



The Maine Geologist

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

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PRESIDENT'S MESSAGE

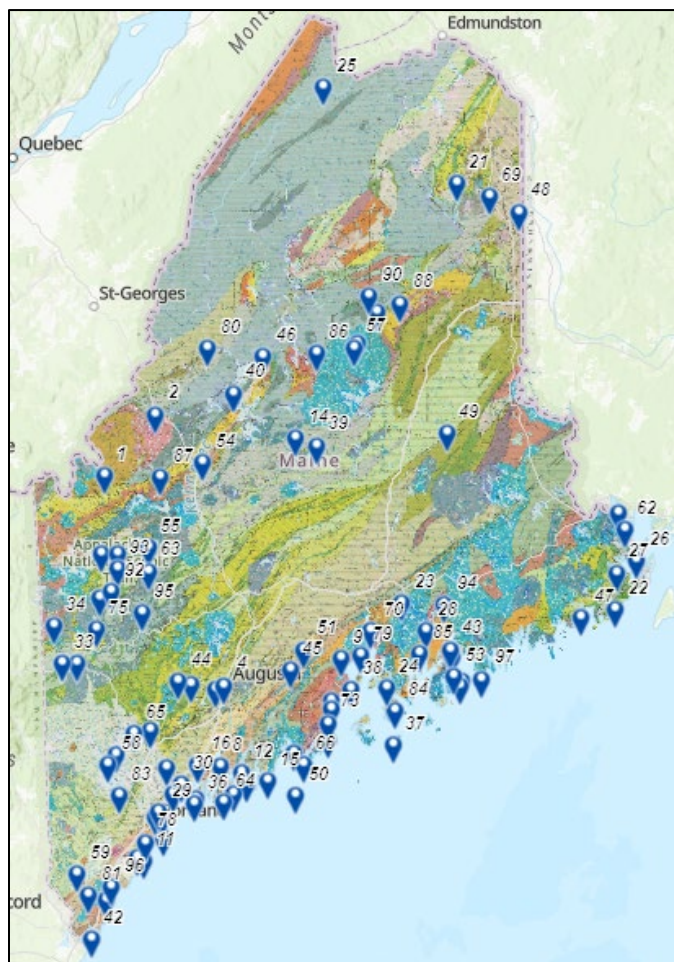
I hope everyone is enjoying the summer in Maine. I've been excited to see some of the field trip localities shared on the GSM [blog](#). I'm hoping to get to a few of the recommended sites myself soon. Be sure to check out the field trip [map](#); thank you so much to everyone who has helped with the planning of the self-guided summer field trip and to Keith Taylor for leading the effort! I'm looking forward to seeing you all at an end-of-summer virtual gathering (more information coming soon). Congratulations to State Geologist, Robert Marvinney, on his recent retirement! Read more about the details of a retirement party for Bob in September within this newsletter. Looking forward to seeing you all later this summer and fall.

Sarah Hall, GSM President
shall@coa.edu

GSM SUMMER FIELD TRIP

May – September 2021
Self-guided trip and contest

Grab your camera and go explore the diverse geologic features of Maine! GSM has selected 100 sites across Maine from the Maine Geological Survey's Geologic Facts and Localities series, a set of short publications written for the layperson to learn a bit more about the geology of Maine in small bites. Choose your sites on the GSM field trip map, then report back to us – we can't wait to see where you've been! Your photos and brief field report will be posted on the field trip blog. Did we mention prizes? A GSM t-shirt will go to those who either visit the most sites, travel the longest distance, or submit the best photo or commentary. At the end of



Geologic Map of Maine showing the 100 selected Geologic Fact and Localities. Get out there and collect them all!

the season GSM members will vote for their favorite photo/caption pair. See the GSM website for more information and be sure to check out the blog! Can you catch up with geoadventurer Amber Whittaker?

GSM Field Trip Info:

<https://www.gsmmaine.org/2021/05/gsm-field-trip-2021/>

GSM Field Trip Blog:

<https://gsmfieldphotos.blogspot.com/>

THE EDITOR'S MESSAGE

The newsletter is distributed through email in pdf format. Anyone with special needs please contact the Editor. Please send items of interest and photographs of GSM activities to:

Amber Whittaker, Newsletter Editor
amber.h.whittaker@maine.gov

GSM WEBSITE: www.gsmmaine.org
FACEBOOK: facebook.com/GSMMaine

NEWS FROM THE STATE GEOLOGIST

Signing Off



On January 8, 1987, I received a call at work while I was toiling with the rudimentary GIS, Arc/Info rev. 2.3 (no on-screen editing!). The caller was Walter Anderson, and he asked, “How would you like to come to Maine?” With that call, my purgatory of the prior 3.5 years in the hot, flat, and crowded environment of Houston, TX, came to an end. A few exceptional people can map out their chosen career path from beginning to end, but I am not one of them. My path to here was rather

circuitous with opportunities at times serendipitous. Suffice it to say, I could not have gotten to Maine without going through Texas where I was immersed in the early applications of GIS. When Walter called that January day, he was seeking a geologist who knew Maine geology and GIS. At that time there were very few of us.

