Goodwin-Niering Center for Conservation Biology & Environmental Studies at Connecticut College

Spring 2005 Newsletter

Environmental CONNections

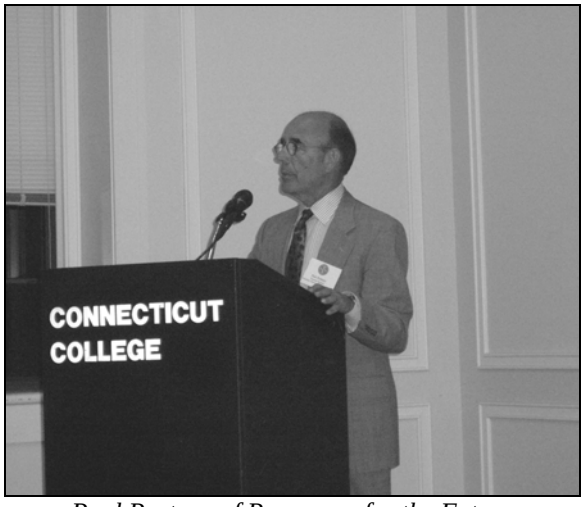
"The phenomenon of the stolen harvest is being experienced in every society, as monocultures replace biodiverse crops, and farming is transformed into a market for genetically engineered seeds, herbicides and pesticides."

-excerpt from *Stolen Harvest* by Vandana Shiva

Inside This Issue:

Acid Deposition Conference a Success

By Melissa Mylchreest



Paul Portney of Resources for the Future

On April 1st and 2nd, the Goodwin-Niering Center hosted the Elizabeth Babbott Conant Interdisciplinary Conference on the Environment. The fifth in a series of semi-annual conferences hosted by the center, and the first with the Conant title, it was called "Acid in the Environment: Lessons Learned and Future Prospects," and dealt with the topic of acid deposition, formerly known as acid rain. Thirteen speakers from throughout the United States and Canada presented their most recent work and findings on the ecological, economic and legislative aspects of acid deposition. Well over 100 people attended, including students, professors, and many from off campus.

During the past fifteen years, acid deposition has been the focus of much political debate and scholarly research. Acid deposition is an environmental problem that crosses state and national boundaries, and is closely linked to energy policy since much of it originates as emissions from fossil-fuel power stations. The goals of this interdisciplinary conference were to summarize scientific and policy lessons learned from the attempt to control acid deposition, and to discuss the future of transboundary pollutants and market-based emission systems. The conference focused on important ecological impacts of acid deposition, the transboundary nature of the pollutants, and domestic and international policies designed to reduce their emission.

World-renowned activist and scholar Dr. Vandana Shiva visited the college on April 13th and 14th. Please see article and more pictures on page 10.

Acid deposition occurs when important precursor pollutants, such as sulfur dioxide ($S0_2$) and nitrogen oxides ($N0_X$), chemically mix with water vapor and oxidants in the atmosphere and fall back to earth in wet or dry form. Wet deposition comes in the form of dew, fog, snow or rain, while dry deposition occurs as either gasses or dry particulates. Acid deposition adversely affects freshwater lakes and streams, coastal habitats, agricultural production, forests, soils, human health and building materials.

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Established in 1993, the Goodwin-Niering Center for Conservation Biology & Environmental Studies is an interdisciplinary program that draws on the expertise and interests of faculty and students in the liberal arts to address contemporary ecological challenges. The Center strives to integrate all areas of learning to deal with the issues of sustainability and the natural environment. Building on a scientific understanding of the natural world, the Center invites the social sciences, the humanities and the arts to help understand and solve difficult environmental issues.

From the Executive Director

Spring semester at the Goodwin-Niering Center has been active and exciting, as you can see from the contents of this issue of *Environmental Connections*. After over a year of planning, our fifth interdisciplinary conference was very well attended and well received. Internationally acclaimed environmental activist Vandana Shiva gave an inspirational talk to an overflowing audience, and participated in a variety of other campus events. And we graduated our largest Certificate class in the Center's history.

The Center's Certificate Program began six years ago, and has been funded primarily by a grant from the A. W. Mellon Foundation. As part of our effort to gauge the success of the program, we invited three distinguished environmental studies professors to evaluate the Certificate curriculum and outcomes. After studying student evaluations and other information sent ahead of time, Professors Peter Ryan (Middlebury College), Harold Ward (Brown University) and Stephen Kellert (Yale University) spent a day with us in early May meeting students and faculty involved in the Certificate. We scheduled the visit so the evaluation committee could attend the public presentations of eight senior integrative projects, the culmination of the Goodwin-Niering Certificate experience. Discussing our goals and methods with these professionals was stimulating for all, and we are looking forward to their ideas about what is working well, and what might be improved upon.

The very next week the Center hosted our Advisory Board in a meeting with the faculty involved in the Center. The Center directors gave an outline of the year's major accomplishments and an overview of student participation through the last six years. Environmental Studies Lecturer Beverly Chomiak gave an overview of our campus Geographic Information Systems (GIS) program, also featured in this newsletter. After the formal meeting the Board shared their ideas with the Center directors, and a particularly interesting discussion developed around the idea of ways to build a long-lasting bond between Certificate students and the Center.

