

Geologically Speaking

A Michigan Section AIPG Publication

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WMU Research Leads to Project Aimed at Lowering Food Costs and Bolstering National Security

Michigan Section's Mozola Scholarship Information

Geology in Raisin River Dolomite Roadcut Along North Dixie Highway in Monroe, Michigan

Student Chapter News: CMU and WSU

THE MERIT ADVANTAGE



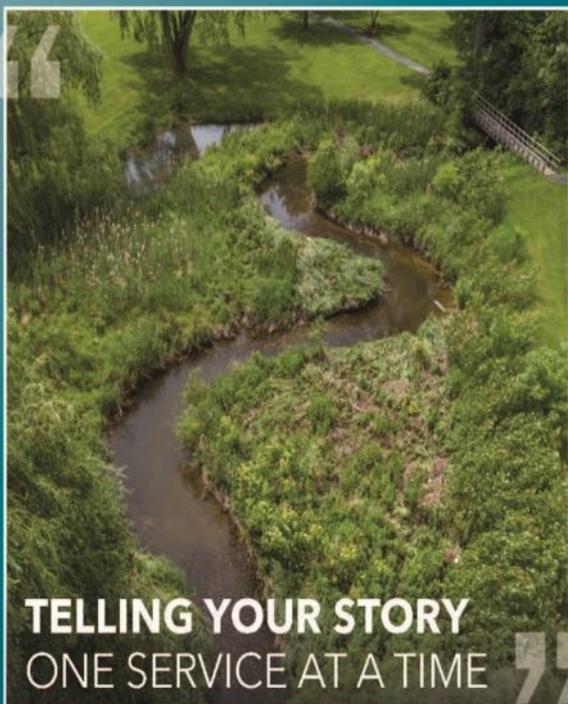
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Front Cover: Ellipsoidal pillow basalts in the Lower Member of the Precambrian Mona Schist along Whetstone Brook by Lake Superior in Marquette. Photo by Sara Pearson during the Annual Meeting in August 2022.

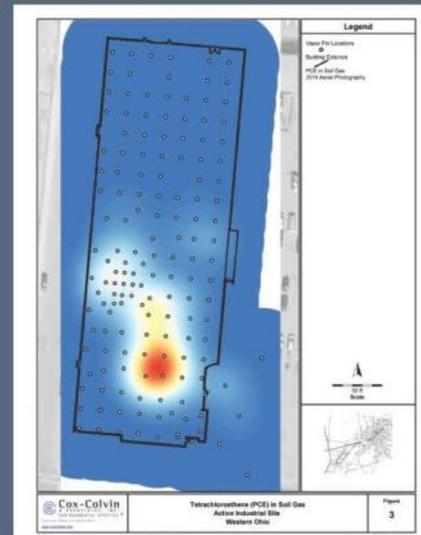
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Geology Crossword #19 Solution

P	O	T	E	N	T	I	O	M	E	T	R	I	C						
E		U								D									
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	C									N									A
R	E	C	H	A	R	G	E			T	H	E	I	S					D

Across

1. Surface representing static conditions
5. Not something one does to a leader
7. Not rich
8. Water table under atmospheric pressure
12. Free flowing well
13. Michigan's lithologic stack
17. Measure of dissolved solids
21. To give way
24. A bird at rest
25. Measure of void space
26. A gaseous sign
28. To cancel a transaction
31. An extensive water bearing zone
32. Something inmates should be
33. Something batteries need to be
34. Developed a model for flow to a well

Down

1. A measure of interconnectedness
2. Said of a bouncy plane ride
3. All constituents in solution
4. Go with it
6. A "fly in the ointment"
9. What a spy plans
10. Law describing flow through porous media
11. Not a pizza measuring device
14. A poisonous metal
15. Short answer
16. Five cents
18. The same conditions in all directions
19. For monitoring or supply
20. Useful water chemistry diagram
22. What one does with a computer
23. Dry soil zone
27. A big "to-do"
29. As opposed to "don't"
30. To kill a snake, cut it off

Silent Mineral Auction



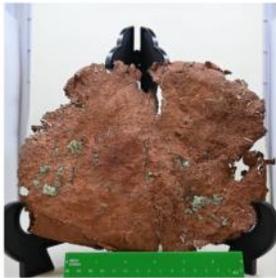
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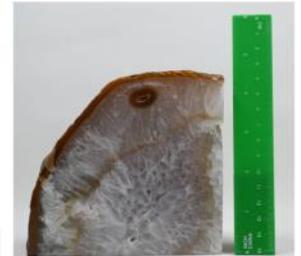
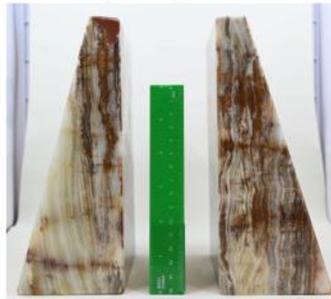
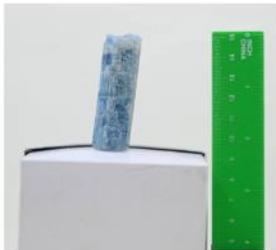


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The scholarship award will be based on content and creativity of the cover letter, the letter of recommendation, and transcripts, as judged by the Scholarship Committee. Financial need is not a consideration for the basis of the award.

Application Process

1. Cover Letter:

Write a cover letter introducing yourself and explaining why you want to be a geoscientist. Tell us what sparked your interest in the field, what inspires you to pursue this career, and share details about your involvement in geology-related extracurricular activities. Whether it's fieldwork, research, club participation, or other initiatives, we want to know how you're engaging with geosciences beyond the classroom.

2. Academic Transcript:

Provide a copy of your transcript (unofficial is acceptable) as proof that you're a current student. Include documentation showing that you've declared a major in geology or geoscience.

3. Letter of Recommendation:

Submit a recommendation letter from a geology or geoscience professor. This letter should highlight your academic performance, participation in department activities, character, and how you collaborate with and support fellow students.

4. AIPG Student Membership Number:

Include your AIPG Student Membership number in your application. If you don't know your number, contact AIPG headquarters for assistance.

Submission Deadline: June 1, 2025 by 5 pm. Winner notified by June 30, 2025.

Submit to:

Attn: MI-AIPG Scholarship Committee Chair

Mr. Timothy B. Woodburne, CPG

Prein & Newhof

3355 Evergreen Drive, NE

Grand Rapids, MI 49525

e-mail: twoodburne@preinnewhof.com

From the President's Desk

Admittedly, I have never had to “address” a group as a president of anything and when thinking about duties, roles and responsibilities as the president of the Michigan Section of AIPG, the quarterly message seemed like a huge undertaking. Who really wants to hear from me? Why should anyone care to read what I have to say? Although after reflection, a few drafts in between some seasonal sickness, and Adam reminding me I had missed the deadline for this article already, here we are. It's a new year. I'm questioning how it's 2025 already. Maybe you are too. Wasn't 2016 just about two years ago?

As the holidays seemingly fly by every year, I always find myself looking forward to the depths of the winter months in the Upper Peninsula. It tends to be a quieter time up here, field season has come to a screeching halt, the tourists are still downstate, and there is more time to adjust to the mundane routine of life as the snow piles up in quiet beauty.

I've never been one for keeping or really making New Year's Resolutions and I find the rhetoric behind all the “new year, new you” noise you often see online as rather demoralizing. Instead, and particularly as I've gotten older, I find myself leaning into the beauty and the potential that lies within each seasonal change, particularly the turning of the calendar straight to the deep winter months. Winter can be a slog at times, and it can be easy to be negative about the lack of daylight, the cloudy, overcast skies, or the frigid temperatures. But, as I've learned in my years in the Upper Peninsula, it can also be a natural time to slow down and flee inward for introspection.

To help adjust to the seasonal darkness, I generally add a bit more running into my weekly routine. Not that it is ever a New Year's resolution to run more, but I've long preferred winter running where I need to bundle up to summer running in the heat and humidity. It's always a transitional difficulty and ultimately a test of motivation to force myself to get up in the dark, dress in layers and will myself to open the door to the cold, but it becomes routine after a while. I prefer hitting the neighborhood roads on fresh snow in the quiet dark before work and before the world (other than the snowplow drivers) wakes up. For me, it's a quiet time of reflection and contemplation as I let my mind wander while I get my heart rate up and log some miles.

One winter in high school, I remember my cross country coach passing out a copied newspaper article titled “Now is the winter of my contentment” (a clever riff on “Now is the winter of our discontent / Made glorious summer by this sun of York” in Shakespeare's Richard III). The article discussed preparing for an upcoming track season and described winter being the time to quietly show up and “put in the work” if you wanted a good base and a strong start for the spring and summer running seasons. More importantly, perhaps, it also described how the winter season was for rest, a time to recover from the previous work and slow down, a time to nourish and take

care of yourself as you prepared for the future.

The article, which I still have shoved in a scrapbook in a box that has been stashed in the basement, has stuck with me for the past 20 or so years. I find myself returning to it, not only to inform my own running, but as a general life reminder, both personally and professional, that the winter months can allow both things to be true. We can slow down and let ourselves rest and we can lean into the work, quietly preparing for the upcoming season.

You may not be a runner, but perhaps there is encouragement in this message to help you embrace the next few dark, cold months. You may need this time to rest and convalesce in a reset, a deep breath from the busy season. You may need this stretch to prepare for the upcoming work to be done, after all field season feels like it is quickly approaching already. Whatever it is, I hope you find what you need or want in this Michigan winter (no one could blame you if that included an extended trip to a sunny, tropical location). Like most things in life though, this season is temporary and before you know it, we'll have the opportunity to bask in the summer sun on a Great Lakes beach or maybe just out with the drill crew. Until then, I hope you can enjoy this season in the moment, whether it is settling in for rest or getting down to work.

Cheers to the New Year! I have no doubt 2025 will be an exciting year and I look forward to seeing you at the upcoming meetings.

