



The Goodwin-Niering Center for Conservation Biology and Environmental Studies



Reflection Papers for the Class of 2010

Melanie Bender

**US Coast Guard Academy and Connecticut Department of Environmental Protection,
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This summer I was able to attain a deep appreciation for the ocean. I had a comprehensive internship that included working with the Connecticut Department of Environmental Protection (DEP) as well as working with a Coast Guard academy Professor, Karina Mrakovcich. My focus was lobsters in the Long Island Sound. I assisted in the Connecticut DEP's lobster monitoring program, specifically their larval trawl. The stated mission of the Department of Environmental Protection is to "conserve, improve and protect the natural resources and environment of the State of Connecticut in such a manner as to encourage the social and economic development of Connecticut while preserving the natural environment and the life forms it supports." The lobster monitoring program in particular strives to gain a deeper understanding of the health of lobsters in Connecticut's waters. My work with Professor Mrakovcich was designed to get a better understanding of the lobster industry and a more anthropogenic look at lobsters as a natural resource.

My duties at the Department of Environmental Protection included sorting larval lobster samples and entering data collected as part of their sea sampling program in which DEP staff accompanies lobstermen and observes their catch. I also created outreach posters and Power Points that the organization can use as part of their various outreach programs. The work I did with Professor Mrakovcich was primarily research based, both literary research and field observations on lobster boats. I read many books, articles, journals and spoke with many specialists, all in the pursuit of a comprehensive understanding of the species and the industry. Accompanying lobstermen allowed me to be privy to the industry, the lobstermen and the state of adult lobsters.

I began my internship with an overarching goal to gain knowledge and experience in a facet of environmental studies that tangles the interests of the natural world and the hominal pursuit for capital. The DEP and my work with Professor Mrakovcich granted me the ability to attain my objective. The parts of my internship complemented each other remarkably well. The Department of Environmental Protection assists in policy making that is geared toward saving the lobster species and creates long term benefit for the industry. The DEP takes weekly samples of larval lobsters throughout their spawning season to see the fecundity, the number of offspring, of the species. This study also gives a good indication of how many adult individuals will be of harvestable size in roughly five years. It has become clear over the last decade that the lobster population has not recovered after they were decimated in the 1999 die off. Subsequently, strict

regulations have been implemented in an attempt to salvage the species. These regulations and policies have been met with criticism and contempt on the part of many lobstermen who must glean a livelihood from the meager bounty the Long Island Sound provides them.

The struggle between anthropocentric and ecocentric concerns is illustrated in the contentious quarrel that embroils policy makers and fishermen. It was fascinating to see that this dynamic is really a microcosm for most environmental issues. My experience this past summer has given me the tools to better relate to diverse opinions and a grasp of the complexity that accompanies all environmental concerns. I consider my internship a great asset to my knowledge base of both the conservation and biology of lobsters as well as how to better understand the compelling human component that is interwoven with the environment.

The greatest prospect that presented itself was the opportunity to connect with many specialists in the marine biology field. In my pursuit of an engaging and educational topic for my senior integrated project, I corresponded with both lobstermen and biologists. The insight I gained was invaluable. Donald Landers of the lobster monitoring program at the Millstone Nuclear Power Plant has agreed to let me assist in the program. I will be documenting the placement and progressions of shell disease on repeatedly captured lobsters. Over the summer I learned a great deal about shell disease, which I can only describe as the lobster equivalent of human leprosy. Shell disease is the result of a bacterial infection of the shell. Even so, the reasons that the bacteria are able to infect the carapace remain clandestine. Reasons for the infliction range from climate change to stresses from pollution. In earlier studies lobsters inflicted with shell disease were put with healthy lobsters. In all cases the healthy lobsters never developed shell disease. Much is unknown about the disease and I hope to help the Millstone Plant in any capacity I can. I will also be spending time at sea with lobstermen. I am in the preliminary stages of designing goals and a methodology for my research on the vessels. I want to learn as much as I can about the relationship lobstermen have with the resource their livelihood hinges upon. I have done much reading about lobstermen and the industry but much of it focused on the industry in Maine, which has a very different dynamic than the industry in Long Island Sound. Connecticut has begun to implement new more stringent regulations that will cut the catch limit of lobstermen in half. This will have a profound effect on the lobstermen and their livelihood. During this pivotal time in the relationship between policy makers and lobstermen I want to see the repercussions of these new laws. Much like my internship this summer, I am striving to have an integrated project that encompasses both the biology of lobsters and the human component.

Erin Brady

Office of the Chancellor, District of Columbia Public Schools, Washington DC

For twelve weeks this summer I was interning for the District of Columbia Public (DCPS) in the Urban Education Leaders Internship Program (UELIP). UELIP is an intensive multi-disciplinary, academic internship program that situates itself in the Office of the Chancellor. UELIP associates conduct research and work on education policy projects with the direction of key leaders of the chancellor's team, charged with the responsibility of creating innovative and outside-the-box solutions to systemic urban education challenges. Through this program I had the chance to attend professional development programming, leadership luncheons, and receive mentoring

from chiefs and directors in DCPS.

On the School Openings Team, I was a key member of a five-person group. My Supervisor, Evan Smith, treated his four interns with great respect as we were given just as much responsibility and work as a full time employee. I was responsible for developing relationships with 34 principals from schools in every ward of the District. I acted as a liaison between central office and the principals to ensure a goal of opening schools that are clean, fully staffed, equipped, and safe for kids on the first day. I coordinated visits with my principals throughout the summer to train on a database to be used for tracking school readiness. I made sure the correct central office staff member would be addressing the concerns in a quick and efficient manner.

