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Where Science and Art Meet

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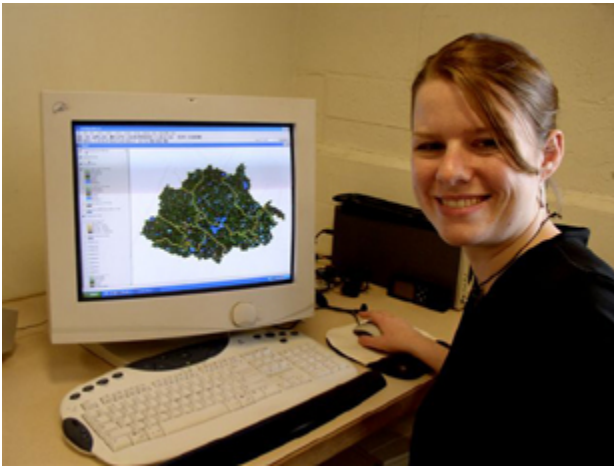
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feature ARTICLE

Where Science and Art Meet

—**Gillian Graham**, *Inquiry* Editor (Edited by Karen Finogle)

University of New Hampshire graduate Mary Dellenbaugh was not your typical forestry student. When most people think of forestry, they probably conjure images of bearded, flannel-clad men using heavy machinery to clear and manage forests for human use. Mary challenged these stereotypes. A petite, energetic UNH honors student, she usually dresses in a simple black shirt and jeans, with silver earrings and her short reddish hair pulled back from her face. Despite the fact that she often disagrees with the way forestry is practiced in the United States, she was recently named 2005 Forestry Student of the Year for New Hampshire by the Society of American Foresters.



Mary and a GIS map

Mary wants her future in environmental management to be about bringing a balance between an artistic, aesthetic approach and a scientific, ecological approach. "I am a very artistic person, very balanced between the arts and the sciences, and I believe that in environmental management we need to find a balance between a creative force and a custodial force," she said.

Perhaps Mary's unique perspective comes from her varied interests and diverse academic history. She started as a classics major at Trinity College in Hartford, Connecticut, but decided to take some time off after an unsuccessful start there. She had taken an advanced placement environmental science class in high school and enjoyed it, so she knew that a certain affinity existed for an environmental vocation. A year spent on Squam Lake in New Hampshire as a caretaker for her parents' land reminded her of her love of the outdoors. When she went back to school in the fall of 2002, she decided to turn it into a career. "I wanted to learn more about the land," she explained. In her junior year she took a Forest Health Monitoring class at UNH with Professor Barry Rock, which sparked her interest in restoring damaged ecosystems. Taking her new-found knowledge in a different direction, she investigated graduate programs in landscape architecture; "I wanted something where I wouldn't just do monitoring but where I would be actively working toward change."

As a bridge between her background in ecology and future studies in urban planning and landscape architecture, Mary undertook a project studying the local Lamprey River watershed, funded by a Summer Undergraduate Research Fellowship (SURF). She analyzed how urbanization is influencing water quality in the watershed and focused on the way impervious surfaces such as roads and parking lots affect the chemical makeup of the water. Mary wanted to understand how we as humans are impacting this important resource, what can be done to remediate existing problems, and how to prevent future difficulties. "We all need water, and there is a definite freshwater crisis going on now, in terms of pollution and wastefulness," she explained. She designed her project so that towns drawing on the watershed would be able to understand what problems currently exist and how to prevent others. "Prevention is often easier and cheaper than restoration," she added.

For this project Mary used data from Dr. Bill McDowell's year-long weekly water monitoring project in the Lamprey watershed. She spent most of her time inside at a computer using specialized software to analyze the spatial relationships between land cover types and their effects on water quality in the Lamprey River watershed.

Mary designed her SURF research project with her plans for graduate studies in landscape architecture in mind. In this project she was aided not only by her mentor Dr. Mark Ducey but also by Michelle Daley, research scientist in the Department of Natural Resources. The project provided her opportunities to learn about restoration techniques which she could later apply to her graduate studies. "I learned so much about restoration techniques," she said. "It wasn't just about studying the problem. I was trying to present some real options for fixing the issues I identified as well."

She began with the hypothesis that urbanization has a negative effect on water quality in the Lamprey watershed. She used a Geographic Information System (GIS), a type of digital map that allowed her to layer different sets of data so she could see a broad view of the issues at hand. She could add and subtract layers of her digital map to compare flow lines of streams, observe different land covers such as forest and wetlands, and evaluate human use and urbanization intensity through indirect indicators such as impervious surfaces and population density. This spatial data was then compared with Dr. McDowell's water chemistry data using a statistical program which would tell her how likely it was that a certain type of land cover, the house density, or the time of year was affecting water quality. Her analysis showed that water quality was generally adversely affected by large amounts of impervious surfaces, and that the effects of different land covers varied over the course of the year. For instance, Mary explained, roads and highways are salted for winter use, which not only affects the quality of the water we use but also the lives of plants and animals in the area during the winter months.

The impact of Mary's work is far-reaching, and her proposed solutions could be valuable to a number of towns and individuals. The Lamprey watershed spans much of southern New Hampshire, running from Candia all the way to Portsmouth. "There are many small towns feeding off this resource, so this research can conceivably affect a lot of people," she said. Mary was hopeful that her research findings would help policy makers understand the environmental significance of their decisions and take these issues into consideration. "Understanding the basic impacts of urbanization will hopefully make people more aware of the damage they are doing and the areas that could use improvement," she said. For example, she discovered that leaving forests intact by the water's edge does a great deal in filtering harmful materials out of the water. When runoff

passes through the intricate root system of trees and plants, the dissolved and suspended sediments are strained out, reducing pollution in the water. "Even leaving a few trees right along the edge would make a big difference," she added.

Mary's research yielded her honors thesis, the completion of her SURF project, and a logical bridge between her undergraduate work and graduate school plans. She is the first American to be accepted to the Anhalt University of Applied Science in the Master of Landscape Architecture program in Germany.

Some landscape architects, she explained, work with the land in a healthy way, but some favor design over ecological friendliness. "My forestry degree stressed stewardship and care for the ecosystem as a whole; landscape architecture stresses design. I'm trying to integrate those to do design-based ecosystem restoration, which could not be done with forestry alone. My goal is to restore urban environments where I feel my efforts will make the most impact." Possible projects range from beautifying downtown areas to designing gardens, but Mary is planning to concentrate on brownfields restoration, which deals with post-industrial and post-commercial areas whose redevelopment may include dealing with environmental contamination.

Mary also discussed how the European view of the environment differs from that in the United States, and how she believes that landscape architecture is becoming more and more relevant in our society. "Forestry in Germany is so sophisticated, it's really a labor of love over there. Here the environment is short-changed; people think it will always be there, and it's that passive approach that destroys the environment. We need to study solutions before prevention is no longer an option," she concluded.

Mary is currently busy studying German before she and her fiancé move to Bernburg, Germany, in July. She received a fellowship from the German Academic Exchange for her graduate work in Germany and will begin her studies in September 2007.

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Author Bio

Gillian Graham, a sophomore from Wilton, New Hampshire, is heading toward a career in nursing. She joined Inquiry this year to get a more hands-on experience in the realm of writing and research. Outside of her school work, Gillian enjoys the outdoors through photography, hiking, skiing, and assisting in therapeutic horseback riding. In her junior year, she plans to spend a semester in Ireland to pursue her passion of music, mainly the Irish harp, which she has played since childhood. Gillian's career aspirations are to gain a degree in nursing and then help with medical development in third world countries, possibly through organizations like the Peace Corps or Doctors Without Borders.