



Granite State Geologist

The Newsletter of the Geological Society of New Hampshire,
Spring Edition – March 2024 – Issue No. 124

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MESSAGE FROM THE PRESIDENT

Hello Friends,

I'm devoting this column to express gratitude and thanks to my former geology professors, and to recognize (anonymously) those who were mentors as I began my lifelong journey of discovery of the planet earth. One of my favorite authors, John McPhee, describes in his book *Basin and Range* (pages 31 and 32) how few college freshmen initially enroll in the study of geology. It is often a combination of a charismatic professor and the need to meet a general science course requirement that draws many students to join the family of geologists. This is true for myself as it was an introductory "Environment and Man" course that I signed up for in the spring of 1978 that motivated me to take more geology courses and eventually make geosciences my major. I am sure that others reading this column have had a similar experience.

I was very fortunate that I started my undergraduate education in a small upstate college in the New York State university system. Although the geology department there did offer graduate studies toward a master's degree, the emphasis was on teaching and undergraduate research. Many of my professors were hired in the late 1960's as part of the university system's rapid expansion to accommodate the large influx of baby boomers. Several of my geology professors had previously worked in the exploration geology field associated with post-war petroleum and uranium extraction in the western states. Staffing cuts associated with the movement of these industries to areas outside the US in the late 1960's coincided with the rising need for geology professors. This was also a period of rapid change in the science of geology with the recognition of the wide-reaching impact of plate tectonics. What an exciting time it was to be a geologist!

In part, it was that sense of excitement and wonder conveyed by my professors that led me to study geology. It was their passion for teaching and desire to be mentors for which I am forever grateful. In my time, many professors hosted geology department parties in their homes. One such party, in the home of a professor I had not previously met, led to my participation in two summer research internships under his direction. Incidentally, it was at that party on Friday, March 30, 1979, that we all sat watching televised reports of the nuclear accident at the Three Mile Island generating facility outside Harrisburg, PA. We anxiously watched the TV wondering whether there would be a catastrophic release of radioactive hydrogen. Not all such parties were so somber. Several years later, while nearing the completion of the requirements for my master's degree, I met the woman who would later become my wife at a Christmas party hosted by my primary thesis advisor. Good times indeed.

So why am I being so nostalgic? It has been forty-plus years since most of my undergraduate and early graduate school experiences. All my geology professors have long since retired, many of those who began teaching at my alma mater after my graduation are also retiring, and unfortunately several of my beloved professors have passed away. Being retired myself, I have started to sort through my old textbooks and the many stacks of reference papers I have accumulated during my university years. I have been taking the time to review old class notes and research papers written by my former professors. At that time the latter were written, it was common for a lone researcher to spend several years in the field and lab accumulating data that was then published in a comprehensive geologic map and/or summary report. Today it is not uncommon for scientific journal articles to appear on-line within months of completion of a phase of a study, often co-authored by a dozen or more collaborators. Is this better? I'm not sure. What I am sure of is my admiration and gratitude for the many geologists who have contributed to my continuing education. Thank you all!

Tom

In Memoriam: John Cotton

Eminent New Hampshire geologist and charter member of GSNH, John Cotton passed away on December 28, 2023, due to Parkinson's disease.

In November 2021, the Lakes Region Planning Commission presented the Kim Ayers Award to John Cotton. **A description of John's work for and dedication to LRPC and the citizens of New Hampshire, from that award ceremony, is copied below.** It should be noted that in 2022 the LRPC renamed the Kim Ayers Award as the Ayers-Cotton Environmental Services Award *"in honor of two prestigious individuals who served as beacons of their communities. Originally created in 1988 in memory of B. Kimball Ayers, Jr. of Moultonborough who significantly contributed to the Lakes Region environment for so many years, this honor will also be bestowed on the recently retired Commissioner and long-term Executive Board member John E. Cotton of Andover as a [then] living icon of common-sense environmental protection in the Lakes Region."*

GSNH has also received the following remembrances:

- From Dorothy Richter, former Board Member of the GSNH: *"John was a Charter Member of GSNH, held NH PG License #2, and served on the first NH Board of Professional Geologists for two terms. He had a long and distinguished career at the USGS and NHDES and was a mentor and friend to countless Geologists in NH and beyond. We are all lucky to have known John Cotton and his beloved wife and fellow geologist, Tina."*
- From John Regan, long-time colleague at NHDES and fellow member of the NH Board of Professional Geologists: *[John was] "An amazing geologist and a wonderful person. We were lucky to work with and learn from him."*

JOHN E. COTTON

Recipient of The 2021 Kim Ayers Award

IN MEMORY OF B. KIMBALL AYERS, JR.

