



THE GEOLOGICAL SOCIETY OF MINNESOTA

News

*Volunteer
opportunities,
field trips,
lectures, and
public service,
since 1938*



GSM President, Dave Wilhelm

From the President's Desk...

Greetings, fellow lovers of geology. Our lecture season has gotten off to a good start with average attendance of 88; this was pulled down a bit by low attendance for bad weather on December 9. The attendance has included around 7 newcomers for each lecture, so the general public is finding us. (Invite your friends!) All this speaks to the great program **Steve Erickson** has put together. If you have an idea for a lecture or lab, or know of a possible presenter, contact Steve directly or via the "Ask GSM" feature on our website. Steve will soon start creating the 2020-2021 schedule, so now is the ideal time to propose suggestions.

As with every new year, there is a partial change to the leadership on GSM's Board of Directors. **Patrick Pfundstein** and **John Westgaard**, the two members you elected at our Annual Meeting in September, became directors on January 1. On that same day, **Dick Bottenberg** and **Kate Clover** ended their terms after 4 years of service on the Board; nonetheless, they will continue in leadership roles that don't require Board membership. At the November meeting, the Board elected to continue with the officers from 2019: myself as President, **Deborah Naffziger** as Vice President, and **Dave Kelso** filling the roles of both Treasurer and Secretary. I look forward to working with our new and continuing members, and sincerely thank those leaving for their past and ongoing service. You can find the full list of Board members and chairpersons on page 2 of this Newsletter. If you wish to learn more about our Board, including meeting minutes from recent years, see our web site. Our next Board meeting is **May 21**; all GSM members are welcome to attend.

I have other leadership changes to mention. After many years in the role, **Theresa Tweet** has resigned as a **Newsletter Editor** due to other time commitments. **Kate Clover** has stepped up to fill Theresa's role, and she will work with continuing editors **Mark Ryan**, **Harvey Thorleifson**, and **Rich Lively** to put together this issue. I am confident this issue will be at the same high quality we have come to expect. Thank you, Theresa, Kate, Mark, Harvey, and Rich. Remember, this Newsletter is written by GSM members for GSM members. If you have travelled somewhere geologically interesting, consider submitting an article; our editors are always looking for material from new writers. The deadline for the next issue is **May 1**, with earlier submissions encouraged. See our web site for guidelines.

I've realized I have not been able to devote enough time to my other role as **Field Trip Coordinator** to put together a full program of field trips for our members. **Joe Newberg** has volunteered to work with me in that position, and we hope to put together an interesting program this year. Thank you, Joe; I look forward to collaborating with you. We have some ideas in the planning stages, and we'll send information by e-mail as it becomes available. As always, we are looking for field trip ideas and for people to help organize field trips. GSM is a volunteer organization; field trips and other activities can only happen

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*from the GSM archives:
Dubuque, Iowa field trip: Boot Jack Sphalerite mine, Tennyson Wisconsin, 1939*



with your input and assistance. If you have never participated in planning a field trip before, no worries – Joe and I and many others have the experience to assist with that.

One of the less obvious missions that GSM performs is **Student Outreach**. Through our website, GSM promotes fee-based opportunities for geology presentations and hands-on geology learning to Metro-area classrooms and groups. This educational experience is geared towards the 2nd through 8th grade schools and groups. The presenters are Macalester College geology graduate students, who are paid by the schools for their services. For many years, **Theresa Tweet** has managed this coordination. Last year, **Joel Renner** moved into that function with Theresa; and beginning this year, Joel is assuming this responsibility by himself. Thanks, Theresa, for your past service and Joel, for your continuing service.

The **State Fair Committee** is looking for new members to assist with this very important activity. Since the early 1960's, our booth at the Fair has made GSM's presence known to the public, fascinated kids of all ages with our rock and fossil samples, and attracted many new members. **Dan Japuntich** has served as GSM's State Fair committee chair for many years, and we are grateful for his efforts for the society. Thank you, Dan. As Dan has now resigned as committee chair, we are looking both for a new chair and for additional committee members. If you think you might be interested, contact Dan or me by e-mail, at a lecture, or through "Ask GSM" on our web site. Enjoy the lengthening days as the sun warms our Mother, the Earth.