Finally, I want to publicly thank our two Center interns for their excellent service to the College. Matt Turcotte '02, Campus Environmental Coordinator for the past two years, has truly moved the College forward in many important ways. His entrepreneurial spirit, quick wit and dedication to environmental issues have been inspirational to all those who worked with him. Melissa Mylchreest '04 is a gifted writer and editor, and has been an outstanding Center Assistant. We at the Center wish them all the best in their new endeavors.

Glenn Dreyer

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Acid Conference

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Fossil-fuel power plants, refineries, and paper and pulp mills are the major sources of SO_2 emissions, while automobiles and other vehicles are the primary emitters of $N0_X$.

The conference provided a broad overview of our current understanding of the environmental effects of acid deposition and a survey of different approaches to reduce this problem.

Certificate Students Write about Conference

Center certificate students attended the acid deposition conference on April 1st and 2nd and then wrote papers about the content, presentation, and organization. The following articles are excerpts from some of their papers, outlining the various sections of the conference.

Section I: The Ecological Impacts of Acid Deposition

By Marcie Berry '05

Much of the acid rain that falls to the earth is a result of fossil fuel emissions; however, the use of fertilizer is also a contributor to the problem. Robert Howarth, a professor at Cornell University, discussed the problem of excessive nitrogen in the atmosphere, where it comes from, and how it affects estuaries and coastal ecosystems. Globally, the use of fertilizer with large amounts of nitrogen for food production and the burning of fossil fuels are the main sources of nitrogen in the atmosphere, with waste water/sewage providing a small percentage. Howarth believes that it is not the acid rain in general that is a problem, it is the nitrogen specifically. Nitrogen pollution increases harmful algal blooms in marine environments. These toxic substances have a harmful effect on marine mammals, shellfish, and other animals. The problem is caused largely by over fertilization. As a result, water quality in coastal marine ecosystems has seriously deteriorated due to eutrophication. Eutrophic waters are rich in organic material, which allows for a sudden increase in plant life, generally algae. These algae die a decompose, drastically reducing the dissolved oxygen available in the water, which would undoubtedly affect anything else that lives there. In addition to over fertilization, nitrogen deposition from the burning of fossil fuels has also rapidly increased due to the use of SUVs and the insufficient monitoring of nitrogen emissions.

Howarth concluded by saying nitrogen pollution is the largest pollution problem in the coastal United States. Although it is a problem everywhere, it has large regional variation. For example, the dead zone in the Gulf of Mexico is a result of nitrogen from agriculture. This case is more severe than in other places. He also concludes that the importance of atmospheric deposition is underestimated in highly populated areas, such as cities.

Howarth brought up the problem about fossil fuel emissions, particularly nitrogen, from SUVs and how they are not sufficiently monitored. This is clearly a big problem in the world, considering how much fuel these unnecessary vehicles eat up. Paul Portney, president of Resources for the Future in Washington DC, discussed the role economics has in air pollution control. He stated that we simply do not have the money to do something about every environmental problem that exists. It is therefore important to understand how much it will cost to fix an environmental problem and whether these costs are exceeded by the benefits of increased environmental protection. Now the only problem here is that it is difficult to assign a cost to environmental problems because things such as living longer, cleaner air, and healthier ecosystems have to be taken into consideration. Unfortunately, there are always cheaper ways to meet goals. These cheaper alternatives tend to give polluters flexibility and if we were to simply require that cars have reduced emissions, then the industry would move to other countries to avoid pollution control costs. Essentially, the problem of fossil fuel emissions is a complicated one from both the scientific and economic perspectives. Controlling emissions and the amount of nitrogen in our ecosystems is probably not economically viable; however, this pollution is having a devastating effect on much of our coastal ecosystems. Both Robert Howarth and Paul Portney gave excellent presentations on both of these perspectives.

Section II: Acid Emission and Energy Policy

By Sarah Lumnah '05

The first speaker, Daniel Sosland, based his comments on energy efficiency. I found his discussion of the Bush Administration's "Clear Skies" bill to be the most interesting part of his presentation. He claimed that the Clear Skies bill was a "Trojan Horse" to dismantle the Clean Air Act (CAA) since it would repeal most major CAA programs for power plant clean up and would erase CO_2 from the bill. I have been hearing a lot of talk about the Clear Skies bill, particularly from the Natural Resources Defense Council, but I found Mr. Sosland's explanation of the bill to be the easiest to understand. Also, Mr. Sosland's suggestions for the future--make effective federal air quality standards, a balanced energy policy, and transition power plants to cleaner fuels--seemed like they would really help improve the current situation. However, it would have been nice if he would have suggested ways to implement these suggestions.

Next up was Don Munton, a professor at the University of Northern British Columbia. Professor

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Don Mylchreest Speaks to Certificate Class about Clean Coal

By Melissa Mylchreest

On February 10th, the Goodwin-Niering Center certificate class welcomed speaker Don Mylchreest, Program Manager of Power Plant Laboratories at Alstom Power in Windsor, CT. He presented a lecture on an innovative power generation facility being developed by Alstom in West Virginia. The project, dubbed Western Greenbrier after the county in which it is located, is at the cutting edge of the "Clean Coal" movement, and is making great strides to prove that this phrase is not as inaccurate as many believe.