Awarded by the Lakes Region Planning Commission Executive Board, Fall 2021

John Cotton, known as Mr. Geology by the Lakes Region Planning Commission and Mr. Groundwater of NH when he was interacting with the public before retirement, is well qualified to be the recipient of the Kim Ayers award. The award is bestowed upon a person who has consistently worked to maintain and improve the environmental quality of the region. A resident of Andover who owns land and a couple of rustic cabins in a cove on Lake Winnisquam in Meredith, John was born in New Hampshire, went on to Dartmouth like Kim Ayers, and was a founding member of the NH Geological Society.

His background includes assisting in the mapping of glacial deposits in Greenland and working on a variety of water resource projects for the U.S. Geological Survey (USGS). Some of these included developing the first groundwater wells for the Cape Cod National Seashore, a hydrologic atlas of groundwater levels in the Boston peninsula, and a statewide New Hampshire reconnaissance of stratified drift (sand and gravel surficial deposits) aquifers. The resulting reconnaissance maps became known as the Cotton maps that are cited in state statutes. These aquifer maps were further refined with material logs from drillers and depths, as well as commentaries specific to municipalities and groundwater recharge, discharge, and quality.

After he retired from the USGS, he joined the Solid Waste Management Bureau of the NH Department of Environmental Services where he was involved with landfill closures. These closures have the potential of contaminating groundwater and wetlands. Oversight was necessary to have landfills properly lined, covered, and monitored for many years. John continued to monitor Andover's landfill as a volunteer until the past few years.

In addition after retirement, he volunteered to map and advise other mappers of surficial geology on a topographic quadrangle basis and resolve contact line differences between maps before they were digitized and combined to create a state surficial map. He was also one of several leaders on a field trip examining the surficial geology along the Merrimack and Pemigewasset Rivers in the Lakes Region area. Before stepping down in 2019, he served for many years as one of Andover's appointed Commissioners to the Lakes Region Planning Commission and was an elected member of the Executive Board.

DATES TO REMEMBER

April 8, 2024 – **Total Solar Eclipse!** The path of totality will cross northern New Hampshire at around 3:30 PM. Map here: <https://svs.gsfc.nasa.gov/5123/>

April 9, 2024 – **New Hampshire Geological Survey Annual Mapping Workshop 2024.** Hybrid; NHDES/online. See details on page 7-8.

April 18, 2024 – **GSNH Dinner Meeting.** Alan's of Boscawen, 133 N. Main Street, Boscawen. See announcement on page 15 and sign-up sheet on page 23.

April 27-28, 2024 – **Southeastern New Hampshire Mineral Club 19th Annual 2024 Rock, Gem and Mineral Show,** Dover Elks Lodge #184, 282 Durham Road, Dover, NH. <https://www.senhmc.org>

May 4, 2024 – **New England Gem & Mineral Show 2024.** Coolidge Hall at the Topsfield Fairground. <https://www.topsfieldfair.org/event/new-england-gem-mineral-show-2/2023-05-06/>

June 22-23, 2024 – **Gilsum Rock Swap 2024.** Gilsum Elementary School and Community Center, 640 Route 10, Gilsum, NH. <https://gilsum.org/rockswap/>

Date, 2024 – **GSNH Field Trip: TBD** – More details to follow!