So began my 34-year career at the Maine Geological Survey and 26 years as State Geologist. There have been many accomplishments during that time, but I cannot claim credit for many of them. They are really the accomplishments of a group of people, both past and present, committed to the mission of the MGS to improve our understanding of the geology of Maine as a basis for sound decisions about resources and the environment. Their collective expertise, creativity, and innovation has served the MGS and the people of Maine well.

One remarkable achievement has been the complete transition of electronic data management and communications. When I arrived in May 1987, the MGS had four phone lines for the office – our secretaries would use the intercom to tell us, “Call on line 2.” No PCs, no email, most reports typed on a typewriter, one Burroughs system computer that allowed rudimentary file sharing among users on text-only terminals. Our map production system was based on cartographers taking pen in hand to draw lines on mylar (aided by architectural curve tools), lettering using Leroy templates, and zipatone pattern sheets for filling areas. Editing these maps required erasing and redrawing. Once a mylar map was completed, we created copies with an Ozalid machine that was larger than an SUV!

It's unnecessary to point out that the paper maps had no database behind them. If we wanted to do some type of analysis using multiple map layers, we had to use the photo shop – the actual shop, not the software! It was a laborious process of enlarging or reducing images, then overlaying them on a light table for analysis.

The transformation to completely digital map production happened over several years, without the addition of more staff – in fact, typically doing more with less. Our cartographic group and geologists recognized the value of the GIS tools and plunged into recreating our processes electronically. Many geologists now collect information in the field

electronically, aided by GPS, and upload the day's work before they return to the office. Our GIS group has developed an integrated database for managing map and publication data, and for seamless analysis of geologic information statewide. It is hard to imagine a process transformation of similar magnitude in the coming years, but it will probably happen, and we'll wonder how we managed before.

In 1992, the Congress passed the National Cooperative Geologic Mapping Act that for the first time directed significant funding to the states to conduct mapping in areas with greatest scientific and societal need. Our first project under this program was mapping the surficial geology of one quadrangle in southern Maine, for which we received \$8,750 in federal funding. To date, we have completed around 160 bedrock and surficial maps through the program, in areas across the State deemed important by our Geologic Mapping Advisory Committee (GMAC). For 2021, we received \$162,706 in federal funding, matched by State funding, to map the surficial geology of three quadrangles and the bedrock geology of six quadrangles. In addition to MGS staff mappers, our team includes the most experienced mappers in Maine. I offer thanks to our volunteer GMAC members who have helped us focus the program on relevant projects that garnered support by the federal/state peer review panel.

The coastal/marine and groundwater programs have flourished in the last decade. Our marine geologists and summer interns have been systematically mapping Maine's major beaches, capturing information on berm width and edge of vegetation that is critical to our understanding of the impacts of sea level rise. We've developed a very strong collaboration with the Maine Coastal Program in the Department of Marine Resources that helps us direct our efforts towards the interface of the shore with the built environment and methods to adapt to changing conditions. One approach we've been working on is Living Shorelines – using natural materials to encourage growth of salt marshes to protect vulnerable shorelines. The work of our marine program has been essential to formulating state policy sea level rise adopted by the Legislature in June of this year.

Every Mainer benefits from MGS's work on water resources. The annual snow survey collects

important information about the water content of the snowpack, and how that might impact the potential for spring flooding. Decades of data will be useful to studies of how our winters have changed in response to climate change. We are working to enhance and expand the National Groundwater Monitoring Network in Maine, and with funding from the USGS, have added around 30 wells to the network. These will also provide valuable data on the response of groundwater to climate change. With ever increasing demands on Maine's water resources, our work to compile statewide water use information across all sectors will be in great demand. All of these groundwater efforts are conducted through collaborations with the USGS.

Perhaps our greatest collective accomplishment has been enhancing the reputation of the Maine Geological Survey, established by my predecessor, as the trusted source of unbiased information on all aspects of Maine's geology. When MGS professionals speak, people listen – homeowners and business owners, coastal residents, groundwater professionals, legislators, Department leadership, Governors (Independent, Democrat, and Republican), and anyone else with an interest in geology. The integrity of this organization, built on the reputations of MGS staff, is its greatest asset. I am honored to have carried the MGS banner for these many years. I extend my thanks to the Maine geological community for all your support during my tenure as State Geologist.