All the best,

Ashley E. Miller

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WMU Research Leads to Project Aimed at Lowering Food Costs and Bolstering National Security

Breaking News Release by Michigan Geological Survey

A treasure trove of geological specimens acquired by Western Michigan University scientists 18 years ago proved to be the key to revealing a Michigan resource that can both reduce grocery prices and increase the nation's food security.

The geologic specimens are rock cores—cylindrical sections from thousands of feet of subsurface rocks from wells drilled in northern Michigan. Researchers at the Michigan Geological Repository for Research and Education (MGRRE), part of the Michigan Geological Survey at WMU, led by Dr. William B. Harrison, analyzed these cores and hundreds of well records.

Harrison says, “This large collection of potash rock core samples and geophysical well records preserved at MGRRE is an exceptional resource to study this geologically unusual and economically valuable rock formation. We sent samples from these cores to be assayed by the Geoanalytical Laboratories of the Saskatchewan Research Council. The results showed that Michigan's deposit is the richest potash deposit known worldwide. It can be estimated that potash deposits occur in 17 Michigan counties, and commercial production could likely be developed in nine counties, representing 2.9 million acres.”

Using analytical data derived from this research at WMU and his own experience as a geologist, Ted Pagano, founder and chief executive officer of Michigan Potash & Salt Company, set out to secure funding to construct a facility in Evert, Michigan using geothermal processes to tap this \$65 billion-dollar rare deposit more than a mile below the Earth's surface.

On Jan. 17, the company was awarded a \$1.26 billion conditional commitment loan from the U.S. Department of Energy to construct that facility to produce a U.S.-sourced supply of potash, a critical fertilizer ingredient for which there is no substitute.

“The United States would not have known this deposit existed without the Michigan Geological Survey and MGRRE, at Western Michigan University” says Ted Pagano. “As a result, we have this opportunity to help people for over 100 years, while strengthening and providing for our country's food security long into the future.”

Potash is in demand worldwide to fertilize crops. It is the nutrient responsible for water uptake by plants, and during droughts, it allows higher crop yields with less water. Historically potash has been used as leverage during political disputes and has been weaponized during war, leading to mass starvation.

The U.S. imports more than 90 percent of its potash needs, mostly from Canada. About 40 percent of the world's potash is controlled by Russia and Belarus. The new Michigan facility is expected to produce about 800,000 tons of high-quality potash annually, putting the needed nutrient in easy shipping reach of the nation's Corn Belt. According to the U. S. Department of Energy's Loan Program announcement, “The project is expected to create, at its peak, 1,400 full-time equivalent union construction jobs and 200 ongoing operations jobs.”

“Our mission to rescue and preserve geological samples and data was pivotal to revealing this amazing subsurface resource,” says Sara Pearson, who directs the Michigan Geological Survey at WMU. “If Dr. Harrison hadn't taken responsibility for preserving and researching truckloads of potash cores, someone would have had to invest hundreds of millions of dollars to drill wells and collect samples for analysis to prove the quality and extent of this deposit.”

Section Website Reminders

The Michigan Section has created a database of geologic photographs on our website. Please submit photographs that you are willing to share to Adam Heft at adam.heft@wsp.com. Don't forget to include your name and a short explanation of what the photograph depicts. The photographs will be uploaded to the website periodically.

If you have suggestions on other items that should be included on the History page, please let a member of the Section Executive Committee know.

Did You Know?

This article is intended to remind members of various aspects of AIPG and benefits of membership. If there is something you would like to see featured in this column, please contact the Editor...

Member Categories

2.3.3 Requirements to be a Professional Member

Professional Members shall normally hold a baccalaureate or higher degree in a geological science but are not otherwise screened prior to acceptance. The requirements to be a Professional Member shall include:

1. A baccalaureate or higher degree in a geological science.
2. A minimum of thirty semester hours or forty-five quarter hours, or the academic equivalent thereof, in one or more of the geological sciences, and, at the discretion of the Executive Committee, acceptable continuing education to demonstrate a currency with technical, regulatory, and economic factors affecting the profession.
3. In lieu of 1 and 2 above, evidence satisfactory to the Executive Committee of the applicant's sound knowledge and proficiency in a field of geological science may be substituted.

2.3.4 Requirements to be an Early Career Professional Member

Early Career Professional Members are recent graduates during their initial years as professional geoscientists. The

requirements to be an Early Career Professional Member shall include:

- A baccalaureate or higher degree in a geological science; with
- A minimum of thirty semester hours or forty-five quarter hours, or the academic equivalent thereof, in one or more of the geological sciences, and, at the discretion of the Executive Committee, acceptable continuing education to demonstrate a currency with technical, regulatory, and economic factors affecting the profession.

In lieu of 1 and 2 above, evidence satisfactory to the Executive Committee of the applicant's sound knowledge and proficiency in a field of geological science may be substituted.

Applicable during the first five (5) years or sixty (60) months upon earning a baccalaureate, master's, or doctorate degree. The 60-month period of Early Career Professional status need not be filled consecutively if interrupted by enrollment for another degree. Thereafter the Early Career Professional Member will automatically be upgraded to Professional Member.

Membership dues for the Early Career Professional Member will be at one-half (1/2) the Professional Member rate.

I Want To Publish Your Articles!



Hey everyone, I would like to encourage you to submit your articles for publication! As the Michigan Section Editor, and also the 2021-24 National Editor, I am working to put together two top-quality publications for our members. This is not a one person job. This is where you come in. I welcome your technical articles, case

studies, opinion pieces, mini field guides, and letters to the Editor.

The guidelines are pretty simple for articles for *Geologically Speaking*. All submissions must be professional and may not violate the AIPG code of ethics. They also may not have been submitted for publication elsewhere.

While most submissions will be accepted, we do not accept articles that are a sales pitch for a product or company.

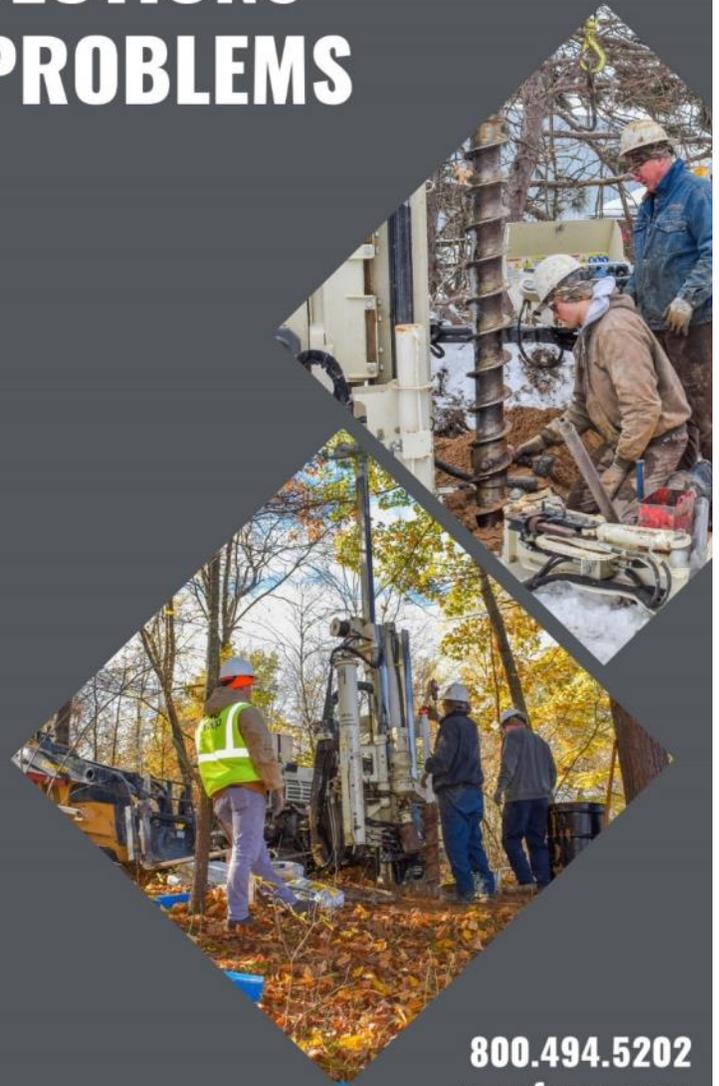
The deadline for submitting articles for *TPG* is two months before the start of the quarter for which the *TPG* edition is published. Thus, February 1 is the deadline for the Apr/May/June edition.

Please submit your articles of no more than 3,200 words in MS Word format directly to me or to Dorothy Combs at National Headquarters at aipg@aipg.org. All graphics (photos, figures, or tables) should be submitted in .jpg, .tiff or other standard format at 300 dpi. Please ensure your graphics are clean and easy to read to make things easier for the editorial staff. Complete information on submitting an article may be found on National's website at: <https://aipg.org/page/TPGInformation>.



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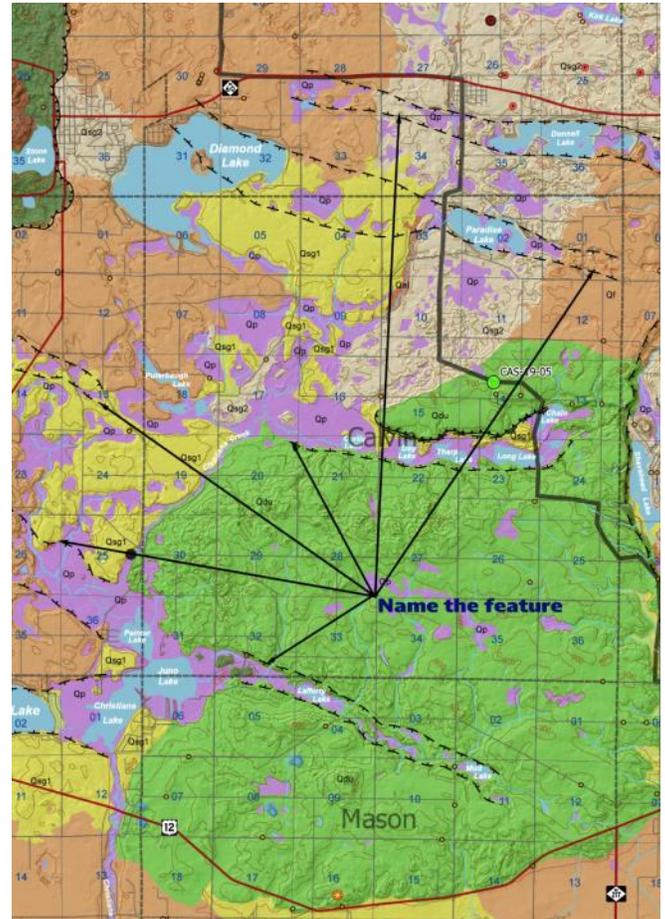
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Where in Michigan?

