



UPSTREAM

News from Itasca Biological Station and Laboratories



Members of the Itasca Booster Club and Associate Director Emily Schilling collecting samples at the headwaters of the Mississippi River.

Photo: Raine Flynn

Braving the cold for the bugs

Students in the Itasca Booster Club encounter winter's thriving life at Itasca.

While winter months are quiet in the Northwoods, underwater it is teeming with life. The Itasca Booster Club experienced this firsthand during its annual winter trip to the station in January. Although temperatures were well below freezing, students bundled up and braved the cold to visit the Mississippi River. Just north of the headwaters, the current keeps the river open throughout the winter despite its small size, creating the perfect habitat for winter-emerging aquatic insects – the focus of Bugs Below Zero, a citizen science project funded by the Minnesota Environmental & Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources.

Winter-active aquatic insects such as caddisflies, mayflies, stoneflies, and midges serve critical roles in freshwater ecosystems, yet very little is known about their natural cycles and life history. Bugs Below Zero aims to increase our understanding of these insects by engaging volunteers across Minnesota to visually sample open stream banks where these insects emerge throughout the winter. These understudied species face increased risks from the impacts of climate change, and disruption of their life cycle could have negative effects on aquatic ecosystems, especially for climate-sensitive species like trout. The combined effort of volunteers results in far more data and geographic coverage than a single research team could

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DIRECTOR'S MESSAGE



Greetings from Itasca!

I hope this note from the North finds you well. I am writing this on a cold evening in Cabin 4. It was -25 degrees Fahrenheit this morning, but thankfully, the car started. Emily and I skied along the South Entrance Road, following a set of bobcat tracks (an actual cat, not a machine) the whole way. It was silent backcountry, months away from a flood of visitor activity. In case 2025 requires extra strength, I'm caching today's memory for later.

In the cabin, I've been reading beat-up Sigurd Olson books. A passage from *Reflections from the North Country* struck me. Olson yearned for "a calm assurance at having conceived an object and seeing it through to its completion, which is missing in production lines." I often refer to field station jobs as Swiss Army knives, where problem-solving requires a broad range of knowledge and tools. But for hands-on stuff at Itasca, you know you're done when you're done. Finishing jobs gives us a little satisfaction in return. It's a bond all of our staff share.

I think we, as Itasca staff, have also found ways to share a similar pride with efforts supporting our mission for research, training, and engagement. Success in these efforts is often delayed or pay-it-forward – collecting long-term data to be analyzed later, or training students and postdocs to solve future problems that launch people down a river of life. A leadership manual would say to use performance metrics "downstream" to verify success, but I think we also need to share those successes with everyone "upstream" who made them possible – all of us, not just the Ph.Ds. This newsletter, now in its eighth year, is strategic in redistributing the value of what we do. The pride and prestige are for all of us.

Enjoy reading *Upstream*, and thank you all for supporting Itasca. -Jonathan Schilling

Turning loss into beauty

Dyer's polypore breathes new life into downed spruce trees.

The station has been losing spruce trees that snap near the base during high winds. Each time one falls – and sometimes before it happens – we discover dyer's polypore (*Phaeolus schweinitzii*) fruiting at the base of the trunk.

Last summer, we sent some dried *Phaeolus* to our colleague, Ami Thompson, a Fisheries, Wildlife, and Conservation Biology Ph.D. graduate, who has been perfecting her craft in dye-making. Ami used the mushrooms to create stunning natural dyes for beautiful, one-of-a-kind yarns. We are saddened by the loss of our spruce trees at the station, and we are actively replanting to encourage new growth. Yet, even in the face of loss, we can find beauty. The fungus, along with the yarns it helped create, serves as a living tribute to the life of these towering giants, reminding us of the way nature's cycles of life, death, and renewal continue to sustain and inspire us. -Emily Schilling

Yarn dyed with Itasca's *Phaeolus* pigments (top), a fallen spruce tree at the station (bottom left), and dyer's polypore fruiting at the base of a tree trunk (bottom right).