Robert G. Marvinney
Maine State Geologist, 1995 – 2021

***Editor's Note:** Watch for an upcoming special edition of *The Maine Geologist* with a compilation of all of Bob's contributions to "News from the State Geologist" from 1998 to now. Acting State Geologist Stephen Dickson will continue the tradition in the fall newsletter.*

MARVINNEY RETIREMENT PARTY

September 11, 2021
Wolfe's Neck Woods State Park

GSM wishes to honor and celebrate Bob's service to Maine geology and support of the Society in his role of State Geologist with an in-person outdoor gathering! The event will be held on September 11, 2021, from 1pm to 5pm, in the Group Picnic Shelter at Wolfe's Neck Woods State Park, 426 Wolfe's Neck Rd, Freeport. Watch your email for a poll on attendance and dietary requirements.

GSM SPRING MEETING RECAP

April 9, 2021
Virtual

The Spring Meeting of the GSM was held on the afternoon of April 9, 2021, from 1–5pm. We enjoyed four keynote addresses from retired State Geologist Walter Anderson, Dr. Cassandra Rose, Dr. Lindsay Spigel, and Professional Geologist Keith Taylor. Two students presented short overviews of their posters that were available for viewing online, and five students gave oral presentations on their work. Student abstracts are provided below and the recorded talks may be accessed online here:

<https://drive.google.com/drive/u/2/folders/1mP9d5up1tmAc5RqAcpsAUGKZaWqyt3wh>

STUDENT ABSTRACTS

Alexander Audet (University of Maine, Orono):
Oral Presentation

Bi-hemispheric Correspondence Among Mid-latitude Glacier Snowlines, Atmospheric Temperatures, and Westerly Wind Fields

Alexander Audet University of Maine, Orono
Aaron E. Putnam, University of Maine
Joellen L. Russell, University of Arizona
Andrew M. Lorrey, National Institute of Water and Atmospheric Research

Andrew N. Mackintosh, Monash University
Brian M. Anderson, Victoria University of Wellington
George H. Denton, University of Maine

Glaciers acutely respond to their ambient climate. However, the extent to which glaciers capture local, regional, or hemispheric climate processes is less clear. Here we explore the relationships between global climate variables and the related concepts of end of summer snowlines (EOSS) and equilibrium line altitude (ELA), hereafter called snowlines, of mountain glaciers on opposite sides of the planet: in the Southern Alps of New Zealand and in the European Alps. We performed EOF analyses on snowline observations for the past several decades from glaciers in these two antipodal mountain ranges. We then correlate these EOF timeseries with relevant variables from the ERA5 climate reanalysis, including summer (ablation) season temperature and tropospheric wind speeds at several different geopotential heights, as well as sea-level pressure. We find that for each study area, glacier snowlines: (1) show a significant and positive correlation with mid-latitude summer atmospheric temperatures from sea-level to ~100 mbar in the troposphere; and (2) a significant positive (negative) correlation with the poleward (equatorward) position of the summertime westerlies again extending from sea-level to ~100 mbar in the troposphere. Our results suggest that glaciers in the Southern and European Alps monitor the temperature and position of air masses associated with their respective westerly wind belts. We also find that glacier snowlines show a similar relationship with regional-scale tropospheric temperature variability to thermometers, highlighting the sensitivity of temperate mid-latitude mountain glacier snowlines to regional, and potentially hemispheric, atmospheric temperature.

Bryer Carlson (University of Maine, Farmington): Poster Presentation
Hunting for an Esker with G.P.R.

Bryer Carlson, University of Maine, Farmington
Julia Daly, University of Maine, Farmington

Readfield Maine hosts a suite of beautiful surficial geological features left from the most recently receded Laurentide ice-sheet of the holocene. From the remains of braided stream systems, recessional moraines and other common surficial features indicative of glaciation, this poster presentation explores these features, but focuses in on a particular structure that it believed to be an "esker" that would be associated with one of the marine fans (or deltas) in Readfield Maine. Through the use of G.P.R. (ground penetrating radar) we searched for evidence of a specific structure below the local peat/bog. The results are presented in this poster and yielded more than satisfying results. So take a minute, and check it out, sometimes the answers to our questions are right under our feet.