The October 2024 edition of *Geologically Speaking* featured a photograph of Pleistocene age glacial eskers located at Pierce Cedar Creek Institute in Hastings, Barry County. **Nate Erber** correctly identified the photograph and gets choice of swag!

This edition of *Geologically Speaking* features a new image **at right** - not the photo on the cover page. The first person to correctly identify what the parts of the photograph pointed to by the arrows depict (feature name, location, and how it was formed) will win AIPG swag! Submit your entry via email to the editor; only one per person per issue please.

Don't forget to check out the feature article "Geology in Michigan" in this issue (as well as the last several editions) that presents a geologic feature of interest as a mini field guide. One of the best parts about being a geologist is field trips, and we are hoping that in your travels around the state or country you include these featured spots as a stop. Why not incorporate them into a family vacation or bring friends who may not be geologists and share these locations that make Michigan unique? We hope you enjoy reading about it, and more importantly, go see it in person! We invite you to share unique geologic features that you know about and submit a "mini field guide" to share with our members in future editions.



Invitation to Our Members!

Do you have a case study to share?

The Michigan Section AIPG promotes knowledge sharing and would like to feature case studies from projects where others may benefit from successes as well as lessons learned. We feel as professionals that learning from each other is a great opportunity that AIPG offers our members. AIPG offers connection with other professionals and their experiences in the work we do every day. This case study represents what we would like to offer more to our members, not only as a way to solve problems, but unify us as professional geologists. Additionally, do you have a suggestion for other types of information to share that would be of interest to our membership?

Please send your case studies and suggestions for future publication in upcoming editions of *Geologically Speaking* to the Editor.

Update Your Information!

Please be sure that you continue to receive the Section's *Geologically Speaking* publication and other announcements. Submit an updated e-mail address to Adam Heft at adam.heft@wsp.com. If you move or change places of employment, don't forget to send your new contact information to both the Section and to National. If you are not receiving announcements directly from the Editor, it is because your email address is not up to date with the Michigan Section or because your IT group may classify it as junk or a bulk sending.

Please help the Editor by making sure that your email address doesn't bounce when the next announcement is sent. And be sure to cc Dorothy Combs, National AIPG Membership Director at aipg@aipg.org when you update your contact information. Thank you!

Students - Reminder

Don't Forget: Each Student Chapter must submit two articles for publication in *Geologically Speaking* each year to qualify for Section funding. Send the articles to Adam Heft at adam.heft@wsp.com.

Support our Sponsors!

The Section Executive Committee would like to remind its members to support the companies advertising in this publication. Consider working with these companies, and when you speak with their representatives, let them know that you saw their ad in the Michigan Section AIPG publication *Geologically Speaking*.

Interesting Geology Links

The Editor has received links to various interesting geology-related sites. Some of the more interesting links are included here. If you have any links to geology-related sites that you would like to share, please forward them (with a citation, if applicable) to the Editor.

Top 10 natural disasters caught on camera: <https://www.youtube.com/watch?v=scRUGRreKmY>.

Geology Professor Shawn Willsey YouTube Channel: <https://www.youtube.com/@shawnwillsey>.

The AIPG YouTube Channel: <https://www.youtube.com/channel/UCZJVHi1yAPLJe1AksLOV3pa>.

Michigan Geological Survey (MGS) and resources from the Michigan Geological Repository for Research and Education (MGRRE) YouTube Channel. <https://www.youtube.com/@michigangeologicalsurvey/videos>.

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1. Visioning
2. Opportunities & Constraints
3. Develop Integrated Framework Plan
4. Implement
5. Measure, Assess & Adapt

PFOS Concentration in Surface Waters (ppb)

Building a Community in a Small Group of Geology Enthusiasts: Balancing Relaxation and Professional Growth

By Brendan Jankowski, SA-12514 and S. Brink, SA-12373



The Central Michigan University (CMU) department of Earth and Atmospheric Sciences (EAS) is a small, tight knit community of meteorologists, environmental scientists, and geologists. Our EAS department has 11 highly active faculty members with diverse specializations and benefits around 130 undergraduates enrolled within its three programs. The department is highly engaged in preparing aspiring students for their futures and, despite its size, it provides multiple school, research, internship, and professional opportunities to its students. One such opportunity is our AIPG student chapter. This year the CMU AIPG leadership is succeeded by an entirely new E-Board with new objectives, aspirations, and the hopes of providing a welcoming and fun opportunity for those interested in geology as a career or professional hobby. We set a goal this year of creating an enjoyable environment for which students can come and share their experiences, do engaging geology related activities, and make new friends in the department. Students are encouraged to bring friends and those interested in anything geology to help department and inspire others to get involved.

We began the academic year by hosting a rock "show and tell," where students brought in their favorite rocks, minerals, and fossils to share. Specimens ranged from small pieces of copper, agatized ammonites, and fossilized brachiopods, to large, complex clusters of quartz crystals and chunks of banded iron formation. Some of us shared personal stories about our rocks, whether it was discovering and collecting them in the wild or finding them at a rock and crystal shop. One of our members, Joy Youngblood, also had the opportunity to share her research project she had been working on with funding from SPAR (Summer Program for Arts and Research). Our meeting served as a practice audience for Joy before her subsequent poster presentation at the Geological Society of America annual meeting in Anaheim, California, titled *Geochemical dispersion halo of lithium pegmatites as a potential exploration tool* (Photo 1).

The first meeting of Fall 2024 was a wonderful way to learn students' names, interests, and personalities, and to begin developing a relationship between members for



Figure 1: Joy Youngblood presenting her student research poster.

a great school year to come. Following our icebreaker, we have continued to meet every other Thursday to discuss the opportunities that are available to our student organization, as well as to come together in a casual setting to discuss geology. One of our meetings was a fun-filled rock-collecting and painting activity. Here at CMU, we have a "rock graveyard" where we went to collect discarded specimens from previous research and field collections. There were slabs of cut sandstone, shales, igneous rocks like pumice, conglomerates, and limestones filled with small fossils. On Halloween, we did simple geology-themed activities and encouraged members to wear costumes to celebrate. We created core samples using assorted candy bars and observed differences in layer compositions, similar to what is seen in actual core samples. Another activity involved carefully "mining" chocolate chip "ore" from muffins. We also hosted a geology bingo game, where students could demonstrate simple geologic knowledge and win small prizes. These activities were valuable to us as a source of relaxation and relief during a busy semester, and they have resulted in a consistent attendance and new friendships.



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Figure 2: Students selecting rock specimens for future fundraisers.

At the end of our meetings, we discussed our plans for the end of the semester and our next academic semester. The upcoming activities we are working on include rock sale fundraisers, alumni and graduate student speakers, and a spring field trip. Recently, we searched through some EAS rock collections and selected interesting specimens that we could sell at our future fundraisers (Photo 2). Some that we felt would be perfect for our sale include agates, slabs of assorted rocks, obsidians, Petoskey stones, polished quartz, and other semi-precious stones, fossils, and petrified wood (Photo 3). We also discovered large puddingstone boulders, pieces of pumice from Mount St. Helens, and jars of iron pellets. These may not be great to sell at a small campus fundraiser, but we have considered cleaning and saving them for future events or silent auctions. Jewelry supplies were found as well, which will be used to make jewelry with some of our smaller stones for the rock sale.

The fundraising from the rock sale and other events will be going to our spring field trip which we discussed in detail in our last meeting. We have brainstormed multiple adventurous trips to various locations around Michigan and the Midwest. Some of these trip ideas include places such as Hocking Hills Ohio, a New York and Ontario loop, a trip to Missouri, a Wisconsin loop, and an Illinois and Indiana Loop. All of these trips were designed to visit unique geological formations and locations around the states. They would be multiple day trips staying near or at state parks and national parks where we would go hiking, find educational opportunities, and collect rocks and fos-

sils depending on location. In previous years, our chapter has gone to Mammoth Cave National Park and the Great Smoky Mountains National Park. Our hope with this trip is to provide an easy, exhilarating, and affordable experience for our members that will bring us closer together as a chapter and department and create memories that will be unforgettable.



All our meetings and activities thus far have been successful in creating a relaxing and fun environment to explore the field of geology. Our members are passionate and enthusiastic students who are eager to learn and get involved in the fields of EAS. Our goal as a new E



Figure 3: Petoskey Stones and petrified wood.

-Board is to focus on community — we hope to bring geology enthusiasts at Central Michigan University together and inspire appreciation for Earth science and our environment to more people. We continue to look forward to creating activities that are fun and friendly but also create opportunities for professional development and experiences such as attending conferences, graduate and alumni talks, research, and educational opportunities. We thank all our friends in the chapter and all the faculty in our EAS department for creating an inviting community and environment that makes it exciting to learn and help us forge our path into the future! Fire Up Chips!

Michigan Geological Survey Publishes Updated Cass County Surficial Geology Map

The Michigan Geological Survey (MGS) has published an updated version of the Cass County surficial geology map. This map can be found at: <https://michigan-geological-survey-hub-wmugeography.hub.arcgis.com/documents/5e02afb817d84261b747951809155a51>. MGS also has updated versions of Allegan and Ottawa Counties on the website.

