**Assignment:** Write a scientific research paper based on your Independent Project. This paper should have all the components of a publishable paper (see below), including in-line literature citations, a reference section at the end, and several original graphs.

**Format:** A publishable scientific manuscript, formatted for submission to the journal *Ecology*. Details can be found at <https://esajournals.onlinelibrary.wiley.com/hub/journal/19399170/resources/author-guidelines-ecy>

**Grade Breakdown:**

**Title Page, Abstract, and Keywords.** Start with a title page. Include a clear, concise, and informative title. List all members of your group as authors. You may include an affiliation line and a running head (short version of the title that you include on the title page and in the Header at the top of all the other pages). On the next page, include an abstract and keywords. Abstract word count: 300 words, max (aim for 280 – 300 words). The abstract summarizes the most relevant aspects of the study so that a reader understands what was done, why, what was found, and what the authors conclude. The abstract does not cite references or give minute details (e.g., stats tests). This is the only thing many people will read of a paper, so make it good. Following the abstract on the same page, include a list of 5 – 7 keywords that would help potential readers find your paper in a literature search.

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**Introduction.** The introduction sets up the broad ecological context for the study through effective use of primary literature and logical arguments. Start broad, then narrow down until you bring the reader to your study and your research questions, hypotheses, and predictions. You may also include a one or two sentence overview of the methods to help the reader know what to expect next.

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**Methods.** Describe what you did and how, with enough detail that someone could repeat the study and properly evaluate whether your conclusions make sense based on what you did (think: peer reviewers). Be sure to describe not only the relevant field methods but also the analytical methods, preferably in distinct subsections. It may be appropriate to cite literature in this section, including primary sources and field guides. You typically will not need to cite references for standard statistical tests.

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**Results.** In paragraph form, describe your results, citing figures and tables as appropriate. Make statements about your results, and support these statements with statistical findings (typically presented in parentheses at the end of the sentence).

Where do you put figures? At the end of the paper (after the Literature Cited). Include a separate page for each table (if you have any) with a descriptive title above the table. Next, include a page of figure legends; at the top of this page, write “Figure Legends.” Next, use a separate page for each figure, with the figure number indicated at the top of the page. Each figure should have axes labeled with units and should look like a publishable figure. Figures should appear in the order in which they are cited in the text. You may use color or grayscale.

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**Discussion.** Make a statement about the overall findings of your study. Highlight the most important contributions. Don’t restate all the results. Put your work in context in the literature – what have others found? Why is previous work similar or different from what you found? It will be true that this study has limitations, and you should discuss them. But don’t complain about them. Interpret whether the limitations (time of year, weather, duration of study, particular issues with field methods) have created any biases or any reasons to interpret the data in light of these limitations. Suggest next steps and future research directions. How do your results bear on your research question, hypotheses, and predictions? What are the big take-home messages from the study? What do you hope your reader will remember and think about into the future?

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**Literature Cited.** List at least 10 highly relevant, recent (within the past ~10 years), peer reviewed journal articles, plus any other relevant citations such as field guides. Each reference listed should be cited appropriately in the paper using in line citations. Each cited paper should be listed alphabetically in this section. Use formatting from the journal, *Ecology*: ([http://esajournals.onlinelibrary.wiley.com/hub/journal/10.1002/(ISSN)1939-9170/issues/)](http://esajournals.onlinelibrary.wiley.com/hub/journal/10.1002/%28ISSN%291939-9170/issues/%29).

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**Writing Mechanics, Clarity, and Depth.** Use clear, correct grammar and ensure punctuation and spelling are correct. Use concise, well-crafted sentences and precise vocabulary. The reader should be able to discern your meaning effortlessly. In science, we generally do not substitute synonyms for commonly used words; instead, we use consistent vocabulary throughout, so the reader does not have to guess whether we mean different things. The paper should be thorough, with an appropriate level of detail for a journal article. You may use active voice (preferred) or passive voice (acceptable).

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**Writing Structure.** Present ideas in a logical and coherent manner throughout the paper. Use strong topic sentences to guide the reader. The reader should be able to follow the structure of your arguments effortlessly. Ensure all material is in the correct sections.

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**Formatting.** Proper formatting of the manuscript is required and demonstrates your professionalism. Please use the formatting in the example manuscripts and specified above for the journal *Ecology*. This includes using Times New Roman, 12-point font, double-spacing, line numbers, and page numbers. This also includes inclusion of figures at the end of the paper.

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**Data.** All data for the project must be presented along with this first draft, in a clear and complete data set. A metadata tab should be included and contain information about each data table, with units and descriptions of each variable.

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 **Total Score: \_\_\_\_\_\_\_ / 100%**