

Core Quarterly

Issue 12
Spring/Summer 2026

A publication of the
Michigan Geological Survey
at Western Michigan University



Michigan Continues Its Investment in Geoscience

by Sara Pearson, CPG

Earlier this year, we wrote that capital investment requires operational commitment. Michigan has made significant investments in the Michigan Geological Survey and the new Michigan Geological Repository for Research and Education, but those investments deliver their greatest value when the Survey has the capacity to put them to work.

We are pleased to share that MGS will receive \$2.7 million in state funding for FY 2027. This support allows us to continue the scientific work that helps Michigan better understand its groundwater, subsurface, critical minerals, energy resources, and geologic data—and to provide information that communities, policymakers, and other decision-makers can use.

The FY 2027 appropriation, however, is one-time funding. Our longer-term goal remains restoration of the \$3 million in ongoing annual funding that supported MGS in FY 2023, FY 2024, and FY 2025. That support began in 2023 after more than a decade without direct state funding for the Survey and represented an important renewed investment in Michigan's geoscience capacity.

Stable, ongoing funding matters because the work of a state geological survey is inherently long-term. Mapping the subsurface, monitoring groundwater, preserving and interpreting geologic information, supporting applied research, and maintaining Michigan's geologic collections all require continuity. These resources and programs become more valuable over time as new data are added and new questions emerge.

State support also strengthens MGS's ability to leverage Michigan's investment through federal grants, partnerships, and other outside funding—bringing additional resources, expertise, and scientific work to the state. We are grateful for the continued support of Michigan policymakers, partners, and others who recognize the value of this work as we continue toward the goal of restoring stable, ongoing funding.

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Understanding Michigan's Hydrogen Opportunity: A System Level Challenge

by Autumn Haagsma, PhD

Since the release of the USGS Hydrogen Prospectivity Map (Figure 1), Michigan is taking a closer look at hydrogen as part of its future energy and economic strategy. Recent evaluations conducted across multiple state agencies, under Executive Directive 2026-1, provide a clearer picture of both the opportunity and the challenges involved—and point to the need for a coordinated, statewide approach. Together, these efforts highlight an important reality: hydrogen development in Michigan is not a single issue to solve, but a system that spans geology, infrastructure, policy, and economics.

Michigan's potential for geologic hydrogen begins deep underground. The state's unique geologic framework including the Midcontinent Rift and the Michigan Basin creates favorable conditions for:

- Natural hydrogen generation
- Potential subsurface storage
- Exploration of emerging approaches like stimulated hydrogen

However, significant uncertainty remains. Understanding how hydrogen is generated, moves through the subsurface, and accumulates requires additional data and subsurface characterization. This scientific foundation is critical. Without it, decisions about development, infrastructure, and investment remain high-risk.

Infrastructure and Technology Challenges - Even if hydrogen resources are confirmed, delivering that resource presents another challenge. State analyses indicate that hydrogen is not easily compatible with existing natural gas infrastructure. While limited blending may be possible, large-scale use would likely require:

- New pipeline systems
- Updated safety standards
- New siting and regulatory frameworks

This makes infrastructure one of the most significant cost and timeline drivers for hydrogen deployment.

Policy and Access to Resources - Another key finding is that current policies do not fully support hydrogen development. Existing statutes were developed for oil and gas and do not clearly include hydrogen. In particular:

- Hydrogen is not explicitly defined within existing regulatory frameworks

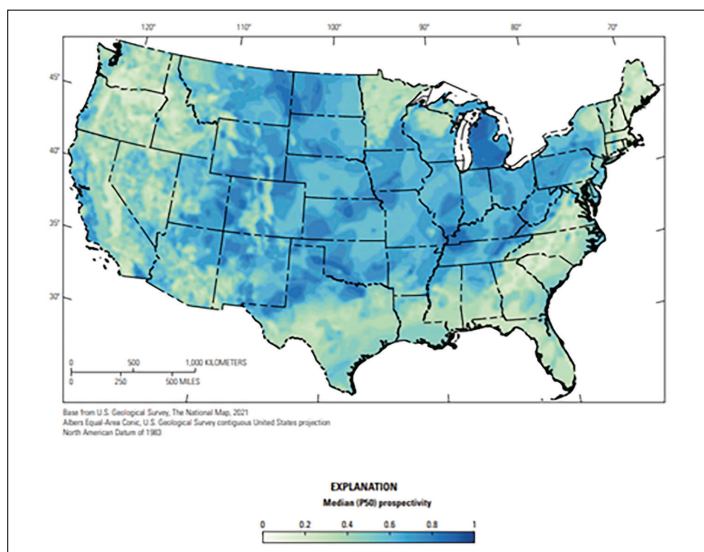


Figure 1: Median hydrogen prospectivity map of the United States, where darker blue indicates higher potential. From Gelman et al., 2025.

- Leasing of state-owned lands for hydrogen is not currently authorized
- Revenue structures for hydrogen development do not yet exist

Given that the state manages millions of acres of land and mineral rights, these limitations represent a major barrier to accessing potential resources.

Economic Potential – With Uncertainty - Hydrogen could play a meaningful role in Michigan's economic future, particularly by:

- Supporting industrial decarbonization
- Reducing input costs for energy-intensive industries
- Creating new opportunities in exploration, infrastructure, and manufacturing

However, the timeline and scale of these benefits remain uncertain. Economic outcomes depend on confirming viable resources, building infrastructure, and establishing regulatory clarity.

A Coordinated Path Forward Could Lead to Success - Across all agencies, one theme is consistent: progress in one area depends on progress in others.

- Scientific understanding enables investment
- Infrastructure enables market growth
- Policy enables access and development

This interdependence means hydrogen development must be approached as a coordinated system, rather than a series of independent efforts.

Learn More!

For a deeper look at these findings—including detailed agency evaluations, identified challenges, and recommended next steps—explore the full report:

Hydrogen in Michigan: Synthesis of State Agency Findings and Strategic Role of the Michigan Geological Survey

[Read the Full Report](#)

The report provides a comprehensive overview of how Michigan can move forward by aligning science, infrastructure, and policy to responsibly evaluate and develop hydrogen resources.

Everything Old is New Again

by Linda K. Harrison and William B. Harrison, III, PhD

For longer than 70 years, more than 700 boxes of geological test well cuttings have been sitting on shelves, quietly holding their data far away from public view. They were drilled by Carter Oil Company in the late 1940's and early 1950's during a post-war economy demanding more energy. Those wells were drilled for one purpose alone—to collect geological data that would reveal prospective sites for oil and gas wells. What data could they now reveal about other geological resources?

Many companies drilled these test wells then. Because so little seismic data was available, companies mapped the subsurface using data from rock samples. They held that data in strict confidence. Even now, little data and very few samples from those early test wells are publicly available.

We were excited to receive this collection, but we had little information to go on to identify the wells. Only Carter's proprietary alphanumeric well code, e.g., "E-3," was written on the box fronts and on the sample envelopes.

We found some surprises inside the boxes. We often saw cuttings from several wells in a box marked with only one well ID. In one box, the cuttings were contained in glycine envelopes, stamped "POPCORN BAG."

Long ago, someone had glued some typed well labels to the backs of most boxes. They



Cuttings stored in popcorn bags.



MGRRE staff, Linda Harrison (left) and Jenny Trout, inventory more than 700 boxes of Carter Oil Company geologic test-well cuttings.

helped us identify some wells, but there was no ink left on many damaged labels. We thought we'd never be able to recover that information.

The "aha moment" came when we saw that some typewriter key stroke indentations were still there. And if we held the box at just the right light angle, we could read some of them.

We still couldn't read much until we photographed the labels and applied filters in Photoshop. We could then make out just enough information to search Dataminer (EGLE's well search

engine), and to finally identify all the wells.