**Lauren Carver (University of Maine, Orono):
Oral Presentation**

¹⁰Be surface-exposure chronology of moraines documenting the onset of the last glacial termination at June Lake, eastern Sierra Nevada, USA

Lauren Carver, University of Maine, Orono
Aaron E. Putnam, University of Maine, Orono
Benjamin J. Hatchett, Desert Research Institute
Douglas P. Boyle, University of Nevada, Reno

What causes late-Pleistocene glacial cycles remains an outstanding problem of climate science. The classic Milankovitch Theory of ice ages posits that variations in Earth's orbital characteristics lead to redistribution of incoming solar radiation ('insolation') around the planet that, in turn, produced of glacier fluctuations. Because of Earth's precessional cycle, this theory would predict out-of-phase glacial cycles between the hemispheres. However, Mercer (1984) pointed out that ice-age maxima were achieved synchronously by glacial masses located at opposite latitudes in the Americas. Mercer referred to this as a problem that 'defies satisfactory explanation' by Milankovitch theory, and has been subsequently dubbed 'Mercer's Paradox.' Therefore, what caused the last glacial maximum (LGM) and termination still remain unresolved. Here, I attempt to test Mercer's Paradox by comparing chronologies of moraines constructed by mountain glaciers in the Cordillera of North and

South America. I present a glacial geomorphological map and a ¹⁰Be surface-exposure chronology of moraines deposited just before the onset of the local glacial termination at June Lake at 38°N in the eastern Sierra Nevada. The pending results will afford a chronology for this iconic terminal moraine belt in the Sierra Nevada and provide a consistent metric for comparing with previously dated moraine sets that document the signature of glaciation at 42°S in the Chilean Lake District of the southern Andes and at 44°S in the Southern Alps of New Zealand. These results will be discussed in the context of Mercer's Paradox. Further reconstruction of glacier chronologies at different latitudes and within different climate regimes will help to clarify the climate dynamics that produced the last ice age and termination.

**Peter Galloway (Bates College): Oral
Presentation**

Geometry of Brittle and Ductile Bedrock Structures influencing Groundwater Hydrology Adjacent to the Chlor-Alkali Superfund site, Berlin, NH

Peter Galloway, Bates College
John Dykstra Eusden, Bates College
Tommy Sheils, Bates College
Liza Folsom, Bates College

Field Mapping and Remote Sensing Analysis of Hydrogeological features in Berlin, NH was conducted as part of a USGS/NHGS State Map program to define bedrock units and structural features within the northern half of the Berlin 7.5' Quadrangle. In addition, the research supplemented previous efforts to define how groundwater flow could assist the entrance of contaminants such as elemental mercury from the superfund site into the Androscoggin River watershed. Previous USGS reports recorded bedrock units and features from the riverbank adjacent to the site and identified fracture domains based on local field data. This latest research incorporates data from the 2020 field mapping season, which updated the northern half of the Berlin quadrangle for the first time since the 1940s. The regional bedrock data allowed us to better identify and contextualize both brittle and ductile structures recorded at the chlor-alkali facility.

The research also includes an expanded dataset of fractures measured in the field. These fracture measurements were taken at similar locations as documented in previous studies, but the increased number of measurements allowed us to define local fracture domains with greater confidence. Lastly, the research included a hillshade analysis of fractures across the entire quad. Hillshade raster imagery on ArcGIS was not available during previous studies, and this analysis provided a valuable way to confirm fracture domains at a regional scale. Measurements of brittle and ductile features surrounding the chlor-alkali facility indicated the presence of a syncline structure running from the chlor-alkali facility towards the Androscoggin River. This structure would certainly assist groundwater flow from the site to the river. Fractures were found to primarily exist in two main domains: NE-SW, and NW-SE. Fractures striking NE-SW appeared to dominate the domain surrounding the chlor-alkali facility.

Isidora L. Munoz (College of the Atlantic):

Poster Presentation

Pathways of arsenic ingestion in Maine: Data to Action

Isidora L. Munoz, College of the Atlantic
Sergio Cahueque, Defend Our Health, Defend Our Health

Anna Farrel, MDI Biological Laboratory

Sarah R. Hall, College of the Atlantic

Kate Buckman, Dartmouth College

Jane Disney, MDI Biological Laboratory

While high doses can be fatal, chronic low-dose exposures elevates the risk for various negative health outcomes: various cancers, cardiovascular, pulmonary, and neurological effects. In this study, we measured arsenic concentrations in a primary pathway of low-dose chronic arsenic ingestion, private well water. Arsenic is naturally sourced from bedrock throughout Maine and New England. Additionally, human activities such as the use of arsenical pesticides in agricultural areas of Maine during the twentieth century, contribute additional arsenic to the near surface environment. We suspect that the cause of elevated As in shallow wells located

in areas where arsenical pesticides were historically used is due to residual concentrations harbored in the soil. We plan to collect soil samples to pair with well water chemistry data collected through the AAA program and the CDC database. Preliminary data from soil pits on previously farmed properties in the central coast of Maine confirm arsenic resides in the shallow soil. Arsenic is detected in both the drilled and dug wells on the properties. While recent efforts in Maine have focused on arsenic contamination in water from drilled wells, likely associated with bedrock sources, less data exists for sources contributing to shallow well contamination. Alongside the soil sampling effort, we are collaborating with environmental and public health organizations, school teachers, and researchers in a civic engagement effort fueled by citizen scientist data collection. To enable members of the public to bring “data to action” we created a toolkit with potential steps citizens can take to potentially improve the health of their wider community.