I also was selected for the “Greening DCPS” Innovation Team. With one other intern and a few staff supervisors, we were in charge of researching best practices for system-wide recycling programs of other school districts of similar size to DCPS. We discussed how DCPS could expand the current meager recycling program to include 10 more schools through a partnership with the District Department of Public Works. We were in charge of contacting the schools and setting up ‘green teams’ to be trained in September as well as providing each school with a copy of the recycling manual that I created. We hope that our research of other school districts’ successful recycling programs can help DCPS in the near future move towards hiring a full time sustainability coordinator. Such a position could provide support for schools in the supervision and monitoring of their recycling programs as well as enriching the environmental education possibilities in the curricula.

My main objective this summer was to gain more knowledge of the challenges and rewards behind school reform. I wanted to develop a stronger understanding of education policy. I was definitely able to accomplish this goal through daily meetings with directors, chiefs, and the Chancellor herself. I experienced the struggle that central office deals with each day to try to overcome bureaucracy to put kids first. I learned much more than I ever would have hoped this summer through my constant communication with principals at many low-performing schools.

My summer was very much focused on the public school system in D.C. and therefore I did not get much exposure to charter schools, which was one of my initial goals. I was able to gain an understanding that charter schools add to the challenge of trying to improve the public system (due to low enrollment from kids leaving the public schools to attend charter or private schools). I worked with a few members of two charter organizations responsible for taking over a few of DCPS’ poor performing high schools. It was interesting to experience the strategies they were using to get the schools ready to open. I realized for the first time that charter schools might not always be the best solution for all problems.

I was also able to get an extremely in depth and honest view of the environmental efforts (or lack thereof) of DCPS. Due to the amount of issues that DCPS deals with each day to try to improve the education of the District’s children, there is not enough time or capacity to put towards “greening” the system. When the main focus is to make sure children can read there are not a lot of people who are willing to devote their time to monitoring a recycling program. Funding also plays a huge role in hindering the success of environmental initiatives.

The value of my internship as a learning experience is immeasurable. I was exposed to all that goes on behind the scenes as well as on the ground at schools in trying to make the best possible learning environments for kids. I learned that government and bureaucracy often prevent or delay progress for reform in schools. The Chancellor has managed to push past conventional means for tackling reform, which has proven to be quite successful in raising the bar for teacher effectiveness and student performance. I also was able to learn a lot about myself this summer in terms of role definition. I did not assert myself as a leader in my team in the beginning due to being nervous about the new situation. If I had not made an effort to change my role later on in the summer, this could have hindered my overall success. I also was able to greatly enhance my verbal communication skills through my use of phone calls and professional in-person meetings.

My internship has provided me with a solid foundation to build on for my senior project research. I have a better understanding about the public school system structure and government interactions that make reform possible. For my project in the spring, I plan to take my knowledge one step forward in looking more specifically at charter schools. I have acquired a lot of personal contacts through my internship that will help me in my research in the spring. One contact in particular, Wynn Calder (Sustainable Schools, LLC.) has offered to help me in my research as he has written on the topic of ecological literacy in private and non-traditional schools.

My current proposal for my senior project is as follows:

I will look specifically at environmental education as practiced by charter schools in urban areas. Is ecological literacy increasing amongst the underrepresented youth? Are eco-focused schools helping students pursue college programs and/or careers related to the environment? I will need to determine how broadly eco-focused schools are being implemented in the wider charter school movement. How do the schools measure their success or lack of success? What is the standard for ecological literacy? Finally, can eco-charter schools be models for environmental education in traditional public schools?

Ariella Cohen

United States Environmental Protection Agency, Boston, MA

This summer I interned with the United States Environmental Protection Agency (EPA) Region I New England in Boston, Massachusetts. The goal of the EPA is to protect the health of Americans and their environment. I was employed in the Assistance and Pollution Prevention Unit (A&P2), which provides compliance assistance. Compliance assistance entails educating the regulated community on EPA's regulations through mailings, workshops, on-site visits and manuals. Within A&P2 I worked in the Automotive Repair and Auto Body Assistance Program under Environmental Specialist Mary Dever-Putnam. The current mission of this program is to help auto body shops in New England comply with new Clean Air Act (CAA) requirements effective in January 2011. Under Mary I was assigned a wide range of tasks ranging from phone surveys with auto body shops to research on vessel permits. My general responsibilities were to prepare and test materials for the unit's statistically valid auto body outcomes pilot, prepare for

workshops, research auto body labor rates in New England and research the Vessel National Pollutant Discharge Elimination System (NPDES) General Permit.

To further explain my responsibilities, I will elaborate on each of my tasks. The EPA Office of Enforcement and Compliance Assurance and A&P2 are currently creating the statistically valid auto body outcomes pilot in order to show that there is a correlation between environmental improvements at auto body shops and the EPA's compliance assistance. I assisted the project by pre-testing phone surveys and on-site surveys on Boston auto body shops, compiling data for identifying the study's pilot population, identifying possible partners and locations for workshops in the pilot cities, and drafting a Quality Assurance Project Plan.

During this ongoing project I also prepared materials for A&P2's auto body workshops. I created and administered a pre/post workshop test to judge whether the EPA's presentation improved attendees understanding of the CAA rule and I drafted an auto refinish repair flow diagram, detailing the inputs and outputs involved in each step of painting a car, in order to better explain to auto body shops their sources of waste.

