



Truman State University
Kirksville, Missouri
Habitat – Carbon Sequestration

FELLOW

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SCHOOL

Truman State University, public 4-year liberal arts institution, 5,559 full time students, Kirksville, Missouri.

ABSTRACT

A ¼ acre carbon sequestration plot and windbreak, containing 585 woody plants and an herbaceous understory, has been established at the University Farm. A mixture of Natives trees, shrubs, legumes, forbs and grasses were chosen to maximize carbon storage. Baseline data for soil carbon content and survivorship of the established plants has been collected. We will continue to collect soil carbon and biomass data for many years to come in an effort to show a verifiable net carbon sequestration based on a land use change. A total of \$1,656.16 has been spent in order to establish the plot, construct a protective electric fence and collect initial soil carbon data.

GOALS AND OUTCOMES

Goals

From the outset of the project, we hoped to: successfully establish the desired vegetation in our experimental plots by May 2009, establish a course that would work in conjunction with the project and be involved in measuring and analyzing the carbon sequestering ability in the experimental and control plots, and also to quantify the net carbon balance of the University Farm property. We hoped to initiate the course by the fall 2009 semester and to establish a service learning outreach connection with Kirksville R-3 public schools. Over the next 2-3 years, we hope to successfully maintain the integrity of the experimental plots and continue to collect soil carbon data for the experimental and control plots, as well as continue to offer the accompanying course. We also hope to better establish the service learning outreach component with Kirksville R-3 public schools. Looking farther into the future, we hope to serve as a resource for students and land owners who wish to explore the possibility of creating a net carbon sink with their land, in an effort to combat climate change.

Accomplishments and Outcomes

We achieved almost all of our goals stated above and exceeded our expectations in some areas. We were successful in establishing our experimental plot in the summer of 2009. 585 woody plants, an herbaceous understory and an electric fence were successfully established. We were also able to establish the accompanying course ahead of schedule. We first administered the course ENVS 380: Climate Change, Land Use Change, in the spring of 2009, with an enrollment of 14 students. The course was also offered in the fall of 2009, with an enrollment of 8 students. The students in the course contributed greatly to the success of the project, with some assisting in planting, research, plot maintenance, and presentation

preparation for conferences. We are still in the process of parameterizing the Century Model, which we still hope to use to model the carbon balance of the University Farm property. Parameterizing the Century Model has been one of many key issues undertaken in the course. We have also covered many subjects relating to climate change; including, but not limited to: national and international climate policy, climate change science, the carbon and nitrogen cycles, carbon sequestration science and current events related to climate change. A permanent service learning outreach component has not yet been established. However, students have developed lesson plans that may be used by future students in outreach activities with the Kirksville R-3 schools. Although a permanent link with Kirksville Schools has yet to be established, we have participated in various outreach projects such as the regional high school Science Olympiad and the “Science on Saturday” program, which brings area elementary students to the university to participate in fun scientific based activities. Time constraints and alternative opportunities for outreach have been the main reason we were unable to meet our goal of establishing a service learning outreach component.

Our Project is one component of a broader movement on Truman’s campus to bring awareness to, and implement, more sustainable practices. In addition to a burgeoning local foods movement, campus-community bike co-op, and many other projects, our project has been an example of how Truman students are striving to make Truman State University more environmentally conscious and sustainable. Our plot also has a direct impact on the local environment of the University Farm. The establishment of our species rich plot of native vegetation will serve to improve local ecosystem functions. Our plot will also serve to improve the quality of the University Farm by providing a desired wind break for cattle.

Challenges and Responses

The major challenges facing our project were a result of time constraints and inclement weather. The initial establishment of the plot faced many obstacles that we were eventually able to overcome. Planting of the woody vegetation and herbaceous understory was continually delayed in the spring of 2009 due to consistent rain. In order to prepare the land for planting, the soil had to sufficiently dry to allow a tractor to pass over and lightly till the existing vegetation. Due to rain delays, the woody plants were forced to sit in cold storage for over four weeks; approximately two weeks longer than the suggested maximum storage time. Once the woody plants were established, they also faced harsh conditions. Significant efforts were undertaken to insure that the plants had the best chance of surviving the harsh conditions. This mostly involved careful monitoring and diligent watering for multiple weeks. Fortunately, a majority of the plants were able to survive the prolonged storage and harsh transplant conditions. Establishment of the herbaceous understory was also a challenge. Due to continued rainfall and time constraints, we were unable to spread seeds as early in the growing season as we had planned. This late seeding allowed unwanted vegetation to take hold and thrive in the experimental plots. We performed hand weeding and mowing of the plot to facilitate the growth of desired vegetation. However, it will be necessary to re-seed the herbaceous understory to get better establishment of the desired species. To date, we have only confirmed the successful establishment of one understory species: Illinois Bundleflower (*Desmanthus illinoensis*). For future projects, I will try to prepare more for the possibility of inclement weather.