Dave Wilhelm

GSM

Officers:

- Dave Wilhelm, President
- Deborah Naffziger, Vice President
- Dave Kelso, Treasurer
- Dave Kelso, Secretary

Board Members: Wolf Bielefeld; Frank Janezich; Dave Kelso; Roxy Knuttilla; Deborah Naffziger, Joe Newberg; Patrick Pfundstein; Theresa Tweet; John Westgaard; Dave Wilhelm

Editors: Kate Clover; Mark Ryan; Harvey Thorleifson; Rich Lively

Programs/Lectures/Labs: Steve Erickson

State Fair: vacant

Video Library: David Wilhelm

Webmaster: Alan Smith

Membership: Joanie Furlong

Field Trips: David Wilhelm; Joe Newberg

Outreach: Joel Renner

Geological Markers: Rebecca Galkiewicz

Lecture Recording: Joe Wright

Web Site: gsmn.org

The Geological Society of Minnesota is a 501(c)3 nonprofit organization.

GSM Mail Address: Send all GSM membership dues, change of address cards, and renewals to: Joanie Furlong, GSM Membership Chair, P.O. Box 141065, Minneapolis, MN 55414-6065

Membership categories and dues:

Student (full time)	\$10
Individual	\$20
Family	\$30
Sustaining	\$50
Supporting	\$100
Guarantor	\$250

Individual and Family memberships can be renewed for 1, 2, or 3 years. Members donating at the Sustaining, Supporting or Guarantor levels will have their names highlighted in the GSM membership directory.

GSM News: The purpose of this newsletter is to inform members and friends of activities of interest to the Geological Society of Minnesota. GSM News is published four times a Year during the months of February, May, August and November.

Newsletter contributions welcome:

GSM enthusiasts: Have you seen interesting geology while traveling? If so, please consider sharing your experiences with others through our GSM Newsletter. Write a short article, add a photo or two and send it in. Deadline for submission is the first of the month before the publication date. Send your story to newsletter editor: Kate Clover, kclover@fastmail.fm Thank you in advance.

GSM Board Membership:

The GSM Board consists of members who have a special interest in advancing the goals of the society, including lectures,

field trips, and community outreach. The Board currently has ten members, and our bylaws limit terms to four years to encourage turnover, and a change of perspectives and ideas.

The Board meets quarterly, on the second Thursdays of February, May, August, and November, or on a different date if conflicts arise. Meetings are from 7-9 PM at the Minnesota Geological Survey at 2609 W. Territorial Rd, St. Paul, MN 55114.

Board meetings are open to all GSM members. If you are a new or long-time member and Board membership is of interest to you, please consider attending a meeting. If you have a topic you would like the Board to consider, please contact Dave Wilhelm, dewilhelm53@msn.com

New GSM Members:

Mark Anderson, Minneapolis

Nancy Jannik, Circle Pines

Ed Mellgren, Minneapolis

Jodi Hodgson-Schmutzer, Sturgeon Lake

Jim Hodgson, Eagan

Mark your calendars on April 27, 2020 for the SPRING BANQUET

The GSM Spring Banquet will be held at the **U-Garden Chinese Restaurant** on **April 27** beginning at **5 p.m.** The lecture will start at 6:30 p.m. Come early and socialize with fellow geology enthusiasts or just come for the lecture. The well-stocked buffet includes lots of tasty options for both vegetarians and omnivores. Not a buffet person? You can order off the regular menu.

Our speaker will be Justin Tweet, M.Sc., with the Geologic Resources Division of the National Park Service. His talk is titled "Craton to Coast: National Park Paleontology from Grant Canyon to the Channel Islands."

The restaurant is located at 2725 University Avenue, SE, Minneapolis and has plenty of free parking behind the building. It's also located near the Green Line's Prospect Park stop. For a map, see the restaurant's website. We hope to see you there!

ILSG Meeting Mountain Iron, MN

The **Institute on Lake Superior Geology (ILSG)** will hold its **66th annual meeting** at Mountain Iron, MN on **May 13 & 14, 2020**, with field trips the day before and after. ILSG is a non-profit professional society with the objectives of providing a forum for the exchange of geological ideas and scientific data and promoting better understanding of the geology of the Lake Superior region. The major activity of the Institute is its Annual Meeting with geological field trips and technical presentations. While ILSG is primarily aimed toward professional geologists and geology students, it is open to interested laypersons; and as I and dozens of

GSM members who have attended past conferences can attest, there is plenty for us to learn. ILSG offers a variety of top-notch field trips, and it is often hard to decide which to choose. As I write, planning is underway for the conference and field trips; for information, check the website <http://lakesuperiorgeology.org/MtIron2020/>. Consider attending this year, especially since the conference is close to the Twin Cities.