We can now bring this dark data to light. You can access the entire collection inventory, created by Jennifer Trout, at our Website. You'll see that the wells were drilled from Benzie and Grand Traverse counties and southward through Manistee, Wexford, Mason, Lake, Oceana and Newaygo counties. They ranged in depth usually from 300 to 1,200 feet, reaching into the bedrock.

While working with these samples, we were reminded of a famous Broadway show song: "Don't throw the past away, you might need it some rainy day. Dreams can come true again when everything old is new again." At MGRRE, we have long known that we can't throw the past away, because old data has many lives.

Because we have these actual physical rock samples, they can be analyzed using newer technologies like X-ray fluorescence (XRF) and X-ray diffraction (XRD) to yield their elemental and mineral compositions. That direct data can be used to address current issues that no one was even thinking about when those samples were first drilled:

- Geochemical properties can identify rare earth elements and other critical minerals, to reduce our reliance on foreign sources.
- Physical properties such as grain size, porosity and permeability can be analyzed to identify groundwater resources needed for every part of our economy.

- The quantity and quality of aggregate materials throughout the boreholes can be assessed to provide resources needed to complete infrastructure projects.
- Lithology and reservoir characteristics can be determined to better model fluid flow in potential petroleum reservoirs to help domestic energy redevelopment.
- Mechanical properties such as strength and hardness of subsurface formations can be measured to estimate bedrock stability beneath proposed roads and bridges.
- Bedrock surface lithology and topography as well as glacial drift thickness can be mapped in greater detail, allowing us to better understand the geologic history of Michigan.

Just like the Broadway cast who nostalgically relived memories of white suits, tap shoes, and tails, we often think of the old days, when these samples were drilled. We think about the geologists, the drillers and mudloggers, the secretaries who typed up labels, and about all the people who worked to acquire this priceless collection.

So far as we know, not one of those people can now tell the story. But the cuttings themselves will tell their own stories, for as long as they are preserved. With sufficient funding for the Michigan Geological Survey and a new building for MGRRE, we are excited that our work to preserve Michigan's geological samples will continue. The show will go on.

Director's Note

Next year, Michigan will celebrate 190 years of statehood—and the Michigan Geological Survey will celebrate 190 years alongside it.

On January 26, 1837, Michigan became the 26th state. At noon, Michigan officially achieved statehood. About two hours later, the new state Legislature introduced and approved a bill establishing a geological survey—making the Geological Survey the first department of Michigan state government created by statute.

That timing says something important. From Michigan's very beginning, its leaders understood that knowing what lay beneath the state was essential to understanding its resources, opportunities, and future.

For 190 years, that fundamental purpose has endured.

The questions have changed. Today, our work helps

Michigan better understand groundwater, critical minerals, natural hydrogen, carbon storage, geologic hazards, infrastructure, and the geology beneath communities across the state. The tools have changed dramatically as well. But our responsibility remains remarkably similar: to build and share the geologic knowledge Michigan needs to make informed decisions about its future.

As we approach this anniversary, I see an opportunity to celebrate more than our history. It is also a chance to look ahead—to consider what Michigan will need from its Geological Survey in the decades to come and how we can continue making science useful to the people and communities we serve.

Throughout 2027, we look forward to sharing more of this remarkable 190-year story—and to celebrating the connection between the history of Michigan and the history of its Geological Survey.— Sara Pearson, CPG

Granite, Karst & Cats:

A Summer in the U.P.

