(e.g., *Biogeochemistry* (2013) 112:275–291) is once again helping to inform and refine my research trajectory in the watershed ecosystems at the Fernow Experimental Forest. I am hopeful that my research in the exquisite central Appalachian broadleaf forest will add a significant piece to the big puzzle of nitrogen cycling.

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The Established Researcher

Early on in my master's program, I came upon the paper that set me on my scientific pathway. Having left my job as a mechanical engineer to look for work that I found more meaningful, I was drawn to the study of Acid Rain, because I wanted to play a part in addressing a serious environmental problem and also felt—perhaps because my mother was a chemist—that I really should learn more aquatic chemistry. Working as a field and lab technician in the bustling lab of Charley Driscoll at Syracuse University was a good start. (I still think of that as my favorite job ever: two days a week snowshoeing through the Adirondacks to collect surface water, snow, and soil lysimeter samples; the rest of the week in the lab running water chemistry samples).

At the same time, I started taking classes for this master's degree; however, Charley went on sabbatical, abandoning me to my own thoughts. At the time, I felt that a good deal more guidance was called for; I can only say that I floundered trying to identify a thesis topic.

In his Ecosystems Ecology class, the irrepressible Charlie Hall introduced me to thinking about ecosystem processes and to reading journal articles critically (if only to be prepared for Charlie's enthusiastic and rigorous cross-examinations in the classroom). When I read "The Ammonium Hypothesis" by Bengt Nihlgård (Ambio 14:2–8), I was immediately taken with the idea that we had been overlooking a problem that was staring us in the face: that the detrimental effects from atmospheric deposition were caused not only by deposition of sulfur and nitrogen oxides, but that ammonium deposition, too, could have complex and ultimately detrimental effects on ecosystems including plant nutrient imbalances (nitrogen saturation). The implication of the paper—which I found very appealing—was that chemical measurements in surface water could be used as a simple tool to assess disruption of the nitrogen cycle in forested watersheds—summing up a cascade of mechanisms and alterations that would be difficult to measure individually. The paper shifted my focus from surface water to the watershed as a whole.

The problem of "nitrogen saturation" has continued to be central to my research. My initial research using nitrate flux as a measure of watershed nitrogen "status" led to trying to understand the factors and mechanisms that control N cycling in forest ecosystems and to using stable isotopes (natural abundance)—an elegant tool for recording the net effect of nitrogen transformations and disturbances that can lead to distinct isotopic patterns More recently, the same quest to understand the factors that regulate forest ecosystem N cycling led to questions on a finer scale (spatially and temporally) about when and how plants access available nitrogen—again using natural abundance stable isotopes.

Throughout, I have continued to be motivated by a desire to use scientific knowledge to solve

Photo credit: Paul Schaberg

environmental problems. In a way, my work came full circle when I asked Bengt to serve as a reviewer for my national-scale synthesis project assessing the state of knowledge about ecosystem responses to N deposition. Over time, I have come to regard the practical application of science not just as an appealing facet of a research project. I now believe that making the links between our research and potential practical applications and communicating science results in ways that are accessible to all is an essential part of the process.

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