As one of GSM's goals is to provide educational support in the geological sciences, the Board has again elected to contribute to the ILSG Eisenbrey Student Travel Fund to support student participation. This fund helps defray some travel costs to the Institute and may allow waiver of registration fees. ILSG provides geology students a valuable learning experience as it is often the first opportunity to present their research to a large audience and to have informal discussions with industry and government geologists outside their universities.

Dave Wilhelm

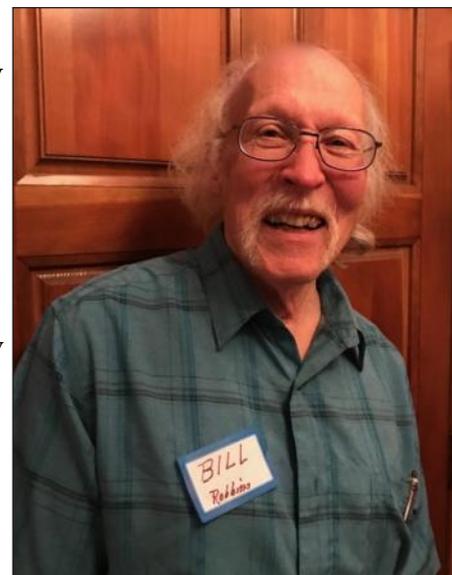
GSM Member Spotlight—Bill Robbins

Bill Robbins is a long-time GSM member; he believes he joined GSM around 1993. He credits former GSM president Judy Hamilton as instrumental in his becoming active in the organization—attending lectures and going on field trips. Bill served as GSM President from 2000 - 2001.

He traces his interest in geology to the many technical people in Midland, Michigan, the headquarters to Dow Chemical, where he grew up. He recalls attending monthly lectures which exposed him to a fair amount of geology plus other technical subjects. Later at work at 3M, he says, "I found that geologists had compiled large amounts of thermodynamic data that was useful to me in some of the work I was doing."

Of the many aspects Bill likes about GSM, he particularly appreciates the diversity of lecture topics and the breadth and range of each speaker's knowledge.

When traveling, he likes seeing the bigger structural features: ancient mountains, old strandlines or extinct volcanoes.



Bill Robbins, photo: Kate Clover

Kate Clover

Notes from the Past

From the Fall 2000 Issue of the GSM News:

GRANITE, BASALT FINES TESTED AS FARM FERTILIZER

University of Minnesota is conducting field trials to see if rock fines – the waste-dust created by Minnesota’s quarrying industry – can be used as a farm fertilizer.

Tests are under way at farms in Gutches Grove, Long Prairie and Bertha, with granite from sources at Cold Spring, Granite Falls and St. Cloud, and basalt from Dresser, Wisconsin. Between 10 tons and 55 tons were spread per acre, a coating of about one-eighth of an inch. Preliminary findings indicate the material added manganese, copper and zinc to the soils. Added nutrients from the fines may increase the nutritional value of animal-feed crops such as hay and alfalfa, grown on the land.

There is currently no commercial use for the material, so it is being stockpiled at aggregate processing facilities around the state. The Minnesota Department of Natural Resources asked the U of M to see if the fines could be used as a source of slow-release nutrients. The Minnesota Department of Agriculture funded the initiative.

Minnesota Mineral Club 2019 Fall Show



Dave Hedlund shows Thomsonite samples, photo: Kate Clover

The Minnesota Mineral Club hosted its Fall 2019 Rock show at the Cottage Grove Armory on October 19 and 20. GSM hosted a table at the event. GSM volunteers distributed lecture schedules, marker brochures



Dave Kelso discusses limestone, photo: Kate Clover

and talked about the rocks on our table to lots of show visitors, young and old. Attendance at the show was about 1900.

Thanks to our volunteers: Dick Hedlund, Dave Kelso, Steve Fox, Zan Tomko, Lynne Grigor, Reuben Parker, and Dave Wilhelm. Kate Clover organized the event.