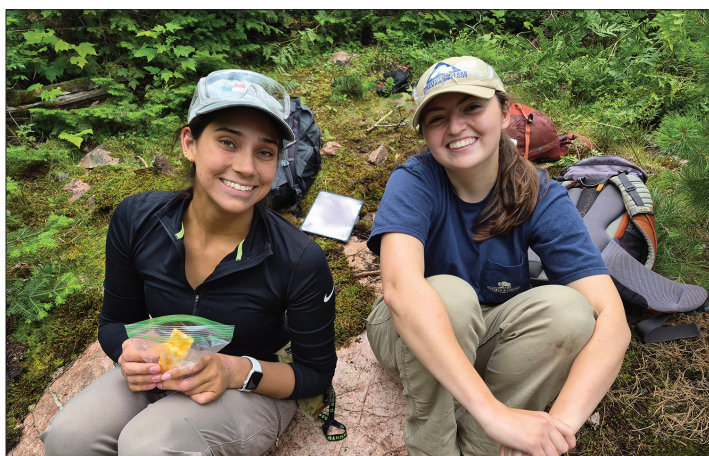


By MGS U.P. Team

Michigan Geological Survey student interns were busy this summer exploring the Upper Peninsula's (U.P.) beautiful landscape and the geology that shapes it. Four dedicated students traveled to the U.P. from universities located in Michigan, Wisconsin, Minnesota, and Idaho. These students spent 10 weeks conducting field work, collecting and analyzing data, and helping spread geologic knowledge through the MGS summer reading outreach program.

Humboldt Granite Mapping Team:

Joy Youngblood and Alyssa Hellrung joined the MGS's Precambrian bedrock mapping team to help map and sample the Humboldt Granite and proximal pegmatites near Republic, MI. The Humboldt Granite is a USGS Earth MRI focus area for magmatic-REE and porphyry-tin mineral systems and the MGS project is part of the Earth MRI cooperative grants program. This ongoing investigation is examining the intrusion in the geochemical context of critical mineral models as well as providing the first detailed map of it.



MGS Interns Joy Youngblood and Alyssa Hellrung.

Joy is a recent graduate of Central Michigan University. She and her cat Spike are hoping to stay in the Marquette area for the time being. She is currently looking for employment in the region but would eventually like to return to graduate school to study geochemistry-mineralogy-economic geology.

Alyssa, a recent graduate from the University of Wisconsin-Madison, has been accepted in the MS/PhD program at Southern

Methodist University. She will begin graduate studies this fall. Among other things, she plans to conduct microstructural analyses of Idaho granites in the context of the regional tectonic history. She hopes to find a cat after she moves to Texas to help with her research.

Karst Mapping Team:

Justin Bettendorf and Tiana Hursh spearheaded MGS's boots-on-the-ground effort to inventory and map karst landforms on the Hiawatha National Forest, located in the eastern UP. While the Hiawatha NF has all the right conditions for karst geomorphology (shallow limestone bedrock, an active groundwater system, and a humid climate), only a handful of features have ever documented prior to this field season. Over the summer, Justin and Tiana walked 4,800 acres of forest and field-verified almost 300 previously undocumented karst landforms.

Tiana is an incoming senior at Idaho State University, where she is working toward a BS in geology. She expects to finish her degree after the Spring



Joy Youngblood examining the Crockley Pegmatite, located in the southwest part of the Humboldt Granite intrusion.



Alyssa Hellrung dialing in her geophysical skills by using a handheld gamma ray spectrometer in the field.

2027 semester and completion of Idaho State's famous field camp. She will be presenting her undergraduate research on Chile tectonics at GSA Connects 2026 this fall in Denver. Tiana's geological endeavors are made possible by the moral support of her cat, Spoons.

Justin recently completed his BS in Environmental Geoscience at University of Minnesota – Twin Cities. He will continue

working on other surficial mapping projects for MGS this fall, before heading to New Zealand to participate in World Wide Opportunities on Organic Farms (WWOOF). Justin intends to return to MGS next year to continue his work on the karst mapping project. During his travels, he will make frequent stops to visit his childhood cat Athena, who he misses dearly.



Tiana Hurst getting her feet wet to identify and map a sinkhole.



Justin Bettendorf navigating a stream near Rapid River to search for bedrock exposures.



Justin Bettendorf and Tiana Hurst lead a field trip in the Hiawatha National Forest, to share their progress and field methods with Forest Service employees.

