ECOLOG

Newsletter from the Ecological Planning students, School of Natural Resources, University of Vermont

Spring 2001

An Evolving Curriculum (for the 21st Century)

by Deane Wang

The Ecological Planning curriculum, now with two cohorts of graduate students, continues to reshape itself. The currents students' interests, and their enthusiasm and willingness to help shape the program have been key to the success of this endeavor. This year we have added a class on Land Conservation Methods and a short course in Mediation and Conflict Resolution. With never enough time to do and learn all the things needed by a practitioner working in the complex world of conservation, our goal is to provide fundamentals mixed in with specialized work in a few specific areas.

The Ecological Planning curriculum was developed to provide an option in the Natural Resources Planning Program that combined rigorous training in field science with a grounding in social science and policy relating to land conservation. With a tall courseload and an emphasis on field experiences, in the first year students move through a variety of topics at a fast clip. Field botany, ecological measurement, research methods, integrative methods of research and planning, technical and popular writing and speaking, and conservation planning are just a few of the topics covered in a rapid, hands-on fashion.

One summer of directed work for a sponsor (e.g., Forest Service, Nature Conservancy, River Conservancy) provides the experience and data

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Tess O'Sullivan

1st year EP/FNs investigate patterns on Mt. Mansfield during their summer landscape ecology class with Deane.

A Bird's Eye View of Conservation

by Brian Carlson

Have you ever seen an air photo of a place that you thought you knew like the back of your hand? Even if it is a place that you could navigate blindfolded, when you see the aerial view for the first time it takes a while to get oriented. Then a fascinating thing happens - you begin to see relationships that you never knew existed. Houses separated by miles of roads may be close neighbors as the crow flies. A small woodlot behind the house may actually be part of a long forested corridor running all the way to the mountains.

After an action-packed year and a half at UVM, I have been given this bird's eye view of conservation. In that short time, I went from my comfortable neighborhood of knowledge about rare plant conservation to a soaring view of the entire field of conservation. Thanks to a great group of teachers (only a few are mentioned here) and several different classes, I was shown the many different routes to conservation, how they relate to each other, and where they each are headed.

Steve Libby introduced us to the operations of land trusts that are so remarkably effective at local conservation efforts. Through his Land Conservation course, we learned many of the innovative "tools of the trade" of conserving land, and saw them applied in current land trust projects. As consultants in Walt Poleman's Landscape Inventory and Assessment class, we were active contributors to a management plan for the conservation of a beautiful parcel of

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Introducing the Current EPs
Class of 2001

Elissa Arnheim

On the summit of Mt. Kilimanjaro, Elissa Arnheim realized how small our planet really is. "I could see the Earth curving away from me," she recalls, "and thought about everything that's disappearing: clean air and water, whole habitats, and so many species." Since then, with an environmental studies degree from Middlebury College and a taste for adventure, Elissa has been exploring and protecting the natural world. She tracked snowshoe hares in the Green Mountain National Forest, worked as a conservation ranger on Martha's Vineyard, and volunteered for the Student Conservation Association monitoring Northern spotted owls in Oregon. Then, in a series of research assistantships, she observed, tracked, netted, counted and evaluated wildlife, from flying squirrels to harlequin ducks to slender salamanders.

Next, Elissa spent eleven months assisting a Master's student with his study of northern pygmy owls, tracking the tiny, fierce raptors up and down mountains of the northern Olympic Peninsula of Washington State. While crossing majestic old forests and bleak clearcuts, mapping where the owls nested and hunted, she frequently wondered, "how much of the natural resources that *we* use do we really need?" She began teaching at the Olympic Park Institute, where her job was to inspire in her students, young and old, a deep and reverent enthusiasm for the natural world. "Ultimately, my goal is that more people recognize their connection to the natural world, feel responsible for stewarding it, and have tools empowering them to act."

Through all of these experiences, she gained insight into the human side of science and the players in land management. Saving the world takes art, science, teamwork, and communication. Elissa jumped at the chance to be part of the Ecological Planning concentration because it is an intensive education that makes critical links between field science and the people's action, through practical experience.