Kate Clover

Holiday Celebration – 2019

Ed and Sandy Steffner recently held another terrific Holiday Celebration in their home for the Geological Society of Minnesota clan. The December weather cooperated with this year’s event which marked the end of 2019 and ushered in 2020. Their home is warm and welcoming, and once inside, there were many familiar faces to greet you as well as a few new faces to get to know, making the Holiday event very special.

As an added bonus, Ted Chura donated bundles of picture reprints from the Minnesota Historical Society of the old logging days on the St. Croix River in Minnesota and Wisconsin dating back to the late 1880s - thank you very much Ted!

The food as always was fantastic and as has been done in years past, the evening ended with the singing of Winter Holiday classics.



Delicious foods: Filling their plates (from left to right) Jan Japuntich, Steve Erickson, Dick Hedlund, Jim Ertz, Andrea Rossman, Roger Benepe. Photo: Kate Clover



Ed Steffner at the piano

Thanks again Ed and Sandy for hosting such a wonderful evening and cheers to 2020!

Theresa Tweet

Katy Paul Receives the GSM Estwing Hammer Award

At the December 2019 holiday party Theresa Tweet presented Katy Paul with the GSM Estwing Hammer Award for her long-time service to GSM. Over the years, Katy has served on the board, as Membership Chair, Auditor, Newsletter Editor, and Co-Chair of the State Fair Committee. She continues to contribute to the newsletter.



Theresa Tweet presents the Estwing Hammer Award to Katy Paul, photos: Kate Clover

Katy Paul first became involved with GSM in 1997 because she was curious. She says, "I want answers. I want to know everything. When I confront a subject that I am unfamiliar with, I do whatever I can to learn about it, understand it, and then pass along that knowledge to someone else." GSM offered lectures and field trip, "excellent learning opportunities" she notes. She traces her interest in geology to her childhood in central Wisconsin, as she says, "in the land of sand and gravel." As she picked up interesting rocks, her interest was piqued, but she never found real answers about the sparkly rocks she found in her driveway, what they were made of, and where it came from. She notes, she was "ever curious, but answers to questions were not always easy to obtain from library books." After moving to Minnesota in 1988 and to become better acquainted with her new surroundings, she purchased "Geology of the Lake Superior Region" by Gene L. LaBerge. After reading that, she says, "I was hooked." Her next book was "Minnesota's Geology" by Richard W. Ojakangas and Charles L. Matsch. Those books prompted her to take self-guided field trips to places around Minnesota. Her travels beyond Minnesota have focused on locations with interesting geology as well. Her all-time favorite destination is New Mexico because of its "never-ending wealth of geologic wonders as well as historic sites." In addition, she's also stood on the seabed at low tide on the Bay of Fundy, and she found Iceland intriguing. Ever curious, her study of geology has helped her appreciate the landscape, the earth, mountains, rock outcrops, and the origin of these things.

Kate Clover

White/ Whakaari Island, New Zealand

I was driving in Illinois on December 10, 2019 when I first heard there had been a volcanic eruption in New Zealand. Interesting, I thought, since I had visited there in February. Then I heard it was White Island – wow, I had been on that very island. Then I heard of the deaths and injuries, and I was shocked.

In February, 2019, I took a bucket-list trip to New Zealand, including a 2-week guided tour of the South Island and one week driving around the North Island. A geologist friend had recommended an excursion to White Island, also known by its Maori name Whakaari ("The Dramatic Volcano"). Although a few hours' drive out of my way, plus a 2-hour boat ride from Whakatane,



Approach to White Island

I decided it was an opportunity not to miss.

The 800-acre island, situated 30 miles from the east coast of the North Island, is New Zealand's most active cone volcano, and has been built up by continuous volcanic activity over the past 150,000 years. The island has been in a nearly continuous stage of releasing volcanic gas at least since it was sighted by James Cook in 1769. The island is an andesite-dacite stratovolcano that consists of two overlapping volcanic cones, the Ngatoro and the Central cones. The Ngatoro Cone is extinct and partially eroded. The amphitheatre-shaped Central Cone is active. The crater of Central Cone is open to the southeast as the result of major, past flank landslides involving hydrothermally altered rock and past phreatic and phreatomagmatic eruptions. Both cones are composed of alternating layers of lava flows, tuffs, agglomerates, tephra, igneous



Dave with vest, helmet, and gas mask



White Island dock



Corroded mining equipment

dikes, and breccias. Some of these strata have been altered to varying degrees by highly corrosive and acid hydrothermal fluids and gases.

