

FIELD NOTES

A publication of the Field Naturalist and Ecological Planning Graduate Students at the University of Vermont



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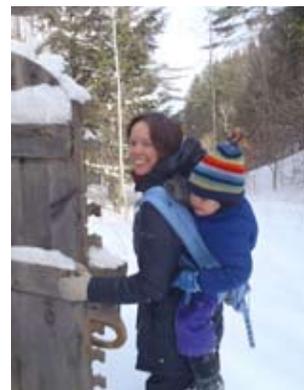
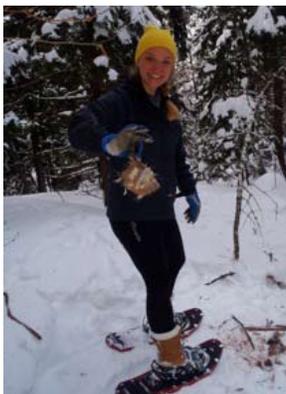
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Special thanks to Bryan Pfeffer, the FNEP writing instructor for the countless hours spent editing our endless versions of "final drafts."

Cover photo by Levi Old

*For more information on the University of Vermont's Field Naturalist and Ecological Planning programs, visit:
<http://www.uvm.edu/~fntrlst/>*

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Editor's Note

The six of us converged on UVM in August, first meeting at the big white van outside Jeffords Hall. After tossing our bags in the back, we climbed aboard and spent the three-hour drive to the Hubbard Brook Experimental Forest trying to get a read on the five strangers we'd be spending so much time with over the next four days – and the next two years. Who are these people?

The three-hour drive was actually the beginning of a two-year journey here in the Field Naturalist and Ecological Planning programs. Whatever first impressions we made in the van that day have since faded behind countless hours spent together scrambling up mountains, slogging through bogs, and learning everything about anything. Each field site we visited was different, but what really defined each place was us.

We all wear glasses colored by our own experiences, values, knowledge, and interests. Walking through a forest, one person might notice the size of the sugar maples, while another might focus on the raptors circling above. In our cohort, I'll turn to Levi if I'm unsure about an animal track; if I don't know a rock, I'll ask Kat. If the footing's treacherous, I've learned to follow Kathryn, who finds each and every slippery spot and posthole. Nikki turns over rocks in a stream to find macroinvertebrates. Mike scans tree buds and bark to confirm their identity.

Each of us experiences life in our own ways. This is our strength, but it isn't always easy. Personality quirks can lead to conflict-- especially when we view the world from different angles. When every project is a group project I start to long for the chance to work alone. Endless group meetings magnify the different approaches that we sometimes take, and frustrations flare. Six stressed out graduate students working together do not make for the most patient group of people. Working with such a diverse group of people is one of the biggest challenges of the FNEP program.

It is also one of our strengths.

As a cohort, and as a program, strength comes from our differences. One of the first lessons we received last fall was that we must rely on one another as shared resources. We are smarter, stronger, and more thorough when we work as a whole. Our unique perspectives offer a wealth of insights into the world around us. These insights inspired the theme of our issue of Field Notes: Perspective.

Mike Blouin offers the naturalist's view to a foreign land: Walmart. Nikki Bauman uses the inspiration of hiking with her dog Levon to reflect upon the ways that perspective colors our interaction with the world. Kathryn Wrigley offers vivid insights into the often-overlooked world of backcountry human waste disposal. Levi Old discusses different perspectives on the bullet ant's excruciating sting. And Kat Deely questions the way our relationship with a place affects our awareness of it.

I believe that this year's Field Notes answers some of the questions we had about each other in the van last August. We hope it allows you to learn more about what makes us tick, as individuals, as cohort AE, and as next year's graduates of the Field Naturalist and Ecological Planning programs.



Madeline H. Morgan Madeline H. Morgan

Maddy Morgan settled in Montpelier with her cat Seamus 5 years ago after a period of wandering. She spends most of her time there sleeping and doing schoolwork, and spends the remaining hours at UVM. She looks forward to her master's work with the Friends of the Hort Farm this summer, and hopes to continue to learn about sustainable agriculture and community.

From the Directors

Dean Wang

Jeff Hughes

Leadership in the 21st Century

Why is the 21st Century any different than previous centuries? Every century in human recorded history has been radically different than the previous. Knowledge, technology, and population have insured that. From flat world to round world, from world war to mutually assured destruction (M.A.D.), from telegraph to twitter feed, the world is in a constant state of radical change with significant implications for the human condition, both positive and negative. However, the 21st Century may be even more radically different than all those that came before. Described in the late 18th Century, the Malthusian catastrophe has not manifested itself in the intervening two centuries, but there are signs that this 21st Century is the one.

The transition from exponential growth to logistic growth (stability around a "carrying capacity") is very likely to occur in this century. Conservation and environmental professionals are going to need to be involved in the manner in which we achieve a sustainable (non-exponential) human development pattern. When deep social change needs to occur, leadership needs to be part of everyone's work. With this in mind, the Field Naturalist and Ecological Planning approach to education will also need to change with an increasing emphasis on systems thinking, sustainability, and leadership. The detailed work of conservation will still be needed, but the imagination, creativity, and committed leadership for finding our way through the bumps of adapting to the century's challenge will also be essential skills for the survivors. We will all need to engage. Minding your own business will now include minding our collective "business" given the full recognition of our total connectedness. It will be an exciting century!



Deane Wang is the director of Ecological Planning and an associate professor in the Rubenstein School of Environment and Natural Resources.

Those of you in the conservation world know that Dr. Hub Vogelmann passed away October 11, 2013. When invited to speak at his memorial, I was overwhelmed: how could I possibly capture in 50 minutes what Hub accomplished in 50+ years? How could I chronicle even a few of his contributions – the conservation crusades he led, the governors and legislatures he advised, the conservation organizations he founded, the threatened landscapes he saved, the boards he served on, the students he inspired, the mountaintops he protected, the harmful effects of acid rain he exposed? And if that task wasn't daunting enough, how could I also capture the "essence of Hub" as a person – the kind, warm, thoughtful, poetic, country gentleman naturalist with clear blue eyes who kept bees, grew 30 varieties of potatoes, ice-fished for perch, drank 5pm martinis, laughed a lot, and rejoiced in student successes? Saying even a portion of what I needed to say couldn't be said in 50 minutes. It could not be done.

But a few days before the memorial I learned that I was wrong in thinking that I had only 50 minutes to talk about Hub. That was the good news. The bad news was that I had 3-5 minutes, not 50.