Looking for some continuing ed credits? Some webinar series are below:

- clu-in.org compiles webinars of interest to EPA and the environmental community here: <https://clu-in.org/training/#upcoming>
- The geoscience online learning initiative (GOLI) has several webinars and short courses: <https://www.americangeosciences.org/workforce/goli>

January 2024 Meeting Recap

Our January meeting was virtual via Zoom, with about 60 attendees. The speaker was Andrea Tokranov, Research Hydrologist in the New England Water Science Center and a Researcher in the Environmental Health Program of the Ecosystems Mission Area at the U.S. Geological Survey (USGS). She gave a presentation on a per- and polyfluoroalkyl substances (PFAS) soil study in New Hampshire that was designed to better understand background (areas without known point sources) concentrations of PFAS in soil. The study included sampling throughout the state in areas not known to be impacted by PFAS, extensive laboratory experiments to understand how PFAS migrate from soil and biosolids to water under a variety of conditions, and additional investigations at two New Hampshire sites to compare field observations with the properties measured in the laboratory.

Assessing PFAS Occurrence and Background Concentrations in New Hampshire Soils

Andrea Tokranov
U.S. Geological Survey
atokranov@usgs.gov

January 18th, 2024
Geological Society of NH



This presentation is nearly identical to a presentation that Andrea gave at the Federal Remediation Technologies Roundtable (FRTR), so if you missed her presentation in January, you can see the full details here: <https://www.frtr.gov/pdf/meetings/nov2023/presentations/tokranov-presentation.pdf>

New Hampshire Geological Survey Update

By Shane Csiki, State Geologist and Director, March 2024

With spring right around the corner (or maybe even already here!), everyone in the New Hampshire Geological Survey is preparing for field season, and 2024 is promising to be another busy one. Ranging from geologic mapping throughout the state, including in southern New Hampshire, to again hosting summer interns who will be focused on stream identification and stream crossing assessment support, NHGS will be once again engaged in its bedrock tradition of field work. Field work is an essential component of any state geological survey, and has been a foundation of NHGS since its inception.

The history of NHGS dates back to 1839, with the first state survey under the direction of Charles Jackson. The first survey of the state, as well as the second survey under the direction of Charles Hitchcock, was focused on describing the state's geology, with an emphasis on identification of earth and mineral resources that were available to support economic development. Succeeding New Hampshire State Geologists wrote reports and publications characterizing aspects of the state's geology. The majority of these are now freely available on the web via NHDES' publications library. In

more recent years, these efforts have continued, in the classical spirit of geologic characterization through NHGS' participation in the USGS National Cooperative Geologic Mapping Program, known as STATEMAP. Field work was, and is, integral to all of these efforts.

Today, in 2024, NHGS is being asked to focus on issues that lie at the intersection of earth science and the long-term well-being of Granite Staters and the environment. Our stewardship of the statewide Groundwater Level Monitoring Network and its connection to drought management; our flood hazards and continued stream crossing efforts, and working with other state agencies and local municipal and regional planning partners on mitigation of these issues, are prime examples of how NHGS has been working to apply earth sciences to the welfare of our state's citizens. Our traditional geologic mapping efforts are also shifting toward southern New Hampshire, where our state's population centers are concentrated.

Contribution to all of these efforts all begins the same way it did in the days of Jackson and Hitchcock – by getting out into the field and collecting the necessary information. This includes Brian and Rebecca going out and measuring groundwater levels; Josh visiting field sites to investigate the surficial materials for geologic map construction; and summer interns who visit sites to verify stream locations and collect data on our state's stream crossing infrastructure and adjacent rivers and streams. We're using modern technology for field data collection, including the use of iPads and electronic applications, as well as lidar. Our geologic mapping efforts, particularly in the Ossipee area, have been aided by our Tromino unit and attendant collected geophysical data, that Mike is the steward of. The use of this modern technology provides greater insights into the environment than was possible years ago, while also making our workflows more efficient and providing enhanced data and information to our users and New Hampshire's citizens.

The needs of state agencies, local municipalities and the public are different today than they were in 1839, and so NHGS' scope is also different and encompasses a broader slice of the earth sciences than it has in the past. NHGS will continue to evolve with the needs of the users of earth sciences monitoring information in order to work toward solving problems. However, even with a broader scope and more advanced technology, some things remain as they did in 1839. Monitoring the conditions of the state's geology, groundwater, rivers, streams and stream crossing infrastructure in service to those who use all of this information to solve today's problems starts with good, solid field work – the bedrock of a state geological survey.