Erika Swahn

From left to right: Jillian, Elissa, Heather, Tess, Brian, and Tom

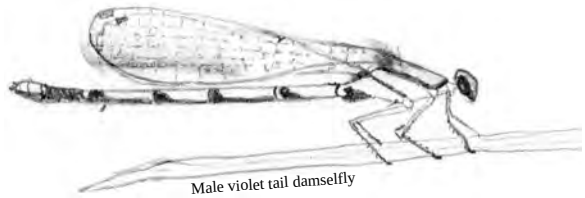
Jillian Butler

Jillian most appreciates life when she is immersed in the natural world. Whether she is sitting atop a mountain peak, backcountry skiing, horseback riding across a seemingly endless meadow, or floating belly-up in an alpine lake, her curiosity for the natural world stirs. This curiosity, combined with witnessing the degradation of pristine landscapes, has lead to her strong desire to actively sustain our wild places. "One of my life's passions is to conserve our wildlands."

Jillian earned a bachelor's degree in biology from Skidmore College with a focus on conservation. Her interest in nature took her to Kenya for a semester abroad to study wildlife management. During that time she began to recognize that effective conservation planning requires more than just a background in biology. Conservation issues are influenced by local and global committees, and to be a successful manager, it is necessary to understand the political, social, and economic variables involved in each issue.

Returning to Skidmore, Jillian sought to expand on her education. She was granted internships with the New York Fish and Wildlife Service monitoring bald eagle populations, and with Saratoga Open Spaces designing interpretative trail brochures. Following graduation she took the opportunity to explore other avenues of conservation by working with both state and private organizations around the country. She studied water quality in Vermont, researched factors affecting plant biodiversity in Minnesota, and monitored the raptor migration in the Florida Keys. Intrigued by raptors, she moved to Montana to research nesting Golden Eagles in the Elkhorn Mountains.

While Jillian enjoyed field research, she desired more training in the management of conservation lands and so chose to continue her education in ecological planning. She sought a graduate program that emphasized a holistic approach to environmental problem solving; a program that supplied a strong background in the field sciences but also in integrative planning. The Ecological Planning concentration at UVM was an appropriate match. Following graduate school, Jillian hopes to continue promoting the integrity of our ecosystems by ensuring their health and diversity through effective land management and conservation planning.



Male violet tail damselfly

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Brian Carlson

Growing up in Vermont, Brian saw a change slowly creeping across the landscape. One by one, farms and forested hillsides around his home were being converted to housing developments and roads. He was especially disturbed when his favorite running trails were being cut short by new gravel pits and big, grassy lawns. But, it was not until spending a summer studying wildlife management in Kenya that he first began to recognize the ecological values that were being lost with the changes in his town. When he returned home he looked at his surroundings with a new perspective. "I suddenly realized that I didn't have to travel to Africa to see wildlife, it was just a matter of opening my eyes to what was in my own backyard." This new awareness, combined with his study of biology at Colby College, heightened Brian's understanding of the impacts of development on habitat and wildlife diversity, and inspired his interest in conservation.

Throughout his work experience doing wetland and bird research and rare plant conservation, Brian witnessed many conflicts between the economic needs of communities and the maintenance of biological diversity and healthy ecosystems. Although these conflicts are complex and controversial, Brian believes there are usually sensible, win-win solutions. "The Ecological Planning concentration, with its mix of natural resource planning and field science, provides the ideal training for this type of problem-solving. It will prepare me to provide valuable input to the conservation planning that will shape tomorrow's landscape."

Heather Fitzgerald

After graduating with a degree in biology from Swarthmore College, Heather spent a summer weeding and sorting blades of grass to species at an ecology research station in Minnesota. "It gave me lots of time to consider what I wanted to do with my life," she recalls.

She spent a few years working through the possibilities she'd come up with while sorting biomass out on the prairie. She worked as a lab technician, a field assistant on a wetland restoration study, and a botanist for a consulting firm, doing "ecology from every angle." Knowing that powerful communication was an important angle as well, she also worked at a non-profit organization devoted to land use issues and as a teacher for several years. She now reflects, "all of these jobs were what I wanted to do, but I wanted to be able to address more than one small part at a time."

Heather is interested in looking at the landscape level. "I want to know about all of the pieces, and how I can put them together, so I can get at the idea of really knowing a place. I think people can be touched vividly by knowing a place so well. What often seems to follow from this is a greater understanding of how powerfully their personal actions, good and bad, affect their place—and others' places too. The Ecological Planning concentration is giving me the tools to know the pieces of a place and to put them all together in a job where I can make them visible."