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Geology in Michigan – Raisin River Dolomite Roadcut Along North Dixie Highway in Monroe, Michigan

By Ira Adolphues, CPG-12157

Abstract

Exposures of the Raisin River Dolomite, a subunit of the Bass Islands Group, are located in Monroe, Michigan. This formation, which dates to the Late Silurian Period, extends from southeast Michigan to north/northwestern Ohio. In Monroe, the Raisin River Dolomite can be observed at a publicly accessible roadcut along North Dixie Highway. This article highlights the region's geology, including the stratigraphy of the Bass Islands Group, which consists of the Raisin River and Put-In-Bay Dolomites, and its importance in understanding the area's Paleozoic past.

The subsurface of Monroe is comprised of a thin layer of glacial drift underlaid by Late Silurian formations that provide insights into ancient marine environments. The Raisin River Dolomite, in particular, is characterized by its dense, banded, argillaceous dolomites, and occasional fossil remnants. This roadcut offers an opportunity for geologists and geology enthusiasts to examine the Raisin River Dolomite up close, with careful attention to safety as the site is located in a high-traffic area. Additionally, ongoing infrastructure projects, such as the West Elm Avenue underpass, present future opportunities to observe more of the Raisin River Dolomite. The article provides detailed observations on the geology of the outcrop, offering insights into the region's geologic history, and realized processes of dolomitization.

Introduction

The town of Monroe, Michigan is located on the western shores of Lake Erie, approximately 20 miles north-east of Toledo, Ohio and 40 miles southwest of Detroit, Michigan. Monroe has several rock quarries where seasoned geologists with permission can spend hours exploring the layers of the Detroit River Group and Bass Islands Group. The roadcut presented in this article is located on public property and accessible to the public. The dolomite outcrop is located along the North Dixie Highway underpass (Figure 1).

The Bass Islands Group Formation, a stratigraphic unit of the Late Silurian Period, lies underneath a thin

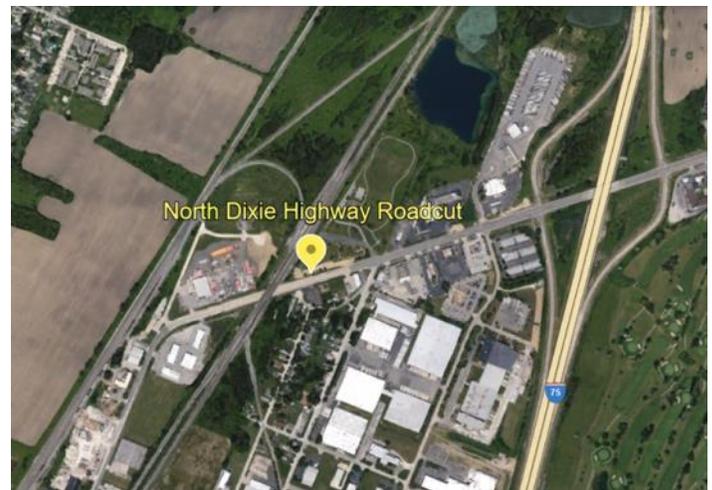


Figure 1: Location of bedrock outcrop on Dixie Highway. Image source: Google Earth.

layer of glacial drift (lacustrine clay and silt). In Michigan, the Bass Islands Group is subdivided into three distinct units: St. Ignace Dolomite (formation located St. Ignace County), Put-In-Bay Dolomite, and Raisin River Dolomite. According to a January 1970 article titled "The Bass Islands Formation in its Type Region", written by Dale R. Sparling, the Raisin River was named for exposures along the river of that name in Monroe County, Michigan.

This article describes where the Raisin River Dolomite can be observed, a description of its geology, and safety tips. The Dixie Highway roadcut is accessible by sidewalk. For safety reasons, when observing rocks along the underpass, be mindful of pedestrians and do not leave any rocks on the sidewalk as they can be a trip/slip hazard.

Regional Geology

Monroe is located at the southeast edge of the Michigan Basin, a bowl-shaped intracratonic crustal depression that contains several geological formations, and several thousand feet of sedimentary rocks deposited during the Paleozoic era (400 to 420 million years ago). The

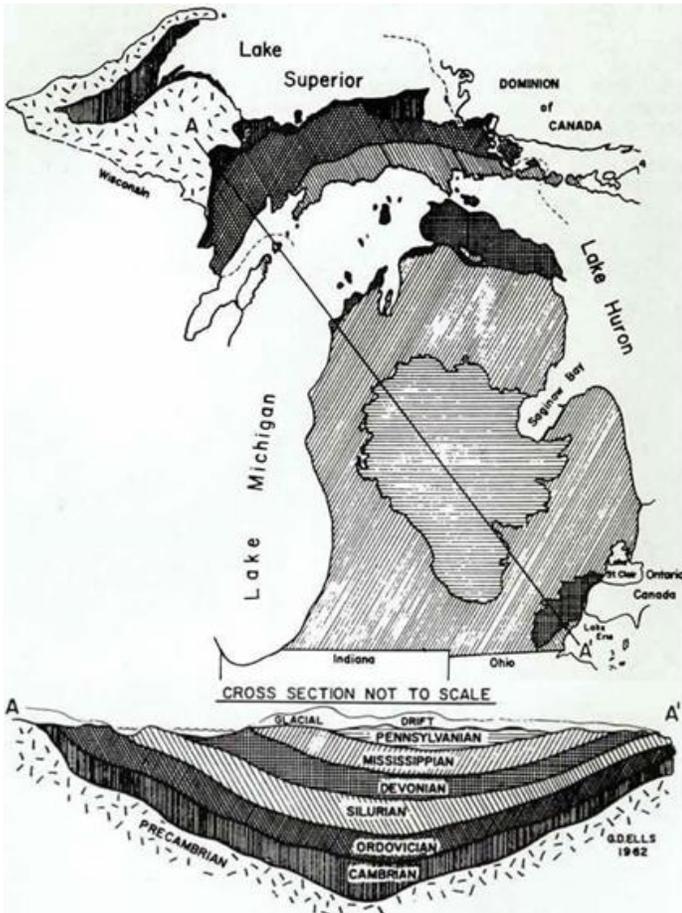


Figure 2 (left): The Michigan Basin in the lower peninsula is primarily composed of limestones, sandstones, and shales, which are around 500 million years old. These sedimentary rocks formed from materials deposited on ancient sea floors and are stacked in layers. In northern Michigan, the edges of these rocks are visible, such as near the Straits of Mackinac, while in the basin's center, the rock layers reach a thickness of about 14,000 feet (4,267 meters). Source: <https://project.geo.msu.edu/geogmich/paleozoic.html>.

seas (Figure 2) at the palaeoequator. These sedimentary rocks are rich in fossils, providing insights into the ancient marine environments of the time. Glacial activity during the Pleistocene Epoch further shaped the landscape, leaving behind glacial drift, including till, sand, and gravel, that covers much of the ground surface (University of Michigan, 2003).

The regional geology of Monroe is depicted on Figure 3. The bedrock underlies the glacial drift that consists of a thin layer of lacustrine clay and silt approximately seven to nine feet thick and is underlain by the Bass Islands Group. The Bass Islands Group, initially described by Lane, Prosser, Sherzer, and Grabau in 1900, is classified as a group rather than a series, which is a larger stratigraphic category. Its name comes from the three islands in western Lake Erie where its upper divisions are prominently exposed. It is a common misconception to refer to it as Bass Island, and there has been historical contention regarding this terminology. In southeast Michigan, the group consists of the Raisin River Dolomite and Put-in-Bay Dolomite (Figure 4) (Ehlers and Kesling, 1962). The Bass Islands Group consists of grey-buff, variably laminated, argillaceous dolostones, with minor

bedrock primarily consists of limestone, dolomite, and shale, which were deposited during the Silurian and Devonian periods, when the region was covered by shallow

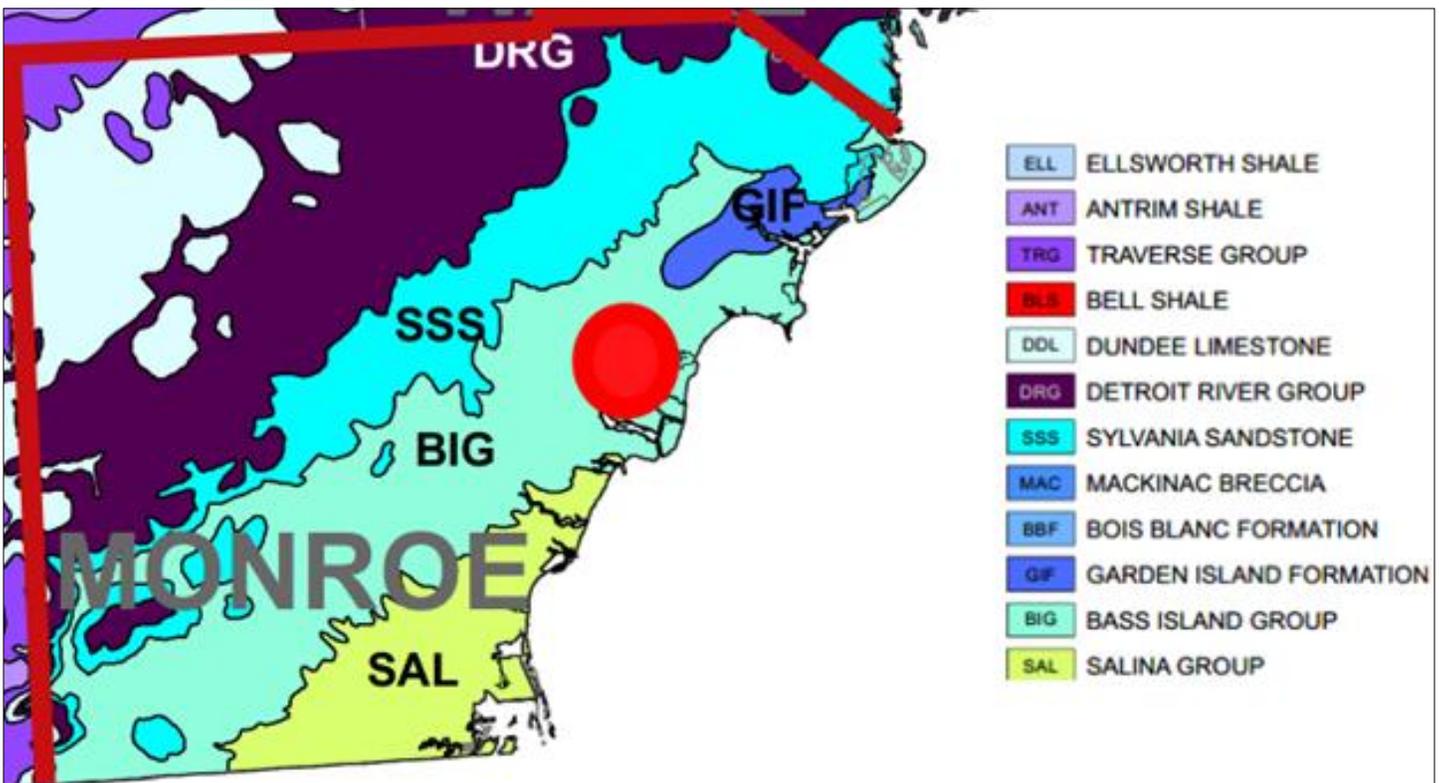


Figure 3: The bedrock geology of Monroe County. The red dot is the location of the North Dixie Highway outcrop. Source: Bedrock Geology of Michigan, 1987 .