Photos: Phoenix Rogers

Hard water science

Winter weather brings researchers to Lake Itasca for precision coring opportunities.

“Why do you think a scientist would rather take a sediment core from the bottom of Lake Itasca in winter than in summer?”

I regularly ask students, staff, and faculty this question during my introduction talks in the Biome Center. People sometimes catch on to the answer if they like ice fishing, but usually, I hear silence. Then, I give them a hint by telling them that during “hard water” season at Itasca, air temps can drop below -40 degrees Fahrenheit and ice thickness can exceed 24 inches. It feels weird to walk on the top of the lake, particularly when it groans and heaves, but ice that thick can support a fully-loaded trailer truck (40 tons).

My “hard water” hint usually causes movement in the crowd – stirring, giggling, gasping – but some eyes will light up. The answer to the sediment core question is that it is easier to control a sediment coring device when you are standing on ice instead of bobbing around in a boat. It allows retrieval of a vertical, small-diameter cylinder of sedimentary material that has its layers of history stacked up neatly, without disruption. This is what Dr. Betsy Swanner would call precision coring. The sediment inside the metal-shafted corer should look like a stack of dimes instead of a pile of coins, each dime representing a period of history.

Dr. Swanner has been coming annually from Iowa State University to Itasca in the dead of winter, with a team of scientists funded by a National Science Foundation CAREER grant. Precision coring is similar to archaeologists who use stratigraphy to date a dinosaur bone if they know in which layer of sediment it was embedded. If you can date the sediments, you can date the age of embedded things. This also works for pollen – this is how we know specifically when Itasca’s vegetation changed in the past 10,000 years. It also works for smaller things, even molecules. Researchers, like Dr. Swanner, and a University of Minnesota Duluth-based effort (collaborative with the U.S. Geological Survey) called the Midwest Varves Project, use sophisticated coring tools in winter to lock everything in place. They retrieve cores that look like the perfect stack of dimes. We can learn a lot about our future by understanding (and overlaying) the sequence of biogeochemical and ecological events in our past.



Students using coring tools to retrieve sedimentary material.

Upstream Spring 2025

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Is winter “hard water” science work easy? No. It presents obvious risks and requires planning. But Itasca has the know-how and gear (pulk sleds, quilted “clam” tents, a side-by-side vehicle with tank treads, augers, etc.) to make this happen, and sediments are not the only reason people sample Itasca’s lakes during this season. In addition to Swanner’s group, other researchers find their way north to follow the biological action under the ice. Some aquatic organisms are just as active in winter as they are in summer, and with a “lid” on top of a mostly-liquid lake system, researchers are finding that these understudied dynamics need research attention. Dr. Jim Cotner visits from Saint Paul to sample Lake Itasca, Elk Lake, and others as part of a Legislative Citizen Commission on Minnesota Resources-funded project focused on the role of microbes emitting carbon dioxide and methane in lakes. The Minnesota Department of Natural Resources also visits for water quality monitoring and coring, as well as sampling algae, and our own Victoria Simons and Associate Director Emily

Schilling track water quality and macroinvertebrates during winter, respectively.

“Hard water” science is cool (literally). If you think of Itasca as having a summer high season, remember that for some, the best time to head north is when it is the quietest. –Jonathan Schilling



Staff spotlight: Connie Shegrud

Connie shares how her mother’s cooking inspires her own time as a cook at Itasca Station.

Connie Shegrud has been a beloved cook at the station for 18 years. Since starting her career at Itasca, she has also had the opportunity to work as a cook at another field station in Ely, Minn., and at a nursing home in her hometown. She is currently spending her off-season working at the Desert Studies Center, a California State University field station.

Can you tell me a little bit about your background? What inspired you to get a job working at Itasca Station?