Campus Climate Action: Your School’s Carbon Footprint

Our project is addressing climate change directly by attempting to create a net carbon sink from a verifiable land use change. We do not yet know the full impact of our project, as the amount of carbon stored will be determined after many years of soil carbon and biomass data accumulation.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

There were many individuals who were crucial to the success of our project. The students of ENVS 380: Climate Change, Land Use Change, were highly involved in many aspects of the project. Most notably, Matt Rhodes has been deeply involved in the project, from establishment of the plot, to parameterizing the Century Model. The farm manager, Bill Kuntz was incredibly helpful and supportive of the project from the beginning, allowing us to use the space on the University Farm, as well as any tools we required. He was also responsible for installing the electric fence necessary to protect the plants from grazing by cattle. Dr. Michael Seipel, Chair of the Department of Agricultural Science and Troy Paino, the former Provost and Vice President for Academic Affairs, and current University President, were very supportive of our efforts. Very special thanks is also given to Dan Fister, who was instrumental in performing research for and assisting in writing our grant proposal, as well as implementing the first offering of the course. Lastly, this project would not have been possible were it not for the incredible support and guidance from Dr. Michael Kelrick, who has been indispensable to this project's success.

Funding and Resources

To date, the project has cost \$1,656.16. We have \$272.84 in funds remaining, which will be used to purchase additional seeds for the understory and to continue taking soil carbon samples. Additional funding (\$3000) for student labor was provided by Troy Paino, through the office of Academic Affairs. The project was fully supported by the Department of Agricultural Science and the Farm Manager, allowing us to secure the necessary space.

Education and Community Outreach

In addition to participating in the local Science Olympiad and "Science on Saturday" programs, we were able to engage our campus and individuals throughout Missouri by participating in multiple conferences. We were able to present at Truman's own, Sustainability Conference, in spring 2009, the 1st and 2nd Annual Show Me Sustainability Conferences, at the University of Missouri in spring 2009/2010, the Missouri Powershift Conference in fall 2009 and the Truman State University Bioenergy Conference, in December 2010. These conferences gave us opportunities to share our project with students, professors and professionals in related fields from around Missouri and neighboring states. These exchanges have allowed us receive valuable constructive criticism, interest, and encouragement from talented and passionate individuals.

National Wildlife Federation's Campus Ecology Program

Without the Campus Ecology program, this project would not have been possible. The opportunities they have provided us are invaluable and very much appreciated. The resources made available by Campus Ecology and the training session in Washington DC were both inspirational and informative. Having a community of like-minded individuals all working on sustainability projects was also very encouraging.

CONTACT INFORMATION

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

Truman has a small, but dedicated group of students, faculty and staff, comprising an environmental movement that is steadily addressing issues facing our campus and community. Groups such as the Environmental Campus Organization, the Bike Co-op, and the newly formed Communiversity Garden are hard at work, making Truman State and the City of Kirksville more sustainable communities. The Communiversity Garden represents the powerful local foods movement that is pushing the campus to obtaining ever increasing amounts of food from local producers, including our newly created campus garden. We do not currently have a formal sustainability office. Truman is also in the beginning stages of completing the AASHE STARS program.

COMMENTARY AND REFLECTION

Never underestimate your own abilities. A small group of dedicated individuals can bring about great changes. A couple of years ago, I would never have imagined that I would be involved in a project such as this, but here I am! Find something you are passionate about and run with it, you will be surprised by how far you can go!

It is hard to name the one, most valuable aspect of my Campus Ecology Fellowship experience. The opportunity to pursue something I am passionate about and to make a difference for my campus has been incredible. It has also been very gratifying to work with such talented and passionate individuals within the Campus Ecology team. The inspiration I have gained from the other fellows is immense, and for their dedication and support I am very grateful. I know that I have grown as a leader and as a person through my experiences as a Fellow. I hope my campus will grow alongside our project for years to come and become a leader in sustainability as well.