I also conducted two research projects. For the first research project on auto body labor rates I tried to answer the following questions: 1) how are labor rates determined, 2) what are the average rates for each New England state and 3) is environmental compliance factored into the determination of the rates? For the second research project I collected basic information on the Vessel NPDES General Permits in order for my department to determine if it was realistic for them to provide outreach to vessels that must comply with these permits.

In my internship description, my original internship objectives were to learn the factors that mobilize communities around environmental issues, learn the areas of Massachusetts that are most adversely affected by pollution, learn about the current Massachusetts environmental laws and regulations, witness how much or little power a governmental organization has to clean up the environment and reduce health problems, and network with people in the environmental regulation field. Most of my objectives were met but only in relation to the auto body industry. I learned that auto body shops mobilized in each state around unfair insurance practices; I learned about the areas of Massachusetts that have the highest cancer and asthma rates; I learned about the laws and regulations pertaining to auto body shops and US vessels and that the EPA has very limited power to influence environmental changes because they are only able to directly regulate 1% of all businesses and industries. Fortunately, I was able to make great contacts within the EPA, with their partners and with the other interns.

Overall, interning with the EPA was a valuable and enjoyable learning experience. First of all, the internship gave me a realistic idea of what working in an environmental field will be like. My office did a great job of educating the interns on the many offices and career tracks within EPA. Secondly, my supervisor and the other employees tried to assign us work that interested us and furthered our education rather than busy work. All the employees were also very willing to entertain our environmental questions and guide us on our potential career paths.

The contacts I made at the EPA were my biggest asset in preparation for my senior project. While none of the people I worked for had specific information about my project, they were able

to give me names of people that could help. Furthermore, the librarian at the EPA helped me find databases and articles that will be useful.

My senior integrative project will focus on the role the environment plays in Chapter 40B, a Massachusetts Housing Law. Chapter 40B was enacted in the 1960s to increase the amount of affordable public housing in Massachusetts. It states that developers can bypass state zoning laws if 25% percent of the housing in the development is low-income or sold below market value. Chapter 40B can only be used in towns in which less than 10% of housing is low-income. Many communities try to appeal the construction of 40B homes in their towns using several different arguments including: increased traffic, increased children in the school system and harm to the environment. Furthermore, developers often try to build 40B developments in areas that were previously landfills or brownfield sites.

I would like to investigate whether the communities that appeal 40B developments on the grounds of environmental protection actually care for the environment or whether it is a front for preventing low-income families from entering their town.

Maria Figliola
Corporate Accountability International, Boston, MA

Corporate Accountability International (CAI) is a non-profit advocacy group based in Boston, Massachusetts. The organization focuses on holding trans-national (also known as multi-national) corporations responsible for harmful activities affecting the rights of people and the environment. They started out in the 1970s (as “InFact”) holding Nestlé accountable for marketing infant formula in developing countries that could not properly use the substance due to a lack of clean water, resulting in severely malnourished children. Today the organization is known as Corporate Accountability International and focuses on its food, water, and tobacco campaigns. The food campaign, “Value [the] Meal,” is pressuring McDonald’s to stop siting its restaurants deliberately near schools. The tobacco campaign is working to incorporate an article into the “Framework Convention on Tobacco Control” to remove the influence of tobacco corporations from public health policy making. And finally, the water campaign, “Think Outside the Bottle,” aims to preserve, promote, and protect our public water supply by holding bottled water corporations accountable for aggressive and misleading marketing.

As an intern in the communications department, I was able to work on visuals for all three campaigns. My projects focused on graphic design, photography, and developing a bulk sales plan for re-usable water bottles to fundraise and enhance the anti-bottled water campaign. I also participated in street actions, commenting on web articles, and other campaign events. I had a very engaged supervisor who made sure I was stimulated by the work I was doing, and we would have weekly “check-ins” to determine daily, weekly, and summer goals. I was given a lot of trust and creative-leeway, which was invaluable to me as an intern.

My graphic design projects began with touching up “Value [the] Meal” visuals diagramming the close proximity of McDonald’s to schools. I then moved on to designing fliers and a brochure for their stainless steel water bottles, and moved on again to designing the layout for their seasonal

newsletter. My photography responsibilities included documenting press conferences, street actions, a campaign launch, a house-party fundraiser, staff headshots, and more. I was also responsible for re-organizing the photo archive which gave me a glimpse into the history of the organization and their work around the world, particularly anti-tobacco conferences in India. My third and final main responsibility was to research and contact potential clientele to purchase the organization's stainless steel water bottles, a key fundraising element as well as an effective supplement to the "Think Outside the Bottle" campaign. I also participated in office-wide campaign events, including street actions and a "Coke call in day" to pressure Coke to label the (municipal water) source of their Dasani brand water.

Due to the environmental nature of re-usable water bottles, I found the development of a sales framework to be surprisingly relevant to my senior integrative project (SIP). While researching possible environmental conferences to purchase re-usable water bottles in bulk, I came upon a diverse collection of environmental logos. The "Bioneers by the Bay" conference, for example, may prove a useful example in my research. The logo uses shades of brown and features an industrial skyline interspersed with butterflies and boats. The firm that designed this logo, "Pixels and Pulp," concentrates on design for environmentally friendly products and events, and may also prove to be a useful resource.

