Action Outstate

As a Land Grant institution, our faculty and students have been working all over the state for more than a century. In this issue you will also find an update from the Cloquet Forestry Center (CFC), a place that has served as a home away from home for many students and an integral part of the U of MN’s forestry and natural resource management mission. With that, you will also hear from the faculty who work from the CFC and some of their exemplary contributions.

This issue will also acquaint you with some of our studies of watershed dynamics as led by one of our newest faculty. Indeed, the technologies now available have allowed for greatly increased detail in the nature of the questions we can address in research. We will also describe some unique and very effective outreach efforts geared to working professionals. I have been especially impressed by the ways we are making a difference today and setting up for even greater impacts tomorrow. On top of that, you will meet one of our outstanding student leaders who will be graduating and entering the workforce soon.

We have also included a list of the many helpful alumni and friends who have made gifts to support our students, instruction, research, and outreach this past year. It is alumni and friends like these who have made a real difference in the quality and impact of our programs. Your support is widely and deeply appreciated.

Finally, we bid farewell to our editor, Jenna Williams, who will be leaving soon for new adventures in Colorado. She has served our communication efforts very effectively and we wish her the very best.

Alan Ek, Professor & Head, Forest Resources

Watershed Tracer Studies

Water quality is one of the most significant considerations in working forests, and many of our current best management practices have been designed to protect our water resources. Diana Karwan, Assistant Professor in forest hydrology and watershed management, works with watershed tracer studies to better understand how sediments move through and interact with streams. In turn, her work can then help improve and design best management practices that are scientifically sound and impactful in forest watersheds.

There are two different styles of watershed tracer studies, and Karwan works with both varieties. One style of study introduces something new to a stream or watershed to watch how it moves. This introduced signal can then be followed through the stream to study movement, time, and interactions with the streambed. In her studies, Karwan has introduced suspended materials like titanium dioxide. She says, “It’s a clay sized particle so it can travel either floating, suspended in the water or it can react with the stream bed, settle to the bottom, or stick to other portions of the stream channel.”

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The titanium dioxide, when used as a tracer, can turn an entire stream white with relatively small amounts. Karwan explains, "The fact that you can see it provides a check on when your plume has passed by when you’re in the field, but the data actually comes from the chemical analysis of the tracer." The amounts of tracer released into the stream are carefully added by finely calibrated pumps and then measured downstream at various points. This allows Karwan to accurately measure the amounts being introduced and make better assessments of how the tracer behaves through data gathered at the downstream stations. "We add the plume, sample downstream, and sample over time," Karwan explains. "That allows us to study how the sediment moves differently than the water that carries it."

The other type of watershed tracer study, known as sediment fingerprinting, does not involve any additions to the stream. Instead, the unique chemistry along a stream is used to identify chemical signals that can then be measured downstream. For example, the upslope sediment chemistry might be unique to litter from the forest floor while downstream locations could be experiencing bank erosion that is providing a different set of chemical inputs into the stream. These unique chemical signals can then be measured through the watershed and picked apart to understand where materials in the stream are coming from and how they move through the environment.

This process of fingerprinting chemical signals from sediment or other sources takes a long time to set up, sample, and analyze. In a single study on one watershed there might be dozens upon dozens of different chemical tracers being tested. From there, the data analysis begins.

Sediment fingerprinting offers an appealing way to study watersheds, but the methodology is fairly new. These types of studies have been used for a decade but interest in them has increased in the past few years.

Karwan notes, "What's happening now in the scientific literature is that people are applying this in different ways and there are lots of questions, of course. This could be a great tool but we need to make sure the science behind it is on solid footing so that we’re applying it in a proper way."

Karwan is working with introduced tracers in working forests to then apply the results to management questions. She has conducted watershed tracer studies in Idaho and Connecticut but is also working to develop basic monitoring stations on forested land in northern Minnesota. Once the baseline information is gathered, experiments can be applied and key research questions can be addressed.

The issue of time is another area Karwan would like to explore. "Some of the foundational work was done in the geology community, and they have a very different sense of time," Karwan notes, compared to a water quality specialist who is interested in immediate effects. "It’s one thing to say during this storm event this is what we see coming out of the stream. That notion of time is interesting, though, and how long did it take it to get there? It is an important issue that’s not as easily understood."

In the end, Karwan is interested in helping refine watershed tracer methodology and applying findings to forest management. She says, "I would like to see a way that we can make sure this toolkit, where there is a lot of interest, is being applied in a manner that is scientifically sound. We need that on the chemistry side, on the stream transport side, and on the statistical analysis side. I would hope we could gain some better understanding of when we get pulses of materials coming out of streams, what brought them there? And on what timescale? So if you are applying a best management practice within your watershed, you have some notion of when you should see a change take place downstream."
In July of 1862, President Abraham Lincoln signed the Morrill Act into law and stated, “The land-grant university system is being built on behalf of the people, who have invested in these public universities their hopes, their support, and their confidence.” The University of Minnesota is one of the country’s original land-grant institutions and has a mission of learning, discovery, and engagement for the common good. As part of this mission, we engage in activities across Minnesota. Our faculty engage in research projects across the state, our extension team helps communities all over Minnesota, and sites like the Cloquet Forestry Center provide hands-on engagement and learning opportunities for novices and professionals alike. We spoke with two faculty members who often work in outstate Minnesota about their thoughts and experiences. Associate Professor Mae Davenport specializes in natural resources and recreation management and Professor Gary Johnson specializes in urban and community forestry.

