Propose a research project that you will conduct as your final project for ESSM 462. The research should be relevant to ecosystem science and management and should include details of the spatial data analysis that you will use to help answer your research question. Proposals need to include an explanation of the proposed research (\textit{what} will be done), methods and techniques that will be used (\textit{how} it will be done), and novelty or importance of the study (\textit{why} it should be done).

\textbf{Title}

Provide a specific summary of the proposed work.

\textbf{Abstract}

This is a brief description of the hypothesis and the goals of the experiment. It should indicate what questions you, as a researcher, will be seeking to answer. An abstract provides a summary that allows readers to quickly assess the basic premise of your proposal.

\textbf{Introduction and Literature Review}

You should begin with the basics of your research topic and then narrow the focus of those details that are especially pertinent to the proposed work. Present what ecosystem scientists currently know, and how these discoveries were made. This is the place to show what is interesting and cutting-edge in the field that led to your research idea. You are laying the groundwork for your proposal with the material that you present. Use a plethora of sources especially primary sources such as journal articles. Make sure to cite appropriately in the text.

This is the heart of your assignment and will probably be the lengthiest piece of it. Your sentence structure should look something like this:

- “According to Thullen et al. (1999), nitrate removal rates were highest in those wetlands that contained a diverse plants species.”
- “Within organisms cellular nitrogen generally exists as either ammonia-nitrogen or amino-nitrogen, which are the most reduced forms of nitrogen (Delwiche, 1981).”

Never leave your reader in doubt as to the source of your information! Cite thoroughly and cite properly.

***A note on sources, paraphrasing, and citations:***

Unlike the style you might use in English expository writing, technical science writing is terse, clear cut, and lacking in artistic enhancements. When using information from a source avoid quoting directly. Read the piece, put the article down, and then put the important points into your own words. By setting the article aside you are allowing yourself to process the information, instead of just spitting the idea back out in a slightly altered sentence.
Citations tend to be (author, year). If you refer to the author in the sentence, immediately follow the name with (year) (see examples above).

**Research Hypothesis**
What is the hypothesis that you are testing? What are the questions that you seek to answer? Based on what is known in this field, explain what you expect to see and hope to show through your result. This is where you share your thoughts.

**Material and Methods**
Describe your proposed analysis in depth. What processes are you going to use? Be thorough, but not excessive. It might be useful to construct an outline before completing this section, as this will give you an idea of what should be occurring when, and if your goals are attainable in the given time.

**Conclusion and Justification**
Your literature review will have already helped to lead the reader to an understanding of why your topic is of importance. This is where you will explicitly state how your proposed research will advance knowledge. What are the far-reaching effects? Will your study potentially change practices or policies? Why is it that your research deserves to be done?

**Bibliography**
Include all the resources that were used in the writing of the paper. Follow guidelines for formatting, which resemble the styles that your would find in a plant biology journal.

Example:

***A note on Voice: There is no one format for voice in scientific writing. Active voice is usually encouraged (action verbs instead of is or was) and first person (use of “I” or “We”), but in practice many writers switch between active and passive voice, and first and third person, to keep the writing from becoming too repetitive.***

**Important Points to Remember**
- An organized, well-written, concise, complete proposal = an easier to conduct analysis.
- A good proposal is like a good sales pitch. In the world of scientific research and management, a proposal is the means by which funding is secured.
- Good writing, when paired with a thorough understanding of the subject matter, is a valuable skill to possess.