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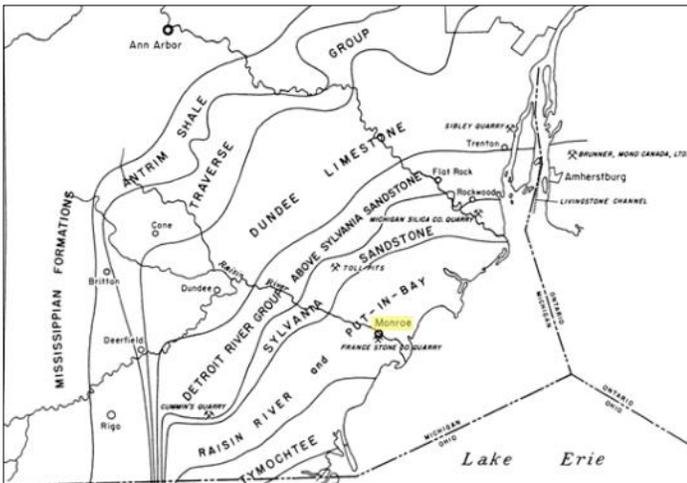


Figure 4: Geological map showing distribution of sedimentary rocks. Mississippian Period formations underlaid Devonian Period formations, and then Silurian Period formations in southeast Michigan (Ehlers, Stumm, Kesling, 1951).

shales and evaporites (Armstrong and Carter, 2010).

The Raisin River Dolomite was named for its exposures along the River Raisin in Monroe. Geologists A.W. Grabau and W.H. Sherzer, provided in 1910 a description of the formation being approximately 200 feet. The underlying Put-in-Bay Dolomite was not discussed. The Raisin River Dolomite has been described as “dolomitic calcilutites and oolites, generally thin-bedded and more or less shattered and broken.” (Sparling, 1970). Fossils are rarely observed in the Raisin River Dolomite; however, Grabau listed a fauna of least twenty species from the Raisin River Dolomite designating *Whitfieldella prosseri* as its most characteristic fossil (Carman, 1927).

The Raisin River Dolomite consists of blue-gray-tan to drab, banded, argillaceous dolomite with carbonaceous partings along the bedding planes. It is commonly in thin beds of approximately two to six inches (Figure 5), but thick beds or massive ledges can be seen at local rock quarries. This formation contains layers or zones of mottled, speckled, and streaked dolomite which is very dense and compacted (Carman, 1927). Lithologically, there are no specific criteria differentiating the Raisin River and Put-in-Bay dolomites. The single characteristic distinguishing the two formations is brecciation as an important characteristic of the Put-in-Bay Dolomite observed by geologist J. Ernest Carman (1927, p. 495) (Sparling, 1970).

North Dixie Highway Roadcut

Latitude: 41°55'28.8"N

Longitude: 83°22'08.5"W

Directions

Drive on I-75 and get off on North Dixie Highway (Exit 15). Once at the intersection, drive west on North Dixie Highway and the park at the Parking Lot located at 1095 North Dixie Highway, Monroe, MI 48162. Parking here is free. You can explore the roadcut within the fenced sidewalk along the north westbound Dixie Highway. No access sidewalk is available for the eastbound roadway. (Figure 6).

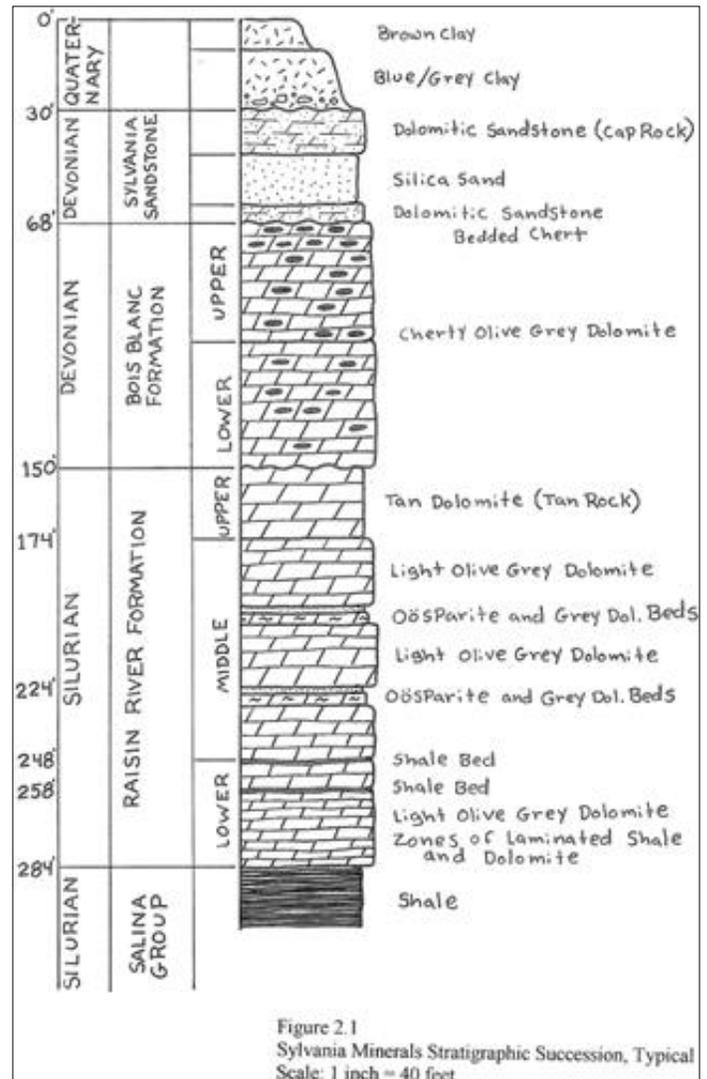


Figure 2.1 Sylvania Minerals Stratigraphic Succession, Typical Scale: 1 inch = 40 feet

Figure 5: Stratigraphic Column under Sylvania. Geologic Column of the Great Lakes Aggregates rock quarry. Classification and thickness of the Raisin River Dolomite underlaid by the Bois Blanc Formation. Source: <https://www.greatlakesagg.com/wp-content/uploads/2016/11/SYL-Strat-Column.pdf>.



Figure 6: View of sidewalk. Photograph taken by Ira Adolphues in July 2024.

Construction of North Dixie Highway underpass

Construction of the Monroe Area Rail Consolidation project began in March 2001 and opened to traffic on October 27, 2002. The objective of this project was to consolidate the two railroad lines, construct the Dixie Highway underpass, and to improve transportation within the Monroe area. Funding for this project was 80% federal, 10% from Michigan Department of Transportation, 5% from City of Monroe, and 5% divided between the two railroad companies. The construction project was designed by Mannik & Smith Group and built by Dan's Excavating, Incorporated. Figures 7 through 10 are photographs from the construction project provided by the city's engineer.



Figure 7: Rock removal operations.



Figure 9: A small cave was located during construction activities. Location unknown. Finely laminated drab dolomite underlaid by gray-to-drab dolomite, medium bedded, with karstic features.



Figure 10: Completion of Dixie Highway underpass (facing west).



Figure 8: Rock work with passing train (facing east).

Safety Tips

The rocks have sharp edges so remember to bring gloves. You should also bring eye protection if you plan to utilize a rock hammer and hydrochloric acid (HCL) for rock identification. The bedrock is highly weathered. Be aware that the rocks are highly weathered and loose. Do not attempt to climb on top of the roadcut!

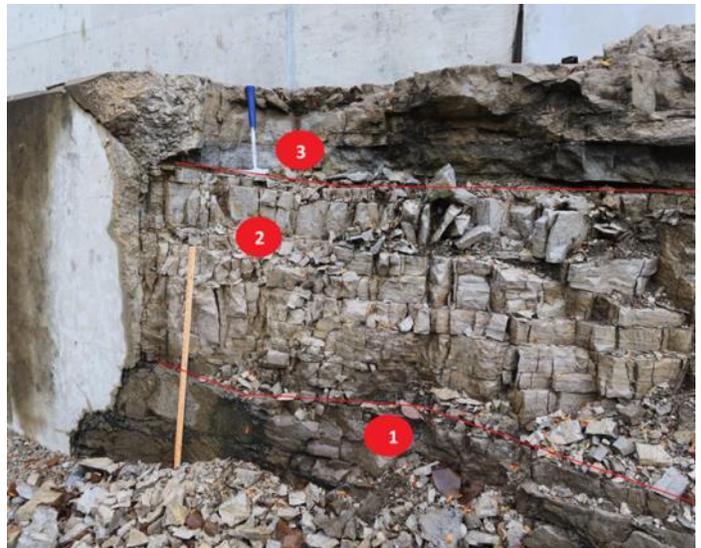


Figure 11: Highly weathered portion of the North Dixie Highway roadcut that shows three distinct features. The red dots are sample locations. Photograph taken by Ira Adolphues in October 2024.