After back-to-back panic attacks and several "Beam me up, Scottie!" prayers, I followed what I thought would be Hub's advice: I grabbed my fishing rod and headed to Shelburne Pond.*

I didn't catch any fish at Shelburne Pond, in fact, I'm not sure I even tried. But I got what I was after – I figured out the ONE THING that best captures the "spirit of Hub." That "one thing", so obvious, is his Field Naturalist Program. It was his pride and joy.

So long as there is a Field Naturalist-Ecological Planning Program, Hub Vogelmann will be an active part of all of our lives, for Field Naturalists and Ecological Planners are trained in Hub's likeness. So be sure to thank yourself if you contributed to the Hub Vogelmann Fund,** you have done a wonderful thing for yourself, the natural world around you, and the people you care about.

Those of us who live the Field Naturalist Program every day also thank you, of course, for your support of the endowment. But the biggest thanks goes to the one who ensures there will be future Hub Vogelmanns. Thank you, Hub.

*Through Hub's efforts, Shelburne Pond and surrounding lands are now a Nature Conservancy and University of Vermont Natural Area, forever protected from development.

**The endowment established for the Field Naturalist Program that seeks to ensure that Hub's vision lives on in support of the Field Naturalist Program.



Jeffrey Hughes is the director of the Field Naturalist Graduate Program, as well as an associate professor in the Plant Biology Department and the Rubenstein School of Environment and Natural Resources.



Bernd Heinrich is an author, scientist, and professor emeritus at UVM. Every January he leads FNEPs on expeditions around his cabin in Maine during his Winter Ecology course.



Saw-whet Surprise

Bernd Heinrich

A late winter thaw of 40 F melted the top layers of the snow, and minus 10 F then crusted them solid. Only moose broke through, leaving post-holes, one of the few kinds of exit holes from the sub-nivian zone for any voles, mice or shrews that might want to reach the snow surface. I doubted that now, on 27th of February, 2014, any small mammal would want to be there, because temperatures in the night had again dropped to minus ten degrees. So what could any owls left in these woods be feeding on? Perhaps none were still around. I had neither heard nor seen any since fall, except an occasional barred owl visiting my cabin in and near which mice still scampered about at night near a bird feeder.

At every dusk and dawn when I looked lately for the Barred owl I saw nothing. Was it still around? I hadn't seen it for months, perhaps because I had not looked at the right time. So now, just in case, a couple of hours after dark, I opened the cabin door and scanned for it. There in the beam of my light- I could not believe it- right above me on a maple branch, sat a Saw-whet owl. With its bright yellow eyes wide open and black pupils contracted in the light, it stared directly at me.

Surprises excite, and they come rarely. They are eye-catching because they highlight the out-of-context. Because these are few and far between, one looks ever-closer and becomes more aware of details. "The devil" is almost always in details that make the difference from the context of the expected.

The owl paid close attention to me; its eyes did not leave me for a second. "What a picture!" I thought, of its three-

ounce body and those huge yellow eyes in the dark. I backed into the cabin to grab my camera to try to hold it "on film." When I came back out a few seconds later, it was still there and I managed to take a Hail-Mary shot that got it.

The only real "shot" I ever took at an owl, also a Saw-whet, was when I was around 15-16 years old. I was at the Good-Will Home, School and Farm in Hinckley, Maine. Several of us boys were on a trail along the brook that separated the "Girl's Farm" from the "Boy's Farm." We were probably on our way to the swimming hole where we had a rope on which to swing far out over the water, and as we were walking along under some hemlock trees that lined the bank, I spied a Saw-whet owl perched in the branches. It was in juvenile plumage, a fledged young of that spring. I had never met a Saw-whet before, and seeing it looking at us, I knew that I had to have it. Dead or alive, it was totally irresistible.

This young owl was fully feathered out, so catching it alive was a long shot. But I was carrying my sling-shot, and at that time I was a proficient maker and marksman of this weapon. I picked some soft but firm clay from the stream's bank, made a pellet, aimed, fired, and hit the owl. It tumbled down, and as I grabbed it and held it in my hand it opened its eyes, becoming alert. Now what to do? I didn't have a plan yet, so I wrapped it in my shirt and took it back to campus.

The evil housemother in my cottage would, of course, never let me have an owl. But I had kept caterpillars in a cage made from window screening. It would hold the owl for now. I decided the best place to keep it would be in the bird's environment. And so I

secured my owl in its cage high in a balsam fir tree in the woods. I got ahold of some mouse traps, and brought my owl a dead mouse, which it ate in its cage. It recovered totally, and I let it free.

I never again had the desire to hold and capture an owl. But already then I made birdhouses for those, like the Saw-whet, who nest in tree cavities. I put them up in the woods, hoping to see the fuzzy white baby owls after they hatched out of the egg. No takers. I tried it again about fifty years later here on The Hill, but the owl houses are still either empty or taken over by squirrels. Squirrels stuff them full of moss and bark and make them useless for owls (owls don't build nests, although some species may use the bird nests as platforms for their own eggs and young).

Having now suddenly and unexpectedly a wild Saw-whet owl thrust in front of my face aroused not only memories. It also stirred hopes of a possible future residence of them, as well as my concerns of them finding food. At this time when the snow was heavily crusted, there was little chance of any owl getting a mouse or shrew in, under, or on the snow. I had no live mouse to offer it. But might it take a dead one? I threw a furred haunch of a red squirrel that I had saved for the expected Barred owl onto the snow directly under its perch in the maple tree, and then retreated back into the cabin.

Twenty minutes later when I checked, both owl and squirrel part were still precisely where they were before. I again tried to photograph the owl. This time, though, it flew off across the clearing toward the woods. Yet a half-hour later it was back near or on the same perch. The squirrel meat was still where it was before, with no tracks near it. When I awoke near 2 am, I forced myself out of bed to check once more. The owl was gone and the meat was still untouched on the snow where I had left it. Surely the owl had been hunting. Can't it recognize a furry piece of meat? Or is it unable to recognize one out of the usual context, of moving legs, pointy nose, and twirling tail, or maybe just movement?

On a whim I decided to check the next night again, to potentially "document" that this owl had just been coming through on its way to somewhere else. No owl was in sight when I went to bed at nine pm, and I had checked several times before that. But I awoke near midnight and got up to check once more. Still no owl in sight. OK- that's what I had expected.

At 2 am I awoke once more, and again forced myself up and out into the minus 8 degrees F night with a sky blazing and sparkling with stars. Behold- the owl was back! And so I went back to bed and slept soundly- until 4:30 am, at the first glimmer of dawn.

