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# Bees, Birds, and Beyond: An Unexpected Journey on the Path to Conservation

Molly Jacobson

*University of New Hampshire, Durham*

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## Commentary

### Bees, Birds, and Beyond: An Unexpected Journey on the Path to Conservation

—Molly Jacobson

I never envisioned I would find myself at the largest entomology conference in the country, six months after I graduated from the University of New Hampshire (UNH), about to meet someone so formative to my career aspirations. But when I think about it, it really was a long time coming.

*“...Molly?”*

I looked up from where I was leafing through pamphlets for the Mile High Bug Club in Denver, and found myself face to face with Eric Eaton, entomologist, writer, and my idol for years. He was incredibly supportive when I was just starting to explore macrophotography and sharing my images of insects on the citizen science website BugGuide, ten years ago when said photos were of now cringe-worthy quality. I shook his hand.

“It’s great to finally meet you in person!” he exclaimed.

I was grinning ear to ear.

My lifelong love of nature, especially insects, led me to this conference, but first it brought me to UNH for its renowned ecological research and location near vast amounts of active conservation land. As a wildlife and conservation biology major, I had a nebulous vision of making a tangible, direct impact to help protect the future of the natural world, but was unsure of how to go about enacting it. I hoped that most of my work would involve insects and their importance in ecosystems. However, I noticed a definite lack of invertebrates in my early wildlife studies, and my searches into potential entomology careers led me down a disheartening path of Integrated Pest Management (IPM), corporate agriculture, and disease vector control. The two



The author posing with a monarch butterfly at Wagon Hill Farm in Durham.  
*Photo by Molly Jacobson.*

worlds of environmentalism and entomology appeared mutually exclusive, and I wondered if my dream job of insect conservation was a myth. But as it turned out, you don't need to know exactly where you're going; all you need is a direction to start in.

During sophomore year, I attended a seminar about the evolution of bee sociality, held by Dr. Sandra Rehan. I discovered that her lab exclusively studied native bees—just what I'd been missing! When I became a junior, I was encouraged to apply for a Summer Undergraduate Research Fellowship (SURF) so that I could spend the summer months in the Rehan Bee Lab, assisting a postdoc with her research on native bee biodiversity and the impact of farming practices on pollinator communities. I was excited by the sound of that—ecology *and* entomology working hand in hand. For a conservation biologist with a buggy side, there was no better place to be.

I had never intended to study pollinators. It was happenstance, and it was perfect. My eyes were opened to the plight our pollinators are facing. Beyond honeybees (which are a non-native, human-managed species) there are over 200 kinds of native bees right here in New Hampshire that are beneficial to crops and vital for ecosystems. Working for credit in the Rehan Lab during the school year as part of an intercollege (INCO) course, and then in the summer for SURF, became my first true lab and field experience. I learned how and why to use colored "bee bowl" pan traps, the standard methods for sweep-netting flowers to catch bumble bees, and how to process, pin, and identify the thousands of bees we collected on farms as part of the project. I was thrilled to be outside, finally getting hands-on with insect study subjects, and knowing that this research would give us new insight into how we could more effectively accommodate these crucial pollinators in our landscapes. However, fieldwork was conducted only a couple of days a week, and as I sat in the lab driving pins through miniscule bee thoraxes, the outdoors called to me. I was proud to be a part of this research, but I was just itching to be more proactive.



The author collecting bees at UNH's Woodman Farm for fieldwork in the Rehan Lab. *Photo by Jeremy Gasowski.*

## Outreach: A New Direction

As an honors student, I was required to write an undergraduate thesis. In my senior year I examined records of bumble bees from the UNH Insect Collection and our own Rehan Lab fieldwork to identify patterns and causes of their decline, as many species of bumble bee are currently imperiled in the U.S. This independent project proved a test of my commitment, but what motivated me was the importance of the work. My thesis compiled new information that might aid regional and national efforts in tracking bumble bee declines and

informing management decisions to protect them. What I was doing *mattered*.

Yet, what I took away most from that period, which spanned my entire senior year, turned out to be the opportunities that arose because of my research. I presented my thesis at the Undergraduate Research Conference, and an article about my SURF work appeared on the Hamel Center website. At the university, I guest lectured two non-science classes about native bees, which was hugely gratifying. I was even invited to speak to New Hampshire Governor Chris Sununu about pollinator conservation, as well as to the UNH Foundation Board of Directors.

I realized how much more important outreach was to me than the actual thesis I wrote. Every single person who walked away with a greater understanding of the need for protecting pollinators would, with any luck, go on to share their knowledge with others and incite further change. I graduated beaming at the impact I'd made. In November of 2017, my thesis was published as a scientific research paper in the journal *Biological Conservation*, where it will be put to use assessing conservation status for declining bumble bee species.

## Everything Is Connected

After I graduated, I wanted to expand my horizons. Scientific research is how we learn about the world around us, and it gives us the tools we need to protect it. But I wanted to be more hands-on than that. Coming from a background of ecology, I had learned to view nature holistically, never becoming too focused on a single component in isolation.