Samuel Roberts (University of Maine, Orono):

Oral Presentation

Establishing Baselines for Assessing Coastal features Using Drone Imagery

Samuel Roberts, University of Maine, Orono

Kristin M. Schild, Climate Change Institute-
University of Maine, Orono

Alice Kelley, Climate Change Institute- University
of Maine, Orono

Over 2,000 shell heaps, or middens are scattered along the Maine coastline, and serve as a rich archive of indigenous lifeways and paleoenvironmental information. are becoming increasingly eroded due to sea level rise, wave action, human activity, and development. Current methods for mapping middens include installation of rebar end points, manual measurements of midden extent, and many hours with several researchers or volunteers sketching and taking photographs of middens. These ground-based limitations restrict mapping to only those midden sites that are logistically feasible (size and location) and at geologically stable locations, eliminating the most at-risk locations and/or large sites. This project addresses prior limitations, and aims to establish a

baseline of midden extent and integrity at seven large and at-risk midden sites in Coastal Maine. We use post-processed aerial imagery to construct 3D digital baselines by means of SfM (structure from motion), and correct the scale using kinematic GPS surveys. This presentation highlights SfM models derived from aerial imagery and presents an interdisciplinary method for assessing the current state of coastal shell heaps and establishing a baseline for future modelling assessment. Remote sensing methods are key to assessing the status and integrity of coastal features, which are vulnerable to rising sea levels and human development, especially in areas of archaeological interest. In creating digital models of these coastal features, necessary steps can be taken to preserve these sites or the information they contain in the future, thereby preserving Maine's Wabanaki heritage and history.

Carolyn Ruth Snow (Bates College): Oral Presentation

A Comparison of Sediments from Above and Below a Tidal Restriction in the Back River Creek Marsh, Woolwich, ME

Carolyn R. Snow, Bates College
Beverly Johnson, Bates College
Philip Dostie, Bates College
Genevieve Dickinson, Bates College
Ruth Indrick, University of Maine

This study examines the geochemistry of sediment cores collected from above and below the approximately 150-year-old Dike Road and Route 1 tidal restriction across the Back River Creek Marsh (BRCM) in Woolwich, ME. Two 1 m long sediment cores were collected north of the restriction, one 1 m core was collected south of the restriction, and a fourth core was taken downstream at a reference site. Sediments were described visually and analyzed for Pb concentration, carbon content, and stable carbon isotope composition. The Pb concentrations were highest at 24 cm below the surface; assuming this reflects the onset of the phasing out of leaded gasoline in the US starting in the 1970s, average sediment deposition rates are estimated to be 0.5 cm/year north of the restriction. The carbon concentrations were higher north of the restriction

than south of the restriction, reflecting the current ecosystems in place; organic rich *Typha* sp. wetlands dominate the system north of the restriction, and sparsely vegetated tidal flats are present south of the restriction. The $\delta^{13}\text{C}$ values from all the cores range between -24‰ and -30‰, falling well within the typical C3 plant range, thus indicating a freshwater or grassland setting across the entire marsh since the late 1700s. Significant carbon and nitrogen isotope shifts occur in the early 2000s reflecting the establishment of current wetlands and shifts in nitrogen cycling immediately after partial tidal flow restoration with the removal of a tide gate and the addition of a new culvert by Bath Iron Works. This study provides important baseline information on the nature of the marsh prior to the building of Route 1 tidal restriction and is useful for evaluating recent and future restoration efforts.

Please contact president@gsmmaine.org with any questions.

USGS GEOPHYSICAL SURVEY 2021

Low-level airplane survey in Northern Maine

Have you seen the plane?! GSM members Chunzeng Wang and Bob Johnston have spotted the low-flying aircraft in Aroostook County. As part of the Earth Mapping Resources Initiative (Earth MRI), the USGS is conducting a high-resolution airborne geophysical survey to measure variations in the Earth's magnetic field and the natural, low-level radiation given off by different rock types. Read more about it here:

<https://www.usgs.gov/news/media-alert-flights-above-northern-maine-map-geology>

EC STUDENT REPRESENTATIVES

Nominations Welcome

The Executive Council is looking to broaden the voices we hear from during our planning meetings throughout the year. We would like to add two student representatives to the council to serve for one year beginning at the student-focused Spring meeting each year. Their primary job would be to provide a student perspective at EC meetings and to engage with peers throughout the year to suggest ways the GSM may benefit current students and recent graduates. **We invite GSM members to nominate potential student members to serve in this role.** Students should be at least 16 years old and be enrolled at an educational institution in Maine. **STUDENTS:** if you are interested in this position, please ask a faculty or peer GSM member to nominate you. **To nominate a student, please fill out this brief [form](#).**