At dawn on 1 March I heard the first song of the year of a Purple finch, and delayed a planned departure in order to write up some notes and take a run around the Hill on my

snowshoes. When I was finally ready to leave, it was almost noon. Seven Blue jays were carrying on in the maples and birch by my window, and I watched them closely, thinking in surprise that maybe they do not necessarily need to have a predator to activate all their noise-making. They were not flying at anything, and left after a minute or two. Strange, I thought, very strange- until- until I went outside and saw the diminutive owl, the Saw-whet, perched in full sight in the light in one of the maples. It was about fifteen feet above the bird feeder being visited by chickadees, who ignored it. It looked down toward the ground and then turned its head towards me and looked with narrowed eyes, and I saw an opportunity to try out a fake live meat test, by dragging the squirrel haunch by a thread across the snow.

I attached a thread to the squirrel foot, tossed it onto the snow, and started to pull. The owl pounced within two seconds of it starting to move. It unhesitatingly took what it had ignored for hours before, and from almost the same place and the same distance.

The owl did not let go as I continued to drag the meat, and it on it, toward me. It tried to resist, back-peddalling with its wings. But in less than 30 seconds both predator and "prey" were within a foot of me. The owl looked at me as it continued

“The owl looked at me as it continued to hold the squirrel haunch with both feet at one end, with me untying it at the other.”

to hold the squirrel haunch with both feet at one end, with me untying it at the other. When I backed away, it stayed clutching its prize, and then flew back up onto the maple with the squirrel haunch in its feet.

From there it flew into the forest on the other side of the field.

The Saw-whet had been cued to hunt by movement and ignored meat and fur, as such. Inadvertent confirmation of the same notion came from a Long-eared owl that I had while I was a grad student in Zoology at UCLA. The owl perched unobtrusively all day and most of the night on the top of an almost ceiling-high bookcase in our tiny apartment. An unsuspecting visitor came in one day and while sitting on our couch absent-mindedly twirling his wristwatch on his index finger, the owl struck from behind him. To say that he was taken aback is an understatement.

A naturalist and prize-winning writer had told me that a Barred owl in his rural setting in the Adirondacks fed on chicken meat during the winter. He had put it out to attract birds. I would be surprised if a hungry Barred owl had not shown up. However, it probably did not appear to eat the chicken. Meat of almost any kind also attracts voles, white-footed and deer mice, ermine and long-tailed weasels, short-tailed shrews, red- and flying squirrels. These animals running around would be manna for an owl. However, this is not to say that an owl will not eat chicken. My tame Great-horned owl, the Long-eared owl, and a young Screech owl that I once received as a present all ate any meat I fed them by hand; context is everything, because the devil, and the surprises, are in the details.

What you Leave Behind

Kathryn Wrigley

As a backcountry caretaker in the Green Mountains of Vermont, I thought a lot about food. At breakfast, I contemplated dinner. How much is too much butter to put in a meal? Atop the mountain, I dreamed of going to brunch on my first day out of the woods still caked in mud from my hike down to my car.

Thinking of the ideal meal to put into my body entertained me - dealing with the food coming out was another thing entirely. The glory in backcountry caretaking is maintaining 15 miles of trail, educating hikers on alpine ecosystems, and tending to your trail campsite. Then there is the composting privy.

A caretaker's job includes taking care of privies: hot composting at its finest. I empty waste from the catcher (a black, plastic tub that collects what you leave in the privy) weekly into green, plastic, 30-gallon trashcans. It's the raw material for a batch of compost. The bulking agent, bark mulch, is hauled up the trail in 50-pound burlap bag loads.

We compost in 200-gallon batches. I'm a cook of sorts, mixing human waste and bark mulch to the perfect texture in a giant blue, plastic bin. Nailing the carbon-to-nitrogen ratio is crucial for the success of the recipe. Six weeks later, human waste becomes fertile soil. I transfer the soil - shovelful by shovelful - from the blue bin to a wooden drying rack, where it will sit until next season before making its way back to the earth.

This need for intensive backcountry waste management

arose out of the hiking boom in the 1970s. Old-style waste management failed to deal with the spike in use, which threatened water quality and, in turn, human health. The new kind of waste management reduces or eliminates both of these problems by creating a harmless and useful product: soil.

The root of a problem can be difficult to figure out. Real solutions often only emerge when you take the time to step back and examine what is really going on in a situation. This part of problem solving is often rushed through, which leads to band aids. Asking questions is a good way to figure out what might really be wrong. Why is water quality around campsites going down? Why do people go to the bathroom everywhere? Why are the privies gross? Can we figure out a way to accelerate human waste decomposition in a controlled environment? Yes.

By taking time in the beginning to expose the actual problem, you save yourself time and money in the end. Which you can then use to go out to brunch.

“I'm a cook of sorts, mixing human waste and bark mulch to the perfect texture in a giant blue, plastic bin.”



Kathryn entered the FNEP program this fall after eight years of working in conservation recreation management. As a member and eventual leader of the Green Mountain Club field staff she spent countless hours managing the extensive Long Trail privy system. She's now learning about other kinds of scat with an upcoming project focused on wildlife habitat suitability in the face of non-motorized trail development.

Common Scents

Nikki Bauman

Every bit of processed information filters through one of the five senses: sight, smell, hearing, taste, and touch, signaling to the brain and triggering a unique response. Lacking acute senses, humans rely on sight more than any other sense. Few other species follow this pattern.

This realization became clear while walking in the woods with my dog. Rarely do the two of us focus on similar stimuli. I mostly use my eyes to discover nature, scanning for nests wedged high between branches. My dog follows his nose, curiously pursuing a new scent trail around every bend. Bombarded by waves of smells, he chases nature that I can only imagine.

What am I missing because I didn't smell it?

Humans have five million cells dedicated to odor detection. Rabbits have 100 million; dogs 220 million. And a bear's sense of smell, seven times stronger than a bloodhound, is a whopping 2,100 times stronger than that of humans. With the ability to track a rotting carcass up to 18 miles away, a bear can also sniff out and pursue that single chocolate covered coffee bean lodged deep in your back pocket, should you decide to sleep under the stars.



Olfaction is the first sense to develop in humans, yet we seem to fall short of maximizing its potential. Try to think about something through only the context of its smell. It's not easy.

What we need is another sense — a sense of awareness. As I walk through the woods, I try to imagine the dimensions of the natural world that I cannot sense. In so doing, I try to heighten my awareness.

We could practice awareness in our interactions with each other, too. Many of us often assume that everyone else's perspective is more or less like our own. Perception shapes our reality, as the saying goes. But when we take a step back and consider another perspective, we may find our own worldview transformed.



In the same week, Nikki Bauman's depth gauge on her scuba vest read 110ft below sea level, and her camera documented a climb in the High Rockies to 11,570ft. Although probably horrible for her ears, both were great for her experiences. Never having traveled to the Northeast before, she decided it would be a great place for graduate school. She is excited to explore the Northeast Kingdom this summer working on her master's project on the Nulhegan River.

