The Ecological Society of America's SEEDS Program

SEEDS Field Trip

Cedar Creek Ecosystems Science Reserve

September 20th – 23rd, 2012

Introduction:

The SEEDS Fall Field Trip took place at the Cedar Creek Ecosystem Science Reserve, Bethel, MN from September 20th – 23rd, 2012. There were 24 diverse student participants from across the nation and from different cultural and educational backgrounds. The group of students experienced four days immersed into what a career in ecology would look like. This included field work, data analysis, and bird monitoring. A career panel composed of Cedar Creek staff and guests allowed students to explore possible ecology careers, and interaction with graduate students from CBS gave students insight into research and paths leading to graduate school. Students also took a trip to visit the Wildlife Science Center in Columbus, MN, where they learned about the larger mammals in North America. On the final night of the trip, students sat around a bonfire with Iyekiyapiwin Darlene St. Clair, Visiting Associate Professor of American Indian Studies at the University of Minnesota and learned about Dakota and Ojibwe culture, history and how science and native knowledge can be jointly supportive.

Group 1
Thursday Evening, Friday Morning

All 25 SEEDS participants arrived at the airport in Minneapolis Saint Paul and were driven by vans provided by UMN to the Cedar Creek Field Station. Fred Abbott and Teresa Mourad of ESA and Mary Spivey of Cedar Creek Field Station greeted us as we arrived at the station. The group then gathered at the Lindeman Center to have a delicious dinner of bison lasagna and salad. As an introduction to the field trip the students were brought together by the "name background game" where students gave a family related or cultural background to their name. Mary Spivey, the educations programs coordinator, then proceeded to present historical information. The first ecosystem research was done by Ray Lindeman, which gave rise to ecology as a respected science. We also learned how Cedar Creek was the birthplace of telemetry. Fred Abbott gave a closing statement about the outline of our trip and then SEEDS students dispersed to the welcoming accommodations provided by Cedar Creek staff. Later that evening all SEEDS participants accompanied by Fred Abbott of ESA and SEEDS Alum Beatriz Jimenez went on a walk by flashlight exploring one of the nature trails of Cedar Creek, which was cut short by the rain. Friday morning, the group woke up in the South Lodge, where all 25 of us ate breakfast. After breakfast we walked over to the Lindeman Center and packed brown bag lunches consisting of cold cut sandwiches and other snacks. At 8:30am, before we headed out to begin a small research project at Field D, on Cedar Creek Reserve, to learn about field techniques used by Cedar Creek Staff, we were introduced to Jeff Corney, the managing

director of Cedar Creek Field Station. With the guidance of Mary Spivey, Jeff Corney and Katrina Freund, we split into small groups to learn how to identify native grasses, forbs, shrubs and trees.

In our working groups, we learned how to survey plant diversity with commonly used 10m transects. We surveyed in 3 areas; one section had not been subjected to any prescribed burning, the adjacent section is burned 1 out of every 3 years and the third section was burned with high frequency averaging 2 out of every 3 years. With preliminary observations, we hypothesized about the effect of prescribed burning on plant diversity. Once we had finished collecting data we headed back to the vans to have our brown bag lunches.

Seeds from different fields
will one day have great yields
Each one took a different path
but came together to do the math
1 part passion
1 part knowledge
and a dash of humor
=success
We share our experiences, our ideas, and our plans
Thank you ESA, for being our #1 fans!

Group 2
Friday Afternoon and Evening

After lunch we loaded into the vans and drove one mile down the road to one of Chickadee Jim's birdfeeders. We were looking for his namesake – the chickadee – and not only did we find them, but his trained ear heard every bird in the forest. He explained the complicated pecking order that arises at the birdfeeder between species and sexes within species. Chickadee Jim has been tagging birds at Cedar Creek for thirty years. He makes nests in dead trees for the

chickadees and tags and follows young fledglings coming out of these nests. He took us on a walk along an oak woodland and open space looking for another of his favorite local birds – the red-headed woodpecker. We found a family of red-headed woodpeckers in a dead aspen on the edge of a bog, where they catch flying insects coming out of the water. Chickadee Jim has tagged around fifty red-headed woodpeckers, and we would have loved to tag these but catching them can take up to two hours, and we were looking forward to data crunching.

