



**Goodwin-Niering Center for the Environment**  
**Class of 2013**  
**Senior Integrative Projects**

**Rebecca Conner**

Major: Biological Sciences; Minor: Anthropology  
Major Advisor: Page Owen, Botany  
Internship: Barrow Arctic Science Consortium, Barrow, Alaska  
SIP Advisor: Manuel Lizarralde, Botany

***Impacts of western economic influence and climate change on indigenous natural resource management: Case study, Barrow, Alaska***

Impacts of western economic influence and climate change on Iñupiat resource management in Barrow, Alaska. The Iñupiat are an indigenous people on the North Slope who have been hunting bowhead whales, *Balaena mysticetus*, for subsistence purposes for over 4,000 years. Today, this subsistence practice is being threatened by dependence upon oil and natural gas production and effects of climate change on the North Slope. On land oil and natural gas production continues to decline, so companies are looking to delve into the vast oil and natural gas resources that are thought to be offshore of the North Slope, under the Chukchi and Beaufort Seas. Climate change is affecting the ice patterns with more new, weak ice and less ice cover than ever before on the North Slope. The combination of these two issues threatens the whale hunt today. Traditional Ecological Knowledge (TEK) in combination with scientific knowledge must be utilized in order to ensure the survival of Iñupiat subsistence whaling culture and the bowhead whales themselves.

**Rhea Corson-Higgs**

Major: Environmental Studies; Minor: Dance  
Major Advisor: Jane Dawson, Government  
Internship: Earth Island Institute: New Leaders Initiative, Berkley, CA  
SIP Advisor: MaryAnne Borrelli, Government

***Connecticut Core Science Curriculum and Environmental Education in New London***

School shapes the way that young people interpret, observe and interact with the world around them, and this is dependent on the value of education and on the cultural values emphasized in standards, curriculum and assessment tools. Many pressing environmental concerns stem from deeply ingrained systemic inequities in society that manipulate and exploit both humans and the environment for the benefit of a few and at the cost of the health and wellbeing of the majority. The purpose of my study was to examine current Connecticut State high school science curriculum and to suggest how an environmental curriculum can address some of the primary concerns about public education in New London, CT, and can be used as a tool for social mobilization, youth empowerment and societal change. This investigation sheds light on the opportunity for states to adopt core science standards and to improve science education nationwide, given recent adoption of core standards in English/language arts and mathematics by 45 states and Washington D.C. Lessons learned about public science education in New London's public schools can be applied to many states throughout the nation and to a general conception of and approach to pedagogy.

## **Rebecca Horan**

Major: Environmental Studies

Major Advisor: Jane Dawson, Government

Internship: University of Maine Forest Bio-Products Research Institute

SIP Advisor: Doug Thompson, Physics

### ***Conservation of an estuary: Addressing habitat quality and action planning in the Poquetanuck Cove***

Estuaries, the transition zones between freshwater sources and the ocean, are highly productive regions that provide significant feeding and spawning habitat for many species. However, these dynamic ecosystems can be heavily impacted by disturbances from up and downstream of the site and may be severely impacted by anticipated climatic changes. The Poquetanuck Cove is an approximately two mile long estuary located between the towns of Preston and Ledyard, CT that feeds into the Thames River and is encompassed within the scope of the Long Island Sound Study. The Cove has been prioritized as an area of special conservation interest by the Thames River Basin Partnership (TRBP) because of its good quality water and habitat resources, especially compared to the degraded quality of much of the watershed. In order to protect this valuable habitat, the TRBP has asked that data gaps in assessment of the habitat quality be addressed, in order to make a more effective Conservation Action Plan (CAP). This project is the initial pilot study in a grander stewardship project being conducted through the collaboration of the TRBP and the U.S. Coast Guard Academy that will see the CAP through to implementation in uniting the varied stakeholders in conserving the estuary for years to come. My study focused on assessment of the benthic macroinvertebrates as indicators of water and habitat quality and the relative influence of the six freshwater tributaries that feed into the upstream end of the Cove on the salinity throughout the Cove.