Mylchreest received his BSME from Northeastern University's College of Engineering in 1974, at which point he went to work for Combustion Engineering, which eventually became Alstom Power, Incorporated. Alstom is an international company that ranks among the world's premier engineering firms, and is the company behind many of the cutting-edge designs in today's energy field.

At their Windsor office where Mylchreest works, Alstom runs a large-scale test facility which allows them to create and study systems envisioned by the research and design team. The current focus for Mylchreest's team is the design, fabrication, and implementation of ultra-clean steam generators to be used in industrial and utility facilities. Their primary objective is to reduce emissions, especially particulate matter, to the lowest possible levels. With this in mind, they have come up with one of the cleanest combustion power plants on the market today, which takes traditional technology in a new direction, reducing emissions drastically. Their design also reduces boiler size by 38%, thus minimizing cost and use of structural steel, while keeping energy production the same.

This technology will be going into the Western Greenbrier facility, along with numerous other environmental safeguards, including scrubbers to reduce SO_2 (sulfur dioxide), as well as the addition of limestone, which also greatly reduces sulfur output. CO (carbon monoxide) and NOx (nitrous oxide) are reduced as well by way of low operating temperatures, uniform mixing of fuels, and other systems.

The most fascinating aspect of Western Greenbrier, however, is its source of fuel: this power plant is designed to run off waste coal. Waste coal, otherwise known as gob, is the leading environmental crisis in West Virginia due to the state's extensive history of coal mining. Gob, a thus-far unusable byproduct of the mining industry, has been left in enormous piles throughout the landscape, and the runoff from these piles has contaminated ground water, altered pH levels in the soil, and is causing serious health problems for those who live nearby. The Western Greenbrier facility will be built it Rainelle, a town with a history of over a century of coal mining. The gob left behind provides enough fuel to operate this power plant for several decades.

In addition to being a practical and useful method of remediation, the Greenbrier facility will put its byproducts to good use. While emissions from the plant are extremely low – greater than 97% capture for all sulfur in the system, and even higher for NOx – there are a few outputs, specifically, ash and waste heat. Remarkably enough, Alstom and its associates have found excellent environmentally-friendly uses for these. The ash will be divided between two destinations; a portion of it will go back to the gob sites, where it will be mixed back into the soil to neutralize the high levels of acid and re-create ecologically stable land. The other portion will be used to create a building material called WoodBrik, a newly patented product that is created with waste wood pulp and ash byproduct, and has the structural properties of cement. The waste heat will be diverted into what has been dubbed an "eco-park," an area immediately adjacent to the power plant, where crops will be farmed and kept warm in large greenhouses.

The Department of Energy has backed the project whole-heartedly, and the people of West Virginia are thrilled not only for the environmental aspects, but from the economic side as well. Rainelle is in dire economic straights, and the construction and operation of the plant will create hundreds of jobs. Mylchreest believes that this is a new and positive direction for the power industry to be headed, especially when there are hundreds of gob piles spread throughout this region of the country which need to be cleaned up, and there is always a demand for low-pollution, low-cost energy.

He admits, of course, that he wishes that there was no need for coal, and that there was a greater shift to cleaner energy. But, he also realizes that it is imperative to use our current resources to the best of our ability within the current economic system. The gob piles are not going to disappear on their own, and are going to continue to cause tremendous damage to ecosystems. Power demand is continuously on the rise. By creating power and lending a hand to the environment at the same time, he has addressed two of the biggest problems facing our country, and developed a feasible and forward-thinking response to both.

Don Mylchreest at work at Alstom Power.

A Look at Conn's GIS Lab

By Beverly Chomiak, Lecturer in Geology and Environmental Studies

What is GIS?

GIS, which stands for "Geographic Information System," is a computer system capable of capturing, storing, analyzing, and displaying geographically referenced information (data identified according to location). It can be used to create maps and images utilized in development planning, resource management, and analysis of land use trends.

The GIS Laboratory

The second incarnation of the college GIS laboratory was installed in August 2003 with six dual processor computers on the college network system, and an overhead projection system. The principal software currently installed is ESRI's ArcInfo 9.0 Educational Laboratory Package, which allows us to offer instruction in both vector and raster data GIS.

Most of the GIS data in use has been supplied by ESRI, or has been downloaded from internet sources such as UNEP databases. Data purchased for the laboratory include the *Global GIS* database from the AGI, Landsat 5 and Landsat 7 images of southern New England from the USGS, the *Environmental Data +for Connecticut* database from the Connecticut Department of Environmental Protection, and ½ foot resolution 1998 orthophotographic images of the Connecticut College Property from the City of New London. In 1995, the arboretum acquired a high resolution AutoCAD database that has recently been converted into shapefile and geodatabase format. Connecticut SBC has kindly donated two sets of high resolution orthophotographic images of the areas that include the college – a black and white set photographed in 2001 and a color set photographed in 2004.

GIS Coursework

Introduction to GIS is a studio style course that meets for 5 hours each week in the G-S Laboratory. Topics covered include map projection and cartography, the use of vector and raster data models, and map manipulation and cartographic modeling of both vector and raster data types. Class exercises utilize the Connecticut DEP and Connecticut College Arboretum Databases, and address environmental issues within our country, the town or the arboretum.