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Geology

The roadcut has a weathered surface, approximately 830 feet in length with a maximum thickness of approximately 6.2 feet. The geology here is rather interesting to observe in person. Three rock samples were collected and examined adjacent to and east of the bridge shown in Figure 11 (preceding page). This part of the roadcut consists of dolomite that is brown, lightly porous, argillaceous, fine-grained, and is approximately 24" in thickness (Figure 12). Above this layer lies a whitish-gray, finely



Figure 12: Sample 1 description: Lightly porous, argillaceous fine-grained dolomite. Photograph taken by Ira Adolphues in October 2024.

laminated dolomite approximately 34" in thickness (Figure 13) that is overlain by gray to drab, argillaceous, mottled gray dolomite (burrowing trace fossils, *Thalassinoides*) (Burton, Jin and Sun, 2017) that extends to the edge of the underpass, south of Heck Park. This bed's thickness ranges from 16.5 inches to 23 inches. It contains small vugs, chert nodules, and formational ripples that were formed in shallow seas during the Late Silurian Period. Mottled gray dolomite can be observed on Figure 14. Typical ripples are shown on Figure 15.

Figure 16 depicts dolomite that is brown, thin-bedded, fine-grained, with calcite crystals that range from less than an inch to over an inch in size that were collected from west of the bridge. Small to large vugs (less than three inches), lightly porous, and more extensive karstic features extend to the end of the underpass. Figure 17 depicts a typical karstic feature. It is located less than 10 feet west of the bridge and is approximately eight to nine inches in diameter and extremely shallow in depth. Calcite crystals are abundant in this area. Figures 18 and 19 show calcite crystals within dolomite. On Figure 20, loose calcite crystals can be observed on top of the roadcut. The samples of dolomite had no reaction to HCL.

Depositional Environment

The upper section of the Bass Islands Group is calcareous dolomite. The rock is dense and flat, and it was likely dolomitized before final lithification. These features are indicative of a shallow sea suggesting the original sedi-



Figure 13: Sample 2 description: Tan, finely laminated dolomite. Photograph taken by Ira Adolphues in October 2024.



Figure 14: Sample 3 description: Gray, mottled dolomite. Photograph taken by Ira Adolphues in October 2024.

ments were deposited in an area of mud flats (Sparling, 1970). The Bass Islands Group are significantly shaped by dissolution and diagenesis, with prominent characteristics that originate from their original depositional environ-



Figure 15: Formational ripples in the Raisin River Dolomite. Photograph taken by Ira Adolphues in July 2024.



Figure 16: West of the John Dingell bridge. Maximum thickness is approximately six feet. Dolomite that is tan to brown, weathered, calcareous, thin-bedded. Photograph taken by Ira Adolphues in July 2024.



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Figure 17: Tiny cave. Photograph taken by Ira Adolphues in July 2024.



Figure 18: Dolomite with calcite crystals. Photograph taken by Ira Adolphues in July 2024.



Figure 19: Large sample of dolomite with calcite crystals. Photograph taken by Ira Adolphues in July 2024.

ments (Barnes, Grammer, Harrison III, 2009). The dolomitization of the Raisin River most likely occurred from evaporation over mud flats that produced brines enriched in magnesium as the mineral gypsum was precipitated. Brines moved from the coastal areas to the open sea by



Figure 20: Loose calcite crystals on top on roadcut. Crystals range from a few centimeters to an inch. Photograph taken by Ira Adolphues in October 2024.

seepage refluxion through the original Bass Island carbonates, resulting in dolomitization (Sparling, 1970).

Conclusion

The Raisin River Dolomite roadcut along North Dixie Highway provides a readily accessible glimpse into the region's Paleozoic past, where shallow seas and evaporation processes contributed to the dolomitization of the area's bedrock. A visit at this location is an excellent opportunity to observe and examine the Late Silurian formation of the Michigan Basin and to collect rocks from the roadcut. This roadcut is in the right-of-way of North Dixie Highway.

The City of Monroe has been awarded a \$23.96 million federal grant to design and construct a new underpass for West Elm Avenue at the CSX railroad tracks. Construction is set to begin in late 2026 and continue into 2027. This project is expected to present additional opportunities to observe more of the Raisin River Dolomite.

Acknowledgements

Special thanks to Partrick Lewis, P.E., who is the director of engineering at Monroe Department of Public Works. Mr. Lewis provided me valuable information about the history and construction of the Dixie Highway underpass.

Special thanks to Jim Day (The Ohio State University, B.S. in Geology, 1987), Senior Environmental Quality Analyst at EGLE. Jim Day took time to review my article and suggested corrections prior to submittal.

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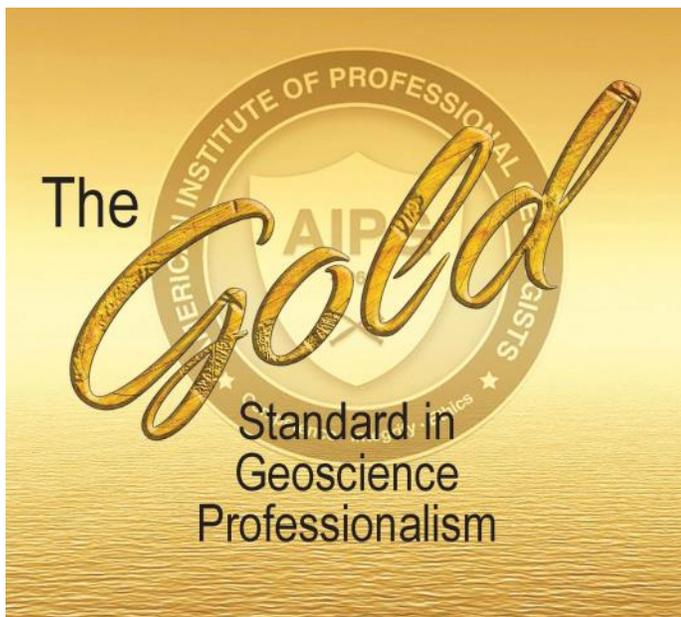
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Member's Corner

The Member's Corner includes information about the Section's membership. This is your chance to provide information on where you are and what you are doing. Simply send the information to the Editor for inclusion in this section.

This installment was provided by Sienna Meekhof, our 2025 Section Secretary.

I am a Senior Staff Geologist in the geotechnical group at SME and I specialize in geodynamic and geophysical services such as MAM/MASW/Refraction seismic surveys and resistivity, as well as trenchless and open-cut utility installation projects in Michigan, Indiana, and Kentucky. In the past year due to region expansion at my company, I received my GIT from the states of Kentucky and Pennsylvania and am working towards a CPG in Michigan and a PG in Indiana and Kentucky. I graduated with a Bachelor in Science in Geology from Michigan Technological University (MTU) and I was on the E-board of the MTU AIPG Student Chapter. Since I've graduated I've remained associated with AIPG and held the Early Career Professional (ECP) position for the AIPG Michigan Section for 2023/2024 academic year as well as participated in the AIPG National Membership Committee during 2024. Like any classic geologist, I like to spend my time rock hounding, hiking, skiing, and exploring national parks.



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Fishing for Fossils – Collecting in the Green River Formation, Kemmerer, Wyoming

By Andrew Chiles, SA-12091



My name is Andrew Chiles, and I am a first-year master's student studying Geology at Wayne State University with a focus on paleomagnetism.

My primary interest in geology lies in paleontology and fossils, which has led to me spending a lot of my free time exploring fossil sites across the country. Last summer, I embarked on a national park road trip out west with plans to collect fossils along the way. I visited sites in several states, but my ultimate destination was the world-renowned Green River Formation in Kemmerer, Wyoming.

If you've ever seen a fish fossil, there's a good chance it was from the Green River Formation, an ancient lake ecosystem. More fish fossils have been found here than any other location in the world, making it a dream destination for paleontology enthusiasts like me. Other organisms that have been found include turtles, crocodiles, amphibians, stingrays, insects, mammals, birds, and over 200 plant species from the Eocene.

The Kemmerer area is also home to Fossil Butte National Monument, which showcases many of the plants



Photo 1: WSU AIPG chapter president Andrew Chiles in front of the Fossil Butte National Monument entrance sign. Photo provided by Kaitlyn Randall.

and animals found within the geologic formation. There is no collecting at the national monument, but the region

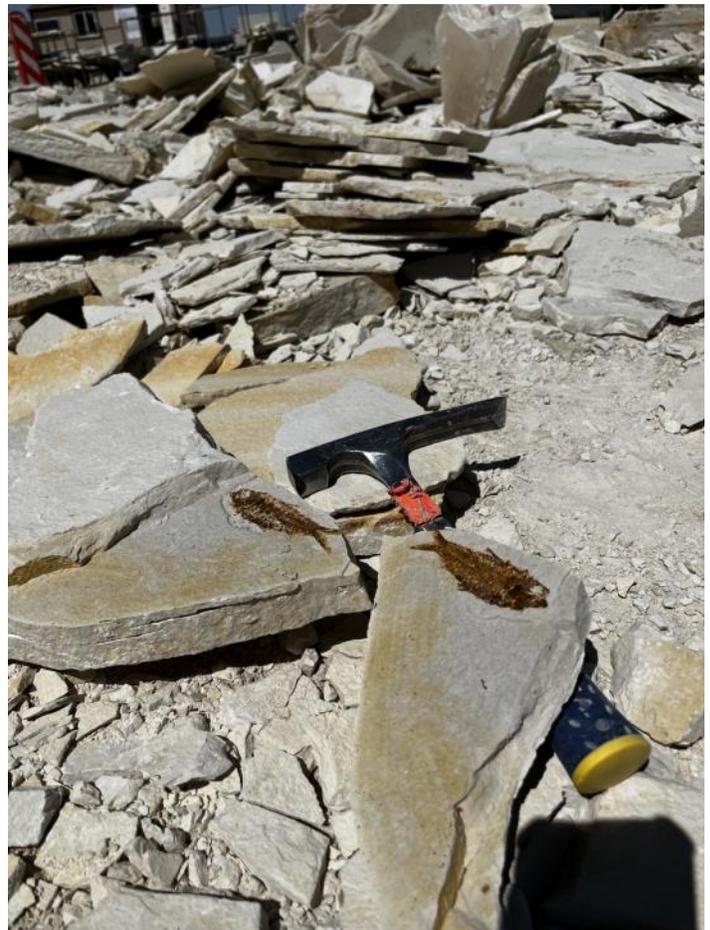


Photo 2: A complete fossil fish perfectly split from limestone, found in the American Fossil Quarry. Photo provided by Andrew Chiles.