2024 New Hampshire Geological Survey Mapping Workshop

The 2024 New Hampshire Geological Survey (NHGS) mapping workshop will be on Tuesday, April 9, 2024 from 8:00 AM to 2:30 PM at the NHDES Auditorium and via Microsoft Teams (hybrid).

Registration is required. Note that registration closed before press time for in-person attendance. The agenda is as follows:

- 8:00-8:30 Continental Breakfast and Posters
- 8:30 - 8:50: *Welcome and New Hampshire Geological Survey Update*
Shane Csiki, State Geologist and Director
- 8:50 - 9:20: *Bedrock Geologic Map of New England*
Gregory Walsh, U.S. Geological Survey
- 9:20 - 9:50: *Massachusetts Depth to Bedrock Project*
Steve Mabee, Massachusetts State Geologist Emeritus
- 9:50 - 10:20: *New Hampshire Department of Transportation Update*
Krystle Pelham, New Hampshire Department of Transportation
- 10:20 - 10:40: Break
- 10:40 – 11:00: *Evaluation of recent droughts in New Hampshire using high-resolution spatial and temporal data from New Hampshire’s Groundwater Level Monitoring Network*
Michael Howley, New Hampshire Geological Survey
- 11:00 - 11:20: *NHGS Map Viewer*
Rebecca LeCain, New Hampshire Geological Survey
- 11:20 - 11:40: *The New Hampshire Stream Crossing Initiative’s Recent Data Collection Efforts*
Brian Hauschild, New Hampshire Geological Survey
- 11:40 - 12:00: *Siluro-Devonian Geology in Northernmost New Hampshire – Stratigraphy, U-Pb Geochronology, Geochemistry and Regional Implications*
David Converse
- 12:00 - 1:20 Lunch
- 1:20 - 1:40: *Bedrock Geology of the Shelburne, New Hampshire region: A transition from convergent to collisional tectonics of the Acadian Orogeny*
J. Dykstra Eusden, Bates College (Emeritus)
- 1:40 - 2:00: *Partially thrust recessional moraines, till benches and other ice-marginal features support active ice sheet recession in the Mount Osceola quadrangle, White Mountains*
Joshua Keeley, New Hampshire Geological Survey
- 2:00 - 2:20: *Awash with Outwash on the Ossipee Lake Quadrangle*
Daniel Tinkham (Senior Consultant and Hydrogeologist), Emery & Garrett Groundwater Investigations, a Division of GZA

2:20 - 2:30: *Closing Remarks*
Shane Csiki, State Geologist and Director

Time to Renew your Membership!

Have you renewed your membership yet for 2024? With your membership, you get a discount on dinner meetings (which will happen at some point!) and field trips, information of upcoming events of interest to the geological community, voting privileges at Society business meetings, and automatic subscription to this newsletter! Membership dues also help to support outreach for the greater community.

See the last page of this newsletter for a membership renewal application.

What's Your Board Been Doing?

The GSNH Board of Directors has had three meetings this winter via Zoom. The primary topics have been about the upcoming NEGSA conference, and preparing for the April dinner meeting, which will be in-person at Alan's of Boscawen on Thursday April 18th. More information on the dinner is elsewhere in the newsletter.

Other matters discussed:

- Summer 2024 field trip.
 - Ideas for GSNH merchandise.
-

New USGS map shows where damaging earthquakes are most likely to occur in US

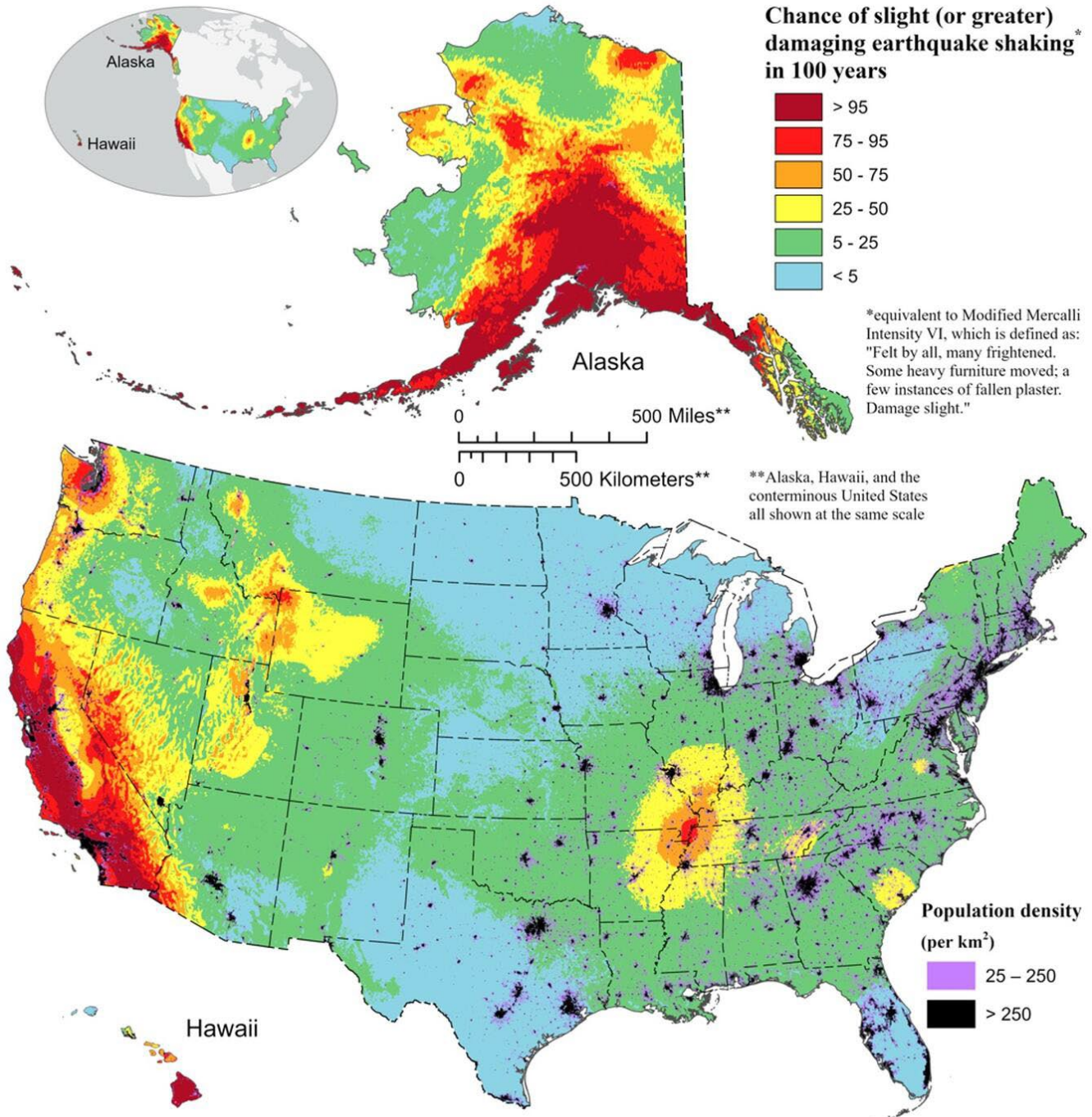
By Heidi Koehler and Steven Sobieszczyk. From USGS, January 16, 2024:

<https://www.usgs.gov/news/national-news-release/new-usgs-map-shows-where-damaging-earthquakes-are-most-likely-occur-us>

Nearly 75 percent of the U.S. could experience damaging earthquake shaking, according to a recent U.S. Geological Survey-led team of 50+ scientists and engineers.

This was one of several key findings from the latest USGS National Seismic Hazard Model (NSHM). The model was used to create a color-coded map that pinpoints where damaging earthquakes are

most likely to occur based on insights from seismic studies, historical geologic data, and the latest data-collection technologies.