Class of 2002

Tess O'Sullivan

Tess went to Colorado when she was fourteen and fell in love with the mountains, the canyons, and the immense sky. Romantic turnover is fast at that age and she quickly developed a new crush when she returned home. Swooned by John Muir during a history assignment, Tess recalls reciting his words at the kitchen table. "I had a connection to places that felt wild and selfishly wanted to work to make sure those places were still available to me, my kids, and all the wild things that lived there."

Since graduating from Yale, Tess has spent a lot of time looking at the natural world through the eyes of young people. Most recently she worked among towering douglas firs in Seattle's city parks. She recalls days singing nature tunes with soggy feet: "I got paid to hike with kids and track down slug slime." While helping young people gain a love for wild places is important to future conservation efforts, she wanted to build formally on her scientific knowledge.

Tess's views on conservation have evolved since those wide-eyed days reciting Muir. Some of the romance was broken when she moved to a small town in northern California engulfed by public land, spotted owl habitat, and contentious debate on forest management. She learned that strategies for conservation need to be creative and integrative rather than divisive. She worked with a non-profit to develop links between community, environment, and economy.

Tess is learning how to further those linkages between science and management within the EP concentration. The combination of field-based science and planning is the integrative approach needed to lead future conservation efforts.

Tom Lautzenheiser

Since he first saw spotted salamanders dancing in cold March pools, the inconspicuous creatures with which we share our back yards have fascinated Tom. As Tom learned the stories of these animals, he also became aware of the many human-caused threats to them. Tom says, "Wonderful events are constantly going on around us, but it takes great effort to notice anything outside of our normal routine. I believe the failure to pay attention to these subtle happenings in our surroundings is an important factor in the ongoing environmental degradation that we face."

After graduating with Biology and Environmental Studies degrees from Tufts University, Tom worked for three years as an Environmental Scientist at a Massachusetts-based civil engineering firm. This work allowed Tom to spend days outside, walking through woods, delineating wetlands, and radio-tracking turtles. Yet it also exposed him to the give-and-take process of progress, and taught him that protecting the places and things he loves is not an easy enterprise. Development often causes degradation despite (or even due to) compliance with environmental policy. In the face of this quandary, Tom decided to return to school.

As an Ecological Planner, Tom hopes to gain insight into how ecology can inform effective environmental policy. More importantly, he believes that through increasing our awareness of our environment and the interconnectedness of life, effective policies may gain the popular support they need to be truly successful. When Tom figures out just how to accomplish all that, he will let us know.

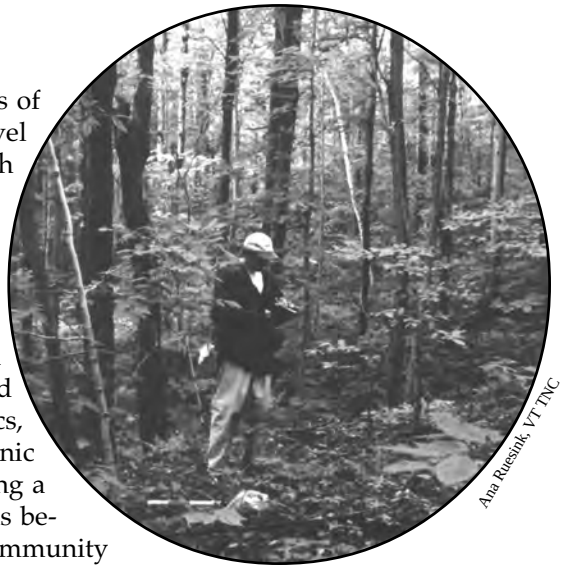

Prometheea moth chrysalis

Project Briefs

Predicting natural community distribution with geophysical data
Brian Carlson

As the focus of conservation efforts has begun to incorporate higher levels of biological organization, GIS has become a widely used tool in landscape-level conservation planning. The Vermont Biodiversity Project has developed such a tool for identifying areas of high physical diversity across the state. The GIS model divides the landscape into units based upon four types of physical data: surficial deposits, bedrock geology, elevation, and landform.