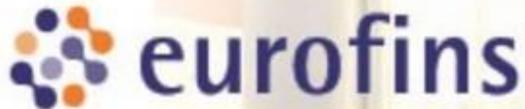
features more than a handful of privately operated quarries that are pay-to-dig fossil sites. One quarry, American Fossil, boasts being the only fossil quarry in the world that allows you to keep every fossil you find, so this is where I decided to collect.

On the morning of the quarry visit, I was off to a bit of a late start. I chose the shortest route provided by Google Maps and left my campsite for the dig. About 30 minutes



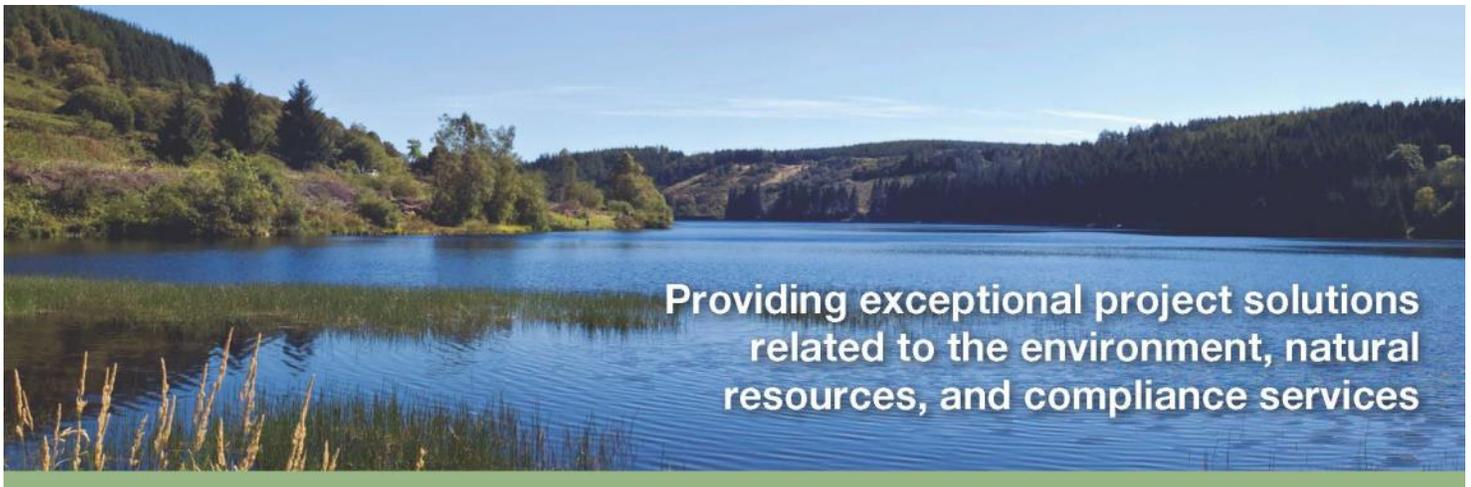
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Photo 3 (preceding page): Positive and negative sides of a baby freshwater stingray (*Heliobatis radians*) fossil, shown with a ChapStick tube for size comparison. Photo provided by Andrew Chiles.

away, the GPS directed me off the highway and onto a dirt road through the sagebrush. As I ventured further the dirt road turned into a two-track path descending steeply downhill. It was too late to turn around, so I cautiously navigated the potholes and bushes now covering the path as I made my way down the hillside. After a few miles of steep slopes and winding paths, I finally ascended the last hill and spotted a paved road again. Finally back on track, I quickly made my way to the American Fossil Quarry to start my hunt.

Upon arrival, I drove down into the quarry, which jutted from the side of a small mountain. Several roped-off areas were designated for collecting, and staff on site had construction equipment in operation to move around the fossil filled limestone. I registered for a four-hour dig which included all the necessary tools: a hammer and chisel. A brief demonstration revealed that the best strategy for fossil extraction is to lightly tap the chisel around the perimeter of a rock. This allows vibrations to split the limestone along bedding planes containing fossils, which serve as a weak point in the rock.

After the demo, I began to scout for promising material. The ground was littered with fragments of fish fossils left behind by collectors in search of complete specimens. I gathered anything that caught my eye, including heads, tails, or fins, and added them to my pile. After some time, I began to break open my own rocks, unveiling numerous great fish.

A couple hours in, I decided to break off from the main group and went to a corner of the quarry near the edge of the designated boundary. I was taking my time to carefully split each rock, with many proving to be completely empty. I then began hammering at a piece just slightly larger than a notebook, following a straight line around the edge of the stone. The limestone split along the line I had made except for one corner, which broke along a different plane. Peering into the limestone layer I had just uncovered, I couldn't believe my eyes and began to shake in excitement. I had just found a baby freshwater stingray (*Heliobatis radians*), exposing it to sunlight for the first time in over 50 million years, and I became the first human to ever lay eyes on it.

I went back with my incredible discovery to show the staff and fellow collectors. It didn't take long for a large group to gather around in awe of the specimen. The employees snapped some pictures and informed me it was the first fully intact stingray uncovered that season. Carefully, I wrapped the fossil in bubble wrap and placed it in a plastic tote bin I had brought with me. Before departing, I took advantage of rock saws that were on site and



Photo 4: WSU AIPG chapter president Andrew Chiles standing over his newly uncovered baby freshwater stingray (*Heliobatis radians*) fossil in the American Fossil Quarry. Photo provided by Kaitlyn Randall.

trimmed down many of my fish fossils to make transport back home easier.

My visit to the Green River Formation was the highlight of my journey and a reminder of the incredible opportunities geology provides to connect with Earth's history. With new discoveries being made every year and quarries expanding their access, this region continues to provide an incredible opportunity unlike any other. For those passionate about fossils, it's a destination not to be missed.





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Coming Events

February 1, 2025: Deadline for National AIPG Scholarship applications, and also for payment of 2025 dues!

February 13-16, 2025: 70th Anniversary Tucson Gem & Mineral Show, Tucson, Arizona. "Shades of Green—Experience the Magic!"

February 22, 2025: AIPG National Executive Committee Meeting to be held at headquarters in Denver. The meeting will have a virtual component; all members are welcome to attend. Email invite forthcoming from AIPG headquarters.

March 30, 2025: Deadline to submit reports for **Student Chapter of the Year**. Complete package must be submitted to aipg@aipg.org prior to the deadline for consideration.

May 2025: Kalamazoo Rock, Gem, Fossil & Mineral Show. Kalamazoo County Expo Center, 2900 Lake Street, Kalamazoo.

June 1, 2025: Deadline to submit applications for the Michigan Section AIPG Andrew Mozola Scholarship.

June 11-12, 2025: 14th Michigan Section AIPG Environmental Risk Management Workshop, Ralph A. MacMullan Conference Center, Roscommon, Michigan. Details Forthcoming!

July 8, 2025: MAEP Golf Outing at Coyote Preserve Golf Club, Fenton, Michigan. Details may be found at: <https://maep.org/event-5973544>.

October, 2025: 62nd AIPG Annual Meeting, St. Louis, Missouri.



Editor Adam Heft receiving the 2024 Significant Contribution to the Michigan Section Award from President Amy Hoeksema At the Section Meeting held on December 5, 2024. Photo by Sara Pearson.

Welcome New Members!

The Michigan Section is continuing to grow. Please welcome the following new CPGs, Professional Members, Early Career Professionals, Associate Members, and Students:

Benjamin Hinks, CPG-12238; Jonathan Haynes, CPG-12235; Joseph Klumpstra, CPG-12236; Daniel Hirvi, CPG-12239; Jack Hines, ECP-1159; Ashley Reibel, MEM-3674; Michael Home, MEM-3689; Carlos Pelletier Martinez, MEM-3690; Anthony Mack, MEM-3685; William Weiss, MEM-3701; Helen Spence, SA-12335; Jonathan DeSantiago, SA-12348; Julia Shreve, SA-12354; Luke Atma, SA-12369; Trentin Hohler, SA-12362; Madison Sorensen, SA-12371; S. Brink, SA-12373; Vanessa Kraemer, SA-12375; Kaylee Harwick, SA-12400; Sherri Nidiffer, SA-12401; Amber Edmondson, SA-12402; Edward

Kosmicki-Lovelace, SA-12403; Kelli Jurich, SA-12407; Akintunde Samakinde, SA-12413; Monica Hormuth, SA-12418; Chris Finley, SA-12432; Thomas McCourt, SA-12434; Gouro Koita, SA-12447; and Jacynda Green, SA-12448.

To each of our new members, welcome to our Section! We encourage you to attend Section meetings and other events. You are also invited to provide information for the Member's Corner articles so that our members can get to know you.

Regulatory Roundup

Regulatory Roundup: A New Legislative Session, Environmental Rules, and Key Court Cases

As Michigan's 103rd Legislative Session begins, the state faces a fresh start with expired bills and opportunities for new initiatives. Alongside legislative activity, several significant court cases are shaping the future of Michigan's environmental policies.

Legislative and Administrative Updates

The new legislative session resets the slate for environmental policy, leaving key proposals on contaminant cleanup, a new statewide on-site septic code, and carbon capture, utilization and storage unresolved. The **Michigan Legislature [website](#)** provides a powerful tool for tracking bills, including keyword searches like "1994 PA 451" for updates to the **Natural Resources and Environmental Protection Act**.

Meanwhile, administrative rulemaking progresses independently of legislative cycles. Notable ongoing efforts by EGLE include updates to **Part 41 rules** governing sewerage systems, aiming to improve operator certifications, streamline permits, and enhance public health protections.