National Seismic Hazard Model (2023). Map displays the likelihood of damaging earthquake shaking in the United States over the next 100 years. Sources/Usage: Public Domain. [View Media Details.](#)

The congressionally requested NSHM update was created as an essential tool to help engineers and others mitigate how earthquakes affect the most vulnerable communities by showing likely earthquake locations and how much shaking they might produce. New tools and technology identified nearly 500

additional faults that could produce a damaging quake, showcasing the evolving landscape of earthquake research.

“This was a massive, multi-year collaborative effort between federal, state and local governments and the private sector,” said Mark Petersen, USGS geophysicist and lead author of the study. “The new seismic hazard model represents a touchstone achievement for enhancing public safety.”

The latest iteration, the first 50-state comprehensive assessment, was updated from previous versions published in 2018 (conterminous U.S.), 2007 (Alaska) and 1998 (Hawaii).

Noteworthy changes in the new model show the possibility of more damaging earthquakes along the central and northeastern Atlantic Coastal corridor, including in the cities of Washington D.C., Philadelphia, New York and Boston. In addition, there is a chance for greater shaking in the seismically active regions of California and Alaska. The new model also characterizes Hawai'i as having greater potential for shaking because of observations from recent volcanic eruptions and seismic unrest on the islands.

"Earthquakes are difficult to forecast but we've made great strides with this new model," said Petersen. "The update includes more faults, better-characterized land surfaces, and computational advancements in modeling that provide the most detailed view ever of the earthquake risks we face."

Key findings from the updated seismic hazard model include:

- **Risk to People:** Nearly 75% of the U.S. could experience potentially damaging earthquakes and intense ground shaking, putting hundreds of millions of people at risk.
- **Widespread Hazard:** 37 U.S. states have experienced earthquakes exceeding magnitude 5 during the last 200 years, highlighting a long history of seismic activity across this country.
- **Structural Implications:** The updated model will inform the future of building and structural design, offering critical insights for architects, engineers, and policymakers on how structures are planned and constructed across the U.S.
- **Unified Approach:** This marks the first National Seismic Hazard Model to encompass all 50 states simultaneously, reflecting a massive collaborative effort with federal, state, and local partners.
- **Not a Prediction:** No one can predict earthquakes. However, by investigating faults and past quakes, scientists can better assess the likelihood of future earthquakes and how intense their shaking might be.

To read the full findings of the scientific assessment, which was published in the journal Earthquake Spectra, please visit: <https://doi.org/10.1177/87552930231215428>

Legislative Committee Update – March 2024

By Tom Fargo

Below is a list of 2024 NH House and Senate Bills that are potentially relevant to members of the Geological Society of New Hampshire. The Bill status was reviewed on March 9, 2024. Bills are identified by either an HB- (House Bill) or SB- (Senate Bill) prefix. This table lists Bills identified by keyword searches completed on December 3, 2023, supplemented by similar searches on March 9, 2024.

| LSR Number | Title | Bill Description | Bill Status |
|--------------------|---|--|--|
| Key Word “Environ” | | | |
| HB-1114 | AN ACT extending the commission to investigate and analyze the environmental and public health impacts relating to releases of perfluorinated chemicals in the air, soil, and groundwater in Merrimack, Bedford, Londonderry, and Litchfield. | This bill would extend for five years the work of the PFAS Legislative Commission established by previous statute until November 2029. | Full House approved motion to pass with amendment on 22-Feb-2024. Referred to Senate Energy and Natural Resources Committee. |
| HB-1171 | AN ACT extending the commission to study environmentally-triggered chronic illness. | This bill would extend the work of the Legislative Commission to Study Environmentally-Triggered Chronic Illness established by previous statute until November 2029 | Full House approved motion to pass with amendment on 07-Mar-2024. |
| HB-1170 -FN | AN ACT requiring public benefit and community impact assessments from the department of environmental services. | This bill would require the commissioner of the Department of Environmental Services to direct the Department to conduct public benefit and community impact assessments when considering any permit or project administered by the department under provisions of Title X and Title L of the RSA to ensure that human values, safety, and concerns receive proper consideration during planning and project development. Before granting a permit or going forth with a project, the department shall demonstrate that there is | Full House approved motion to refer to interim study on 07-Mar-2024. |

