Community partner's mission, operations, and impact

The Sewanee Bat Study is a research study conducted by Amy Turner in the Office of Environmental Stewardship and Sustainability (OESS). The OESS strives to provide natural resource experiences and societal experiences that foster understanding of our place in the world while aiming to empower human communities and natural communities. One way in which they hope to achieve this vision is through the Sewanee Bat Study.

Project's Objective: The Sewanee Bat Study aims to further understand management strategies and its impact on the foraging habitat of cave-dwelling bat species in order to properly manage forested sites and control the spread of white nose syndrome (WNS), a disease that kills hibernating bats.

To accomplish this goal, the project placed monitors throughout the domain to record bat sound waves and frequencies. Bats navigate and find food by producing sound waves at frequencies above human hearing that bounce off objects in their environment, and the sounds return to the bats' ears. Using specialized microphones and recording devices, Amy Turner and her team can identify and study bats by recording their calls and translating the calls into forms that humans can see and hear. Since bats change their calls for different purposes and each species of bat has its own unique call pattern, the Sewanee Bat Study can analyze this data to monitor activity and the survival of bats. This study allows Sewanee to track bat populations, determine what management efforts are needed to protect those populations, and provides students with the opportunity to research and learn about stewardship and sustainability at the University. Sewanee is one of the few places that does bat research year round, and this research will have a huge impact on conservation efforts and will foster conversation on how to manage the land in Sewanee.

Community partner's need

In regards to a physical product, the Sewanee Bat Study needs their data temporally analyzed and summarized on an online interactive dashboard. The program has been collecting data for almost six

years and does not have a summarization or analysis of the data demonstrating trends of the Sewanee bat population.

The Sewanee Bat Study hopes to take on an intern who will continue work with the program through the Fall of 2022. This intern will work with DataLab but will also be specially trained to analyze the acoustic data files from a biological research perspective. The student who takes on this role could begin research in the summer and continue in graduate school, and this position will provide an opportunity to develop relationships with external partners, which could lead to internship and job opportunities. Ideally, this intern would be a conscientious individual who is interested in mathematics or statistics and interested in working on this particular project. This internship position would be funded by OESS.

Proposed DataLab project: (A) a description of the MVP, then (B) a description of possibilities for optional work beyond MVP.

The Sewanee Bat Study is a large project that may not be able to be completed in one summer. Therefore, Amy Turner suggested that instead of creating an MVP, the project should be completed in phases. It could also be interesting to streamline this project into a capstone project.

Phase One/ MVP

The first phase would consist of an online interactive dashboard that summarizes and temporally analyzes the data. Due to climate change, the winter months have become warmer, and the Sewanee Bat Study hopes to analyze the differences in yearly bat activity during the winter months. Also, white nose syndrome has caused the number of evening bats to increase, and the leaders of this study hope to determine if this data reflects the understanding of white nose syndrome's impact on the population of evening bats.

Phase two

Aside from these two main necessities for the dashboard, another phase could analyze weather patterns and their impact on bat population and species competition over the years. It would also be beneficial to develop a biological station data repo that allows for others to explore and access the data and to add mapping and geographic information to the dashboard.

Project's potential impact

This research impacts the world of sustainability, bats, and forest management. By publishing this data, others would learn about the impact of management strategies on the foraging habitat of cave-dwelling species and new management strategies could be developed to control the spread of WNS. This project encourages researchers and others to think about weather patterns and how the warming of the climate impacts species. In regards to students, the Sewanee Bat Study gives them the opportunity to become involved and develop along with the program.

Data availability and logistics of acquisition

The Sewanee Bat Study has been recording data since 2017 and began with 3 monitors but has acquired a total of 9 monitors over the years. The monitors detect and record the calling patterns of bats when the bats are looking for food which has created an immense amount of raw data that is stored in wav files. The wav files produce excel files that determine what kind of bat the calling pattern may be associated with. Another program called kaleidoscope is then used to serve as an extra set of data analysis in determining what kind of bat is associated with the specific calling pattern. The data is processed every month and put into a new folder. Therefore, the data is organized into separate excel sheets that are in individual folders. These files will be easy to obtain via email, however each year is in 12 separate folders which contain data for each month.

Pre-mortem analysis of possible roadblocks, needs and unknowns with respect to data access and other critical aspects of the project.

A possible roadblock is that there is a lot of data and a lot of hopes for this project. Amy Turner discussed this project occurring in phases, and since there are so many needs for this project, not all of them may be accomplished this summer. It also may be difficult to find an intern that was described above**.**

History of communications with the partner: how many times you met, names and contact info for everyone involved in the project.

I have met with Amy Turner twice throughout this semester.

Next step in solidifying this partnership.

The next step is to obtain the excel sheets and the data from Amy Turner and Kevin Fouts and to search for a specific intern who would work for DataLab and Amy Turner. Amy Turner is excited to have the opportunity to talk about her research during the summer as well as to show the sites of the project to the individuals who will work on the project.

Appendix of any additional resources (links, documentation, etc.)

Contact Information		Additional Resources
Amy Turner	Kevin Fouts	Article on the Project
	(678) 923-2683	Bat Study Capstone
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