NEWS FROM THE CAMPUSES

College of the Atlantic

Current students, Ben Capuano, Isi Muñoz Segovia, Lenka Slamova, and Adam Feher are assisting with the on-going groundwater quality project in the MDI area. With colleagues at MDI Biological Laboratory the students are investigating seasonality and intense rain event effects on private well water quality and beginning a complementary soil chemistry project on modern and past agricultural lands. The new Center For Human Ecology building opening this fall will host a new geoscience teaching space, rock and mineral storage area, and a geoscience student research laboratory.

Sarah Hall
shall@coa.edu

Unity College

The Unity College campus in Unity will reopen on August 2nd this year and we will be welcoming returning students to the residences later that month.



Above: Chunzeng Wang spotted the plane while out mapping in early July.

Below: Bob Johnston snapped this photo of the plane flying over the Allagash Waterway.



NEIGC 2021

**Grafton – Bethel Region, Maine
October 15 – 17**

The 2021 New England Intercollegiate Geological Conference will be held on October 15 – 17 in the Grafton – Bethel Region, western Maine. The Grafton Notch Campground has been reserved for NEIGC attendees only during this time. An icebreaker event will be held at the Maine Mineral and Gem Museum on Friday 10/15/2021 from 5:00–7:00pm. The Banquet will be held at the Bear River Grange on Rt. 26 in Newry, Maine, on Saturday 10/16/2021 from 5:00–7:00pm.

For more information, including contact details, please see the NEIGC Annual Conference website: <http://neigc.info/neigc-annual-conference/>

At this stage, we are not sure what size cohort will return to in-person learning as while many students are excited, a not insignificant number of students have fully embraced and enjoyed our online offerings (which include a variety of environmental science courses) and will be continuing in that modality. Whatever the outcome, it promises to be exciting!

At May commencement a total of seven students graduated with Bachelor of Science degrees in Earth and Environmental Science from Unity College. They will likely be the last to graduate under this moniker as the program name was shortened last summer to Environmental Science. Congratulations to those students (at Unity and elsewhere) on making it to the end! Among the graduates was Garrett Beaulieu who just wrapped up a thesis under the title "Subaqueous Soils of Freedom Pond, Maine." This work represents possibly the first identification and documentation of non-marine subaqueous soils in Maine. To celebrate submission of the thesis, Garrett will be jumping into some different fieldwork in Maine this summer: investigating bedrock outcrops in northern Maine with Dr. Allan Ludman.

Getting out in the field with students is what we are planning and looking forward to this academic year. While the effects of the pandemic have forced us to think differently about teaching (and in most cases that difference has really helped us elevate our craft as educators), getting a group of students out in the field remains a key tool for sparking interest, developing skills, and cementing learning of concepts. And it is also a lot of fun for us instructors! Unity College is attempting to join the Maine Cooperative Snow Survey this coming winter (Jan-May 2022) and will be adding one new site to the survey and hopefully resurrecting another. This work will engage students in field experiences that contribute directly to real-world science.

Best wishes from Unity!

Tom Whittaker

IN MEMORIAM

Roger LeBaron Hooke, 1939 – 2021

A memorial service will be held for Roger Hooke in Castine on July 31 at 2:00pm in the Unitarian Church on Court Street.

Ann Hooke describes it as "hopefully fitting for Roger – no flowers, just rocks; readings of several of his favorite poems and people having a chance to speak."

Alice Kelley



Photo is of Roger Hooke, taken on June 5, 2010, at the 73rd Reunion of the Friends of the Pleistocene. Glaciation of the Connecticut River Valley, Hanover, Lebanon, Enfield, Cornish and Claremont, New Hampshire.

Bob Grobe
Camden, Maine

SECRETARY'S REPORT

The Executive Council (EC) met by Zoom on Friday, March 26, 2021. Agenda items: ways to connect with students and increase student presence and representation in GSM, a funding request received for the Walter Anderson Fund, planning for

the virtual GSM spring meeting, and planning for a summer field trip.