During the boat ride out, we were issued safety gear: a life vest for the transfer from the tour boat to the island's dock, a hard hat we were required to wear on the island, and a gas mask, whose use was optional. After spotting dolphins

en route, we could see steam rising from the rugged island's caldera as we approached. Small boats shuttled us to the rusted dock, left over from sulfur-mining



Tour group walking past sulfur deposits

operations that ended in the 1930s. The dock and the abandoned equipment were deeply corroded by the acidic atmosphere of the island.

We assembled nearby in small groups for a 90-minute trek on the island. Our guide

cautioned us to walk only where she said it was safe. We proceeded to hike across an alien landscape, past steaming vents and outcrops coated bright yellow with sulfur. Although I did not wear my gas mask continuously, there were many times I was glad for it to block the acrid air.



Sulfur encrusted vent

We walked near the Central Cone, but kept well back from the edge, so we could not see down into it. (In



Dave by sulfur deposits, photo by guide Kelsey Waghorn

retrospect, a very good precaution.) The swirling vapor from the caldera was eerily fascinating. We walked past small acidic streams, where we were encouraged to sample the water. Supposedly, water from different parts of the island were different in temperatures and smells, but it was hard to tell. We saw a few helicopters on the island, some for tourists who paid extra for a quick ride out, and some on high ledges used by researchers. It was a fascinating 90 minutes, but I was glad I was not one of the miners living



Caldera of the Central Cone

and working there in the early 20th century.

Aftermath: On December 9, 2019, White Island erupted. There were 47 people on the island at the time, of whom 20 were killed and a further 25 seriously injured. The ongoing seismic and volcanic activity in the area and subsequent heavy rainfall as well as low visibility and toxic gases all hampered recovery efforts. Volcanologists identified the event as a phreatic eruption: a release of steam and volcanic gases which caused an explosion, launching rock and ash into the air.



Corroded coins on a post and a research helicopter on a ledge

While researching this article, I discovered that Kelsey Waghorn, who guided the small group I was in, was one of the persons on the island during the eruption. According to the New Zealand Herald, Waghorn, a 25-year-old marine scientist, survived the tragedy but sustained full-thickness burns to 45 per cent of her body. She spent 10 days in ICU, five of those in an induced coma after the island spewed ash, steam and toxic gas. She underwent more than a dozen surgeries. A January 23 report from her aunt states: "Kelsey's progress is now so positive." I wish her a complete recovery. A dear friend of hers and fellow guide was killed.

For more information and updates, see the White Island/Whakaari website <https://www.whakatane.com/activities/white-island>. The site notes: "For the foreseeable future, there will be no tours or flights to Whakaari/White Island."

For more photos and videos of my trip to White Island, see <https://tinyurl.com/DaveOnWhiteIsland>



White Island after the deadly eruption, internet photo, George Novak

Dave Wilhelm

Rosemount High Dinosaur Dig

In April, 2019, we received an “Ask GSM” request through our web site from Joe Christman, a science teacher at Rosemount High School. Joe wrote: “I created a new science elective class which revolves around dinosaur paleontology. An important part of paleontology is doing research in the field, and I felt this was an important aspect of the science students should experience. Understanding field research can give students skills in organization, attention to detail, spatial reasoning, and interpretation of data. To give students this experience, I am building a mock dig site on campus. This includes a 20x20 foot area filled with sand and gravel. Replicas of dinosaur fossils will be placed in a matrix of sand and wax. Students will use geologic rock hammers, chisels and other field equipment to record, analyze and excavate the fossils. Science is about curiosity, evaluation, and putting pieces of evidence together. This is a unique experience for students; however, it is a necessary one. It is an experience that will illuminate and inspire students to consider a career path in science.