I was interested in ornithology, and I had avidly taken up birdwatching. After all, insects and birds are inextricably linked in the great food web. I was toying with a potential career in endangered species management; that was an area where I could make a real difference! I received a summer internship from U.S. Fish & Wildlife at the Rachel Carson National Wildlife Refuge in Wells, Maine. My duties centered on the nationally threatened piping plover, a small shorebird that nests in beach dunes and has suffered severe habitat loss due to coastal development and climate change. During my internship, I was in the field constantly. I assisted in plover censuses, installed nest enclosures and electric fencing, and was pooped on by many a tern. My supervisor and I also educated beachgoers and landowners about the plovers and how to coexist with them by keeping a safe distance, backed by stiff fines. While many wildlife graduates pursue a career as a park ranger, this felt like policing to me, and I wished for my interactions with the public to remain more positive.



Molly had the chance to work with piping plovers on many beaches along the southern coast of Maine, including Parson's Beach in Kennebunk. *Photo by Molly Jacobson.*

About halfway through the summer the plovers migrated, and I was shifted to another project: native bee surveying. I was the only intern who had previously worked with pollinators, so I ended up putting my experience in the Rehan Lab to use. I never expected my prior academic work to rear its head in an internship about birds, but as it turned out, the refuge was interested in becoming more involved with pollinators. It seems I came along at just the right time.

During that latter half of my time at the refuge, I became engaged in many forms of outreach. I spent several weeks creating a native bee field guide using my own macrophotography taken on refuge property. I stalked their trails and gardens. To track down some species, I pushed my way through brambles and poison ivy, peering at every goldenrod bloom until: ha! A *Bombus ternarius* at last. The finished guide found a home in the refuge's visitor center, and I was overjoyed to watch tourists flip through it, captivated by the glittering green sweat bees and the brick red cuckoo bees, discovering the biodiversity right outside their doors. I hosted programs for the refuge on topics from birdwatching to tidepooling, and my favorite, a program about native pollinators that attracted hikers, gardeners, families, tourists, and more. I forged a connection with folks from all different walks of life; I got them to care.

When I trudged out to repair the electric fence after a massive storm, or babysat chicks on a crowded beach, I made an impact on the survival of a species where every individual mattered. When a little girl stared in fascination rather than disgust at the live great golden digger wasp I'd brought for my program, I could see my impact ripple for years down the road. Research holds little value if it is confined to the academic community. Communicating science to the public is crucial. No one will advocate to save what they do not care about, and they cannot care about what they do not know exists. I came to realize that being in the field and teaching others, my two favorite aspects of wildlife conservation, held the same goal, *my* goal: to make a direct difference. I had spent a few years discovering what I didn't want for my career. Here was something I wouldn't mind sticking with.

Through my research at UNH and internship at the wildlife refuge, I've tasted each flavor of the scientific process, from lab work to fieldwork to implementation and outreach. After my internship, I reconnected with the Rehan Lab, and was able to attend the entomology conference in Denver where I met Eric Eaton and some of the greatest researchers in my field. I'm not quite ready to leave academia yet (and I hope I never truly will), so, a graduate degree is in my near future. But I have learned that exploration is essential, and that learning what you both like *and* dislike are equally worthwhile. I am still not comfortable pinning myself down completely, but I have learned where I feel most at home: out in the world, engaging with both what I am trying to save, and the people who I can inspire to carry the torch with me.

*The incredible experiences I had as an undergraduate would not have been possible without the support of the many wise and generous faculty of the Department of Natural Resources and the Environment (NREN) and the Biological Sciences Department at UNH. It is thanks to Dr. Sandra Rehan, my faculty mentor, that I had the chance to pursue my passion of insect conservation, become involved with efforts to save native pollinators, and share that passion with others. She started me on*

*my path, and for that I am eternally grateful. I would also like to thank Dr. Thomas Lee, my academic advisor, for always being so patient and insightful, and encouraging me to chase my dreams. Thank you to the Hamel Center for their support and for so graciously bestowing the Summer Undergraduate Research Fellowship (SURF) that allowed me to perform my fieldwork. Thank you to my fellow Rehan Lab members (The Bee People, or Beeple): Jake Withee, Katherine Odanaka, Minna Mathiasson, Dr. Erika Tucker, Wyatt Shell, and many others. And a big thank you to everyone at the Rachel Carson National Wildlife Refuge that made my internship such an unforgettable experience: Katrina, Ryan, Ward, Kate, Katie, Vanessa, Cassie, Sue, and all the rest I can't possibly name here. Finally, thank you to my parents for being my unwavering support all these years and always encouraging me to do what I love. I can't wait to see where the road takes me next!*

## **Author Bio**

**Molly Jacobson**, from Merrimack, New Hampshire, graduated summa cum laude from the University of New Hampshire in 2017. A wildlife and conservation biology major, she conducted research under the mentorship of Dr. Sandra Rehan, which greatly influenced the work she does today. As an undergraduate, Molly was a member of the University Honors Program, the Hamel Scholar Program and both the Xi Sigma Pi National Forestry Honors Society and Phi Sigma Biological Honor Society. She received a Summer Undergraduate Research Fellowship (SURF), through which she conducted research on the national bumble bee decline. After graduation, Molly published her research in *Biological Conservation* and presented it at the Entomological Society of America national conference. She plans to attend graduate school starting in the fall of 2019. She hopes to make a difference in the world through hands-on work in the field and outreach in the forms of photography, writing, and education. Molly wrote her commentary for *Inquiry* as a way to “inspire others to explore their own passions, and to learn about themselves and where they want the paths of their lives to take them.”

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