We returned to Lindeman Research Center to get some coffee and continue our morning activity looking at how prescribed burning affects plant diversity in Minnesota oak savanna. Our task now was to (hopefully) find some trends in the morning's data. Groups that had worked in each of the three treatments – no burn, low burn, and high burn frequencies – collaborated to calculate raw species richness and a weighted diversity index. Overall, we found that both species richness and the weighted species diversity are highest in high frequency burn sites. These data suggest that fairly frequent fires allow many plant species to establish themselves in an environment without allowing any highly-competitive species to dominate. Minnesota historically had frequent fires and supported a healthy savanna ecosystem. After European settlement, fires were suppressed. Restoration of a healthy savanna ecosystem statewide, then, depends on re-establishment of a burning regime.

After data crunching, we circled together as a SEEDS group to discuss what exactly ESA is and does. As a group after this discussion, we came up with what we think SEEDS and ESA mean to us personally, as scientists, students, and people. ESA is a great network for us as students and scientists to meet peers, mentors, and future employers. Within ESA and SEEDS we collaborate for a diverse science and people. We not only get our feet wet by being exposed to other scientists, but we also encounter other ecosystems and cultures within ESA. With this network, we can hopefully learn how to not only inform each other as scientists, but also share with the rest of the world for a better tomorrow.

On the schedule, the evening event was listed as “surprise”, and we were kept in the dark until we were loaded into the vans and brought to the Wildlife Science Center in Columbus, Minnesota. This center focuses on conservation of large predatory mammals in the state. The menagerie at the Science Center includes wolves, bears, mountain lions, lynx, coyotes, foxes, and an eighteen-year-old New Guinea highland dog. Many of these animals, such as bears and coyotes, are present at Cedar Creek but are often only seen on camera traps. All the animals at the Center were rescue animals from local accidents or from other wildlife centers and zoos. Many of the species at the Center are endangered and continue to be endangered by human development and unregulated hunting. As we lit a campfire and listened to the howling wolves, we reflected on how the conservation of these apex predators is essential to ecosystems like Cedar Creek.

Group 3
Saturday Morning

As a group we began our day by eating a hardy breakfast before loading the vans. As we were heading out Hannah, one of the students, discovered mammal scat under one of her boots, which she had to clean off before getting into the van. At 8:46 am we crossed the fence into the study site that we have only heard about in textbooks. On the background the sound of the nitrogen machine was really loud. As we stepped out of the vans into the bitter freezing cold Minnesota weather, we noticed the 342 squares that are part of the legendary Tilman experiment, BigBio. Mary Spivey started off by introducing us to the experiment and its founder David Tilman. Tilman was trying to answer the question: "Does biodiversity affect plant productivity?" To go about this question he started this experiment in the late 80's by converting a 20 ha hay field into what know is known as BigBio. Each of the 342 plots contains a different number of native species ranging from 0 to 32, each of the species is a member of one of 4 functional groups (legumes, forbs, C3 or C4). During our time in the field we had a chance to examine the soil in the different plots and noticed how it varied depending on the number of species.

After our visit to BigBio we loaded up the vans again and traveled a staggering 20 feet into the ConBio experiment. This experiment has a similar setup as the Big Bio but at a much smaller scale. Jeff Corney gave us an overview of the experiment that they have been running for 15 years. The purpose of the experiment was to understand how higher levels of CO2 and nitrogen affect native grasslands. In this experiment they manipulate the availability of these nutrients. The costs of running this research are very high, for example they spend approximately 125,000 dollars every year for the purchase of CO2. The setup of the plot is a ring of PVC tubes were they maintain co2 concentration using sensors that measure the wind direction and can tell where they must increase the release of co2 so that it is equal throughout the plot. After learning about these 2 experiments we drove back to headquarters.