Given our understanding that physical attributes of a site can influence the distribution of vegetation, can we predict patterns in vegetation based upon such a model? My project with the Vermont Nature Conservancy attempted to answer this question for a 20,000 acre tract of land in the northern Taconics, west of Rutland. I spent the summer hiking up and down the rugged Taconic hills, recording natural community types and their precise location. Having a few hundred such data points should allow me to discern any associations between the landscape units identified by the GIS model, and the natural community types that are found on them.

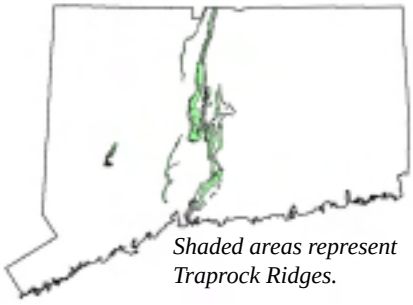


Ana Ruesink, VT TNC

Brian collects veg-plot data in rich northern hardwoods.

Establishing conservation priorities on Connecticut's traprock ridges
Heather Fitzgerald

After spending my summer on the traprock ridges, which are basalt cliffs that run from Long Island Sound through central Connecticut and into Massachusetts, I am developing a Site Conservation Plan for the Connecticuú Nature Conservancy. Unique aspects of these ridges include their possible function as an animal corridor, the presence of vernal pools, the location of major public drinking water supplies, a popular and heavily used hiking trail which runs the length of the ridgetops, and unusual microclimates which support globally rare communities, rare plants, and rare snakes.



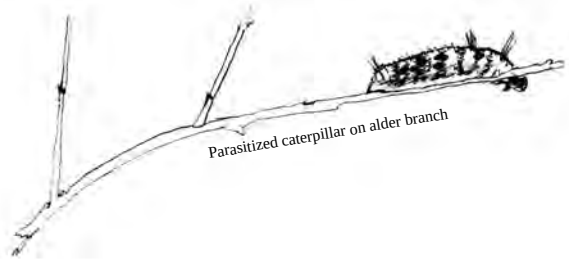
Shaded areas represent Traprock Ridges.

Judy Preston,CT TNC

Heather examines the flora of a bedrock outcrop on a traprock ridge.

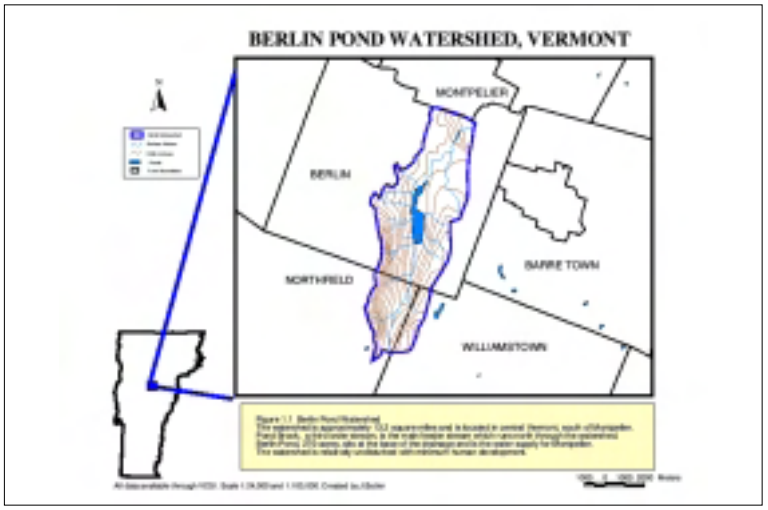
Threats to the ridges include housing development at both the bottom and top of the cliffs, cellular phone towers, and quarrying for aggregate. Fire and recreation also need to be evaluated as potential threats.

In this project I am examining each of these aspects and threats in order to prioritize what parts of the ridges are most important for The Nature Conservancy to focus on. I collected soil and vegetation data to compare ridgetop communities and assessed state data on element occurrences of one of the rare communities. Using these data, protected parcel information, land trust reports, and town responses to state viewshed protection legislation, I will recommend conservation priorities. I will also examine how this method of landscape-level conservation site planning compares with other conservation prioritization schemes.