My objectives were met in that I was able to witness and participate in the development of visuals for the campaigns. My objectives were NOT met in that I was unable to witness the origins of the images developed for these campaigns. For this reason, interviews will become an important component of my SIP research. I will be able to interview my supervisor and other campaign designers as soon as I develop a set of questions. I know that CAI works to develop a "clean and professional" look for their environmental campaigns, avoiding a cliché "earthy" image, which is a theme I would like to explore further.

My internship was a very valuable learning experience because I learned practicalities of design and photography, as well as the inner-workings of a very organized campaign team. Because I was given a lot of trust, respect, and creative-leeway as an intern, I was constantly stimulated by my work, my surroundings, my co-workers, and the current events related to the issues of CAI's campaigns.

The internship prepared me for my senior integrative project because it gave me a good framework to develop questions for designers of the materials and images of a campaign. It made me realize that I need to distinguish between basic design principles and design principles for an environmental campaign. Ultimately I would like to document the "branding of the environmental movement" using specific campaigns as examples and case-studies. I will accomplish this through interviews, research, and analyzing campaign images, using my experiences in the communications department as a framework for developing these standards for comparison and to come to conclusions.

Erica Hildebrand
Woods Hole Oceanographic Institution, MA

My internship this summer was at the Woods Hole Oceanographic Institution (WHOI), in their Summer Student Fellow program. At WHOI, the mission is to be an institution dedicated to research and education, to advance understanding of the ocean and its interaction with the Earth system, as well as communicating this understanding for the benefit of society. There are several research departments, such as physical oceanography, biogeochemistry, chemistry, and biology. My sponsor, Dr. Stefan Sievert, is in the biology department, and works on microbial communities at deep sea hydrothermal vents.

My internship responsibilities were to be a student researcher in Dr. Sievert's microbial ecology and physiology lab. This meant that my first task was to understand the project, by reviewing the scientific literature on the types of microbes and habitats that I would be studying over the summer. I was then responsible for working in the lab, learning and carrying out procedures such as DNA extractions and polymerase chain reactions (PCR), and optimizing and troubleshooting anything that was not working correctly. I was also responsible for putting together two power point presentations, one was 5 minutes and was a midsummer progress report, and the other was a 15 minute presentation at the end of the summer, and writing up my results for the lab records. Besides my lab responsibilities, the WHOI Summer Student Fellow program required me to attend lectures on oceanographic topics every week, as well as a workshop on ethics in science.

My original learning objectives for the summer were to gain skills such as collection and ecological field work techniques, molecular techniques in the laboratory, and to learn more about problem solving and becoming more comfortable and experienced working in a laboratory setting. I did not do any collecting for my advisor's project, but I did learn about different methods that are used in oceanographic research and was able to have hands on experience with these techniques on a day cruise on one of the WHOI research vessels, which was part of the Summer Student Fellow program. I did learn new molecular biology techniques in the lab, such as DNA extraction and quantitative PCR. I think the most important aspect of my internship was the problem solving and troubleshooting skills that I was able to develop, by optimizing new procedures in the lab, and working to figure out what was going wrong, and what I could do to fix it. This will be very important in future lab work, since analyzing the problem and figuring out what can be done to make procedures work correctly is something that happens everywhere. I also learned more about how lab groups work, and what I am looking for in a research group, as I look for research opportunities in the future, which I think is also very useful.

My internship was a great learning experience for me this summer. I not only learned about the field of environmental microbiology, which I find really interesting and may be interested in continuing to work in, but I also learned a lot about laboratory group dynamics and the day to day aspects of research that are really important.

My senior integrative project (SIP) will be with Dr. Anne Bernhard, in the biology department, working on microbial communities from salt marshes. My project this summer was also looking at microbial communities, and many of the techniques that I learned and used such as DNA extractions and polymerase chain reaction to copy specific DNA sequences will be used during my SIP as well, although they will be modified since I will be working with sediment samples rather than samples filtered from water. My SIP will be to make a clone library of the archaeal ammonia oxidizing genes from sediment samples from Sippewissett marsh on Cape Cod.

Different parts of the marsh were treated with different amounts of nitrogen fertilizer, so it will be interesting to see how the archaeal and bacterial communities are different between treatments. This project will involve first extracting DNA from sediment samples from the salt marsh so that the genes present in the microbial community can be studied. Next, quantitative PCR will be used to amplify and quantify the gene which codes for the enzyme that is used to oxidize ammonia by archaea. The many copies of this gene will be made using primers that match the gene in a wide range of different archaeal types. This means that the PCR product will contain many different gene sequences, depending on which archaea are present in the environmental sample. We are interested in looking at the differences between the DNA sequences of the different genes, so that we can see which archaea are at the different nitrogen fertilizer conditions, and how the amino acid sequence may be different between different types of archaea that are all able to oxidize ammonia.

In order to sequence these PCR products to look at their differences, a clone library will be created. This means that I will then clone these PCR products into a plasmid vector, which in turn will be added to *E. coli*. Colonies will grow from each single bacteria that incorporates the vector, and each of these will contain only one of the PCR products. The plasmid DNA can then be isolated from the *E. coli*, and sent to a sequencing facility, which will allow us to study the sequences that are present in the sediment samples. The goals of this project are to look at the microbial community structure in the Sippewissett salt marsh, as well as to look at the effects of nitrogen fertilization on the ammonia oxidizing archaea in this area. Since nitrogen can be added to salt marshes through run-off, this may model effects of fertilizer run-off on microbial communities in this type of habitat.