Dig site under construction

Joe asked if GSM might help fund the project. Since outreach, especially to students, is one of our prime objectives, the Board thought that helping to fund such a project was a great idea, and voted to do so in May. During the summer of 2019, Joe supervised construction of the mock dig site, so it was ready for students when the fall semester began. I'll let Joe tell the rest of his story:

Each week we had a lab in the dig site. Each lab focused on various aspects of field research. The first week I placed various fossils in the dig site, gave students the necessary tools to accurately record their observations, and just told them to record what they noticed. I wanted to give them the opportunity to first think about what a paleontologist would need to observe and then create a plan to record that information. The next week I repeated the lab, however, we discussed successes and failures of the previous week and why certain steps need to be taken before specimens are removed from the matrix. From there, each week we worked on isolated skills paleontologists need



Sign acknowledging GSM and other contributors



Students unearthing fossils while recording careful measurements



Student protecting fossil in plaster



Student extracting fossil from substrate

to first find a fossil and to eventually bring that fossil to a place of study for research or display. These skills varied

from reading maps, to gridding out a field site, to carefully removing the matrix without breaking their fossil. We ended the lab portion of the class with a lab final which brought all of those isolated skills together.

The class also visited the Science Museum of Minnesota so the students could see parts of the recovery process they were practicing in the lab in real life. They were able to go behind the scenes and look at the collections of fossils; it was really eye opening for them to see that many fossils. Dr. Alex Hastings, Fitzgerald Chair of Paleontology at the museum, took them into the paleontology preparation lab, and they saw that some of the same tools they were using in class were used at the museum. It was fun to watch them point out similarities and say, "Hey, we use those tools too!" Some students also used this trip to ask important career questions regarding how to prepare for a career in geology or paleontology.

Students loved the class. They enjoyed how different it was compared to the rest of their science classes. They appreciated the opportunity to be outside and the realness (to them) of the dig site. By far, their favorite part of the class was lab day. They loved the opportunity to work together "in the field" or in "prep lab" to solve a problem and make sense of the data they gathered. What is really cool about the location of the dig site is that it can be seen from most rooms in the school. So, there were a lot of positive conversations around the building from students about how cool that class was and what it was about.

To see more photos of this project, visit:

<https://tinyurl.com/RosemountDinoDig>

Dave Wilhelm with Joe Christman

Saint Anthony Falls Research Lab Dec 2019

On a cold raw day in December, four hardy souls met at the Saint Anthony Falls Laboratories (SAFL) for a tour. Our guide was Barbara Heitkamp, the communications specialist for the Lab. She said the Lab is well-known worldwide and yet unknown locally. It was built from 1936-1938 with a WPA grant and was the brainchild of Dr. Lawrence Straub of the University of Minnesota. He wanted to create a laboratory in the river as a bridge between science and applied engineering where he could conduct physical experiments and make models



SAFL is located across the river from downtown Minneapolis at St. Anthony Falls, photo Kate Clover

to understand natural phenomena.

Since then, SAFL's continuing evolution has come to include landscape management and interdisciplinary fluid dynamics. Also built into the lab's mission were the ideas that river management should be sustainable and river ecosystems were valuable and should be maintained. In the 1980's, a new level was built onto the facility, and they entered into wind experimentation with a wind tunnel. Wind? Yes, wind is a fluid. Delta restorations were explored. Computational fluid dynamics with all the computer analysis, was added.

In 2010, SAFL was put under the entire College of Science and Engineering at the University of Minnesota. Seventeen faculty are based at the lab from a variety of departments as well as the Lab's own team of researchers. SAFL is also like a consulting agency; it receives funds from the University, but soft money also funds research, from culverts to new canoe paddle designs and much more. 2012-2014 brought big renovations to the building, especially a new elevator, and yet preserved much of the original Depression décor.

The building itself was built to flood as the river floods; 2019 was an unusually wet year. From March to May there was 5 to 30 inches of water in the basement. It flooded again in the fall, and as of December 10th, backup due to river ice flooded the basement again. There was 8 inches of water when we were touring on the 11th.

On the top floor, the lab's wind tunnel can generate hurricane force winds, and a lot of research is done with wind turbines, from optimal placement for power generation, to patenting a foundation sensor system to monitor how the towers move as they operate, to patterning airflow through cityscapes for the NIH monitoring pollution and possible bioterrorism. The SAFL is also working with the raptor center to develop audio and visual deterrents for bald and golden eagles to prevent strikes on the turbine blades.

The Ecolab was new for me. Researchers there are studying native freshwater mussels; lately the mussels have been in decline, and they are trying to find out why. They study alien invasive species, and helped to develop the bubble barriers for Asian Carp, as well as speakers and lights at lock and dam #8 on the Mississippi River near the Iowa border. They also monitor harmful algal blooms and developed the "David Buoy" which is placed in lakes to monitor and hopefully minimize and prevent algal blooms.

