

Environmental Science and Policy

Summer Newsletter

Welcome to the Class of 2016!

July 2012

This year my oldest daughter Kayleigh is heading off to college, so I have a special place in my heart for the Class of 2016. Not only that, but your ENSP class looks to be the largest ever at Drake. That's great, because we've been adding a lot of new opportunities, including three J-term courses (geology, winter ecology, and a travel seminar to Ecuador and the Galapagos), a number of new geology courses, and an updated curriculum that we will be implementing this year (we'll talk more about this in our fall newsletter).

We will do all that we can to make your transition to Drake smooth, and incorporate you into the ENSP community. Along these lines, there are three things that I'd strongly encourage you to do to facilitate the process, in addition to checking out the newsletters. First, join our facebook group (Drake Environmental Science and Policy). We try to use the page to post program information, job and internship opportunities, and to have conversations about environmentally relevant topics. Second, our web page artsci.drake.edu/ensp has useful information about majors, faculty members, links to job websites (under "resources"), and more. Finally, and most importantly, spend time talking to faculty members. Make an appointment early on to spend some time getting to know your advisor and letting him or her know what is important to you. But getting to know your advisor and other faculty members isn't just about classes: they will help you find research opportunities, learn about things going on at Drake, and negotiate the transition to college. But they can only help if you take the time to visit with them.

I and all of our ENSP faculty look forward to seeing you in the fall!

David Courard-Hauri, Associate Professor
Environmental Science & Policy Program



Sebastian Peters, a high school student from Newton, sampling insects as part of Dr. Summerville's summer camp.



Aj Foust identifying prairie plants as part of Dr. Summerville's summer camp.



8th graders Kirk Heinze and Sam Wilson restoring an oak savanna near Runnels, Iowa.

What's Going On This Summer...

Research:

This summer Bre Hess and Danielle Hefferan are working on a few research projects in Gishwati Forest in Rwanda. The students are in Rwanda for two months continuing work that former students worked on as well as some new projects.

One of the projects they are working on is vegetative monitoring of Ficus trees that were planted by an NGO as a reforestation project last year. Various measurements on the trees are being taken on the trees as well as tagging them and GPS identifying them. This is being done in order to gain knowledge on plants that may be viable for a potential corridor that would connect the three major forest fragments in Rwanda, facilitating movement for the Chimpanzees and other mammals within the forests.

The second project Danielle and Bre are working on is mapping the sight lines of chimpanzee from the forest border. Professor Renner hypothesizes that chimpanzees will only raid the crops of farmers that they can visibly recognize from the shelter of the forest. Therefore, creating these sight maps will help figure out if this is true after a follow up study of what crops are raiding during the growing season (our winter).

If the hypothesis is true, then the maps can help propose land usage strategies to the farmers. The third thing the ENSP students are doing, is assisting two of the researchers on habituating Golden Monkeys within Gishwati forest.

ENSP student, Patrick Bradley, is spending his summer working for Northern Arizona University and the Lab of Landscape Ecology and Conservation Biology as a Small Mammal Research Technician. He is in the Apache-Sitgreaves National Forest outside of Flagstaff, Arizona. The research itself seeks to do many things such as:

- determine occupancy levels (seeing what is around and what isn't) as elevation changes in areas
- determining what species were most effected and conversely what was least effected by the Wallow Fires of last year
- checking for a relationship between environmental variables (such as specific species of plants and specific amounts of downfall) to see if various small mammals are more prone to live in certain conditions. This last part is in effort to cross reference the conditions brought about by conservation efforts to decrease the severity.

Summer Jobs and Internships

In addition to the work that Andrew Rupiper has been doing this summer at Chichaqua Bottoms, he has also been working on a GIS (Geographic Information Systems) project. Andrew received a grant from NASA, via the Iowa Space Consortium, in order to model faunal recolonization of restored wetlands in central Iowa. When ecological restoration takes place, it is not widely understood how and when animals are introduced into the system. Andrew has been combining aerial photography, LIDAR, and other satellite imagery in order to produce permeability maps for the wetlands. During the initial phase of research he has been compiling genus specific traits in order to produce a landscape permeability map. These maps will include data for land cover, road density, human density, topography, hydrology, and soil structure. We will be validating the findings of these models across 4-5 different constructed wetlands over the course of the next 5 years.

Andrew also found a side project concerning invasive snails that he hopes to publish in the coming year or so. The Chinese mystery snail *Bellamya chinensis* is a large, freshwater snail with gills and an operculum. It was introduced to the United States in the late 1800's through the seafood trade and has expanded its range across the lower 48. They have an interesting morphology, specifically their "trapdoor" operculum, that can close to protect from predation and drought. This makes them difficult to remove from aquatic systems. Andrew is most interested in their ability to traverse upstream. If we can better understand the dispersal abilities of these organisms, determining methods to control them will be improved. In conjunction with this study he is also sampling water quality at Two Dam Pond to determine nitrate, phosphate, and E. Coli levels.



Andrew Rupiper, searching for the 'Chinese Mystery Snail'.



The Chinese Mystery Snail, *Bellamya chinensis*.

Summer Jobs and Internships

The experiences of Drake ENSP student, David Wyker at the Department of Energy's (DOE's) Argonne National Laboratory over the past five summers have been extensive, as each summer has involved tackling a new project of regional to national visibility across a suite of federal agencies. The projects have ranged from early environmental planning for an underground research laboratory to soil cleanup levels and toxicity evaluations for dioxin, as well as site-specific air dispersion and health risk assessment for a waste site, and sensors and apps for citizen sensing of air pollutants.