“These lessons in the woods can be applied to our daily lives and interactions.”

Our awareness can include our ability to listen—to understand. There are significant implications for education, communication, and society if we open up and truly listen to unfamiliar opinions. Listening leads to cooperation. There's not much we can do to enhance our physical senses, but improving our awareness through better listening could greatly benefit our interpersonal relationships.

As Field Naturalists and Ecological Planners, we are trained to identify patterns in nature using our senses. For example, most trees in the genus *Acer* have simple leaves, and most *Urticaceae* have stinging hairs that will leave your skin itching. But among these patterns are inconsistencies. *Acer negundo* has compound leaves, and *Pilea plumia*

lacks stinging hairs. We don't dismiss these irregularities, however, we recognize the variations. These lessons in the woods can be applied to our daily lives and interactions.

Tree-huggers and hunters have more in common than one would think, both are concerned about land integrity and conservation. They may perceive values differently, but in the end they share a common goal.

Practicing awareness and staying open-minded is a never-ending process. I intend to search for new angles on how to experience what's around me, in and out of the woods. Meanwhile, I'll continue to explore hidden worlds through the nose of a canine friend.

Stings, sutures and the tropics

Levi Old

Entomologist Justin Orvel Schmidt interprets pain. Burlington deli worker Ed Tarnell fears pain. The Amazon's Mawé elders ritualize pain. At the center of all this pain is a two-centimeter insect delivering a mile of misery: the bullet ant.

At a glance, it might be easy to lump the bullet ant in with other jungle ants that tear apart insect prey, feed day and night, and form cooperative social structures similar to those of bees and humans. But the bullet ant is in a league of its own. Nicknamed *la hormiga venticuatro* (24-hour ant) for the duration of its sting, bullet ants deliver venom that contains a neurotoxin. The poison inhibits synaptic transmission in the central nervous system, leading to uncontrollable convulsions and, at times, anaphylactic shock. This is not exactly a comfortable situation to find oneself in while traveling in the tropics.

Bullet ants range from Nicaragua to the Amazon Basin. Adult bullet ants feed almost exclusively on nectar; juveniles feed mainly on dead invertebrates. They use their mandibles to carry nectar droplets, insect prey, and other materials back to their arboreal nests. One Costa Rican study observed 4500 ants returning to the nest, of which 45 percent carried booty. Of this, 37 percent carried visible liquid, 25 percent carried insect prey and 21 percent carried plant parts. Several ants were even seen lugging the head of a small tree frog back to the nest.

Inside a bullet ant colony are "jails" where adult police ants train workers to carry liquid droplets. It is suspected



that carrying items in its mandibles enables the bullet ant to detect the nutritional makeup of possible meals.

The bullet ant is the world's largest ant but it's the intensely painful sting that gets people's attention. Surprisingly, some people seek out this pain.

Scientist or Masochist

Justin Schmidt has traveled the world for three decades studying insects that inflict pain. His study of sawflies, wasps, bees, and ants has led him to subject himself to the wrath of over 80 creatures. In the process he has developed his own index of discomfort.

The "Schmidt Sting Pain Index" rates stings from 0 to 4, from "very benign" to "mostly dead." He scores the bald-faced hornet a 2.0 and reports: "Rich, hearty, slightly crunchy... similar to getting your hand mashed in a revolving door." The pepsis wasp sting rates a 4.0: "Blinding, fierce, shockingly electric. A running hair dryer has been dropped into your bubble bath (if you get stung by one you might as well lie down and scream)."

Then there's the bullet ant, scoring a 4.0+: "Pure, intense, brilliant pain. Like walking over flaming charcoal with a 3-inch rusty nail grinding into your heel."

Caution

On a recent trip to Costa Rica, I had the fortune to travel with my friend Ed. Ed is no stranger to the tropics and he is hyperaware of its biters and stingers. He takes all measures to avoid the misery wrought by chiggers and eyelash vipers, but those precautions pale in comparison to his reaction when he spots a bullet ant: Ed doesn't just avoid them, he runs for cover.

Levi Old is a naturalist and wilderness educator. His expeditions range over a determined path from the local garden to the Yukon, from natural building to whitewater canoeing. For his master's work, Levi will develop a stewardship plan for Oregon's Fall River.



Photo by Zoe Davis

To Ed, every centimeter of the jungle could house a bullet ant. This borderline phobia affects how and where Ed moves. His caution contrasted greatly with my own curiosity-driven exuberance. When I kneeled down to take a macro-photo of a poison arrow frog, Ed warned: "You're asking for it!" His unending warnings eventually registered with me: even in my dreams I was on the lookout for bullet ants.

Becoming a warrior

The Mawé people of the Amazon have a long tradition involving bullet ants and their sting. As part of the culture's warrior initiation ceremony, young boys must endure the stings of hundreds of bullet ants. Elders gather ants from the forest and place them in an herbal sedative solution. The ants' stupor is short, yet gives the elders just enough time to wedge the ants, stinger-first, into the crevices of large mittens hand-woven from plant material. When the ants waken from sedation they are trapped and angry like bulls in a pen.

One by one the boys, some as young as 12 years old, step up and place both hands into the mittens of enraged bullets. The tribe's medicine man leads the boys in a trance dance around the central pole of a thatched hut. The arms of elders and the young men intertwine for support during the dance. Enduring the fury of toxins for 10 minutes at a time, for 20 separate rounds, each boy

feels the pain for hours beyond the ritual's end. (As a reminder, Schmidt describes a single bullet ant sting as being "like walking over flaming charcoal with a 3-inch rusty nail grinding into your heel." The Mawé boys experience that pain times 100).

Seeing other ways

Bullet ants have also been used as sutures to "bite-shut" wounds. Once the ant locks its mandibles around the cut, the ant's body is torn off, leaving the pincers and head to hold the wound closed. Ant saliva activates swelling and seals the wound from air and water. Healing by bullet ant provides yet another perspective on these insects that differs from Ed, Schmidt, and the Mawé.

Ed, a cautious jungle traveler, seeks to protect his body from undue pain. Schmidt, a curious scientist, willingly subjects his body to pain. Mawé elders ritualize pain, believing that it helps transform young boys into warriors. Meanwhile, bullet ants go about their lives, defending their nests and running up trees while unknowingly threading a link between humanity and perspective.

Perspective guides our relationship to the world. Like Scout's counsel in *To Kill a Mockingbird*, the bullet ant reminds us: "You never really understand a person until you consider things from his point of view... until you climb into his skin and walk around in it."

"Pure, intense, brilliant pain. Like walking over flaming charcoal with a 3-inch rusty nail grinding into your heel."



Single, thirty-something seeking...

