ESM 206 – ASSIGNMENT 5

Pacific giant salamanders (*Dicamptodon tenebrosus*) in Mack Creek (near Blue River, Oregon): Size and channel location in old growth and previously clear cut forest sections

Due Wed 2019-12-04 at 8:00am PST. Submit one report per group via GauchoSpace.
Read through the entire assignment before starting. **Follow instructions carefully.**
Submit exactly and only what is requested.

For Assignment 5, you may work alone or in groups of two.

If you work in a group of two:

- You will submit a single report with both members listed as coauthors
- You will be graded based on the same rubric as individual submissions
- Both members of the group will receive the same score
- We will not manage interpersonal conflicts that arise

For Assignment 5, you will prepare a cohesive, well-written and professionally presented "mini-report" **created entirely in R Markdown** to describe Pacific giant salamander observations (size, channel classification) in an old growth (OG) forest section, and in a previously clear cut (CC) forest section of the creek. To get started:

- Download ***mack_creek_vertebrates.csv*** file, which contains observations for cutthroat trout (*Onchorhyncus clarkii*), Pacific giant salamanders (*Dicamptodon tenebrosus*), and Olympic torrent salamanders (*Rhyacotriton olympicus*). You will only be using observations for Pacific giant salamanders (species code "DITE") for this assignment.
- Familiarize yourself with the data and metadata
- **Citation:** Gregory S. V. 2016. Aquatic Vertebrate Population Study in Mack Creek, Andrews Experimental Forest, 1987 to present. Environmental Data Initiative. https://doi.org/10.6073/pasta/5de64af9c11579266ef20da2ff32f702. Dataset accessed 11/19/2019.

NOTE 1: Read through the entire assignment prompt before starting. You probably want to hold off on writing the *Introduction* and *Data and Methods* sections until after you've completed your data analyses and visualizations.
NOTE 2: You will do everything for this report in R Markdown. We will look at your .Rmd to see your code, but you should **update code chunk settings so that only your final outputs show up in the knitted HTML**. In other words, don't have your code or any warnings/messages show up in the knitted document.
NOTE 3: Download and look at the example report

What you are expected to include in your report:

1. **INTRODUCTION:** A short (7 - 8 sentence) introduction that helps the reader understand the purpose/motivation of the research, and previews the content of the report. **Add an image of the Pacific giant salamander**, making sure to give appropriate credit to the author / creator) in the image figure caption.

2. **DATA AND METHODS:** A brief 'Data and Methods' section (5 - 6 sentences) summarizing the data and how it was analyzed. Briefly describe the variables being studied in this report. Include the types of statistical tests performed, significance level used, and software (with version) for analysis. **Include a map of the area**. You can use an already published map of the area, making sure to give appropriate credit to the author / creator) in the map figure caption.

3. **RESULTS**: Prepare finalized figures and perform statistical analyses (as indicated) to do the following. You are expected to also add useful text that weaves the pieces together into a cohesive Results section (i.e., this should not just be a series of figures and without useful description & text flow between them).

   Results A: Visually compare annual salamander counts in old growth (OG) and clear cut (CC) sections of Mack Creek. For all years when Pacific giant salamander observations were recorded in the study, find the total annual Pacific giant salamander counts for the two sections of Mack Creek. Create a finalized graph to show the changes in annual counts for each section over time, add a figure caption, and briefly describe the trends in text.

   Results B: Table of 2017 salamander counts by channel classification (pool, cascades and side-channel) in old growth (OG) and clear cut (CC) sections of Mack Creek. Using only Pacific giant salamander observations from 2017, create a finalized table showing the **counts and proportions** of salamanders observed in different channel classifications (pool, cascade, or side-channel) within Mack Creek for the two sections (OG and CC). Add a table caption above the table. ***Note:*** *We're only interested in Pacific giant salamanders observed in the creek, so you should* ***exclude*** *salamanders observed in isolated pools (IP) disconnected from the channel.*

   Results C: Using the 2017 counts found in Results B above, answer: is there a significant difference in *where in the channel* Pacific giant salamanders are located (pool, cascade or side channel) between the two sections (old growth and clear cut)? Another way to ask this: Regarding the locations where salamanders were observed in Mack Creek in 2017, is there a significant effect of forest condition (old growth or clear cut) on where in the channel salamanders are found (channel

classification)? Report your statistical findings in text, in the context of the actual counts / proportions you present in the table.

Results D. Compare weights of Pacific giant salamanders in clear cut and old growth forest sections of the creek in 2017. Only considering creek section (OG or CC) as a variable (not further factoring by channel classification), answer: Is there a significant difference in mean weights for Pacific giant salamanders observed in the two forest sections (clear cut and old growth) in 2017?

Results E. Compare weights of Pacific giant salamanders in pools, cascades and side-channels of Mack Creek in 2017. Pool salamander observations from both the old growth and clear cut sections for this part (i.e., you will not consider "section" as a factor here).

- **First,** visually compare Pacific giant salamander weights between the three channel classifications. You can choose how to best visualize the weights between the three groups (Beeswarm? Jitter? Histogram? Density? Something else?), but you should indicate values for the mean, and standard deviation, standard error **or** a 95% confidence interval. Add a figure caption.

- **Second,** answer: Is there a significant difference in mean weights for Pacific giant salamanders observed in pools vs. cascades vs. side-channels in 2017? Describe the results of your statistical analysis in text, within the context of broader (and more important) measures of differences between groups (some options: means differences, effect sizes, percent differences, etc).

- **Third,** describe any concerns you have about comparing *means* across the groups. What might be another option to consider moving forward with the analysis? (You don't need to actually do that here, just describe briefly in 1-2 sentences.)

4. **SUMMARY:** A brief summary of the major findings (pick 3 - 4) from your mini-report. A bullet-pointed list is fine, but the findings should be well-written, responsible (don't overstate your findings), and refer to outcomes (e.g. figures, tables) in the Results section

5. **REFERENCES:** References (including for data sources & literature cited in your introduction) that were used to prepare the report. Reference formatting matters.

WHAT YOU WILL SUBMIT FOR THIS ASSIGNMENT:

- Submit **ONE .Rmd** and **ONE final knitted HTML** for your completed report **per group** on GauchoSpace. No code or warnings / messages should appear in your knitted HTML. We will look at your code in the .Rmd.
- If you work in a group of two, **make sure both members are listed as authors** but only one of you should be submitting the .Rmd and HTML through GauchoSpace

WHAT YOU WILL BE GRADED ON FOR THIS ASSIGNMENT:

- Does the introduction motivate the analyses and preview what is presented within it?
- Are the data and methods clearly and concisely described?
- Are data and statistics presented in graphs, tables, and text correct?
- Are graphs and tables responsible, clear, and professionally presented?
- Are figure captions descriptive, concise, and containing all necessary information to help the reader understand what's shown (e.g. units, series descriptions, etc.)?
- Are statistical outcomes to compare means described appropriately in text (using in-line referencing), along with more important metrics for comparison?
- Is the report thoughtfully organized with clear subsections / headers?
- Does the report clearly communicate outcomes as part of a cohesive story?
- Does the summary correctly and clearly convey the major / interesting findings?
- Are references professionally formatted and presented?
- Is the code within your .Rmd organized, annotated and reproducible?
- Is text well-written, spell & grammar checked, and professional?

Grading will be thorough and detail-oriented for all of the above criteria.