The internship has led to direct involvement in technical analyses for several major federal programs that have guided national policy and programs and framed regional efforts, with a strong emphasis on community involvement. The internship has taught David how to research, organize, and draft high-visibility technical reports, understand the National Environmental Policy Act including the public's role in proposed federal actions, and prepare technical materials that support interagency communications. Work on the projects has resulted in coauthorship of multiple publications and presentations, as well as further acknowledgements. These projects have involved working closely with and directly interacting with a number of government personnel. To illustrate, this summer alone, David has participated in regular conference calls with EPA Headquarters and outlined approaches for the novel sensors and apps project as it evolves, to help promote citizen science and encourage community investment and involvement in their personal air quality. This internship has provided a unique opportunity to contribute to complicated federal environmental evaluations that must integrate a variety of existing data and risk assessment approaches to help frame the direction of major programs.

Senior Capstone Projects

Every year our Senior Capstone course gets students involved in a service learning opportunity with a community partner. The projects are designed to be useful to the partners as well as to use and refine skills that students have been working on while at Drake.

Garlic Mustard: A Research Project to Aid Invasive Species Control



Zombie garlic mustard grows for weeks after being pulled from the ground."

Garlic mustard (*Alliaria petiolata*) is one of the more noxious invasives in Iowa woodlands and savannahs. The Des Moines Parks and Recreation Department (DMPR) has worked for years on removing the species from locations throughout the city, often using large groups of volunteers to physically uproot the plants from a site. Volunteers usually put plants into large plastic bags and dispose of them in landfills, because there is concern from past research that garlic mustard might be able to set viable seed if left on the ground to decompose. Inger Lamb of DMPR needed to determine how likely seed setting was for young plants, because bagging presents many difficulties for DMPR, including waste disposal, loss of nutrients, and most importantly difficulties for volunteers as they carry large bags through thorny underbrush. The four seniors in this group removed plants at various life stages and tested the plants' ability to set viable seed under multiple scenarios. Students found that garlic mustard was quite tenacious, living up to four weeks in the Drake greenhouse even after being pulled from the ground, as long as plants were kept moist. However, if roots and stems were separated after plants were pulled, then plants died before producing seeds. This simple strategy is likely to save DMPR volunteers significant time, allowing them to restore more land.

Senior Capstone Projects

Raccoon River: The Development of Novel Legal Strategies for Protection

This year we did something slightly different than usual, in that ten of our students partnered with Jerry Anderson and his Environmental Practice class in the Law School to work with the Raccoon River Watershed Association (RRWA) in looking for new ways to protect the watershed. Members of the RRWA have been frustrated with the degradation of the river, and the Iowa DNR's lack of ability or willingness to drive a stronger effort to rehabilitate it. They worked with the law class as clients to explore potential legal avenues for action, while ENSP students worked as experts for the legal team. Among other things, ENSP students prepared legal opinions based upon measurements of water quality throughout the watershed, used GIS tools to produce maps of various parameters and find tile drainage sites, analyzed discharge permits for various industrial and agricultural sites along the river, and researched the state of the endangered Topeka Shiner (*Notropis topeka*). While the groups did not find any blatant permit violations that the DNR was not already aware of, they did identify several useful avenues for further study, as well as highlight a particularly problematic set of animal feeding operations in the Elk Run tributary.

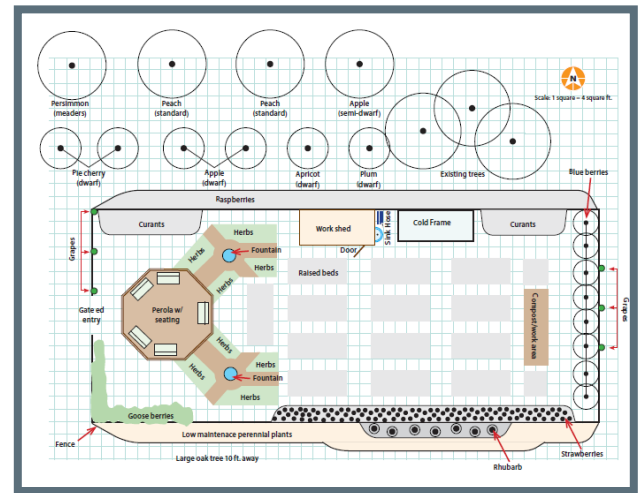


ENSP students, Nikki and Ashley testing water in a tributary of the Raccoon River.

Sowing Sustainability: The Urban Youth Garden Classroom

Four seniors worked with the local environmental advocacy group Urban Ambassadors on a project to bring a working permaculture garden and learning center to Drake's campus.

They chose to work with the Boys and Girls Club (BGC) at First Christian Church as a way to foster environmental education for at-risk youth in the Drake area. If funded, the Garden Classroom will support BGC programs during the summer, and allow BGC to develop hands-on environmental education in an exciting, nearby, beautiful location. The Garden Classroom will also be used as a site for horticultural education of interested Drake students during the school year. The group identified a site, worked with Drake Administration to gain support, developed a work plan and budget for site construction and maintenance, and built a coalition to help with implementation in 2012-2013. The students applied for a \$45,000 grant from State Farm, and we will find out in August whether the project will be funded. If not, ENSP and Drake will continue to look for funding for the project, as we are very excited about the ideas that these students have come up with.



Proposed layout of the Garden Classroom.

We hoped to show future ENSP students the opportunities and fun summer activities that are possible to partake in. We hope you are having a great summer, and cannot wait to see you this fall!

-ENSP staff and students