A threat analysis for the Berlin Pond Site Conservation Plan
Jillian Butler

Berlin pond, a 270-acre body of water located in the town of Berlin, Vermont, has been closed to human activities since the late 1800s to protect the water supply for the City of Montpelier. Limited development and disturbance over the past century has allowed the establishment of a unique natural area. The recent construction of a state-of-the-art water filtration plant has raised interest in opening the pond to recreation. In response, the conservation commissions and residents of Berlin, Montpelier, and Northfield and The Vermont River Conservancy are developing a site conservation plan for the Berlin Watershed. The process is a cooperative, watershed-scale approach aimed primarily at conserving ecological features. Unlike other watershed efforts, this collaborative process did not evolve in response to a problem but is instead a proactive measure to protect a unique natural area.



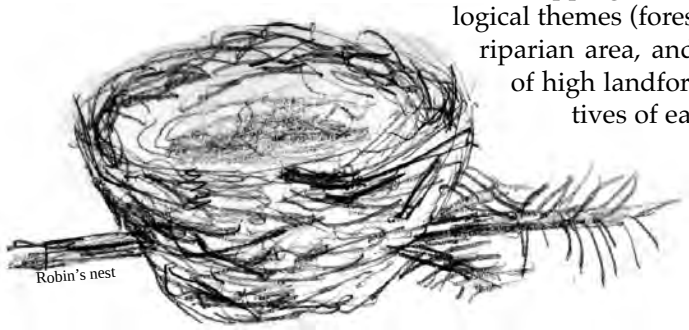
A layout from Jillian's Berlin Pond GIS analysis

My project with the Vermont River Conservancy involves performing a threat analysis that will serve as the basis for conservation strategies and recommendations on future use. The threat analysis framework is modeled after The Nature Conservancy's approach (Fawver and Sutter 1996), and includes the identification, evaluation, and ranking of stresses and sources of stress that negatively impact the conservation goals. I will also use GIS analyses to determine if Berlin Pond is a unique feature on the Vermont landscape. The conservation plan built upon this threat analysis will be revisited annually and updated as needed, but the decisions made in conjunction with this effort represent a crucial crossroads in the future of Berlin Pond.

Zoning for conservation in the Huntington River Watershed
Elissa Arnheim

It's been said that "you get what you zone for." The question is, what are you zoning for? Many town plans describe a local interest in protecting natural systems, sometimes enforced through zoning bylaws. However, it is difficult to effectively protect landscape-level systems with zoning that ends at municipal boundaries. Towns in the Huntington River Watershed (HRW) have expressed interest in coordinating their approaches to regional municipal issues. I am 1) summarizing (map and matrix form) the existing zoning schemes of the towns in the HRW (Huntington, Richmond, Hinesburg, Starksboro, and Buel's Gore), 2) mapping several ecological themes (forest area, riparian area, and areas of high landform diversity), and 3) presenting this information to representatives of each town. These meetings will follow charette format, with the intent of generating strategies to improve protection of regional ecological systems. Municipal-level zoning decisions made with mutual understanding and cooperative intent can effectively protect natural systems that flow across municipal boundaries.


Elissa Arnheim
Brush Brook, a Huntington River tributary in mid-winter

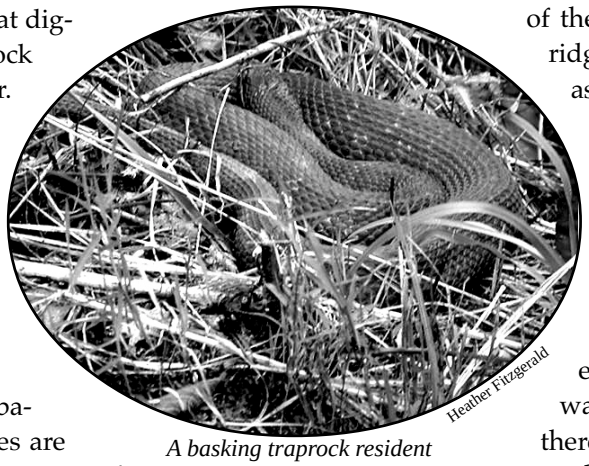

Robin's nest

Connecticut's Snake Haven

by Heather Fitzgerald

This summer, as I was wandering along Connecticut's traprock ridges, I kept coming upon snakes sunning themselves on rocks. I'd stop and watch, until eventually they would slip away, blend in, and disappear. This is how I usually saw snakes—sitting there next to a path, and then slipping away to…somewhere. Over the course of the season, I got curious about where they were going and how they were spending the rest of their time.