UNEARTHING MICHIGAN

MGS Takes Geology Across the State

by Lisa Wininger and Sophia White

From Negaunee to Niles, Alpena to Adrian, and South Haven to Saginaw, Michigan Geological Survey staff traveled the state this spring and summer, visiting local libraries to “Unearth a Story” and conducting outreach programs on beaches, museums, schools, and parks. The map below shows the breadth of MGS’ educational footprint this summer.

During the 2026 summer reading season of June and July, we conducted twenty-two library programs, averaging nearly three libraries a week! These programs allowed MGS to interact

with people in small group settings, give talks (we had ten separate slide decks to meet the needs of different audiences), and conduct hands-on activities like fossil replica making, rock testing, and mineral exploration. We offered fun story times for younger children and a guided tour and lecture about the Grand Ledges with adults.

In addition to the library events, MGS also conducted general outreach activities in June, July, and August, surpassing our event participation in the previous year. We worked with in-





MGS Rockhound trading card example.

service and pre-service teachers, and hosted Kalamazoo Public Schools summer campers. Our Air Zoo exhibit had seven hundred visitors and over 1,000 people visited us at the Grand Rapids Public Museum.

We conducted "Dino Day" at the Nature's Playscape in downtown Kalamazoo and "Beach Rocks Day" at the Pilgrim Haven Natural Area near South Haven. We began building a partnership

with the Michigan Department of Natural Resources by reprising "Geology Day on the Beach" at Warren Dunes State Park, and "Glacial Geology" at Yankee Springs Recreation Area. We hope to expand our state parks outreach next summer to encompass a schedule of state park collaborations across Michigan.

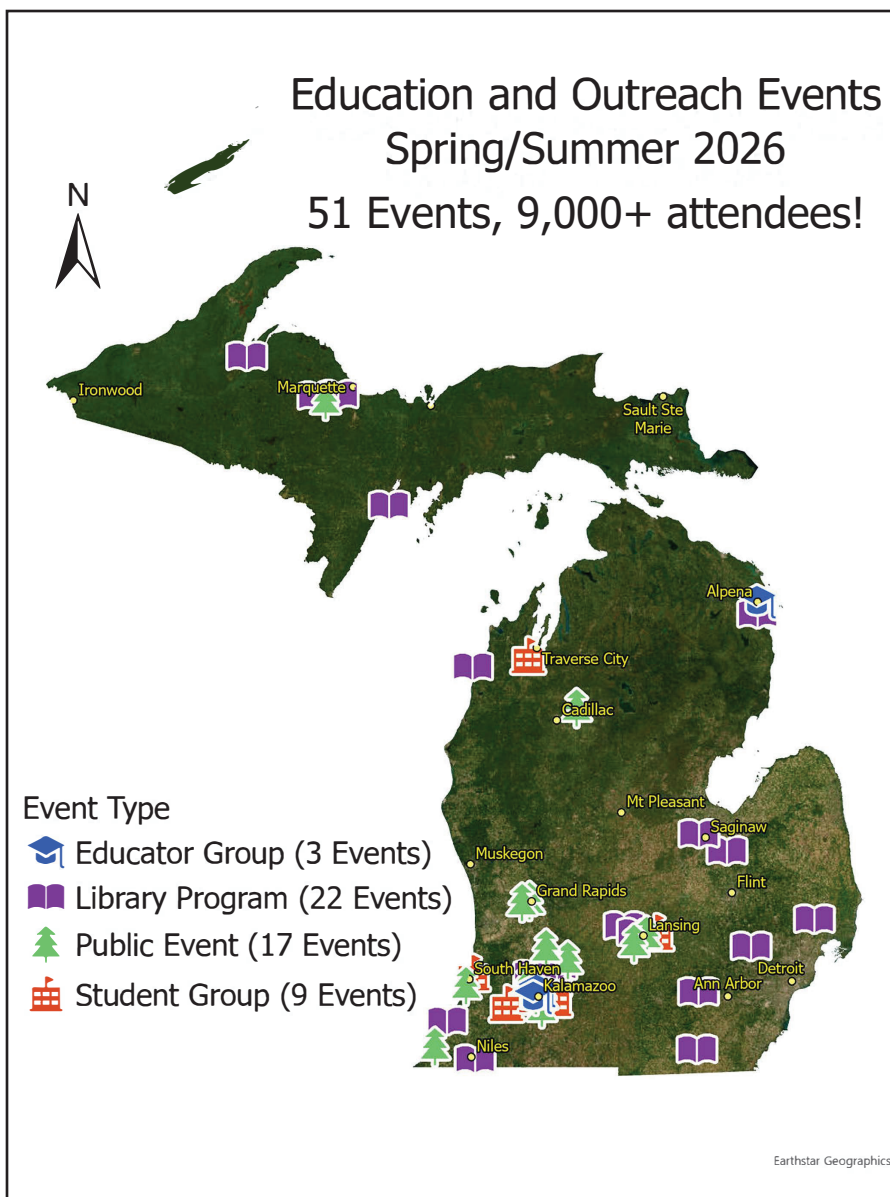
People in Michigan love rocks and rockhounding! Every program included young and not-so-young people bringing in their favorite rock to discover its backstory. MGS decided to support this interest and created the "Michigan Rockhounds" campaign: Interested rockhounds can visit our website and find a fun interactive rockhounding map which includes many sites of geological interest.