Kat Deely

I'm in a bad relationship. I've ignored, taken for granted and outright shunned someone who is integral to my happiness, my health and my identity. And it's all my fault. As all good Gen Y'ers do, I can spread the blame – I've been enabled into this role, there were no reminders, no confrontations, just silence. I can blame my parents - why didn't they set me up for success? But really, I inadvertently made a choice. I chose adventure.

This realization dropped on me like a boulder, crushing my delusion and forcing reality upon my feeble constructs. Sitting atop that rock was Jeff Hughes and Deane Wang, knowingly smiling down on my amazement. 'What is your fish?' My fish? My place in this world that I know so well it is a part of my being? A place I observe day after day, the minute details looked upon with such careful focus they become

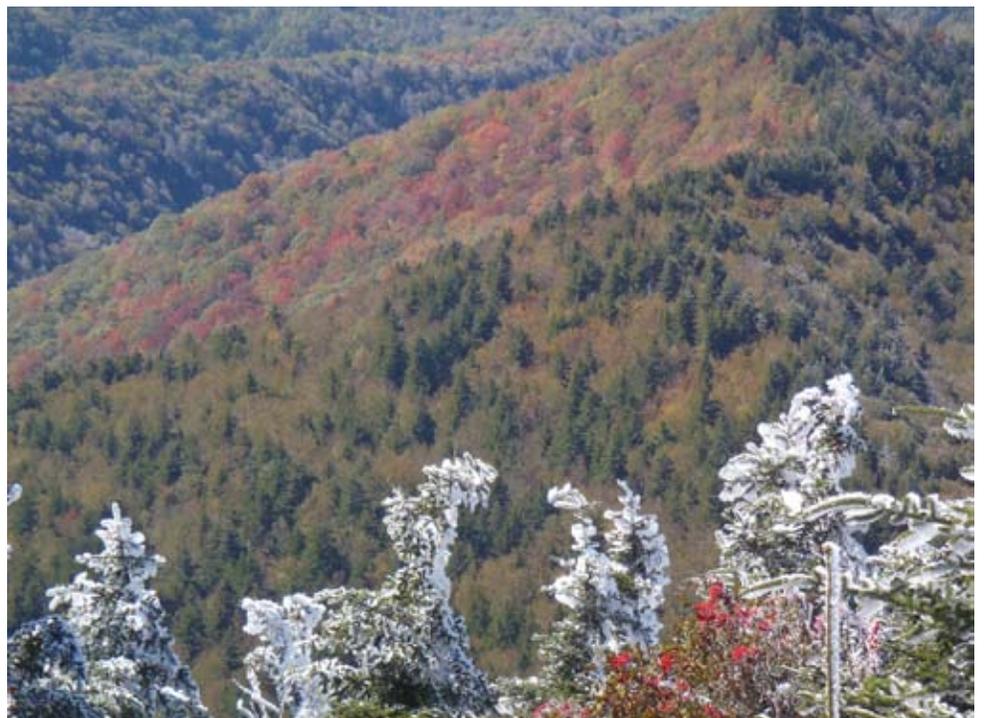
disturbingly large in proportion to everything else? A place of scents and sights that spontaneously materialize from memory? My fish? I didn't have one. Panic set in.

Who am I without a fish to relate to? I know I had a fish. It was the land I grew up on. I knew the day the mallards arrived on the pond each spring, I knew the musky scent of a doe as she peered over a rockwall to observe me huddled below. I knew the coarse ridges of the oak tree – THE Oak Tree. This place was my sanctuary. It heard stories of my greatest accomplishments and most embarrassed defeats. In a family of 7, it was the 8th. But then I did what was expected. I left. I went to college, I traveled, I explored places that fascinated me, I worked on projects that intrigued me. And that relationship I once had was lost to me.

I choked down the panic, and sallied

forth my compartmentalization skills to find understanding within this complex eco-social system. I currently had a relationship with the natural world built on awe and respect, passion and defense, but no connection. I lived with the rattlesnakes under the rocks, the whistling marmots in the fog, the beavers on the pond. And, much like meeting a third-cousin-twice-removed, I recognized similarities, I objectively understood the ties that bound me to each place, but I felt no loss of belonging when I left. When did my relationship morph from identification to simple observation? The day I began living with nature instead of in nature.

This planet is small. Technological advances in communication, travel and economy bring the other side of the world within the grasp of a whimsical idea. The ease at which we navigate our global community is a blessing



“THE Oak Tree. This place was my sanctuary.”

for human-human connections and our understanding and building of relationships. But what has it done to our relationship with nature – the land that sustains us, the land held in memory, the land at the core of our identity? For me and many others, it has parceled out this relationship to mere flashes of recognition. Remnants of me scattered across the globe.

Some people in this global community have found their fish. Their place may not be vast and expansive as Yellowstone or lush as Hawaii, or humbling as the edge of the Great Barrier Reef. But they are connected to this place. Their relationship is not expressed in terms of awe, but identification. The furrows on the fields mirror lines on their brows. It is a relationship of love, respect, and complete understanding that

comes with past, present and future knowledge. It is a relationship of siblings; a shared existence in family.

‘Globality’ is reality. But I’ve found my fish again - a newly discovered place where sorrow comes with the wane of summer, and laughter springs from the spontaneous eruption of birdsong. As I continue my migratory ways in life, I know the place will change. I’ve learned my fish is more than a place to observe. It is a place to connect with the land and experience the growth of intimacy. As long as I, and others like me, have a fish - if we make the effort to maintain that relationship – there will be people living in nature.

*Note to the Reader: More information on the ‘fish’ can be found in a short story by Samuel Hubbard Scudder titled, “Look at your fish!”

After years of moving around the country, building trails, teaching leadership and learning more than she taught, Kat has returned to the life of a student, to learn a bit more. Recent days spent making maps or grading hundreds of essays has her dreaming of her days in the woods. She can hardly wait for this summer’s field work getting to know the natural communities of Merck Forest and Farmland!



Drawing by Kelly Finan





Alarm Clocks, Choice, and Happiness: A Field Naturalist Goes to Walmart

Mike Blouin

A man in a camouflage baseball cap studies the 40 alarm clocks arranged before him on the tan metal shelves. I stand beside him, scribbling in my notebook, pretending to pay him no attention. But secretly, I'm a naturalist in the field, taking notes on his every move, piecing together the story of this unnatural place. On this frigid February Sunday, I'm far from the forest – I'm at Walmart.

My self-imposed mission is to repurpose two essential skills of the naturalist – close observation and pattern recognition – to learn something about this tiled-floor ecosystem. It's foreign at first: no soils to analyze, no trees to identify, no tracks in the snow or birds overhead. But there is – I will soon find – a pattern to the people and products here, one that will lead to fundamental questions about choice, human nature, and happiness.