Spring 2021 Annual Business Meeting Minutes

1. The spring 2021 business meeting was held by Zoom on Friday, April 9, 2021 beginning at 1:00pm. GSM President Sarah Hall welcomed all and called the meeting to order.
2. Updates from EC committees
 - a. Amber Whittaker provided an update from the Communications Committee: The new GSM website was launched at the start of 2021. This was a many-year project to develop and launch a new website, with the expected difficulties and kinks to work out. Dues can now be paid on-line. We will continue to develop new content and resources for the geologic community.
 - b. Bruce Hunter provided the Treasurer's report
 - i. We had thought the GSM website would be available to receive dues on-line in fall 2020, as dues are ordinarily collected at the fall meeting. Although payment via the website was not ready at that time, we have collected about \$3,600 in dues so far. GSM members are encouraged to pay their dues, either through the website or by sending a check. Cassy Rose, Website Administrator, can provide information and assistance in how to access website and pay dues on-line. Cassy can be reached at webadmin@gsmmaine.org.
 - ii. Walter Anderson Fund: There is almost \$39,000 in the fund at this time. After establishing an endowment fund at Bath Savings Institution, a funding campaign was started a little more than a year ago but activity was stalled during the pandemic. We are looking forward to re-starting this funding campaign.
 - iii. Kevin McCartney Fund: There is a little over \$10,000 in the fund at this time, which will continue to grow.
3. Summer Field trip
 - a. Keith Taylor reported on preparations for a virtual field trip, which will be organized to include sites of interest identified by Maine Geological Survey and GSM members over many years. There are more than 100 sites identified across Maine, in a mix of surficial and bedrock sites.
 - i. Sahra Gibson has created a great GIS map of sites of interest.
 - ii. GSM members can visit sites and submit photos and observations from their visits. Photos and field trip observations will be shared on a blog.
 - iii. Information for the virtual field trip will be shared by email and on the GSM website.
 - b. Sahra Gibson discussed the concept of Geosites, inspired by UNESCO Global Geoparks. The focus is on geoscience education and geoheritage (ecology and cultural heritage). Work to establish a Coastal Maine Geopark is underway, in the process of deciding which sites to focus on. Feedback from GSM members from the virtual field trip will be helpful for this process.
4. Cassy Rose provided an update from the ME Climate Council. Cassy is the Climate Council Coordinator in the Governor's Office of Policy Innovation and the Future. "Maine Won't Wait, a Four-Year Plan for Climate Action" was published in fall 2020. The Climate Council is very busy with implementing the plan. State agencies and the legislature are tasked with implementing the plan, through rulemaking in different agencies and assessing resources available or needed to implement plan recommendations. A lot of the work will likely spill into the next legislative session. Colleges and universities are participating, local governments and entities will be critical in implementing the plan, and working groups and subcommittees are forming and meeting.

5. State Geologist Bob Marvinney provided an update from MGS.
 - a. MGS has a busy summer ahead and many projects and initiatives in the works:
 - i. Earth Mapping Resources Initiative (MRI) – an exciting joint project with USGS involving mapping, geochemistry, and geochronology in western Maine. Amber Whittaker, Henry Berry, Bob Marvinney, Dyke Eusden, Chris Koteas, and Myles Felch are all involved.
 - ii. Surficial mapping – Lindsay Spigel and Dan Locke, Unity and Norridgewock areas
 - iii. Bedrock mapping – Amber Whittaker in Lewiston, Dave West in Bath, Chunzeng Wang in northern Maine
 - iv. Coastal marine program – mapping status of large sand beaches in advance of compiling the state of Maine beaches report
 - v. Groundwater – working to improve national groundwater monitoring network
 - vi. Engagement in the work of the ME Climate Council, including the process of adopting sea level rise forecasts. Note the sea level rise ticker available at the MGS website.
 - b. Bob is retiring at the end of June, and will stay around and engaged in ME geology following his retirement. Steve Dickson will take over as acting State Geologist.
6. Announcements from the GSM community
 - a. Alice Kelley reported that UMO is the recipient of a large donation of minerals from an anonymous donor. More than 70 samples will be on display, likely open to the public in the fall or winter. Most are museum-quality samples, and work is underway on appropriate displays and security.
 - b. Cassy Rose reported that the Governor's Office of Policy Innovation and the Future

has some summer internship opportunities. The application deadline is April 16. All are asked to pass the information along to interested students.

- c. Gary Lewis reported that he runs field trips every year for school teachers through his geoscience education and outreach company. He will be running a field trip to Iceland in July 2021 for vaccinated folks, and a field trip next year in NH.

The business meeting concluded at 1:30, followed by presentations from career geoscientists, student presentations, and a social hour.

Respectfully submitted,

Lisa Jacob, Secretary
ljj@smemaine.com
207-829-5016

TREASURER'S REPORT

Dues payment on the Website under the New System

A new fiscal year starts for GSM on August 1, 2021. This means that it will be time to pay your annual dues on the GSM Website under the new dues management system. On August 1 you will receive an email reminding you to go to your account on the website and pay your dues. We will also send a separate email with a copy of the "Logging into your membership Portal and paying dues" instructions that Webmaster Cassy Rose wrote for the Spring Newsletter in March 2021 (Volume 47, No. 1).