James Irwin
Sierra Club Cool Cities Campaign, Portland, ME

My internship for the summer of 2009 was at the Sierra Club Maine Chapter working with the Cool Cities campaign and Maine Partners for Cool Communities, the Maine chapter of the Cool Cities program. Using grassroots organizing tactics honed over 100 years of experience fighting for environmental protection, Sierra Club began Cool Cities amidst an upswell of climate action at the local level. The Cool Cities campaign empowers local citizens and government leaders to implement climate solutions in their town or city. Through its network of cool communities, Sierra Club collects best practices to educate “cool teams” about what other towns have done successfully. While not reinventing the wheel, Sierra Club partnered with the International Council on Local Environmental Initiatives (ICLEI) - Local Governments for Sustainability to encourage cool communities to use their climate action software to create an emissions base line and track progress. Sierra Club recommends that all cool communities also sign on to the Mayor’s Climate Protection Agreement.

As an intern at the office in Portland, ME, I compiled data about climate action in cities and towns around Maine, researched best practices to assemble into a manual for cool teams in Maine, and organized grassroots and grasstops support for local and national climate action. Grasstops include mayors, local business owners and others who are in higher positions of power than regular citizens. Despite our intentions to publicize and celebrate our cool communities’

commitment to climate action and sustainability, data compilation was very difficult due to a low rate of response from towns. In preparation for the congress of cool communities in October, I was tasked with creating a manual for the cool teams to use in effectively implementing a climate action plan. The manual included steps for beginners as well as tips on how to keep groups engaged and involved long term to work towards deeper emissions cuts. While many cities have made strides to increase energy efficiency in buildings and promote no-idling campaigns for personal and government vehicles, going beyond low-cost campaigns is a real challenge.

My original learning objectives for my internship were based around informing my thesis on resilience to climate change in small towns and cities. First, I wanted to learn first hand how groups like the Sierra Club and their cool teams organize a successful climate action campaign. This required training and experience in grassroots organizing in the office and in the field. I also wanted to learn about the barriers to these cool teams in implementing their campaign. What stopped them despite their passion about climate issues? What capacity restrictions did they face and how did they overcome them (if they did)? Next, and more towards the focus of my senior integrative project (SIP), I wanted to look at how if at all, communities were discussing climate adaptation and resilience. Lastly, I wanted to take note as much as possible of any vulnerability to climate change that emerged during my internship.

In meeting these learning objectives, I found that grassroots organizing was far more essential to the task of creating and implementing a climate action campaign than I had previously thought. Especially in small towns that lack governmental capacity, it is important to have a strong group of citizens working on this issue. Much of the training in grassroots organizing I received through the Sierra Club I see as valuable to my career in the future. Through personal experience I learned about the setbacks and barriers that one comes up against when working on such a campaign. Many volunteers and interested citizens have gotten burnt out in the past and it is difficult to restore interest in a particular campaign after this happens. Many local campaigns were in the early stages and at no point was there a discussion of resilience and adaptation. This also reveals the extent to which they were aware of their own vulnerability to climate change. Through the contacts I made, I learned of valuable resources that I can call on if needed during my work on my SIP. Specifically, I identified certain small towns that have begun to take action on resilience plans through ICLEI.

The internship provided me mostly with very valuable primary research for my senior integrative project. Having met or spoken with many members of cool teams, I gained a stronger appreciation for the difficult task of implementing such a campaign. Also, I established important contacts that I can return to for further questions if needed during my work on my SIP. Lastly, as mentioned before, I gained valuable training and experience in grassroots and grassroots organizing that I can take with me wherever I go.

In preparing myself for my SIP, the internship helped reveal the lack of discussion on resilience, and how this is possibly due to a lack of capacity in small cities. I also further honed my approach to my SIP through my experiences and research at my internship. My SIP will be a thesis that explores the vulnerabilities of small cities to climate change from a socio-ecological

systems perspective and how such cities can move towards becoming resilient to climate change while also building community and creating a just and prosperous future.

Kevin Izzo

Kilawatt Technologies, Shelburne, VT

I completed my summer internship at the Vermont Center for Emerging Technologies (VCET). This non-profit organization is a small business incubator, specific to technology based, start-up companies in Vermont. Through VCET, I was assigned to work with a new conservation and efficiency company in Shelburne, Vermont called Kilawatt Technologies. Kilawatt operates as a “software as a service” (SaaS) company and utilizes its proprietary software, EnerSuite, to help lower the energy use of large buildings while saving money. Kilawatt Technologies targets office, industrial, academic, and municipal buildings and guarantees 15%-25% annual energy, cost, and CO₂ savings without requiring any initial capital investment. Kilawatt’s mission is to provide their clients energy savings, which go straight to the bottom line, while simultaneously reducing their carbon footprint.

Kilawatt Technologies is a member of VCET; therefore they are a small, start up company actively searching for investors. Kilawatt has a total of only five employees, two of which only worked part time, so throughout my internship this summer I worked directly with the company’s CEO. I was essentially his assistant and helped him with whatever he was currently working on. He had recently purchased Kilawatt Technologies this summer and was in the process of totally reorganizing the company, from the website to the business plan. My main responsibilities during the summer were rewriting the business and executive business plans, writing press releases, editing and rewriting online brochures, updating contact lists, and researching competitors as well as potential clients. My responsibilities did not include any of the engineering or software aspects of Kilawatt’s operations.

