

My internship this summer consisted of two phases. For the first part of the summer, I was as a research assistant to Dr. Deborah McGrath of the Sewanee Biology department. I worked for Dr. McGrath on her project in Haiti. I then took the data collected in Haiti to the second phase of my internship at the Geospatial Analysis Lab of the University of San Francisco in San Francisco, California.

The research I was conducting in Haiti centered upon the Zanmi Kafe (Haitian Creole for Partners in Coffee) project, a partnership between Sewanee and a Haitian non-profit organization called Zanmi Agrikol (Partners in Agriculture), an affiliate of the global health organization Partners in Health. The Zanmi Kafe project was created by Dr. McGrath in cooperation with several partners in Haiti as a potential method for supporting sustainable reforestation of the country while also supplying Haitian subsistence farmers with a living income.

Due at least in part to its dependence on charcoal for cooking and heating, Haiti is the most deforested country in the world, retaining about 2% of its native forest. With deforestation come attendant problems such as erosion, which has depleted much of the productive farmland in the country. This is especially problematic as most Haitians are subsistence farmers. The method of operations for Zanmi Kafe is to provide the infrastructure for the creation of sustainable coffee agro-ecosystems in the Mountains of Haiti. Haitians who sign on to the program receive a number of coffee seedlings, as well as several other seedlings of faster-growing canopy trees to plant around the coffee. These canopy trees, which are essential for the growth of the shade-loving coffee trees, will also provide nutrients to replenish the soil.

In addition to this, the large canopy trees will also act as sinks for carbon sequestration. For this ecosystem service, Zanmi Kafe provides the farmers with a small remuneration, which offsets the money they might make by selling a tree for charcoal in order to feed their families.

My job this summer was to develop a method of remotely quantifying change in carbon sequestration for the farms partnered with Zanmi Kafe. This would allow us and future projects based on our model to determine the efficaciousness of our project without costly and time-consuming ground surveys. To this end, I spent my time in Haiti directing a research team in sub-sampling of carbon sequestration on partner farms. We spent five weeks hiking to the relatively remote villages in the mountains of Haiti where Zanmi Kafe has partnerships and collecting field data on tree height, diameter, etc. This data was taken to San Francisco for the second part of my internship.

In San Francisco, I worked at the USF Geospatial Analysis Lab under the direction of David Saah, a leader in the field of ecosystem service quantification. Here I learned the method by which field data samples can be statistically correlated with specific color bands of satellite imagery to provide a method of remotely determining aboveground biomass and carbon sequestration on a larger, landscape scale.

While I was in San Francisco, I was also co-opted to another project that the USF Geospatial Analysis Lab was undertaking, which was to develop a graduate-level introductory class on LiDAR (Light Detection and Ranging) systems and interpretation. LiDAR is an emerging field with many useful applications ranging from forestry to urban planning, and is

often used to quantify carbon sequestration in places where such data is available, thus making it a field of significance to my study. Sewanee has also recently acquired a LiDAR dataset for the domain, making knowledge of LiDAR interpretation invaluable to the University. Working with another Sewanee student and our lab manager, I helped to develop a class that will be taught at USF this fall, and hopefully will provide a resource for Sewanee students in years to come.

Over the course of this internship, I learned many valuable lessons about leadership and teamwork that cannot be contained within the bounds of a short report, but which have certainly made me a more confident, better leader. I gained insight into the workings of NGOs (such as Zanmi Kafe and Zanmi Agrikol), and the difficulties and intricacies inherent in projects designed to help people and the environment. This is invaluable to me, as I plan to continue in the field of promoting ecosystem health and human development.

Furthermore, I gained a valuable skill set. The knowledge I gained in forest inventory methods, as well as the mathematical methods used to determine various forest metrics such as carbon sequestration, will be useful in any variety of future careers I may undertake. Meanwhile, my knowledge of LiDAR interpretation provides me with a skill much sought after in innumerable professions, and a foot in the door of an emerging technology that continues to become more widely used and important every year. I have not only gained knowledge of how to interpret LiDAR data, I have also gained the resources required to teach others to interpret this data. Finally, I have gained a number of invaluable acquaintances in several Haitian NGOs, as well as the field of ecosystem service quantification in general and at USF in particular, and I have broadened my horizons.