The Goodwin-Niering Center for Conservation Biology and Environmental Studies

Senior Integrative Project Abstracts for the Class of 2007

Noah Fralich
Renewable Energy Sources Act and its Effect on the German Wind Energy Industry: Lessons for the U.S.

Germany has become relatively well known for its advanced renewable energy industry and understanding why could be useful for other developed countries that could benefit equally from such an industry. Closer examination of the German case shows that this success is the result of a landmark energy law that prioritizes renewable energy. Among the various types of renewable energy, wind power has been particularly successful in Germany as a result of this law. This paper looks closely at this law and outlines the principle elements of it that play a role in fostering renewable energy development. In addition to examining what has made this industry a success, the ways in which it has been successful are also explored, from emission reductions to decreased reliance on energy imports to the creation of jobs. Much of what has resulted from this law is not specific to the German case and there is strong evidence to conclude that a similar would have similar results here in the United States. The purpose of this paper, however, is not to outline a detailed plan for importing this legal mechanism to the US, but rather to show how such a mechanism works. Further work must be done to more exactly apply this type of law to the United States' energy sector.

David Hecht
Returning to Nuclear Power: A Historical Look at the U.S Experience and Analysis of the Current Obstacles to New Plant Development

As the United States enters the 21st century, the argument over whether nuclear power should once again be pursued in the United States has re-entered the national debate and become a very politicized and divisive issue. President Bush has recommended the building of more nuclear power plants in order to start to address a series of serious economic, political, and environmental issues the U.S is currently facing: these include global warming, energy insecurity, and price volatility. However, if we as a nation decide to pursue nuclear power as part of the solution to these issues, we must evaluate the potential risks, and the current political, economic, and regulatory hurdles that must be overcome to make the idea of a renewed pursuit of nuclear power a reality. This paper will concretely examine two of the current obstacles to new plant development: financial uncertainty and the lack of permanent nuclear waste disposition.

Sara Jayanthi

A Paleolimnological Examination of the Acidity Trends in Two Kettle Ponds along the Eastern Seaboard

Chrysophytes, microscopic algae composed of siliceous scales, were used to evaluate acidity trends in two kettle ponds. Snow Pond is in Truro, Massachusetts, along the Cape Cod National Seashore. Peskowesk Lake is located in Kejimikujik National Park on the Atlantic Canadian Province of Nova Scotia. Both ponds are acidic, poorly buffered waterbodies. Snow Pond lies adjacent to Route 6, the main road which runs through all of Cape Cod, while Peskowesk is remotely located in the middle of Kejimikujik with no public road access to the shore. Monitoring data from the Cape Cod National Seashore dating by to 1984 indicates increased acidification in the past few years, while the monitoring data from Parks Canada dating by to 1987 indicates stable pH levels. The downcores of both ponds showed the flora characteristic of very acidic water bodies. Snow Pond showed a relatively consistent floral composition until the surface sediment, when there appeared a notable increase in the percent abundance of the acidobiontic taxa *M. canina* and *M. hamata*, simultaneously with the disappearance of the acidophilous taxon *M. lychenensis*. Peskowesk Lake also exhibited consistent floral compositions throughout all strata except at 5cm, where there appears a notable spike in alkalinity marked by the presence of *M. akrokomos*. Results of this study suggest the Snow Pond has been undergoing recent increased acidification, while acidity levels of Peskowesk Lake have remained steady. The sudden taxonomic shift at 5cm from an acidobiontic taxa dominance community to an alkalibiontic taxa dominance community indicates abrupt and short-term forest disturbance.

Rebecca Mason
Local Food as an Educational Tool: A Deeper Look into Student Run Gardens

Global food production has advanced rapidly in the last century. Modern technology has provided increased ability to fertilize, scientific knowledge to genetically modify crops, and fossil fuels to aid in transportation produce. As a result the environment has suffered from land misuse and pollution and the average North American has lost all connection to the land. The objectives of the following study is to help educate community about destructive practices involved in large-scale food industrialization, promote the unique and beneficial roles of student run gardens in academia and to promote means for a sustainable future, as well as research student-run gardens at different colleges to supply helpful information for the Connecticut College student garden. Student gardens are a valuable tool for training students for a sustainable future. A garden helps educate about local food, teaches how to grow food sustainably, and provides knowledgeable growers for the future.

Christine Monahan
Mining, AIDS, and Development: Could sustainable mining bring more harm than good to Madagascar?

The island state of Madagascar could be turning into a mineral economy. A massive ilmenite mine is currently being built by mining giant Rio Tinto in the southeastern Anosy region, near the city of Fort Dauphin. Rio Tinto purports that this is a sustainable mining project; it has addressed important environmental and social problems that have historically plagued the mining

industry and believes that this project will spur sustainable development in the impoverished country. Unfortunately the company has given little attention to the causal link between mining and the spread of HIV/AIDS throughout Sub-Saharan Africa. Currently Madagascar's rate of seropositivity is below one percent, but this project almost guarantees that this number will increase significantly. Consequently, the broad-reaching effects of an HIV/AIDS epidemic will undermine many of the actions Rio Tinto has made to encourage sustainable development.

Jesse Taylor-Waldman
The Role of Land Trusts and Conservation Easements in Environmental Protection in Vermont: A Case Study of the Vermont Nature Conservancy and the Vermont Land Trust

In the last twenty years, conservation easements, legal agreements between landowners and land trusts that seek to protect private lands and limit development, have become an increasingly popular conservation tool of the land trust movement. While the majority of recent studies have attempted to assess the extent to which conservation easements can play a role in environmental protection and biodiversity conservation, they have predominantly overlooked other contributions of easements, most importantly the ability of easements to preserve cultural landscapes and protect agricultural lands economically important to local communities. Looking to Vermont as a case study, this paper looks at the role easements are playing in protecting biodiversity in the state, and also highlights the use of easements in conserving working landscapes, such as farms and timber forests. The Vermont Land Trust (VLT) and the Vermont Nature Conservancy (VNC), the state's two largest land trust organizations, are examined in order to understand how easements tie into land acquisition strategies, as well as the extent to which they are used to protect biodiversity.

Jennifer Vasquez
Use of Magnesium to Prevent Lead Poisoning in Zebra Fish: A Model for Prevention in Humans

Lead poisoning and magnesium actions were tested on zebra fish (*Danio rerio*) fertilization from October 2006- April 2007. The fish were exposed to 100 µg/dl of lead and 24.6 mg/dl of magnesium. Zebra fish eggs were collected daily and left to hatch in order to see the effects of lead on fecundity and hatchability. Lead seems to have an effect on zebra fish reproduction. Magnesium seems to have a slight effect on fecundity as well, but it also looks as if it competes against lead when both treatments are given to the fish. When compared to the control tank: zebra fish exposed to lead laid 80% less eggs, those exposed to magnesium laid 21% less eggs, and those exposed to both lead and magnesium laid 47% less eggs. Neither treatment seems to have an effect on egg hatchability. Potential reasons as to why this might be the case are explored.