Before the start of my internship, aside from the obvious objective of gaining “green” work experience, my main intention was to learn as much as I could about the methods and framework for promoting environmentally conscious large scale sporting events. While my internship did not deal at all with sporting events, I definitely learned a lot about various methods of conservation and efficiency within large buildings. I understand that operating an arena is vastly different from operating a factory or office building, however I believe that Kilawatt’s and other consulting firm’s methods of increasing efficiency can be broadened to include sporting venues. I would have liked to gain some knowledge or experience involved with spectators and green sporting events (i.e. waste and concessions), but that was not possible during my internship with Kilawatt.

Despite the fact that my internship was not perfect in terms of my senior integrative project (SIP), I certainly valued my time with Kilawatt as a learning experience. Before this summer I had never had an office job and that was a learning experience in itself. However the two greatest things I gathered throughout the summer were the difficulties of entrepreneurial business and the inner workings of green business. I never fully realized how difficult it was to start a business, with such issues as managing daily business operations and meeting forecasted revenue, all the

while desperately trying to receive investment. In terms of green business, perhaps my greatest revelation is that many businesses, large or small, are extremely wary of almost anything to do with efficiency or conservation. Even with the vast potential to save money through conservation and efficiency and with Kilowatt guaranteeing no initial capital investment, many businesses are extremely slow to make any decisions that can reduce their carbon footprint.

A lot of my responsibilities while working with Kilowatt Technologies, such as rewriting online brochures and updating contact lists, will unfortunately not be very relevant to my SIP. Despite this, I feel like I have gained valuable information through some of my other duties which I can utilize during my SIP. Perhaps my most SIP relevant duty was my project on Kilowatt's competitors. Simply researching roughly 50 companies, who all strive to help their clients reduce their carbon footprint, through numerous different methods, will no doubt be very important while I complete my SIP. As many of the companies I researched utilized different techniques and methods to help their clients conserve and become more efficient, I am very confident that some of those techniques can be transferred to the world of sporting events. Before this summer I was totally ignorant of the methods, and how many there are, which can be used to reduce energy consumption. Some energy and cost saving methods which I learned about this past summer include software such as Kilowatt's, various building hardware upgrades, implementing a cost-effective electrical utility contract to avoid peak electricity charges, and even on-site electricity generation.

My SIP will deal with the growing trend of bringing environmentalism to large scale sporting events. I hope to address construction, planning, and event management techniques, while including innovative technology that applies to all three of these areas. I will incorporate model events such as the upcoming 2010 Vancouver Winter Olympics that are attempting to operate as carbon neutral. I will also contrast green events such as this with previous environmentally degrading events in order to highlight the amount of damage that can occur if events are negligent to the environment. Throughout my SIP I hope to place a large emphasis on the economic viability of holding green sporting events to accentuate both their economic and environmental potential, because without making a profit there are no sports.

Lily Kunin
Calvert Social Investment Foundation, Bethesda, MD

This summer I interned at Calvert Social Investment Foundation (Calvert Foundation) in Bethesda, Maryland. Calvert Foundation is a nonprofit established with the mission to help end poverty through investment. The organization channels capital into underdeveloped or disadvantaged communities to create economic opportunities in places where it is greatly needed. The Community Investment Note is Calvert Foundation's flagship product, with the capital provided by both individuals and institutions. The organization allows individuals and institutions to blend financial and social returns on their investments. Calvert Foundation manages a diverse portfolio, working in key impact sectors including affordable housing, microfinance, social enterprise, small business, and community facilities. As of June 2009, Calvert Foundation had more than 168 million dollars deployed to over 200 partners in the US and abroad.

As a “Community Investment Profile Researcher,” my main responsibility was to update and develop the content of profiles on organizations in Calvert Foundation’s portfolio. My position also included correspondence with organizations, writing, editing, and compiling social impact data. The research included a prose survey with basic questions about the organizations’ mission, programs, and management. I was able to add a question on whether the organization has an environmental initiative. There was also a data-point survey that collected 2008 financial data, social impact data, and diversity data on management, staff, and clients of the various organizations. New impact stories and photos were also collected to compile the 2008 Impact Report. When an organization sent their due diligence packet to Calvert Foundation, I filled in the social and financial impact data that we had received, then contacted that organization and sent the forms to be finished. By the end of my internship, I had compiled a document on environmental initiatives in Calvert Foundation’s portfolio and I presented it to the team on my last day. I classified the organizations in categories: affordable housing, social enterprises, community development financial institutions, non-traditional, fair trade, and microfinance. I found that the overwhelming majority of affordable housing lenders and developers had environmental initiatives. For example, Florida Community Loan Fund has a “Green Building Loan Pool” that assists other nonprofit developers in building “green” buildings. I was also responsible for presenting at “Lunch and Learns” on a weekly basis, and I presented on two to three organizations that I had recently researched. The meetings gave me the opportunity to interact with different members of the team and share interesting facts I found in my research.

Working under the marketing team gave me direction and guidance, but I was also able to work with the lending team at times. This gave me the ability to see both sides of the organization; the team that “brings the money in” and the team that “gets the money out.” I was able to speak specifically with the head of the fair trade portfolio and the microfinance portfolio to learn about organizations that they loan to. My internship met all of my objectives and surpassed them with my participation in a “Brown Bag Lunch” program on microfinance. The lunches consisted of multiple presentations in the Washington, DC area at places such as Grameen Foundation, DAI, Inc., Making Cents, and FINCA. It offered the interns at Calvert Foundation with an opportunity to network and meet other people in the microfinance industry. Most importantly, we were able to see the world of microfinance from many different perspectives. Some organizations were nonprofits, some relatively small, and others linked to the government. At the end of the “Brown Bag Lunch” program, I felt as if I had taken a crash course in microfinance and heard important perspectives from many organizations that are involved in the industry.