I grew up on a farm in Bagley, Minn., with five brothers. My mom was an excellent cook with her full-time job being to keep us fed. My first job being a cook for a large group of people was when I worked at a Bible camp. I did it with my mom. She had more experience cooking for lots of people, so that was a good experience. That prepared me for working at Itasca.

These kinds of jobs are seasonal, and that also appealed to me because I had kids at home. Now I’m always searching through my mom’s recipes. She’s on my mind a lot as I do things in the kitchen.

What is one of your favorite memories from your time as a cook?

When I was working as a cook in Ely, it was really remote. Students were coming and putting their phones up in the air

trying to get service, and there wasn’t any. It was comical. Well, they were going to be heading out and doing a canoe trip, and when they came back, they were so grateful to me. They’d been living on dried oatmeal. I made chili tacos. I wish I had taken a video. They were like a bunch of wolves.



What’s your favorite dish to prepare?

It really depends on how big the group is and if there are any special diets. It’s kind of a funny thing to see students’ reactions to new foods. Like, I’m in California right now and they’ve never heard of tater tot hotdish. But I really like making a simple pork roast with mashed potatoes and gravy. Or stew. I love making soups and bread.

What’s your favorite thing about the station?

I’m fortunate to work with people that I like to work with and get along with. That’s pretty unique after working in a place for 18 years! And I love everybody there. It’s a beautiful place, and it’s great meeting students from all over the world.

Get hooked on fly fishing this June!

Instructor Carl Haensel shares his love of fly fishing and the science behind it.

Carl Haensel is a fly fishing guide, biologist, conservationist, photographer, educator, author, and instructor for Science of Craft's newest course, The Science of Fly Fishing. He teaches post-secondary courses on ecology, biology, and geology for teachers and educators and is passionate about outdoor education. Carl is the author of two books about fishing in Minnesota: *Fly Fishing Minnesota* and *Minnesota Fly Fishing Maps*.

What's one of your most memorable fly fishing experiences?

From fly fishing alongside alligators in the Florida Everglades to scrambling high Spanish mountains in search of native brown trout, I've been fortunate to enjoy many thrilling adventures. Still, some of my most memorable moments of fly fishing are in the spring in Minnesota. Watching wild brook trout in gin-clear water rise to the surface, and sip in mayflies floating down the current of a Minnesota stream, tumbles through my memory most days. While I've been lucky enough to observe hatches and feeding like this many times, it remains one of the most poignant parts of fly fishing for me when it occurs.

How has fly fishing shaped the way you see ecosystems?

Good fishing generally occurs in intact ecosystems. It's always heartening to experience a conserved area where you can see

an intact ecosystem flourishing. Often, if the fishing is good, we can also enjoy amazing birding and other wildlife observations. Unfortunately, I have traveled to many locations in the world where we hoped to have good fishing, but something went wrong. From pollution to overharvesting, logging, erosion, and suburban sprawl, many things have derailed our natural systems. Fixing these challenges has long gone hand-in-hand for me as an angler, and has led to decades of working with Trout Unlimited and natural resource agencies around the country.



What are you most excited about in terms of teaching the fly fishing course at Itasca?

I'm excited to share my deep love for observing the natural world through the lens of fly fishing. I believe anglers that understand how our ecosystems function can be some of the best advocates for threatened natural resources. We need more strong advocates, now more than ever. I look forward to sharing the camaraderie of a fun day on the water, and seeing the joy that fly fishing brings anglers while encouraging them to explore the natural world in Minnesota and beyond.

Learn more and register for The Science of Fly Fishing at z.umn.edu/FlyFishing.



ORGANISM SPOTLIGHT

Red Squirrel

Red squirrels (*Tamiasciurus hudsonicus*) are also known as "pine squirrels" in some regions. While they are highly active and noisy most of the year, they become more sedentary to conserve energy in the cold winter months, spending hours resting in their thick, warm nests. Some will even nest in old bird houses! Adults mate in late winter, and females give birth to a litter of up to five kits in early spring. When kits are born, their eyes are closed and they are hairless, weighing less than an ounce. It takes about 12 weeks for red squirrels to become independent. -Victoria Simons





Behind the scenes

Winter facilities work welcomes the spring season.