Breaking news at the clock display: the man in the camouflage hat has picked up a camouflage clock. I can barely conceal my excitement, and seconds later, my disappointment as he returns the clock to

the shelf. The vast array before him appears to be causing him stress – he can't decide which clock is best. Nine minutes in, after examining seven alarm clocks and ripping open two packages to test out buttons, he departs with an unexceptional-looking silver clock with a cable to connect an MP3 player.

Nervous that spying on customers will end badly, I turn my attention to the abiotic. I start wandering the aisles, counting things and writing down intriguing product names.

I start in sporting goods, and find a floor-to-ceiling display with 84 kinds of golf balls. Some names: Diablo, Crush, Mojo, Hex Warbird, Rocketballz, Lethal. There are also Spongebob golf balls.

In the home goods section, a 20-foot-long rack of shelves holds 287 varieties of scented candles. Some scents you may or may not be familiar with: Dreamsicle, Sugared Donut, Tahitian Sunset, Starry Night, Peaceful Waters, White Casablanca Morning, and Warm Rustic Woods. For the less adventurous: vanilla.



is a lot of choice here. This is obvious, and also true in supermarkets and office supply stores, but it leads to a deeper line of inquiry – how does choosing from vast arrays of products affect the chooser? I return home to conduct some research.

Too much choice, it turns out, often makes people unhappy. Though it seems like having the ability to pick whatever candle or cat food we prefer should make us happier, we become overwhelmed if there are too many options. Barry Schwartz, a Swarthmore psychologist, argues that too many choices paralyze us and – if and when we finally decide – leave us feeling that we’ve missed out on something better.

Many of us probably identify with these feelings of paralysis and buyer’s remorse – I know I do. I’ve spent a solid ten minutes deciding which toothpaste to buy at the supermarket. I’ve agonized about which paint to purchase at the hardware store, then so regretted my decision that I returned to buy my second choice. I – like many Americans – can empathize with the man struggling to choose the perfect alarm clock.

There’s no panacea to this problem of overwhelming choice, but perhaps finding little ways to prioritize what we really care about could help. With our small, daily decisions – ones that happen far from Walmart – we can choose relationships over stuff, people and place over products. We can make Mom a birthday card instead of buying her one, bask in the glow of a real sunset instead of a Tahitian sunset candle, spend time with our kids outdoors and not at the store. We’ll slip up, of course, and occasionally devote (at least) nine minutes to picking alarm clocks or toothpaste or paint, but each day brings another opportunity to choose relationships over objects, and perhaps find a deeper sort of satisfaction in the process.

Mike Blouin is graduate student in the Field Naturalist program. He has spent most of his adult life teaching science, in settings ranging from Boston’s crowded classrooms to Yosemite’s verdant meadows. He aspires to learn (and teach) practical, real-world-relevant skills that help people connect to place and one another.

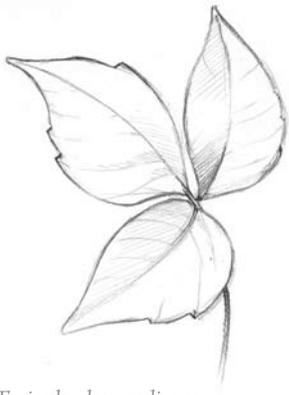


“My self-imposed mission is to repurpose two essential skills of the naturalist: close observation and pattern recognition, to learn something about this tiled-floor.”

On a big cardboard display in the middle of an aisle, calendarstofiteverytaste:YorkshireTerriers,Sailboats, The Bible, Studs n’ Spurs, Justin Bieber, Jelly Shot Test Kitchen, Elvis and his Toys, and Church Signs.

Soon I’m feeling overwhelmed. I count 90 birthday card options for “Mom.” At least 107 painfully cute shoes for girls, most of these hot pink or covered in glittery stars. Seven types of manual can openers; 73 types of bath towels in every imaginable color; 57 throw pillow varieties; 29 types of wall clocks; 153 flavors of canned cat food, with subtle differences – there’s both turkey feast in gravy and turkey dinner in gravy; three children in three different families begging for toys; a shopping cart filled with plastic Tupperware, pudding, Velcro shoes, a DVD player, a hamper, and cake frosting; three older gentlemen comparing work-out videos; a family deciding which of the 672 pairs of sunglasses to purchase their young son. Not a single price that ends in 9.

Sitting in my car in the parking lot, I review my notes and immediately spot a pattern: there sure



Drawing by Kelly Finan

Toxicodendron radicans

notes

from the field

cohort AD



kellyfinan The residents of Maine own the world’s fastest plant, the world’s most dramatic tides, and North America’s largest rodent. And most of them don’t even know it. Kelly Finan, artist and naturalist, is seeking to change that. She’s using creative writing to bring the state’s natural history secrets to Mainers and Maine visitors – for free.

Her master’s project, a joint venture between the Maine Natural Areas Program and the University of Vermont, will help connect hikers to Maine’s public lands, and all they need is an Internet connection.

Because of the space limitations, most guidebooks and trail narratives are bland, matter-of-fact directions. Any mention of nature is limited to “the trail enters the trees” or “the trail leaves the trees.” Thanks to the Internet, however, trail narratives can now

expand to include natural history tidbits. They can be read on a portable device or printed beforehand and carried on the trail.

Armed with maps, a full backpack, and a green pickup truck with the windows rolled down, Kelly forged through fogs, bogs, and biting insects studying fifteen of Maine’s most scattered and spectacular trails.

Her work is about to pay off. In May of 2014, the Maine Natural Areas Program will unveil fifteen exciting new trail descriptions available on the Maine Trail Finder Website. Complete with maps and illustrations, they are guaranteed to capture the attention, and hopefully hearts, of Maine’s hikers.

We need to change the culture around invasive plants. Currently, most property owners are fighting a losing battle against invasive plants—their isolated actions futile in a landscape of prolific invaders—or ignoring the issue altogether. For these battles to lead to victory (or at least truce), we need coordination across property boundaries. The Vermont Chapter of The Nature Conservancy (TNC) and the Vermont Land Trust (VLT) are doing just that by mapping and prioritizing management of invasive plants in Vermont’s Northern Champlain Valley. As part of this effort, my master’s project focuses on private lands near TNC’s Raven Ridge and LaPlatte River Marsh Natural Areas, where invasive plant removal is underway.

clarecrosby

With an intern from TNC, I bushwhacked through tangles of invasive honeysuckle, browsed on native blueberries atop rocky outcrops, and tried in vain to find an effective non-DEET mosquito repellent. We visited 22 properties, using an iPad to create maps of invasive plant cover and distribution. We produced a report for each landowner, recounting the current state of invasive plants on the property, explaining the importance of control, and recommending management actions to maximize effectiveness of control at the lowest cost.