There's a reason I kept coming upon snakes in my travels this summer. They live on the traprock ridges because the basalt these cliffs are made of breaks off and comes to rest in large, unstable piles at the bottom, called talus. "Talus slopes are great places for snakes—the best," Geoff Hammerson, a herpetologist at Wesleyan University, told me. Almost all the snake species that live in the state have been seen on the traprock ridges, including hognose snakes, black rat snakes, ribbon snakes, northern water snakes, black racers, and, historically anyway, timber rattlers. Perhaps this is not so surprising. Snakes aren't any good at digging (no feet), and they use the traprock talus as a place to hibernate in winter. It allows them to move below ground easily, where they can avoid freezing. Also, since the traprock ridges are mostly west-facing, there is good afternoon sun, useful for warming up their ectothermic bodies in the spring and fall.



A basking traprock resident

We all learned about ectotherms in basic biology, and we know that snakes are cold-blooded and take on the temperature of their environment. What we may not have learned is that snakes have optimum temperatures, and that the heat stored by rocks can be important for snakes in attaining those temperatures. Researchers in one study on talus found that some snakes use individual rocks very carefully to help them regulate their body temperatures. The snakes could survive temperatures anywhere between 2° and 43°C. Below 2° they lost coordination and could not defend themselves, while above 43°, they died of heat stress. However, their optimum range was narrow: only 28 to 32°C. To stay in the optimum range, they preferentially chose rocks between 20 and 30 centimeters thick. A typical snake in this study spent a few hours on a summer morning basking directly in the sun, and then spent the rest of the day under rocks in the ideal thickness range. Snakes under rocks that were too thin would quickly die of heat stress; those in deep burrows or under rocks that were too thick would never reach their optimum temperature. Further, by subtly shifting their positions under ideal rocks, snakes could optimize their temperature to suit their needs. For instance, those without food moved so as to minimize their energy expenditure.

Of course, snakes do emerge from the talus sometimes. Different species of snakes have various destinations in mind when they leave the talus. I investigated where copperheads, which are a threatened species in Connecticut, might go. Copperheads seem to head to the lowlands in the summer to find food. They tend to be shy, and mostly come out at night to hunt small rodents. Although suburban lawns don't make good habitat, powerline corridors and other open, brushy areas are okay, as long as they're not treated with herbicide.

How much lowland do they need to forage in? A study on copperheads in Kansas found that individual females need a summer home range of 8 1/2 acres, and males need 24 1/2 acres. Connecticut's copperheads probably need a similar area. For an entire population, Hammerson estimates habitat needs extending two miles out from the base of the ridge. In Connecticut, where the ridges can occur right next to roads such as Interstate 91, it seems that this much habitat isn't available.

However, Jim Andrews, a herpetologist at Middlebury College, explains how they can survive. It turns out copperheads don't need two miles of unbroken field and forest, just patches of suitable habitat and ways to get there. Therefore, as long as there are some woods and fields which aren't right next to roads, and they are connected by at least some habitat other than lawns and houses, conditions should be okay. People can even help: in Florida, for instance, where certain snakes are on the verge of becoming extinct, snake underpasses were built beneath roads in areas with heavy snake roadkill. They seem to be working.

So, there's hope for the conservation of copperheads and other snakes through intelligent planning, on the traprocks and elsewhere. Hopefully they will be around for years to come for future hikers to come upon and wonder over. In the meantime, their mysteriousness may continue attracting the attention of future conservationists, as what starts out as simple curiosity about what they're doing and where they're going turns in practical directions.

A Source of Serenity

by Jillian Butler

Where do you find peace and solitude? Perhaps it is late at night, when the house is quiet and dark, except for one pod of light where you are curled on the couch with your book. Or is it early in the morning during your routine walk to the barn to feed the animals as the sun slowly rises and warms your back? Or maybe it is a place that you are only able to get to occasionally, but it remains with you long after you have left. Wherever the spot may be, it provides the serenity so often abscent from our day to day lives. It offers an opportunity to reflect and gain perspective on life. For many central Vermonters, Berlin Pond is such a place.