## **Katie Lynch**

Majors: Environmental Studies, Government

Major Advisor: Jane Dawson, Government

Internship: Denison Pequotsepos Nature Center, Mystic, CT

SIP Advisor: Rachel Spicer, Botany

### ***Coogan Farm: A land management proposal for historical open space preservation***

As the last remaining parcel of open farmland in Mystic, CT, Coogan Farm protection from development is integral to the preservation of Mystic's rich history and character as a coastal New England town. In a joint venture between the Denison Pequotsepos Nature Center of Stonington, CT, and the national organization the Trustees for Public Land, the 34-acre parcel of land is being preserved through a combination of public and private donations as well as state grants. Through a combined literature review and personal-interaction with the land through Summer 2012, I developed a land management proposal for Coogan Farm as a recreational, historical open space. The study focused on three areas of concern: species preservation, sound mitigation, and historical land recreational use. In evaluating the needs of the present species, the residents of neighboring properties, and anticipated needs of visitors, my study details how best to balance populations of native and invasive species; a cost-effective and environmentally-safe solution to sound pollution from a neighboring power plant; and recommendations for trail maintenance and access to improve quality of recreational use for visitors and the land alike.

## **Clare Murphy-Hagan**

Major: Physics; Minor: Mathematics

Major Advisor: Doug Thompson, Physics

Internship: Colorado State University, Fort Collins, CO

SIP Advisor: Doug Thompson, Physics

### ***The effects of gradient and discharge on culvert outlet scour***

The continuity of our nation's waterways comes into conflict with our every growing infrastructure across all landscapes. Often when building a road, an engineer must pass the road over a stream or other small channel of water. Bridges are not always feasible or affordable solutions. One way to convey water under a road is to funnel it through a pipe or concrete

tunnel situated beneath the road called a culvert. From an environmental lens, issues arise when scouring beneath a culvert outlet causes it to perch above the surface of the stream. The perched outlet creates habitat discontinuity, cutting off organisms from their upstream environment that are unable or unwilling to jump up into the pipe. For my SIP I explored the effects of culvert-channel gradient and discharge on the dimensions of scour at pipe outlets. Using a flume I tested the variables, mapped the resulting scour, and examined mathematical correlations between inputs and outputs of the model.

### **Raymond Palmer**

Major: International Relations; Minor: East Asian Studies

Major Advisor: Jane Dawson, Government

Internship: Shaxi Low-Carbon Community Center, Yunnan Center, Yunnan Province, China

SIP Advisor: Jane Dawson, Government

### ***Where democracy concedes: Examining environmental civil societies in China and Japan***

Civil society is thought to flourish under a democracy, while they tend to wither under authoritarianism. However, a comparison between contemporary China and Japan reveal a paradoxical relationship: civil society in China under an authoritarian regime is more active than it is in Japan under a democratic one. Through case studies of China's Shifang protests and Japan's Minamata victims' movement, this project attempts to understand this paradoxical relationship between political regimes and civil society in the Asian context – a realm of political science that defies many Western conceptions and has yet to be explored.

### **Wynndee Reese**

Major: Anthropology; Minor (self-designed): Traditional Medicine and Biomedicine in Africa

Major Advisor: Catherine Benoit, Anthropology

Internship: World Camp, Inc., Lilongwe, Malawi, Africa

SIP Advisor: Catherine Benoit, Anthropology

### ***Environmental Education: Sustainability, Delivery and Impact***

Environmental education is an important step in becoming a good steward of the earth. The environment is facing tremendous degradation and current environmental education curriculum models suggest the possibility of conserving the environment and doing so effectively. My SIP sought to better understand how an environmental education curriculum can be implemented sustainably. I used my internship experience with World Camp Inc. to better comprehend how a new environmental education curriculum could be initiated and how it would be received. World Camp realizes the importance of environmental education in schools and its effectiveness on the surrounding community. In an effort to increase the sustainability of World Camp's Environmental Education Curriculum, we did environmental education workshops with teachers to familiarize them with the curriculum so they could continue to teach it in the local schools. The curriculum covered the topics of deforestation, effects of erosion, climate change, and alternative energy source.