As well as increasing my knowledge on microfinance, I was able to learn more about Calvert Foundation’s key impact sectors. It was interesting to research the “Mission Plus” category which consists of organizations that typically fall outside of Calvert Foundation’s traditional loan criteria, but make a strong social impact that the Foundation feels is necessary to support. Organizations in “Mission Plus” were often discussed at meetings. Many of these organizations also had environmental initiatives. For example, E+Co provides access to clean energy to over four million people in Africa, Latin America, and Asia, offsets carbon dioxide emissions, and saves firewood.

Researching organizations such as E+Co prepared me for my senior integrative project. As my coursework progressed I became interested in looking at emerging opportunities for clean energy in developing countries. E+Co demonstrates one way to provide clean energy to developing countries. My senior integrative project will investigate how developing countries can meet the rising demand for energy. I would like to look at electricity and clean energy in terms of its cost-competitiveness, energy security, environmental concerns, and local economic development projects. One thing I may want to add is how clean energy aligns with the mission to end poverty. Calvert Foundation gave me a stronger “social perspective” and demonstrated how an underlying mission behind investment decisions can be involved. It is important to remember that while clean energy benefits these countries and their populations, the emerging market of clean energy can also provide lucrative investment opportunities. At Calvert Foundation, the mission to end poverty takes precedence, but in addition to receiving a social return, investors receive a solid financial return. Financial return is an important factor in investors’ decision-making process, and I will look at numerous investment opportunities clean energy can provide.

Sturgis Sobin

Clark Construction Group, Bethesda, MD

This summer I interned in the estimating department of Clark Construction Group, LLP in Bethesda, Maryland. One of the largest general contractors in the country, Clark Construction has been a national leader in construction services since 1906, and is currently ranked seventh by Engineering News-Record 2009 for Top Green Contractors in their Top General Contractors Survey. As of June 1st, 2009 Clark’s quarterly fact sheet reports over \$4.8 billion in LEED Projects under construction with \$2.7 billion already completed. These accolades and statistics demonstrate Clark’s experience as an industry leader in green construction. During my internship I worked at the corporate headquarters performing a variety of preconstruction tasks in preparation for competitive bids. Clark has a large preconstruction department in order to ensure continuity between preconstruction and construction, so that decisions made during project planning are accurately implemented in the field.

I was part of three different preconstruction teams working on projects ranging in cost from \$65M to \$450M. My teams worked closely with the client and design teams. I helped develop and maintain accurate construction cost estimates as well as analyzed scheduling, materials, building systems, and construction methods in teams comprised of executives, project managers, superintendents and purchasers. In addition to these technical tasks, I was expected to maintain and establish relationships on behalf of the company with countless subcontractors, with contracts ranging from \$100,000 to \$3M. My primary tasks were to quantify and price take-offs for various trades, review subcontractors’ bids to prepare total project cost, identify and assess risks, and assemble a final bid estimate on the day of the bid.

Basically, I was expected to go through a set of blueprints for an upcoming bid, which in my case were sets of over 1,000+ pages, and estimate how much work an individual subcontractor would have (called take-offs). I then priced the take-off (called an estimate). For one project, I had to do this for five different trades, which really tested my multi-tasking abilities. One of the largest risks I had to deal with was when portions of my estimate ended up not being priced by a subcontractor. When this happens, it transfers the risk from the subcontractor to me. Having a

fundamentally sound estimate is one that makes sure the subcontractors assume all of the risk. However, this rarely happens, as the size and complexity of projects Clark bids on are considerable. Finally, usually at the last minute, I compared all of the subcontractors' bids to my own estimate; made sure my estimate included the least amount of risk possible, and tried to come up with the lowest cost, most comprehensive price. This entails a lot of time analyzing blueprints and going over small details on the phone.

The experience I had far exceeded what I thought I would learn. I was given substantial responsibility upfront, expected to perform tasks under strict time constraints, and learned a lot about how the business of large-scale commercial construction is executed. Because most of the projects Clark bids on are LEED certified, I was able to gain firsthand experience in how green building projects are realized. I took part in meetings in which company presidents and executives discussed complex strategy. Through sitting in meetings like these, I saw the business side of LEED that I had not been made aware of by just studying for the exam.

The internship was a valuable learning experience because of its technical nature and competitive business culture. I was expected to understand and implement green building processes as a part of the preconstruction phase of building. The path to getting a building LEED certified is never the same, and gets extremely complicated when the project is design/build, which was the case with all three projects I worked on. It was my responsibility to understand how the LEED certification applied to the trades I dealt with, and then make sure the subcontractors I was doing business with understood exactly what was expected of them. The blueprints I was expected to know like the back of my hand were full of nuances and sometimes mistakes, therefore increasing risks that could be directly traced back to me. This internship also let me test myself in a demanding work atmosphere. The early mornings and long, often very busy days gave me the chance to see if I would like to work in such an environment.

Working in a preconstruction department provided me with both the quantitative and experiential information I need for my senior integrative project. I had access to the latest green building reports and stimulus critiques. I saw how an industry leader in green building responded to both the current economic climate as well as the stimulus package. It was an especially interesting time to work in this company as the recession made the building business extremely competitive. I was able to interview a Senior Vice President about the state of the economy with relation to green building. He provided me with a good perspective I had not fully understood by just studying the building industry and the economy.