Every student is required to submit a final GIS project demonstrating his or her ability to create GIS data, manage attribute data, conduct spatial analysis and write metadata. Students are free to choose themes and locations that interest them. Finished projects with supporting files and documentation are saved on cd-roms and donated to the college library for use by the college community.

GIS in ES Courses and Research

Faculty in the Environmental Studies (ES) program are encouraged to introduce GIS components into their courses, particularly field-based courses. Currently, there are GIS components in ecology, physical geology, and plant ecology courses. GIS components are being planned or developed for three other courses for the '05 – '06 academic year; ethnobotany, geomorphology and hydrology.

Over the past 50 years, a large amount of spatial data has been collected in the arboretum and we are starting to

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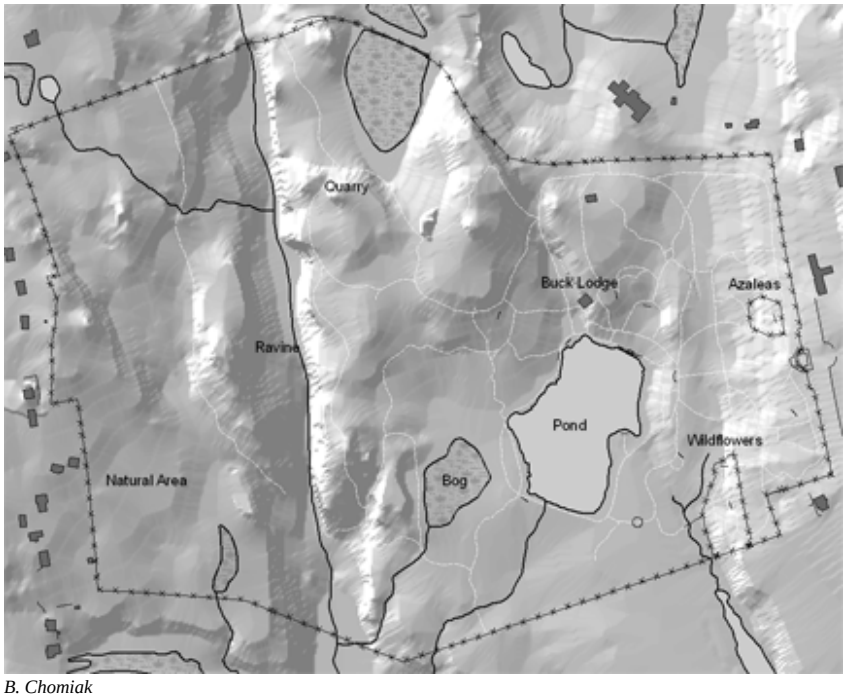


B. Chomiak

A map of the Connecticut College Arboretum created in the GIS Laboratory. The main campus us just out of sight on the right (east) side of the map.

Certificate Seniors Present Projects

On May 5th and May 12th, the 13 members of the certificate class of 2005 wrapped up their commitment to the center with their final presentations of their Senior Integrative Projects. Each senior delivered a 15 minute presentation, based on the cumulative work they have been pursuing either this past semester or this past year. Their topics varied widely, and all presentations were interesting and well-delivered.

Marcie Berry presented her independent study entitled "The Benefits of Offshore Wind Farms for Renewable Energy and the Possible Creation of Artificial Habitat for a Variety of Marine Life, Using the Cape Wind Project in Nantucket Sound as a Case Study." Advised by Stephen Loomis, Temple '65 Professor of Biology, her project examined the proposed Cape Wind Project in Cape Cod, and the possibility that its structure may provide artificial aquatic habitats.

An offshore wind farm in Denmark, similar to the proposed Cape Wind Project that Marcie studied.

Allen Bunting delivered a talk on her project "Nature, Environment and Consumption," which looked into the question of the consumer, and the idea of "buying environmental." Working with Professor Tejaswini Ganti of the anthropology department, Allen explored the means by which the public can be persuaded to choose eco-friendly products, and how this has recently become a more common trend.

Betsy Ginn explored environmentalism in a city atmosphere with her presentation "Community Gardening and Urban Development in New York City." Working with botany Senior Lecturer Pam Hine, she discussed the effects community action has on raising urban awareness of environmental issues.

Jen Godfrey drew on her work at Mystic Aquarium for her paper "The Use of Environmental Enrichment in Preparing a Harbor Porpoise for Care in Zoological Facility." She worked with biology Professor Bob Askins, and integrated her hands-on work with a harbor porpoise to determine which methods best acclimate non-releasable animals to human care.

Cam Hewitt presented "The Paradox of Western Environmentalism," in which he explores the struggles and successes of the conflict between different American ideals; environmentalism, expansion, conservation, land management and personal land use. He worked with Jane Dawson, Weinmann '51 Professor of Government

Rory José spoke about "The Environmental, Social, and Economic Impacts of Large Dams: A Case Study of the Three Gorges Dam in China," on which he also worked with Professor Jane Dawson. He examined the controversial Three Gorges Dam and analyzed its various effects on the population and land.

Sarah Lumnah presented her work titled "James Fenimore Cooper: Justifying History Through Manipulating the Environment." Under the supervision of Professor Julie Rivkin of the English department, she explored "The Last of the Mohicans", and the manner in which Cooper viewed Native Americans, early settlers and the American landscape.