When taken as a whole, data from the 22 sites allowed me to assess patterns of invasion across the study area, and to identify where future outreach and control should be directed.

Sequoia and Kings Canyon National Parks are home to the largest trees and highest peaks in the lower 48. Increasingly, these two Parks and the entire southern Sierra Nevada of California are also home to an invasive and destructive forest pathogen – White Pine Blister Rust. This Asian fungus has ravaged white pine species in North America for a century. Despite previous research that predicted blister rust could not thrive in California’s arid climate, the fungus now heavily infects sugar pine growing at low elevations in the mountains. Concerns are high that the fungus will continue to climb in elevation towards the pristine and fragile whitebark and foxtail pine forests that crown the Sierra crest.

*matt*cahill



Last summer, I documented changes in blister rust distribution in the Parks by trekking extensively through the remote backcountry to resurvey permanent plots. These plots, established in the mid 1990’s, were marked by rusty quarter-size tags cemented to boulders. Finding the tags was a challenge but I was able to locate and resurvey 50 plots. My data revealed that blister rust is more severe than it was 20 years ago, but higher elevations remain relatively free of the fungus. In my analysis I found strong correlations of rust with elevation, geography, temperature, and precipitation. Hopefully, these findings will allow ecologists to accurately track the disease in years to come.



*joanne*garton

Customary wisdom advises that we run for the hills during high water. Unpaved roads, however, run the opposite way, funneling water and sediment into streams and valleys.

While town road crews and select boards struggle to maintain safe and affordable passage on unpaved roads, state agencies address the broader effects of road erosion on water quality. During storm events, unpaved roads act as networks of streams that expedite transport of excess sediment and phosphorous into the state’s major water bodies. Stonework, revetments, culverts and vegetative controls all capture and slow runoff, reducing the impact of rain and snowmelt on road surfaces and adjacent ditches and turnouts. Normally silent and effective, these management practices only reach the public eye when they fail, catastrophically taking the road downhill.

My project retrospectively evaluates the effectiveness and longevity of erosion mitigation projects funded in part by Better Backroads, a state-run non-profit that provides grants and technical assistance to towns implementing best management practices on unpaved roads. This work will help Vermont towns and the Vermont Agency of Transportation determine how to spend limited funds complying with town road and bridge standards that ultimately keep our water clean.

Interns have more to offer than coffee brewing and photocopying. They can also help land trusts

*laura*yayac

care for their land, create management plans and evaluate natural resources. Working with the Southern Maine Conservation Collaborative (SMCC), I’m designing an internship program in which college interns perform rapid ecological assessments, survey for invasive species, and develop GIS maps for cash-strapped non-profits. The interns gain professional experience and earn a stipend; the conservation organizations get field researchers and high-quality reports

The program employs a leader to teach and manage the cohort of interns so the responsibility does not fall on the organization’s time-limited staff. Interns share their skills with each other, and explore the challenges and rewards of real-time land stewardship. That entails some office work, of course, but most of the work is field-based application of what they have learned in college.

The design of this new internship program is based on Vermont’s Land Stewardship (LANDS) program. To better understand the inner workings of LANDS – the networking, the budgeting, the management, and the necessary leadership skills -- I served as assistant leader for Vermont LANDS. The end result: better conservation, applied student learning, and no coffee errands.





*gus*goodwin The statewide surficial geology map captures Vermont’s glacial legacy in a wash of color. Kames are drawn in three shades of turquoise, lake shore sediments in eight shades of orange, and clays in four shades of green. But the till—a glacial feature as ubiquitous in Vermont as sugar maples—gets only a single color. This treatment gives the impression that till is a homogenous, uniform mixture. The opposite couldn’t be more true.

Till varies dramatically in thickness, density, and composition. With over 400 types of bedrock to draw from, the latter is particularly relevant here in Vermont. Our till can be composed of the state’s youngest or oldest rocks, its hardest or softest rocks, its most nutrient-rich and nutrient-poor rocks, and most any mixture in-between. Throughout much of the state, the till is so dense and thick that it, not underlying bedrock, is the parent material for soil. This means that the structure and chemistry of the soil, and in turn, the diversity, productivity, and resilience of the vegetation above can be strongly influenced by the composition of the till below.

I am working with the Green Mountain National Forest (GMNF) to build and test a model that predicts the composition and chemistry of the till at any given site within the GMNF. With this, the GMNF can identify forest stands that sit atop deep reserves of essential nutrients, such as calcium, that support vigorous trees and reduce the harmful effects of acid rain. Just as importantly, they can identify stands without this nutrient reserve. This insight into the potential of forest soils allows the GMNF to look beyond the forest’s current condition as it designs long-term management plans for timber production, wildlife, and recreation.

Boardfeet + Bird feet...it all adds up in the Adirondacks

matt pierle

The 6-million acre Adirondack Park in New York is one of the world’s greatest experiments in conservation. Mature forests on vast public lands provide recreation, tourism, and ecological services like water protection. Working forests on privately owned properties supply timber, pulpwood and sustainable livelihoods for residents. For wildlife, the result is a mosaic of forested habitat types. A sustainable forest-based economy can be measured in boardfeet of timber per year but also in bird feet!