Court Cases to Watch

In addition to legislative and rulemaking developments, court rulings are shaping Michigan's environmental landscape. Here are two major cases of interest:

3M Company v. EGLE: PFAS Regulatory Challenges

On November 13, 2024, EGLE attorneys urged the Michigan Supreme Court to overturn a Court of Appeals decision invalidating rules that set PFAS limits. The Court of Appeals held that EGLE failed to issue a proper regulatory impact statement under the **Administrative Procedures Act (APA)** because it didn't account for groundwater cleanup costs.

Key arguments include:

- **EGLE's Position:** The APA requires only an estimate of compliance costs for the proposed rule, not ripple effects like groundwater cleanup.
- **3M's Counterargument:** EGLE's failure to address all compliance costs undermines the validity of its rules.
- **Potential Implications:** A decision against EGLE could weaken PFAS regulations and hinder mitigation efforts for these harmful "forever chemicals."

Nessel v. Enbridge Energy: Line 5 Pipeline Dispute

Arguments in the state's lawsuit to shut down the Line 5 pipeline beneath the **Straits of Mackinac** will begin January 27, 2025 in Ingham Circuit Court. Attorney General Dana Nessel has argued the pipeline poses significant

environmental risks and that the case belongs in state court, where a favorable ruling for the state is more likely.

Key considerations include:

- **Pipeline Risks:** Concerns over catastrophic ruptures and environmental damage.
- **Economic Impact:** Critics warn of potential energy market disruptions, but Nessel emphasizes reports showing markets would adapt quickly.
- **State's Goal:** An orderly shutdown of the pipeline to avoid emergency scenarios.

Why This Matters

Court decisions like these have far-reaching consequences for Michigan's natural resources and environmental policies. They underscore the importance of staying informed and engaged.

How You Can Contribute

Professionals in geoscience, engineering, and environmental practice can play a pivotal role by lending their expertise to inform policy decisions. We encourage members to:

- Monitor legislative and rulemaking developments using tools like the **Michigan Legislature [website](#)**.
- Participate in public comment periods for proposed rules.
- Stay updated on key court cases affecting Michigan's natural resources and environmental future.

As the 2025-2026 session unfolds, **Regulatory Roundup** will continue to provide updates on bills, rules, and court cases that matter to our community. Let's work together to shape a sustainable and well-regulated future for Michigan.



Michigan legislative bill [search](#)



Michigan Administrative Code Rulemaking System [search](#).

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Student Poster Contest!



2024 Student Poster Contest winners with Section Executive Committee members Adam Heft (left) and Amy Hoeksema (right). Student recipients (left to right) Joy Youngblood, Sydney Davis, Nathaniel Okkonen, and Donovan Vitale.

The Michigan Section AIPG held its Annual Meeting on December 5, 2024 at the Crystal Gardens in Howell. During that meeting, the usual student poster contest took place. This year, there were eight student posters submitted; two undergraduate and six graduate posters.

Sydney Davis, SA-11839, of Eastern Michigan University presented “*Determining Groundwater Flow and Recharge Rates in the Wetlands at Fish Lake Environmental Education Center, Lapeer County, Michigan.*” This poster took first place in the undergraduate category.

Joy Youngblood, SA-12326, of Central Michigan University presented “*Geochemical Dispersion Halos of Lithium Pegmatites as a Potential Exploration Tool: A Comparison Study in Florence County, Northeastern Wisconsin, USA.*” This poster was the runner up in the undergraduate category.

Max Copus, SA-12585, of Western Michigan University presented “*Development of a Wellbore Integrity Database to Aid CO₂ Storage Site Screening.*”

Ariel Martin, SA-11557, of Western Michigan University presented “*A Visual Journey Through Dolomitization: Mineralogical and Textural Transformations in Ca-Mg-*

Carbonates During High-Temperature Experiments.”

Saeed Norouzi of Western Michigan University presented “*When Dolomite Textures, Geochemistry, and Stable Isotopes Miss Recrystallization: Is All Hope Lost? Maybe Not... A Case for Integrative Petrology.*”

Nathaniel Okkonen, SA-12515, of Wayne State University presented “*Probabilistic Teleseismic Tomography for Hypothesis Testing of Slab Structure Beneath Alaska.*” This poster was the runner up in the graduate category.

Madeline Sigler, SA-11318, of Michigan State University presented “*Modeling Groundwater in the Great Lakes; a Basin Scale Approach.*”

Donovan Vitale, SA-11158, of Western Michigan University presented “*Surface Water Foam as a FPAS Matrix for Source and Process Identification.*” This poster took first place in the graduate category.

The Michigan Section AIPG greatly appreciates each of our students for sharing their research with us as posters, and hopes you will consider participating in future events. Congratulations to each of the student poster contest winners!

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ASBOG Exams

The ASBOG Fundamentals of Geology (FG) and Practice of Geology (PG) examinations are given on the third week in March and the first week in October each year. All examinees must be certified to take the examination at an approved Prometric/Iso-Quality Testing (IQT) testing facility. There are multiple testing centers located throughout Michigan.

Central Michigan University qualifies candidates to take the FG examination in Michigan and surrounding states. The next scheduled examination dates are Thursday, March 20 and Friday, March 21, 2025. Two days will be available to accommodate anticipated demand.

There are three fees for taking the FG examination:

\$50 CMU administration fee, \$200 ASBOG examination fee, and \$75 Prometric testing center seat fee. **For March, the deadline to apply through CMU is January 31st.**

Complete information on applying to take the FG exam is available at se.cmich.edu/asbog. Useful information to help prepare for the FG Exam can be found in the ASBOG Candidate Handbook, which is accessible on the [ASBOG website](#).

Member Input Sought

The Section Executive Committee is seeking input from members on a variety of topics. Do you have any suggestions regarding speakers/presentation topics that you would like to hear? What about field trips or other events? Some place you'd like to see us go, or something you think the membership would enjoy doing? Then

make your voice heard; please send your suggestions to one of the members of the Executive Committee; any of the seven members would be glad to hear from you. AIPG is your organization. Please help keep it relevant and interesting for all by participating.



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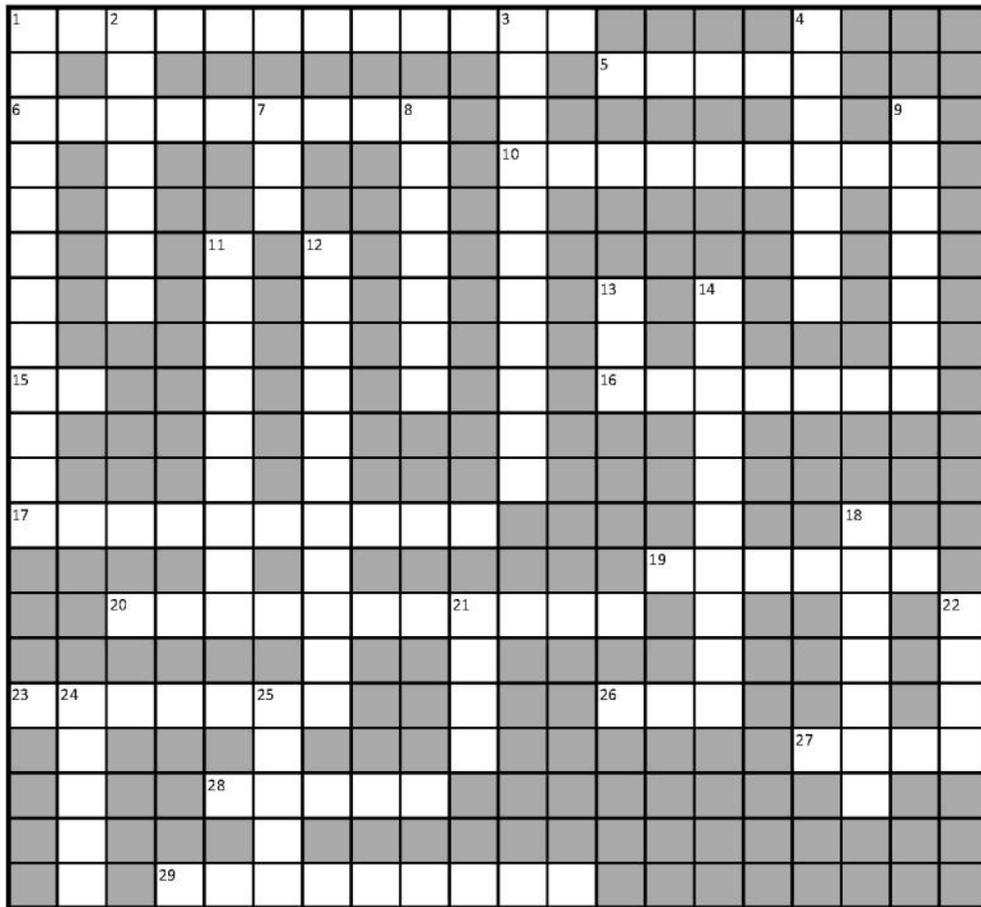
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Geology Crossword #20



Across

1. Study of earth's magnetic field
5. Third greek letter
6. Receivers of seismic energy
10. A type of cooking surface
15. Measurement of magnetic field, abbv.
16. Said of a serious situation
17. Of a mirror or pool of water
19. A series of questions
20. Reduction in energy
23. Same atomic number, different mass
26. Used to find USTs, abbv.
27. Something precious as we age
28. An unwanted signal; something loud
29. Reproducibility

Down

1. Measures earth's magnetic field
2. Study of earth's shape, gravity and mass
3. Resistance to passage of current
4. A precision measuring device
7. A unit of resistance
8. Distance between transmitters and receivers
9. Something out of the ordinary
11. Fleeting
12. A measure of the passage of current
13. A tree trunk on the ground
14. A transmitter or receiver in a probe
18. Energy waves travelling through strata
21. Time domain electromagnetics
22. Ripples form through this action
24. Something done to sheep
25. Something sent into the unknown

*The solution to this geology crossword will be included in the next edition of *Geologically Speaking*.

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