I am sitting at the edge of a frontier. A still, narrow body of water reflecting the surrounding ridges extends to the opposite shore, which although close in distance are untouchable. A red maple stands tall over the western banks where equal amounts of water and wetlands are exposed. Looming cumulous clouds fill the southern end of the basin—from it I hear the mysterious, unmistakable call of the Common Loon. Elodea sways beneath the water reaching up towards the sky where flocks of cedar waxwings feed on catkins and fly between the branches of birch trees. Behind me, dust rises from the road as cars head for their homes scattered around the pond. The rumble of an eighteen wheeler cruising down Interstate 89 penetrates the air. Just beyond the interstate lies a major urban center where people take advantage of the large, one-stop shopping plaza. Although humans heavily influence the surrounding landscape, what lies in front of me offers a feeling of solitude and wildness.

Berlin Pond has been gradually attracting attention over the past few years. The pond and shoreline have been closed to all human activities since the late 1800s to protect the City of Montpelier's water supply. But the recent construction of a water filtration plant has raised interest in opening the pond to recreation. Human use decisions associated with any conservation effort are typically challenging. Commonly, it is the urgency or personal connection that drive us to protect our natural systems. For example, if the movement is responding to a problem that needs immediate response, such as protecting the last remnant of a unique habitat about to be demolished by a development, the urgency elicits a wide range of support. Or, if the place is well-used and well-loved, such as a local trail that provides access to a network of biking and hiking trails, it is the sense of personal ownership which brings interest to protect it. But Berlin Pond does not have any major environmental problems and the restrictions on human use limit the degree to which many people can experience it. Instead, it asks us to extend ourselves, fine tune our senses, and immerse from a distance. In its current state, it is unlike the many other lakes in the region that allow fishing, swimming, and boating. And the dirt road that surrounds the pond allows us to experience its undisturbed nature without altering its current state. Increasing the use of the pond and shoreline probably would not destroy the ecosystem, but it certainly would disrupt the natural processes that take place there and alter the current ambience.

Jillian Butler

View looking south across the Berlin watershed, Summer 2001

Berlin Pond is one of those places that sticks with you long after you have left. As a relatively undisturbed natural area, its close proximity to a major city is an important refuge for both humans and nature alike. Beyond its unique physical features—including designation as an Important Bird Area by the Vermont Audubon, the presence of rare and threatened species, and a significant natural community—it offers an uncommon aesthetic and sensory experience. We are fortunate to have both the foresight and the opportunity to protect such a valuable place.

Ecological Planning

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for completion of a project and associated presentations to different audiences. Classwork in the second year emphasizes planning theory and applications as well as methods such as GIS, remote sensing, or statistics. A few elective classes, a project write-up and defense, and a field final exam complete the two year sequence. Graduates will be well-prepared to continue a life-long learning process striving to understand the complex natural and human systems that interact in any conservation effort.

If this is the kind of education you are looking for in a graduate program, please come see us. Talking to current students and seeing the environments in which they work will give you the best feel for this new, integrative educational experience.

Willard Morgan

Tom and Tess orient with an aerial photo at Niquette Bay State Park.

Bird's eye view

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town-owned land. This process was a great lesson in both the challenges and opportunities of working with public lands. Jim Northup covered a vast range of conservation territory in his Natural Resource Planning course. He taught us how to pay attention to state and federal policies regarding land management and taxation. These policies have profound effects on conservation efforts in our small towns and across the country. Through my own research project, I have learned the specifics of the scientific approach The Nature Conservancy uses to tackle regional and statewide biodiversity conservation. All together, these experiences have broadened my perspective on conservation.

I believe it is views like this one that are necessary to develop innovative solutions to today's conservation challenges. For instance, the recent deal between state, federal, non-profit, and private organizations to protect former Champion Paper Company land in the Northeast Kingdom could never have happened if someone had not realized the potential for collaboration among groups that, from the ground, did not appear to have much in common. Finding solutions to the ever-increasing complexity of conserving the natural would around us will never be easy. However, I feel much more confident about my ability to make the best use of a variety of conservation strategies with the conservation "air photo" that I have been given at UVM.

Pennsylvania smartweed

For More Information

contact Professor Deane Wang or the EP students

Deane: (802) 656-2694
deane.wang@uvm.edu
Tess: mosulliv@zoo.uvm.edu
Tom: tlautzen@zoo.uvm.edu
Elissa: earnheim@zoo.uvm.edu
Jillian: jbutler1@zoo.uvm.edu
Brian: bdcarlso@zoo.uvm.edu
Heather: hfitzger@zoo.uvm.edu

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