Q: What projects are you currently working on or have recently worked on in greater Minnesota?

Professor Mae Davenport: I've had several projects in greater Minnesota. An ongoing project is investigating climate community readiness on the North Shore. The research and outreach project brings together scientists in social science, climate modeling, economics, and tourism to assess community assets, climate vulnerabilities, and adaptive capacity of recreation and tourism resources. We are working closely with local park and trail managers, tourism professionals, business owners, and community leaders to engage them in discussions about climate and visualizations of potential impacts. The ultimate goal is to build climate readiness organically—through local leaders, business owners, and community organizers.

Professor Gary Johnson: Greater Minnesota has been the part of the state where we have conducted most of our urban forestry research, outreach, and community engagement for the past several years. Our Community Engagement and Preparedness (CEP) program began in earnest in 2009 when emerald ash borer (EAB) first became a realized threat to Minnesota. That program has several branches including citizen engagement and community outreach programs where we trained local citizens to become local “best practices” contacts for managing EAB and developed outreach materials for their use. We also provided technical assistance and financial support for constructing, stocking, and planting out trees from community gravel beds, an option for reforesting communities that are on tight budgets.

The list goes on and on. We have more than two dozen communities in greater Minnesota with gravel beds. We continue to provide technical assistance to those and other communities on urban forest diversification, tree health issues, best planting practices, and engaging citizens in the management of their natural resources.

Q: Are there unique challenges or opportunities when working in greater Minnesota communities?

Professor Davenport: Coming from the Twin Cities as a University of Minnesota professor can be a challenge in terms of building legitimacy. However, since I'm from the Iron Range originally, I'm able to relate to life up north and some of the hardships folks in rural Minnesota face. At the same time, my research team has developed some really neat relationships and has experienced great generosity from rural community members. I think rural Minnesotans take pride in their communities and are very welcoming and willing to share their stories.

Professor Johnson: The biggest challenge is the distance among the communities and the campus. Think about it; we work with Crookston, Hendricks, Rochester, Ely, Hibbing, and Mora just to name a few. I literally travel thousands of miles a year within the borders of our state, and several of the program assistants, research fellows, and student research assistants are logging in as many miles.

My experience is that people are pretty much the same everywhere, however. I do find that working with smaller communities offers us the chance to work more intimately with stakeholders. We get to know the people a little better.

Q: Why is it important for the University to work in outstate areas?

Professor Davenport: Greater Minnesota is rich with natural and cultural resources upon which all Minnesotans depend. As a researcher at a land grant university, it's my responsibility to serve rural communities and help them discover their own strengths and address unique challenges when it comes to natural resource management.

Professor Johnson: If we don't, who will? We can't individually serve every single person in the state, but every single person in the state deserves to be assisted when they request it. The University of Minnesota by scale is very small compared to the rest of the state. Why would we expect everyone to come to us? Plus, to be honest, I love the different beauty of every part of Minnesota from the hardwood forests of the southeastern corner to the prairie pothole region. There’s nothing boring about Minnesota’s landscapes.

Q: What does the University bring to the table?

Professor Davenport: We bring resources for discovery, learning, and engagement including people (e.g., scientific experts, graduate and undergraduate students, outreach specialists), technology and information, and effective processes (e.g., collaborative planning, asset mapping) that can enhance what communities are already doing well or help communities solve the many problems they face in being sustainable socially, ecologically, and economically.

Professor Johnson: We have no agendas other than to help, pass on information that can help communities, bring groups together, and listen. Most of our research projects have germinated from idea seeds that we've picked up working around the state. We also are very good at cooperative efforts, bringing together the expertise of the different agencies and non-profit groups. The more we can involve those partners, the more sustainable the programs become. Also, the less work I have to do! ✨
Student Spotlight: Darin Erickson

Graduating this June, senior Darin Erickson is looking forward to getting back to Minnesota’s north woods. Darin started his college career with general courses toward an associate’s degree. Then, as a student at Itasca Community College, he was encouraged by an instructor to try a few forestry classes. Forestry wasn’t new to Darin; his father is a forester and also a University of Minnesota graduate. After deciding to pursue forestry as a career, Darin decided to also pursue a four-year degree and transferred to the UMN.

Even though he was nervous coming in, Darin handled the transition to the UMN very well. “Coming from a small school and then going to a university, I figured all my classes would be 100-200 students,” Darin says. “Here in the forestry program there are maybe 20-25 students in most of my classes, so that was a big surprise. And then only being here for two years, I can walk around the St. Paul campus and know a lot of people on a first name basis. It’s nice to walk around campus and know people.”