Cait McIntosh spoke about her work on "Plant Poisoning of Livestock: Issues of Economic and Biological Sustainability Using *Cicuta douglassi* and *Kochia scoparia* Case Studies." Working with the biology department's Professor Stephen Loomis, she studied the biological effects of two common weeds on the health of livestock, and the resulting economic consequences.

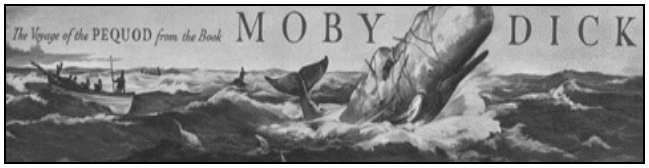
Keiko Nishimoto outlined her work on "The U.S. Forest Service and the Multiple-Use Sustained Yield Act of 1960." She worked under Professor Bill Frasure in the government department, and drew on her research of the Forest Service's interpretations of the multiple-use sustained yield act and the effects on various ecosystems.

Amy Phelan completed her ongoing work with Professors Christine Small and Glenn Dreyer, both of the botany department. She studied restoration ecology in a project titled "Restoration of a Pitch Pine/Scrub Oak Woodland at the Hopeville Pond Natural Area Preserve, Griswold, CT."

Lauren Richter presented her work called "Equating Reason with Rational: How Rationality Limits Modern Approaches to Environmental Problems," in which she explored the feasibility of our current solutions to environmental issues, and how our views of reason may limit our tactics. She worked with Professor Arthur Ferrari of the sociology department.

Emily Weidner presented her year-long work entitled "Struggles for Cultural Survival in a Changing Environment: Two Panamanian Hydroelectric Projects and their Impacts on Indigenous Communities." Working with Professor Manuel Lizarralde of the botany and anthropology departments, she looked at a currently existing dam and a dam which is being proposed, and their effects or potential effects on the indigenous community.

Kate Williams presented her work "Musings: A Sense of Place in Moby Dick." She explored the development of environmental literature, and the environmental influence Moby Dick had on future generations of authors. She worked under the guidance of Professor David Greven with the English department.



Kate drew on her experiences at Mystic Seaport to augment her analysis of "Moby Dick."

Senior Recognition Ceremony

On Saturday, May 21st, the Goodwin-Niering Center held its yearly recognition ceremony to honor its thirteen graduating seniors. Parents, families, advisors and friends turned out to watch the seniors receive their certificates and speak briefly about their internships, projects, and plans for the future. Such plans vary widely, and include teaching English in Japan, graduate school for veterinary medicine, teaching math in the Bronx, writing for a newspaper and leading high school trips to Costa Rica.

President Fainstein, Professor Robert Askins, Director of the Goodwin-Niering Center and Professor Gerald Visgilio, Associate Director of the center welcomed the students and guests, and then turned to Diana Whitelaw, Associate Director of the center to present the certificates.

Glenn Dreyer, Executive Director of the center spoke to congratulate the seniors, and introduce the guest speaker, Ralph Lewis. Lewis, Connecticut State Geologist (retired) and member of the Goodwin-Niering Center advisory discussed his career path, spent mainly with the Connecticut DEP, and commented on the recent Ocean Commission report.

We wish our graduating seniors the best of luck in all of their endeavors, and hope that they keep the center updated on their various adventures in the future.

Above: Ralph Lewis addresses the Recognition Ceremony.

Below: Senior Class, back row: Lauren Richter, Emily Weidner, Kate Williams, Cam Hewitt, Rory Jose, Amy Phelan, Sarah Lumnah, Cait McIntosh. Front row: Keiko Nishimoto, Marcie Berry, Betsy Ginn, Allen Bunting, Jen Godfrey.

Junior Internship Plans

The certificate class of 2006 is heading out to summer internships around the world. The following are their destinations. We look forward to hearing about their adventures when they come back in the fall!

Ben Alander – Save the Bay, Providence, Rhode Island
Allie Baldwin – Legambiente, Lombardia, Italy
Selin Devranoglu – Bumerang Environmental Organization, Istanbul, Turkey
Meghan Lucy - Ocean Alliance, Gloucester, Massachusetts
Alaya Morning – City Slicker Farms, Oakland, California
Adanna Roberts – New York City Department of Education, Office of Occupational Safety and Health
Joel Scata – Atlantic Council of the United States, Washington DC
Ceileigh Syme - Wildlife Friends of Thailand, Petchburi Province, Thailand
Laurinda Wong – Ocean Alliance, Gloucester, Massachusetts

Munton seamlessly wove jokes and anecdotes throughout his informative talk, producing a very entertaining presentation. Professor Munton spent the majority of his time discussing the shortcomings of the Clean Air Act. Ultimately, he believes that the CAA was not ambitious enough. He explained that the target levels for emissions were set too low because they were based on over-estimated costs.