My senior integrative project will be an independent study on the future of green building in America. Specifically, the study is an economic analysis of the effects of the American Recovery and Reinvestment Act of 2009 (ARRA) on green building in America. It will entail in-depth research of current macroeconomic market data, as well as perspectives and approaches of the implementation of the new stimulus package with Professor Visgilio as my advisor. My study will include first hand observations and data collected from my internship. I will use this information to come up with recommendations for the current administration as far as how to 'stimulate' more green building. It is a unique opportunity because of the company's national presence and the state of the economy.

It will be interesting to see if construction companies build any of the new infrastructure and building projects that haven't usually been thought to be potentially environmentally friendly projects up to LEED standards. A lot of new green projects, or LEED projects, are the first of their kind, and it will be interesting to see if/how less-commonly thought-of building types like mass transit and water and power infrastructure incorporate green strategies. I think if the basic built-environment is environmentally friendly, then it will foster a more environmentally friendly approach in other aspects of life. Will green building translate green to other industries?

Charles van Rees

WIDECAST Sea Turtle Conservation Project, Gandoca, Costa Rica

On July 24th, 2009 I returned from an eleven-week internship working in Gandoca, Talamanca County, Costa Rica for the WIDECAST sea-turtle conservation project stationed there. Over the last 11 weeks, I engaged in countless hours of labor toward conservation efforts of Leatherback, Green, and Hawksbill sea turtles. I gained a first-person perspective on the organization, management, and implementation of non-governmental species-conservation efforts. With this experience came a more realistic understanding and intimacy with the subject of my proposed senior project; a planned investigation of the ethics of conservation.

WIDECAST (The Wider Caribbean Sea Turtle Conservation Network) is a non-profit organization dedicated to the support of locally staffed conservation efforts for sea turtle species in the Caribbean region of Central America. WIDECAST projects are found in over forty countries including Costa Rica, Panama, the Bahamas, and Suriname with at least five in Costa Rica alone. The official mission of the organization, as stated on their website, is "to reinforce local efforts at conserving endangered [sea] turtle species." Following this mission statement, the group operates mainly from a headquarters located in a large city (in the case of Costa Rica, the capitol of San José), hiring biologists to lead research and organization of local projects throughout the country. These biologists then cooperate with locals engaged in turtle conservation to gather information on turtles and provide equipment for conservation efforts. Heads of local projects hire locals as employees, especially in low-income areas where other jobs may be difficult to attain. These projects are additionally staffed by volunteers who, arriving from abroad for the conservation experience, bring an entirely new economy to local villages in housing, transport, and food purchases.

My job as a research assistant to the head biologist in the Gandoca beach conservation project consisted of a great variety of tasks. My primary work was to train volunteers in the protocol of sea turtle research and conservation; how to gather data from nesting turtles, capture and relocate their eggs, and how to care for relocated nests until hatching. Among other responsibilities, I assisted in the transcription of data collected in the field to a main database kept by the head biologist, lead nightly patrols to relocate turtle nests and gather data on nesting turtles, tagged nesting turtles for further research, and measured the success of hatched nests through exhumations. Additional and more occasional responsibilities ranged from community outreach workshops with local schoolchildren to landscaping at the research station.

Before working with WIDECAST, I had a number of objectives for my stay in Costa Rica, including the acquisition of a clearer perspective of global conservation efforts (specifically outside the United States), and a deep understanding and familiarity with one particular conservation project for use as a case-study in my senior integrative project. These objectives were unquestionably met by my internship experience, which immersed me in a cultural attitude drastically different from my own and put me in touch with the leadership of the WIDECAST program from local staff to regional leaders and the Country Coordinator for all of Costa Rica.

Beyond my academic interests, my internship had great value as a personal learning experience. The independence of the internship was at once intimidating and thrilling; I was immersed in a culture far different from my own and given the opportunity to practice and refine my skills in a foreign language. Not only was I being given substantial responsibility in a field with which I was initially unfamiliar, but I was also being asked to conduct myself in a second language and live a completely different lifestyle in the process. At work I trained volunteers and cared for future generations of a critically endangered species, and in my free time I explored a country and culture entirely foreign to me. In this respect, I view my time in Costa Rica as an invaluable learning experience the likes of which I may never see again. I can only be grateful I had the opportunity to work there and for the help and guidance I received from my friends and mentors.

Returning to a more academic perspective, I find that my experience abroad has provided a great foundation for my goals in a senior integrative project. To reiterate, my senior project is intended to be an interdisciplinary exploration of the idea of endangered species, manifested by a literature review of both scientific articles and philosophical texts to explore both the scientific and ethical consequences of species extinction. The goal of the project as a literature review is to answer a number of questions pertinent to the subject, among them “What sort of ethics do we currently use in our conservation, how should or will these change, and on what scientific research or ethical systems are they based? In answering these questions, I hope to provide an accurate analysis of the current state of conservation and the thought process behind it, as well as a justification for further conservation efforts. My first-hand experience provides me with a case-study to draw on in my thoughts and analysis and will help me better understand how to look at a conservation organization or project analytically. This way, not only will I have a solid example to draw from my own personal experience, but I will know precisely what aspects of a project to look for when examining another case study.

It is for the reasons discussed above that I have little hesitation in lauding my summer internship as a valuable and worthwhile experience. Beyond simple academic knowledge and a better familiarity with a field of work in which I'm interested, I've gained a solid foundation upon which to construct my senior integrative project and, perhaps more importantly, a wealth of personal growth and unique experiences which will stay with me for a lifetime.