It is important to note that you may pay for one year or set up a 2-year payment plan which you can select when you are in your account. You may also enroll in autopayments by clicking on "Change" under payment methods and at the bottom of the page where you enter your credit card you will find a box that you can check to start your autopayments.

You will receive a dues reminder every two weeks until the Fall Meeting when you may bring your checkbook to pay if you wish. If you have not

paid by December 1, 2021 you will be removed from GSM membership and will no longer receive emails about GSM activities. You can be reinstated after that date at any time by paying your dues.

Respectfully submitted,
Bruce E. Hunter (Treasurer, 2021)

UPCOMING EVENTS

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Organizer</u>
May – October	2021 GSM Summer Field Trip	Statewide, self-guided	GSM
September 11	Marvinney Retirement Party	Wolfe's Neck Woods State Park	GSM
October 1	Anderson Fund grant proposal deadline		GSM
October 10–13	GSA Connects 2021	Portland, Oregon	Geological Society of America https://www.geosociety.org/
October 15–17	112 th New England Intercollegiate Geological Conference	Grafton-Bethel Region, Maine	Norwich University and Maine Geological Society
October 23–26	AIPG 2021 National Conference	Sacramento, California	American Institute of Professional Geologists https://aipg.org/page/2021CANationalConference
October 24–26	Exploration, Mining and Petroleum New Brunswick Conference	Fredericton, New Brunswick, Canada	New Brunswick Department of Energy and Resource Development
December 13–17	2021 American Geophysical Union Fall Meeting	New Orleans, Louisiana & Online	AGU www.agu.org

Please submit events to include on the calendar to the Newsletter Editor: amber.h.whittaker@maine.gov

MEMBERSHIP DUES STATEMENT

The GEOLOGICAL SOCIETY OF MAINE, INC. (often referred to as **GSM**) is a non-profit corporation established as an educational Society to advance the professional improvement of its members; to inform its members and others of current and planned geological programs in Maine; to encourage continuing social contact and dialog among geologists working in Maine; and to further public awareness and understanding of the geology of the State of Maine; and of the modern geological processes which affect the Maine landscape and the human environment.

The Society holds three meetings each year, in the late fall (Annual Meeting), early spring, and mid-summer (usually a field trip). A newsletter, ***The Maine Geologist***, is published for all members three times a year. The Society year runs from Aug. 1 to Jul. 31. Annual dues and gift or fund contributions to the Society are tax deductible. There are four classes of membership:

2021 FEE SCHEDULE

\$ 30.00 REGULAR MEMBER	Graduate geologists, or equivalent, with one year of practice in geology, or with an advanced degree.
\$ 30.00 INSTITUTIONAL MEMBER	Libraries, societies, agencies, businesses with interests in or practicing geology and related disciplines.
\$ 15.00 ASSOCIATE MEMBER	Any person or organization desirous of association with the Society.
\$ 5.00 STUDENT MEMBER	Persons currently enrolled as college or university students.

THE GEOLOGICAL SOCIETY OF MAINE ANNUAL RENEWAL / APPLICATION FOR MEMBERSHIP

Regular Member	\$ 30.00	\$ _____	Name _____	Make checks payable to: Geological Society of Maine Bruce Hunter, GSM Treasurer 44 Old Fairgrounds Rd Readfield, ME 04355
Institutional Members	\$ 30.00	\$ _____		
Associate Member	\$ 15.00	\$ _____	Address _____	
Student Member	\$ 5.00	\$ _____		
Contributions to GSM		\$ _____		
(please write gift or fund on check)				
TOTAL ENCLOSED		\$ _____		

Email Address _____

(GSM funds include the Walter Anderson Fund _____, and discretionary gifts as noted by contributor)

THE MAINE GEOLOGIST is the Newsletter of the Geological Society of Maine, published three times a year, in mid-winter, summer, and early fall, for members and associates.

Items for inclusion in the **Newsletter** may be directed to:

Amber Whittaker, Newsletter Editor
amber.h.whittaker@maine.gov
207-287-2803

2020/2021 SOCIETY YEAR BEGAN August 1
PLEASE SEND DUES TO TREASURER.
(or pay online at our website: gsmmaine.org)

THE GEOLOGICAL SOCIETY OF MAINE
c/o Bruce Hunter, GSM Treasurer
44 Old Fairgrounds Rd
Readfield, ME 04355

PLEASE PAY YOUR DUES!

THE GEOLOGICAL SOCIETY OF MAINE EXECUTIVE COUNCIL

President	Sarah Hall	(2022)	College of the Atlantic, shall@coa.edu
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Newsletter Editor	Amber Whittaker	(2022)	Maine Geological Survey, amber.h.whittaker@maine.gov
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	Troy Smith	(2022)	Maine DEP, Troy.T.Smith@maine.gov
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