During his first semester, Darin connected with the Forestry Club and the Society of American Foresters – UMN Chapter. This was another factor that helped him connect with campus and get to know people. For the past year, he has been SAF chapter president and the vice president of the Forestry Club. “It’s been an awesome experience. Coming in as a transfer student and not knowing anybody, it helped having the club to fall back on for friends and getting out,” he says.

In addition, Darin has led the SAF chapter in creating educational and outreach opportunities for students. “I’ve learned a lot outside of the classroom setting with the clubs,” he explained. “Once I took over the presidency for SAF I tried to incorporate an educational experience for the members but also an outreach effort in the community. We went to Edgewood Middle School in the fall and taught a class of 6th, 7th, and 8th graders how to run GPSs and compasses and figure out their pace factor. We also have a groups of students from different schools coming here in the spring to learn more about forestry in general, so that’ll be interesting.”

After taking the final field session this May, Darin will graduate in June. He would love to work as a procurement forester for industry, but is also applying for positions at the state, federal, and county levels. Now a wise senior about to graduate, Darin’s advice to future students is to get involved and get connected. “Don’t be scared of your professors. They are there to help you,” he says. “Definitely take advantage of office hours and get to know them. Most likely they want to get to know you too.”

While a north woods guy at heart, Darin has enjoyed his time at the UMN. “I’m not going to miss living in the cities. I’m going to try and head north as far as I can go,” he says. “I’ll definitely miss the friends I’ve made. I will miss the connections with professors that I’ve had and miss that everyday communication with them.”

Thank you to our 2014 donors!

Your generous gifts help our students and our programs succeed now and in the future. Thank you for your support!

Life on (and off) Campus

Farewell from the Editor

For the past seven years, I have had the pleasure of working for the Department of Forest Resources as their Communications Coordinator, but as of this May I will be moving to Colorado for some new adventures.

The UMN campus has been my home as either a student or a staff member for over ten years now, and I will greatly miss my campus. It’s a beautiful place to come to work, and there is always something exciting happening. Plus, as I’ve told many prospective students, the St. Paul campus is the friendliest place on campus!

Thank you to the students who make this a lively, vibrant place to come to work. Thank you to the staff and faculty who share their passion through their work. It has been my job to sell our program to prospective students, and you make it an easy and honest sell. Thank you to Alan, our steadfast leader, who has shaped this Department into what it is now. You have been fantastic to work for and have taught me many lessons, small and large, that I will carry with me. (For instance, never underestimate the simple power of cake to cheer up the office and bring people together.)

I’m may be off to CO, but I’ll always be a MN Gopher at heart! - Jenna Williams

Jenna with a gratuitous selfie at the top of a climb in Red Rock Canyon Open Space, CO. (Don’t tell her mom she wasn’t wearing a helmet.)

[Left] Six Members of the SAF Club attended the SAF National Convention in Salt Lake City Utah. While at the convention, students took part in seminars ranging from Emerald Ash Borer management to management of red pine. Members also took advantage of the great scenery around Salt Lake City by visiting Antelope Island State Park and Wasatch National Forest. (Pictured: Darin Erickson, Lauren Stufft, Karen Beck, Emmie Peters, Thomas Burke, Danielle Ringle)

[Center] Club members visited the Cloquet Forestry Center for a jack pine thinning experience. Students helped set up research plots in a stand and thinned research plots to different densities (5x5, 7x7, and 9x9 spacing). It was a great experience for club members to get involved with research and hands-on opportunities. Thanks to Mike Reinikainen, Matt Russell, and Sawyer Scherer for leading and assisting with this event. (Pictured: Danielle Ringle, Thomas Burke, Darin Erickson, Melissa Lenius, Emmie Peters, Matt Russell, Michael Shearen, Mike Reinikainen, and Sawyer Scherer [front, left])

[Above] Members from the SAF Club help teach 6-8th grade students how to traverse using their pace factor and also how to navigate using a GPS unit. In addition, the club connected with the Hope for Tomorrow Mentoring Program. During multiple campus visits, club members taught groups of diverse students from across the metro area about the college experience and what students learn about while studying toward a natural resources degree. (Pictured: Darin Erickson with 6th-8th grade students)
Our Forest and Natural Resource Management undergraduate program is often called a “discovery” major. This is because students often discover natural resources as a career choice after having started college.

How did you first discover your major? What sparked your interest in a natural resource career? Do you know of someone who could use that spark or who could benefit from some support and encouragement?

The UMN’s Forest and Natural Resource Management major is one of a kind. We have a small community feel on the St. Paul campus while still benefiting from the many opportunities and resources of a Big Ten university. Whether a student is interested in the environment, forestry, conservation, parks, or urban forestry, this major provides the skills and knowledge necessary for a variety of careers. We also offer the only 4-year SAF accredited degree in Minnesota.

Pass on the spark and help that student find their path to a natural resource career. Visit z.umn.edu/FNRM for more information or to set up a campus visit.