Although the station is quieter in winter, staff are busy preparing for the next field season's "go time." While summer is typically Minnesota's construction season, winter is our prime time for major facilities projects.

This year, our facilities staff have been busy reflooring several of our cabins, including our largest, Cabin 70 and Cabin 10. They also restored the original flooring and installed new paneling in our historic bunkhouse, Fragaria (Cabin 25; also see "Then and Now"). The remodel for Cabin 51 is also nearing completion.

Each project is handled with craftsmanship, while preserving the station's historic charm and our commitment to sustainability. Even smaller updates, like the built-in game storage in the Assembly Hall and new door handles in the Dining Hall, make a big difference in our day-to-day life at the station. Alongside these tasks, our staff handles daily winter maintenance – plowing roads, preventing pipes from freezing, and preparing for the upcoming spring season. Spring is almost here!

Then and now

Take a look back on the station's history.

Thanks to a robust collection of photo and document archives, as well as the comprehensive cultural resources survey that was conducted in 2015 by a team of architects, historical consultants, and landscape architects, we are able to look back in time to learn interesting facts about the station's history. In its earliest days, students slept in platform tents by the lakeshore, with cots covered by mosquito netting (pictured bottom left).

Shortly after the station was established, permanent structures were added, including the first student bunkhouse built in 1911. This two-story log building, with porches on both levels and a recreation room on the main floor, was situated along the lakeshore near the site of our current dining hall. This original bunkhouse was demolished in 1948 during a period of new construction, which included the construction of several smaller bunkhouses at the north end of the station, near where the original platform tents once stood. These bunkhouses are still in use by students today. Cabin 25, named Fragaria, is the oldest of these (built in 1935) that still remains (pictured bottom right). -Emily Schilling



Writing the watershed

Honors seminar students spent part of their spring break at the station as part of an interdisciplinary course on watersheds, co-taught by associate director Emily Schilling and UMN English Department Chair Kate Nuernberger.

Read more about the students' experience at Itasca in this recent story published by the Honors Program at z.umn.edu/WritingWatershed.

manage, demonstrating the value of citizen science initiatives. In addition to participating in Bugs Below Zero, several Booster Club students donned waders to collect aquatic invertebrates directly from the river. Using dip nets, students observed the diversity of aquatic life found along the river bottom, and their excitement and surprise over their findings quickly overshadowed

any hesitation over being out in the cold. The hands-on experience was a powerful demonstration of the complexity of aquatic macroinvertebrate life cycles. Students returned to the station with smiling faces, equipped with a greater understanding of citizen science and a heightened appreciation for the surprising wonders of winter biology. –Victoria Simons

Photos: Raine Flynn, Heather Kokesh, and Emily Schilling



From top left: Itasca Booster Club on a winter hike to Schoolcraft Island on Lake Itasca, students in waders collecting aquatic insects in the river, a damselfly nymph from the family *Calopterygidae* (likely a river jewelwing), students examining the insects they collected.

Interested in supporting IBSL? Learn more at z.umn.edu/supportIBSL.

SUMMER 2025 COURSES

Science of Craft is back!

Explore the intersection of science, nature, and creativity in a one-of-a-kind field course at the headwaters of the Mississippi River. Enhance your skills in a living laboratory alongside scientists who are both experts in their field and talented craftspeople. No experience needed. These courses are open to the general public.

Courses include:

- **The Science of Fly Fishing**
- **Drawn to Nature: Observing and Documenting Itasca State Park**
- **Writing the Wild: A Minnesota-Inspired Poetry and Prose Workshop**

Reserve your spot: z.umn.edu/sciofcraft2025