Next, Miranda Schreurs spoke about the politics of acid rain in Europe. It was nice being exposed to the European side of acid in the environment after having spent the early part of the morning discussing North American CAA issues. I learned that acid rain only became a real issue after the Stockholm Conference of 1972. She also introduced me to the fact that there was a convention on long-range transboundary air pollution in 1979. I was very surprised to learn of this convention since it seems like it was way ahead of its time. In fact, one of the things that she stressed the most was that Europe was the pioneer in addressing acid rain and that it was about 10 years ahead of the United States. She also explained the different ways that Europe and America approach the acid rain problem; the U.S. uses market-based initiatives and emissions trading, whereas Europe sets targets. Since both methods have been equally effective, it seems that both areas of the world have something to learn from one another.

Liliana Andonova, the session's final speaker, presented the topic of acid rain policy in Eastern Europe. She discussed three countries, the Czech Republic, Poland, and Bulgaria. All three countries have effectively reduced pollutants, suggesting three implications for other developing countries that need to address acid rain: the need for concern and voice from civil society, capacity for enforcement, and financing (international, domestic, public, and private). Overall, it was interesting seeing how each of the presenters was able to add a different aspect to the acid rain discussion. I came away from the conference with a deeper understanding of the great complexity surrounding the issue of acid in the environment.

Section III: SO_2 and the Market

By Christine Monahan '07

The three speakers of Section III were Richard Morgenstern, Senior Fellow at Resources for the Future, Ronald Shadbegian, a professor at UMASS-Dartmouth and a visiting economist at the Environmental Protection Agency's National Center for Environmental Economics, and Joseph Kruger, Visiting Scholar at Resources for the Future. All three lectures focused on economic incentives as a means of environmental protection, with special attention to sulfur dioxide (SO_2). The first lecture, by Morgenstern, compared regulatory means with environmental incentives in both the United States and Europe. The second lecture, presented by Shadbegian, focused specifically on analyzing costs and benefits of trading SO_2 credits to determine if such measures were environmentally just. The last lecture, presented by Kruger, applied lessons learned from trading SO_2 to the creation of programs for trading greenhouse gases (GHGs).

Morgenstern first presented a group of hypotheses on whether economic incentives (a cap and trade system) or regulations (a command and control system) would be better in particular categories. For example, he hypothesized that a command and control system would result in greater altruism than a cap and trade system. This hypothesis and some, but not all, of the others were proven wrong after he studied six case studies in both the United States and Europe. Morgenstern's general conclusion was that environmental regulation worked both with economic incentives and regulation. Regulation was likely to fall short of expectations, though, while economic incentives were more efficient. Yet economic incentives put a greater burden on industries. He suggested that simply choosing one system over the other was unrealistic, and that the system most likely to work would involve a mix of instruments from both.

Shadbegian's presentation shifted the focus of the conference directly to SO_2 trading and the effectiveness of economic incentives. He specifically studied improvements in air quality and subsequent health improvements under Title IV of the 1990 Clean Air Act. His calculations were complex, but in the end he asserted that the Aggregate Benefits of the subsequent SO_2 reductions far exceeded the Aggregate Costs. He measured the Aggregate Benefits to total fifty-six billion dollars, while the aggregate costs were only five-hundred sixty million dollars. The net benefit is fifty-five point four billion dollars, and from 1990 to 1995, one-hundred forty-eight plants reduced SO_2 from 9.5 billion to 4.9 million tons. An important issue he pushed in his presentation was that the costs and benefits of this were environmentally just. The costs hurt no particular socioeconomic group significantly more than any other, and only the poor had more costs than benefits and this difference was only slight. He encouraged the continuation of such policies.

Kruger took a lot of the ideas presented by Morgenstern and Shadbegian and applied them to the trading of GHGs. He believed that trading of GHGs would potentially be more effective than it was for SO_2 because it would not result in the creation of hot spots. He stressed the importance of specific elements such as flexibility of timing through banking, independent third party monitoring systems and allowance distribution. Changes that needed to be made were in the scope and point of regulation, geographic flexibility, the auction of allowances, mechanisms to limit price uncertainty and the issues of multiple gases and sequestration. As of yet there has been no consensus at the federal level of GHG trading, but there have been many voluntary initiatives made, such as the Chicago Climate Exchange Trading Program. He also cited respectable work at the state level with the Regional Greenhouse Gas Initiative and the trading program of the European Union. He was confident that such programs could be and needed to be put to use more and, if so, would be successful.

The economic section of the conference presented a positive view of the system of economic incentives as a means of environmental protection. The presentations flowed well from one to the next in a progressive view of

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the issues involved. They were informative and left the audience confident that progress can be made.

Acid Conference Overview

Friday's portion of the conference began at noon with a keynote lecture by Anthony Janetos, Vice President of the Heinz Center for Science, Economics and the Environment. The Heinz Center is a nonprofit institution dedicated to improving environmental policy through collaboration among industry, government, academia, and environmental organizations. Janetos spoke on *Lessons Learned from the Acid Deposition Research Experience*, delivering an introduction to and overview of the topic.