This fall, the map will incorporate a citizen science component to allow individuals or groups to submit information about sites currently on the map and submit recommendations for additional geological sites to visit.

Michigan Rockhounds also offers online resources to allow budding rockhounds to create their own

Michigan Rockhound trading cards or posters, using digital templates. The templates allow users to select a "rockhound" of their choice, add their favorite rock, mineral, or fossil, and pick a favorite Michigan geology site. It could be their own backyard!

This work was made possible through the time and support of our MGS staff. Eighteen MGS staffers from the Upper Peninsula and Lower Peninsula offices pitched in to staff events, and their expertise and enthusiasm made Summer 2026 a season where many Michiganders not only discovered rocks, fossils, and water but also the mission of MGS to understand, preserve, and share in understanding Michigan's rich geologic heritage.



MGS geoscientist Augustine Lodise introduces a curious young learner to the world of fossils at the Zauel Memorial Public Library in Saginaw.

A New Home for Michigan's Geologic Records!

by Sara Pearson, CPG

A new chapter is taking shape for the Michigan Geological Survey and the Michigan Geological Repository for Research and Education (MGRRE).

Construction is underway on MGRRE's new purpose-built facility at Western Michigan University's Parkview Campus. The approximately 20,000-square-foot building will provide expanded high-density storage for Michigan's extensive collection of rock core, cuttings, samples, and other geologic materials, along with laboratory space where those materials can be examined, analyzed, and used for research, education, and applied geoscience. The move is about much more than additional storage. MGRRE preserves a physical record of Michigan's subsurface—materials collected through decades of drilling and exploration that continue to support work on groundwater, critical minerals, energy resources, geologic mapping, and other questions important to Michigan's future. Researchers, government agencies, students, and industry all use the collection to better understand the subsurface, revisit existing materials with new questions and technologies, and gain information without having to recreate the original drilling.

Bringing collections and laboratory capabilities together will make it easier to put that geologic record to work.

MGS staff will also be getting a new home. Survey offices will be located nearby in a building recently acquired by Western Michigan University, where MGS will share space with WMU Facilities and the University's soccer programs. The location

will keep staff close to the repository and laboratories while providing office space for the Survey's growing team.

Together, the two facilities will create a more connected home for MGS staff, collections, laboratories, research, and educational activities—and provide room for the Survey to continue expanding its service to Michigan.

As construction and preparations continue, MGS staff are looking forward to the move and to welcoming researchers, industry partners, students, and visitors into our new home in 2027.



The new MGRRE warehouse space under construction will house Michigan's largest collection of geologic records.

Photo by construction manager avb.

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