **BONUS** Convert back to wide format from long format.

Exercise 4/4 Sea lion Rookery Counts

1. `SSL_Sites.csv` contains the latitude and longitude of sea lion rookeries.

2. Use a suitable `join` function to add the lat/lon information and geographic region to the counts dataset.

3. Summarize the average annual pups that were counted between 2000-2015 in the Aleutian Islands (west of longitude 160W), the Gulf of Alaska (east of longitude 160W, west of 140W), and Southeast Alaska (South of latiutude 60 degrees N, but not in the Pacific Northwest).

4. **BONUS** Look up how to make a map using `ggplot()` to map the rookery counts in 2015.