### **Mark Roberto**

Major: History

Major Advisor: James Downs, History

Internship: Conservation Law Foundation, Boston, MA

SIP Advisor: James Downs, History

### ***50 years since "Silent Spring": Rediscovering Rachel Carson***

50 years ago, the sight of large scale DDT spraying from an aircraft flying over agricultural lands or a truck in a suburban neighborhood might not have been viewed as dangerous. In fact, it probably would have been seen as progress. Rachel Carson's iconic book, *Silent Spring*, changed the American public's perspective on the use of pesticides and spraying and jump-started the contemporary environmental movement. My SIP takes a look at the making of *Silent Spring*, 50 years after its publication, and provides an analysis of the press and reactions it received. I performed my research in the Linda Lear Center for Special Collections and Archives in the Rachel Carson Collection. The collection is a gift from Connecticut College alumna and author of *Rachel Carson: Witness for Nature*, Linda Lear. I began my research with an investigation of

the reviews and reactions to the book starting in the fall of 1962 continuing into the mid-1960s. I focused largely on the critiques and negative reactions to the book with special attention the multi-million dollar publicity campaigns of the chemical and agricultural industries. My sources for this work included newspaper and magazine articles and reviews of the book and a variety of chemical and agricultural industry publications. The second stage of my research was an investigation of the book's creation. My sources for this study were largely correspondence between Rachel and her publisher, literary agent, scientists, and friends. What I found within this correspondence was not always expected and made for interesting work. In an attempt to make this history project relevant today, I have applied my findings to the current environmental movement and how its leaders can learn from Rachel Carson's success.

### **Mitchell Serota**

Major: Biological Sciences; Minor: Chemistry

Major Advisor: Marylynn Fallon, Biology

Internship: University of Florida: The "Croc Docs," Fort Lauderdale, FL

SIP Advisor: Robert Askins, Biology

#### ***Assessing the effects of grassland restoration on a fall migratory bird stopover site***

Grassland bird species are on a steep decline in the Northeastern United States. This is because of the ecosystems that have declined by >95% of which 55% are grasslands, savannas, and barren communities. Moreover, conservation initiatives largely ignore stopover sites even though birds may spend up to one-third of the year in migration. Since early-successional communities are maintained exclusively through active management, habitat restoration is the most plausible way to increase grassland migratory bird populations. My research sought to implement the beginning of a long-term assessment of a newly restored meadow in the Connecticut College Arboretum. I surveyed and compared land bird populations in this newly restored meadow as well as two adjacent meadows. I found that sparrow abundance and species richness was greater in the newly restored meadow. The newly restored meadow may have attracted more migratory sparrows because of a higher diversity and vegetational heterogeneity of grasses and forbs. If these findings hold true over the course of a long-term study, future restoration efforts should focus on maximizing the diversity of grasses and forbs.

### **Seana Siekman**

Majors: Environmental Studies, Government

Major Advisor: Jane Dawson, Government

Internship: Provincetown Center for Coastal Studies, Provincetown, MA

SIP Advisor: Jane Dawson, Government

#### ***Environmental injustices of the electronics life cycle***

This SIP explored the environmental injustices that are caused by the electronics industry from the initial extraction of precious metals and minerals to the disposal of obsolete goods. I looked at both the basic environmental concerns such as pollution and water and land degradation, as well as social concerns such as health and safety issues. I then compared two possible solutions to addressing these environmental injustices: corporate social responsibility (CSR) and regulations. Through a comparison of two companies, Apple Inc. that employs CSR and Nokia which is guided by regulations, I determined that the regulatory approach leads to more immediate action and results, but that CSR leaves more room for companies to continue to improve their environmental rules and records.