When we returned to headquarters we were excited to find a panel of graduate students from the University of Minnesota who had prepared presentations for us about their experiences in ecology. The first speaker, Adam Clark, talked about his research in poly-culture systems, from which he has sought to create biofuels. The second speaker, aka "fungirl", spoke about her research experience and her journey into graduate school. She also introduced the topic of her dissertation—plant-entophyte relationships. Daniel Nidzgorski was the third speaker. He had a very influential stage presence and he sought to interact with all of us in the audience. Daniel's presentation was about the relationship between the level of nutrients in groundwater and tree presence in urban areas. Peter Wragg, the last speaker on the panel, was a graduate student

from South Africa. He shared insight into his studies on the effect of temperature, fire, herbivores, and nutrient availability on grasslands.

THEN WE ATE TACOS. THE END

Group 4
Saturday Afternoon, Evening, and Sunday Morning

Following a taco lunch with the grad students, which allowed us to ask them about their personal experiences as ecologists and students, we sat in on a career panel. The panel included Mary Spivey, Jeff, Jim Kreuger, Caiti, Amy Thompson, and Bea Otero and was moderated by our own Teresa.
Jeff pointed out how education was one of the most important elements of his job as managing director of Cedar Creek and that he often had to be very flexible when acting as the public interface for ecology. He also stressed how important it was for him to teach and present the importance of ecology so that the public felt their tax dollars were being put to good use.

Mary Spivey, the education coordinator at Cedar Creek, emphasized the importance of education and curiosity and the fact that we are all life-long learners. She stressed being proactive and giving your opinion as opposed to just following directions.

We then heard from Jim Kreuger, a charismatic entrepreneur and Cedar Creek grounds supervisor (among many other titles), who initially started working in the private sector in order to support his family, but has been able to achieve the career he always wanted. He was truly inspirational in reminding us all that you won't have the career you want overnight. It takes time. You have to take chances.

Caiti, a researcher and education coordinator assistant, reminded us that there is a lot of self-motivation involved in the field of ecology. She spoke of being motivated from childhood because of reading Dr. Seuss' "The Lorax." When it came to deciding a path after college, Caiti told us how she followed her gut and turned down a master's program so that she could work at Cedar Creek where she discovered her unexpected passion for science education.

We then heard from Amy Thompson, who runs her own environmental education consulting agency. She was once a national park ranger but left that career in order to have time for other hobbies in her life. She bestowed a lot of wisdom about starting your own business and the trials as well as the satisfaction she got from her work. She said that passing on excitement and enthusiasm in her workshops was the most important parts of her job.

Finally, Bea, a fellow SEEDS alumnus, talked about her experience in graduate school and the import role mentoring played in her developing an interest in ecology. She said that working in a lab that allowed her to have close contact with a professor was crucial to her continuing to study ecology in graduate school. One particular experience she had on an REU in Costa Rica

illuminated the importance of communication and conveying scientific information to non-scientific community members. Science communication has become a strong passion of hers.

After the informative and candid career panel, the staff members and seedlings meandered down the trail to the Cedar Creek Bog Lake where we had a chance to talk one-on-one with all the panel members. As we walked we observed the dramatic changes in landscape from prairie to a Boreal Forest/wetland and finally through one of the last undisturbed deciduous forests until we reached the lake.

We discussed how the lake was the starting point from which Cedar Creek was developed when it was discovered to be a late succession lake in the 1940s. We observed the Swamp Loosestrife or *Decadon verticillota,* which is an endangered plant that was turning a deep shade of rustic red in the fall weather. The presence of this especially sensitive species signifies that the lake has been undisturbed since its genesis. Finally, Mary Spivey read a poem by the late Raymond Lindeman, which he wrote about all that the natural Minnesota landscape had to teach us. The lake was the perfect location for a SEEDS photo-op.

After a short amount of downtime, we came back together for a large barbeque with the seeds staff and family. We had a professor of Native American culture come and speak about the Native American populations of Minnesota. Finally at the bonfire we were able to reflect on our time together and each participant shared his or her own personal experience. Fred couldn't contain his excitement and whipped out his banjo and danced around the bonfire. The next morning we said our goodbyes and returned to the airport to catch our flights home.