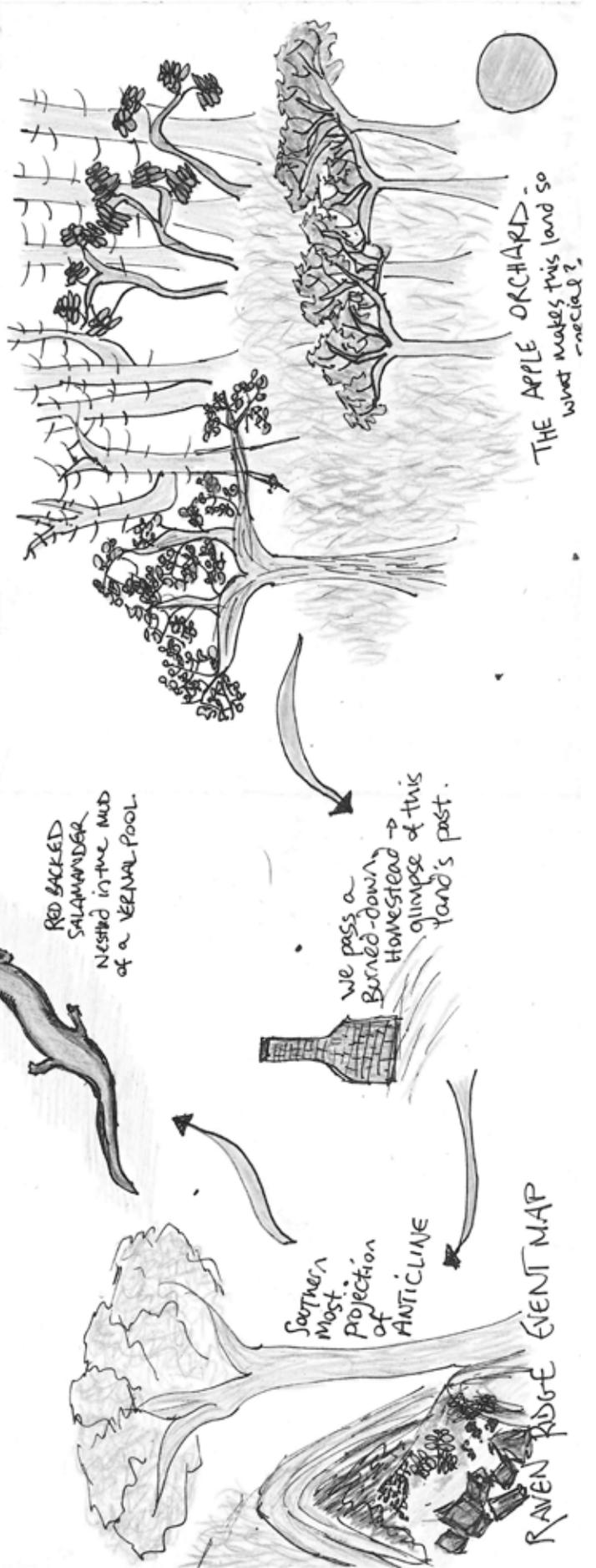
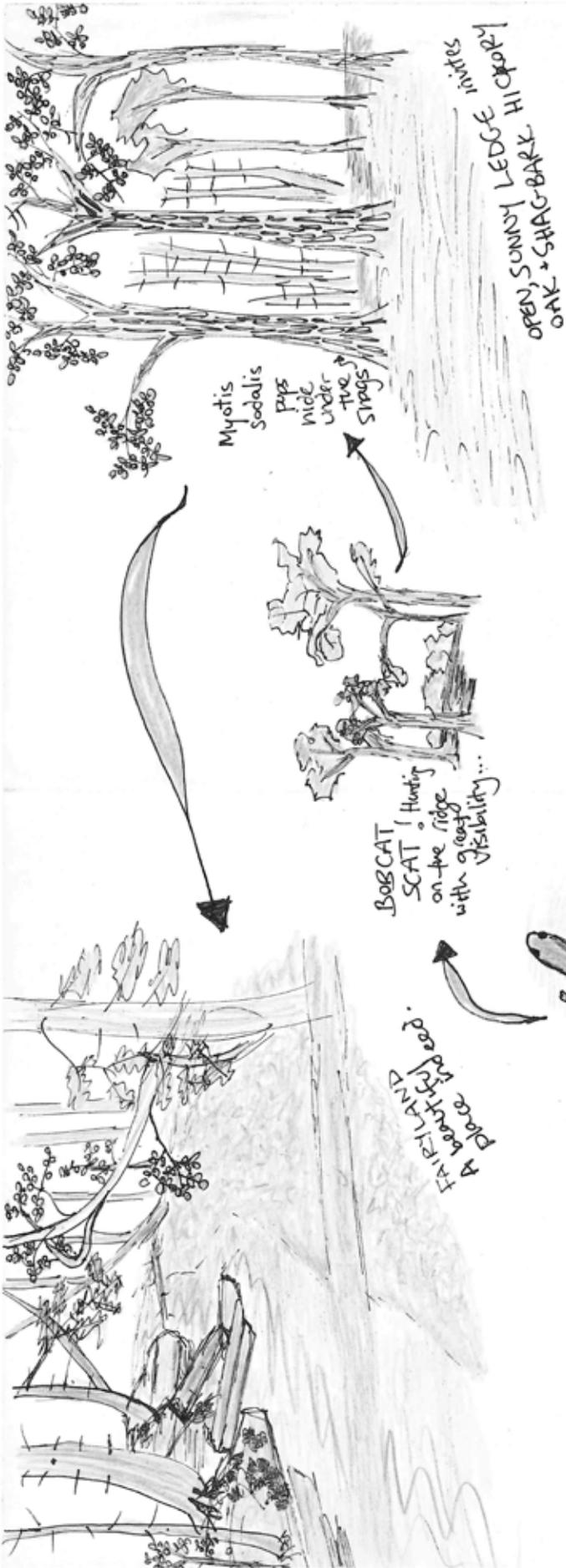
My project, in collaboration with Audubon New York, investigated how bird communities on private lands respond to forest cutting of various intensities. After six weeks at the Cornell Lab of Ornithology, I headed inside the “Blue Line” that delineates the Adirondack Park, to assess management plans and conduct assessments of forested habitats.

An extensive literature review and engaging dialogue with professional foresters offered me a trio of search images. I saw the forest as birds, conservationists and foresters interested in sustainable yields do. Magnolia warblers, Northern Saw-whet owls, Purple Finches and a suite of other responsibility birds were my companions in the forest.



I continue to integrate knowledge about wildlife, ecological communities and silviculture to determine how landowners and their foresters can enhance wildlife habitat for vulnerable species as they extract wood and regenerate forest stands.

Among other things, I’ve identified forest structural and biological variables that a forester can easily measure while conducting a traditional timber cruise. This should allow forest professionals to better practice the craft of forestry by integrating bird considerations into management for other goals, including recreation, aesthetics, and timber.



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CALL FOR PROPOSALS

DO YOU NEED TECHNICAL ASSISTANCE WITH A HIGH-PRIORITY FIELD RESEARCH PROJECT? We seek to match Field Naturalists and Ecological Planners from the class of 2015 with Master's projects sponsored by environmental organizations on the cutting edge of conservation science.

We are looking to link FNs and EPs with projects that challenge them to use their intensive training to its fullest. Our graduate students are professionals who are expected to demonstrate their unique skill sets while working with sponsoring organizations. FNs and EPs work closely with their communities and sponsors throughout the process to ensure that the product directly addresses the sponsor's needs.

In return for the services provided, we ask sponsors to contribute \$5,000 to our Sponsored Master's Research Project Fund. This contribution is used in its entirety to help defray tuition expenses of the student.

We plan to match students with projects by January 2014 so that students can work with sponsors during the spring (2014) semester to plan for the summer field season. Data analysis and report writing continue into the fall semester, with products delivered to sponsors between December 2014 and May 2015. If you are interested in having an FN or EP work with your organization, please contact:

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