Insert title of project here

https://github.com/ytgong/ENV322_group_project

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<Arrow brackets are used for annotating the RMarkdown files. Text within these brackets should not appear in the final version of the PDF document>

<**General Guidelines**> <1. Write in scientific style> <2. Global options for R chunks should be set so that only relevant output is displayed> <3. Make sure your final knitted PDF looks professional. Format tables appropriately, size figures appropriately, make sure bulleted and numbered lists appear as such, avoid awkwardly placed page breaks, etc.>

1 Rationale and Research Questions

<Write 1-2 paragraph(s) detailing the rationale for your study. This should include both the context of the topic as well as a rationale for your choice of dataset (reason for location, variables, etc.) A few citations should be included to give context for your topic. You may choose to configure autoreferencing for your citations or add these manually.>

<At the end of your rationale, introduce a numbered list of your questions (or an overarching question and sub-questions). Each question should be accompanied by one or more working hypotheses, inserted beneath each question.>

Each time a storm event occurs, it has the potential to influence the land and waterways with which it comes in contact. A storm can bring high levels of precipitation that can flood rivers and streams and temporarily alter their discharge levels. The precipitation can also alter the biogeochemistry of water bodies: eroding soil, increasing terrestrial inputs of organic matter, and transporting in contaminants such as pesticides and fertilizers. Alterations to the natural processes of streams impact the ecosystems present in the streams and can affect human activity such as hunting, fishing, recreation, and the utilization of river water for irrigation. Eutrophication is one example of a massive alteration to a river that can have negative consequences for people. Eutrophication is the induction of a dead zone devoid of oxygen in a body of water due to nutrient loading from a storm event.

The effects of storm events on bodies of water are compounded by human activity. The use of pesticides and fertilizers on agricultural land makes nutrients such as nitrogen and phosphorus accessible for storm transport in the first place. Furthermore, anthropogenically-induced climate change is intensifying natural precipitation events by making them wetter, longer, and more intense. As storms worsen, so do their effects.

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This applies to the region we are studying in particular. Florida is a state that has a
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It is important for us to understand the science behind the interaction of storms and st
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Our research questions are:

What, if any, is the correlation between hydrologic flashiness and chemical flashiness in Florida?

What aspects of a stream influence chemical flashiness in Florida?

What aspects of a storm influence chemical flashiness in Florida?

2 Dataset Information

<Provide information on how the dataset for this analysis were collected, the data contained in the dataset, and any important pieces of information that are relevant to your analyses. This section should contain much of same information as the metadata file for the dataset but formatted in a way that is more narrative.>

<Describe how your team wrangled your dataset in a format similar to a methods section of a journal article.>

<Add a table that summarizes your data structure (variables, units, ranges and/or central tendencies, data source if multiple are used, etc.). This table can be made in markdown text or inserted as a `kable` function in an R chunk. If the latter, do not include the code used to generate your table.>

For this analysis, our datasets were USGS NWIS high frequency and water use data. The data contained in our datasets for hypothesis 1 are the site number, date/time of measurement, instantaneous discharge, and instantaneous nitrate. Contained in the datasets for hypothesis 2 and 3 are site number, date/time of measurement, instantaneous discharge, nitrate, pH, dissolved oxygen, specific conductance; population of the county each site is in, and the amount of surface water used for thermoelectric, industrial, livestock and irrigation uses in each county. We wrangled all our data frames to include periods of data that included all of the variables, and that exhibited the most continuous measurements - all for easier, more standardized analysis and visualization. We chose sites from the state of Florida because it had sufficient sites with high frequency nitrate and discharge data.

Variable	Units	Type	Hypothesis
Proximity to Farms	km	Independent	2
Urban / Rural	N/A (Categorical variable)	Independent	2
Trophic State	N/A (Categorical variable)	Independent	2
Average discharge	m^3/s	Independent	2
Total annual rainfall at site	mm	Independent	2
Soil type	N/A (Categorical variable)	Independent	2
Slope	m/km	Independent	2
Storm rainfall	mm	Independent	3
Storm duration	minutes	Independent	3
Storm precip. rate (rainfall / time)	mm/minutes	Independent	3
Initial stream discharge/average discharge	ratio	Independent	3
Total suspended solids	mg/L	Dependent	To determine che
Conductance	Siemens (S)	Dependent	To determine che
Nitrate concentrations – high frequency	ng/L	Dependent	To determine che
Discharge – high frequency	m^3/s	Independent	1
Richards-Baker Index value		Independent	1

3 Exploratory Analysis

<Insert exploratory visualizations of your dataset. This may include, but is not limited to, graphs illustrating the distributions of variables of interest and/or maps of the spatial context of your dataset. Format your R chunks so that graphs are displayed but code is not displayed. Accompany these graphs with text sections that describe the visualizations and provide context for further analyses.>

<Each figure should be accompanied by a caption, and each figure should be referenced within the text>

4 Analysis

<Insert visualizations and text describing your main analyses. Format your R chunks so that graphs are displayed but code and other output is not displayed. Instead, describe the results of any statistical tests in the main text (e.g., “Variable x was significantly different among y groups (ANOVA; df = 300, F = 5.55, p < 0.0001)”). Each paragraph, accompanied by one or more visualizations, should describe the major findings and how they relate to the question and hypotheses. Divide this section into subsections, one for each research question.>

<Each figure should be accompanied by a caption, and each figure should be referenced within the text>

4.1 Question 1:

4.2 Question 2:

5 Summary and Conclusions

<Summarize your major findings from your analyses in a few paragraphs. What conclusions do you draw from your findings? Relate your findings back to the original research questions and rationale.>

6 References

Chislock, M. F., Doster, E., Zitomer, R. A. & Wilson, A. E. (2013) Eutrophication: Causes, Consequences, and Controls in Aquatic Ecosystems. Nature Education Knowledge 4(4):10

Smith, V. H. & Schindler, D. W. Eutrophication science: where do we go from here? Trends in Ecology and Evolution 24, 201-207 (2009).

Stephenson, C. “Addressing Eutrophication in Florida, one watershed at a time.” University of Florida: IFAS Extension. July 23, 2018. Web: https://nwdistrict.ifas.ufl.edu/nat/2018/07/23/addressing-eutrophication-in-florida-one-watershed-at-a-time/.