The lab includes a large fabrication shop for creating the models they need. We saw a mockup of the Cedar Falls Spillway on the Red Cedar River in Cedar Falls, Wisconsin. Here, they are investigating how to reconstruct a 1910 hydroelectric dam and redesign the spillway for higher flows and to increase dam safety. And they are measuring bridge scour on the County

Road BB bridge just downstream of the dam. We also learned, there is a good make-out site under the bridge



Model of the Cedar Falls spillway and County Rd BB, Cedar Falls Wisconsin, photo Kate Clover

that will remain undisturbed.

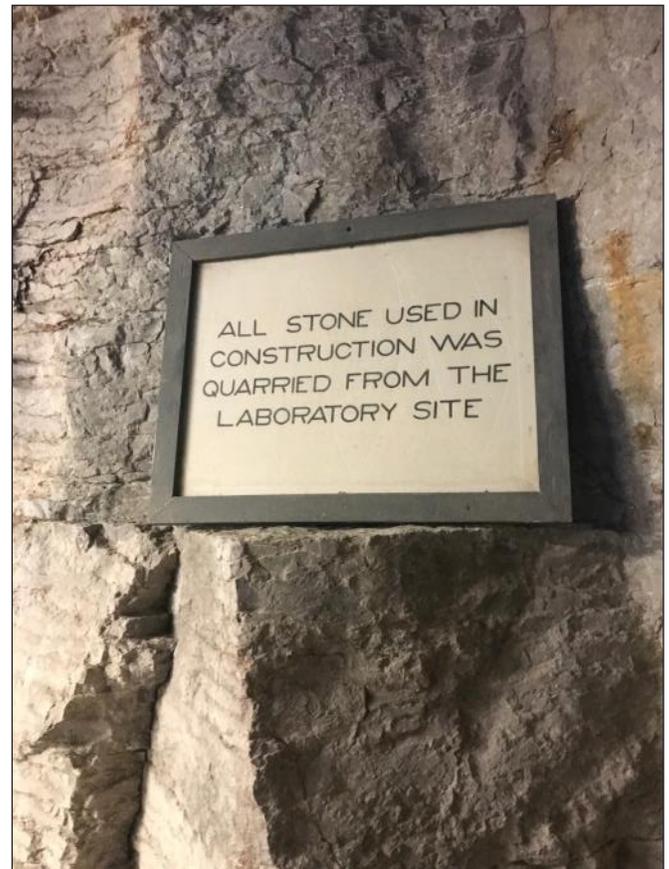
Early detection of Zebra mussels is done by multibeam sonar. This coming spring will be the field validation of their research. There were many rigid safeguards to prevent escape with a big decontamination tank on site, and no zebra mussels escaped. The lab makes and sells data collection carts for extra revenue. The carts track along the ceiling, moving up and down, back and forth across the room while lasers scan the water, and the data captured by computers for research. There are proprietary projects for clients as well. One stormwater project looked interesting but was hidden within a box of rocks and could not be explained to us.

They model experimental delta basins. The most successful mud/sand delta made to date was being reconditioned for new experiments. They use ground walnut shell as a material for experimental deltas. Hydrokinetic energy generation is studied; they questioned if turbines would get buried in a water channel with lots of sediment, and if that would shut them down? They learned, if the turbines keep moving, they can unbury themselves. A \$1.2 million-dollar grant allowed them to build a sediment passage model for a

hydroelectric dam. It allows sediment to pass through the dam, preventing silt-up and prolonging the dam's useful life.

Deep in the lab we saw the walls cut directly from the Platteville limestone, and the excess was re-used for building materials for the lab.

The Jurassic tank, which was idle during our visit, is an Experimental Earth Scape (XES) sediment basin that



Like many buildings of this era, the Platteville Limestone used in construction was quarried on site, photo Kate Clover

allows for subsidence to model faulting under load which is useful for the oil and gas industries. It is one of only two facilities in the world that can model subsidence. Our tour ended by the outdoor stream lab, which was in winter mode. Every time I visit SAFL, the lab has different experiments. It is a dynamic and vital place in the middle of Minneapolis that's unknown to most but making good science worldwide.

Deborah Naffziger



Lake Superior storms Duluth, Minnesota, Fall 2018.
Photos by Mark Ryan



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