Janetos' speech was followed by the first of three section of the conference; The Ecological Impacts of Acid Deposition. Within the framework of Section I, three speakers delivered the results of the most recent scientific research on the effects of acid deposition on the ecological landscape. Peter Dillon, Professor of Biogeochemistry, Environmental and Resource Studies and Chemistry Departments, Trent University, Canada, presented a talk called *Acid Deposition – Effects, Response to Decreases in Sulfur Emissions, and Prospects for Long-Term Recovery*. He was followed by Knute Nadelhoffer, Professor of Ecology and Evolutionary Biology at the University of Michigan, where he also serves as Director of the Biological Station. He spoke on *Atmospheric Nitrogen Deposition: Implications for Nutrient Cycling, Acidification and Terrestrial Ecosystem Functioning.* The section was concluded by Robert Howarth, Professor of Ecology and Environmental Biology at Cornell University, who delivered a lecture entitled *Nitrogen Pollution from Acid Rain is a Major Driver of Eutrophication in Coastal Marine Ecosystems.* Following the conclusion of Section I, the speakers and conference attendees attended a reception and formal dinner.

The evening keynote was delivered by Paul Portney, who is the President and Senior Fellow of Resources For the Future (RFF), based in Washington, DC. The goal of RFF is to improve environmental and natural resource policymaking worldwide through the use of social research. Portney's speech was entitled *Economics and Air Pollution Control*.

Saturday morning began with a breakfast for attendees, and then proceeded into Section II, which focused on Acid Emissions and Energy Policy. Daniel Sosland, founder and executive director of Environment Northeast, presented the first lecture on *U.S. Energy Policy and the Transmission of Acid-Producing Emissions Across State Boundaries*. He was followed by Don Munton, who is a Professor of Political Science at the University of Northern British Columbia. Munton's lecture was titled *Transboundary Acid Rain: Conflict to Cooperation to Collusion*, and dealt with the U.S.- Canadian acid deposition conflict.

Following a break, Miranda Schreurs delivered her lecture, *Addressing the Transboundary Acid Rain Issue in Western Europe: Lessons and Comparison with the U.S. Experience*. Schreurs is an Associate Professor of Political Science at the University of Maryland. She was followed by Liliana Andonova, Assistant Professor of Government and Environmental Studies at Colby College. She spoke on *EU Integration and Acid Rain Policies in Central and Eastern Europe*.

Attendees and speakers enjoyed a lunch between the second and third sections, which gave them an opportunity to meet one another and discuss presentations and theories. The final section dealt with SO_2 and the Market, and featured three speakers. The first was Richard Morganstern, another member of Resources for the Future, where he serves as Senior Fellow. He presented C*hoosing Environmental Policy: Comparing Instruments and Outcomes in the United States and Europe*.

Ron Shadbegian presented next, delivering a talk on *The 1990 Clean Air Act Amendments: Who Got Cleaner Air and Who Paid For It?* Shadbegian is a professor at the University of Massachusetts at Dartmouth, and also a Visiting Economist at the Environmental Protection Agency's National Center for Environmental Economics. Section III was wrapped up by Joe Kruger, the final delegate from Resources For the Future, where he is a Visiting Scholar. His lecture was entitled *From SO_2 to Greenhouse Gases: Trends and Events Shaping Future Emission Trading Programs*.

The final speaker of the conference was Timothy Tear, the Director of Conservation at the Eastern New York Chapter of The Nature Conservancy. He spoke on *Atmospheric Deposition and Conservation*, and presented a fitting conclusion to the weekend by drawing on the content of the previous lectures, and looking towards the prospects for the future.

For more information on the conference, including abstracts of lectures and bios of speakers, please visit our website.

Diana Whitelaw, Associate Director of the Goodwin-Niering Center with Elizabeth Babbott Conant '51, after whom the conference is named.

Dr. Vandana Shiva Visits College

By Melissa Mylchreest

On April 13th and 14th, world renowned environmentalist Dr. Vandana Shiva visited Connecticut College, and presented a lecture titled "Keeping Food Security in Women's Hands." She was also awarded an Honorary Degree by the Board of Trustees, and participated in a number of events organized in honor of her visit.

Dr. Shiva is a globally recognized environmentalist, physicist, feminist scholar and activist. She has contributed greatly to the fields of biodiversity, biotechnology, intellectual property rights, women's rights, and ecological issues related to agriculture. Currently, she is the director of the Research Foundation for Science, Technology, and Ecology in New Delhi, India, and the founder of the Bija Vidyapeeth School.

Her lecture, co-sponsored by the Department of Gender and Women's Studies and the Goodwin-Niering Center's Lambert Lecture Series, dealt with the issues of food security, and the importance of recognizing this as a very real global problem. She is particularly concerned with the prevalence of genetic modification of crops, and the impact this is having, not only in terms of the environment, but in terms of human health and the economy as well. She believes that the modification and subsequent patenting of crops by large corporations is having dire effects on farmers throughout the world, and is jeopardizing the health of the global population. She has dedicated her life to reversing this situation, and returning agriculture to its traditional roots. Food, she believes, is such an integral and essential part of all life that it must be given the utmost attention; genetic modification has so modified our crops as to leave them nearly void of nutritional value. This, coupled with monoculture (the practice of growing only a single species of crop rather than several within the same plot), has altered the face of agriculture. Farmers are forced into a position that leaves them reliant on pesticides and heavy irrigation, and suffering consistently low yields.

Shiva spoke passionately about her work and beliefs.

Dr. Vandana Shiva

Shiva calls for a return to traditional, organic methods of farming and gardening, and believes that in most cultures, this knowledge lies in women's hands. The replacement of monoculture with mixed-crop gardens should significantly reduce the need for pesticides. In addition to health problems associated with pesticides, they are also petroleum-based, and thus further aggravate the current global oil issues. She believes the banning of genetic modification will allow plants to evolve and diversify, and protect themselves naturally. A shift to local or at least regional food sources will cut down both transportation and cost.

However, Shiva is no stranger to the difficulties of going head-to-head with large corporations who are intent, she says, on the highest profit regardless of cost to human life and the environment. For years, she has battled companies such as Monsanto, which are patenting crops that have existed for hundreds if not thousands of years, and driving small farmers to plant and grow only their seeds. Shiva claims that in India, tens of thousands of farmers have lost their farms, and many are starving to death. Shiva has remarkable persistence, and has, over the past dozen years, managed to have many of these patents revoked.

Shiva believes that a return to traditional agriculture is the most essential change facing the world today. Starvation is a horrific reality everywhere in the world, as is malnutrition. America is not exempt from these issues, even though our options and our food seem so plentiful. It is imperative that we reclaim the food we eat, and support the farmers who grow it.

In honor of this notion, Ben Tressler '05 and Greg Hopkins, Director of Auxiliary Services, organized a lunch on April 14th, comprised almost entirely of locally grown, seasonal, organic food. Approximately 50 people attended the lunch, and all proceeds went to support the newly-forming Connecticut College Community Garden. During the lunch of salads, root vegetables, lamb sausage, spinach and maple ice cream, Tressler and Hopkins discussed future plans to integrate organic food into the Connecticut College campus, by means of converting one of the small dining halls to serve local, organic food.

Continued on next page

Lambert Lecture Series

Continued from previous page.

Ben Tressler '05 enjoys the organic luncheon he organized.

Prior to the luncheon, Shiva took part in a panel discussion along with three other women; Tejaswini Ganti, Professor of Anthropology, Merilee Mardon, Professor of Economics, and Kassie Rohrbach '03, who is a Goodwin-Niering Certificate alum. The panel, moderated by Mab Segrest, Professor of Gender and Women's Studies, was titled, "A Conversation with Vandana Shiva on Sustainability, Biodiversity and Human Rights." The panelists used the opportunity to probe deeper into the issues that Shiva had presented the night before, to ask questions, and to discuss solutions.

Dr. Shiva's kind, insightful manner and spirited lecture inspired everyone who attended. Many bought one or two of her numerous books, which include *Stolen Harvest: The Hijacking of the Global Food Supply*; *Water Wars: Privatization, Pollution and Profit*; *Biopiracy; The Plunder of Nature and Knowledge*; *Monocultures of the Mind: Perspectives on Biodiversity and Biotechnology*; and *Staying Alive: Women, Ecology and Development.* For more information about Vandana Shiva, the Bija Vidyapeeth institute, and the Research Foundation for Science, Technology and Ecology, visit www.vshiva.net.

Members of the discussion panel (l-r): Kassie Rohrbach '03, Mab Segrest, Tejaswini Ganti, Vandana Shiva, and Merilee Mardon.

GIS at Conn

Continued from page 5

enter the data into the arboretum database in order to study environmental change. Students in the GIS course are contributing their efforts to the data entry. The evolving database will be available for use in a number of field-based courses, and will be particularly useful to the arboretum for land management and education. The arboretum staff recently updated the visitor's brochure with a GIS-based trail map, and are currently creating digital maps of accessioned plants in the native plant collection.

Future Directions

Enrollment in the GIS course has been consistent (14 or 15 students), therefore, it would benefit the program to have two or three additional computers and ArcGIS licenses available in the laboratory. The additional seats would also make it possible to invite laboratory sections of other ES courses to use the GIS laboratory.

Because GIS is rapidly moving towards delivery of information over the Internet, a priority task in the GIS laboratory is to create an online GIS using the arboretum database for a pilot project. This will require the acquisition of a server and ArcGIS software. Information Services at the college has agreed to support our efforts in the hope of delivering online GIS to courses outside the Environmental Studies program.

What Students Say about GIS:

"Taking this GIS course has been a wonderful opportunity for me to gain a better understanding of the patterns and trends in spacial geographic data. Beverly has taught us how to navigate around the frustrations innately built into a digital program. It has been really interesting to learn that the public tends to believe maps despite their levels of accuracy, and how GIS can help correct some of these problems."

-Kelly Washburn '05, Environmental Studies

"The communal learning environment in the classroom is perfect; students are given the chance to work alongside each other and thus teach and learn from each other. The opportunity to work on a new project every class is a thrill, and Beverly is so eager to help out. I think that GIS is fantastic, because it allows you to explain geography in a compelling format; I've really learned how to understand topographical information, and how to orient myself in the landscape to a much higher degree."

-Scott Peterson '06, Environmental Studies

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At a ceremony on April 13, 2005, a Sugar Maple tree at the college's main entrance was dedicated to the memory of Jean Thomas Lambert '45. Jean was a long-time supporter of the college and environmental issues and, through her foundation, made generous gifts to both the Goodwin-Niering Center and the Program in Environmental Studies. Nancy Reyman, Jean's daughter and Patrick Weschler, Counsel to the Jean Thomas Lambert Foundation, are pictured with the tree.