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| | | <p>positive community impact and a positive public benefit.</p> <p>Note: The FN designation indicates the bill contains a fiscal note describing the impact of the bill on the State budget. In this case the cost was described and an indeterminable increase in expenses to the Department.</p> | |
| <p>HOUSE RESOLUTION 27 <i>(a non-binding policy statement)</i></p> | <p>A RESOLUTION calling for policymakers locally and nationally to fully consider all relevant information and factors pertaining to climate change before pursuing courses of action that could adversely affect any economy or environment.</p> | <p>The proposed resolution states: Whereas, climate change is occurring and has occurred throughout all of time; and Whereas, it is crucial that policy decisions and lawmaking relating to climate reflect all relevant research; and Whereas, there is a documented pattern of suppression of some climate perspectives and data; and Whereas, fraudulent research and media reporting threaten the development of practical and well-founded climate policies; and Whereas, the many historically wrong climate predictions by so many climate activists should require caution by contemporary policymakers in developing long-term climate policies; and Whereas, there is a long history of climate alarmism and intimidation by special interests that have had chilling effects on the proper discourse and dialogue necessary to effectuate the best public policies; and Whereas, there is a wide spectrum of opinion regarding the true impact of human behavior on climate change; now, therefore, be it Resolved by the House of Representatives: that the New Hampshire house of representatives supports the proper consideration of all relevant data and perspectives as climate policy is developed on every level throughout the United States of America.</p> | <p>House Committee on State-Federal Relations and Veterans Affairs voted ought to pass on 09-Feb-2024.</p> |

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| LSR 2024-2171 | Title: relative to prohibiting the state of New Hampshire from enforcing the regulations of the Environmental Protection Agency. | | Proposed bill withdrawn or fully amended. |
| HB-1614-FN | Title: AN ACT relative to judicial review of department of environmental services decisions. | This bill establishes a new framework for review of decisions and rules of the department of environmental services to give less deference to agency decisions and prior reviews thereof. | Referred to House Judiciary Committee. Scheduled for vote on 06-Mar-2024. No report yet. |
| SB-543 | Title: An ACT relative to establishing the state environmental adaptation, resilience, and innovation council. | This bill establishes the state environmental adaptation, resilience, and innovation council. | Referred to Senate Energy and Natural Resources Committee. |
| SB-393-FN | Title: AN ACT relative to making an appropriation to the department of environmental services to fund regional drinking water infrastructure. | This bill makes an appropriation to the department of environmental services for the funding of regional drinking water infrastructure as part of Phase 2 of the Southern New Hampshire Regional Water Project to increase water supply to multiple towns impacted by PFAS contamination and growing water demands. | Full Senate approved motion to pass with amendment on 21-Feb-2024. Referred to House Finance Committee. |
| Key Word "Water" | | | |
| HB-1268-FN | Title: AN ACT relative to prohibiting the issuance of large groundwater withdrawal permits for the commercial sale of bottled or bulk water. | This bill prohibits the issuance of large groundwater withdrawal permits for the commercial sale of bottled or bulk water. | Full House approved motion of inexpedient to legislate on 07-Mar-2024. |
| HB-1326-FN | Title: AN ACT relative to notification processes for large groundwater withdrawal applications. | This bill requires notice of a public meeting requested during the consideration of an application for a large groundwater withdrawal. | Referred to House Committee on Resources, Recreation and Development. |
| Key Word "Waste" | | | |
| HB-1221 | Title: AN ACT relative to including solid waste landfills in the definition of development of regional impact. | This bill would Amend RSA 33:56 by inserting after paragraph II the following new paragraph: III. All proposed solid waste landfills shall be projects of regional impact and notice shall be made to all communities that are: (a) Located within any watershed where such landfill may be proposed; and (b) Located within 20 miles of such proposed landfill location. Note: This would potentially make it possible for | Referred to House Committee on Environment and Agriculture. |

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| | | communities within such boundaries of a proposed facility to have legal standing in a dispute over NHDES permit issuance. | |
| HB-1386-FN | Title: AN ACT relative to prohibiting the disposal of lithium-ion batteries in solid waste landfill facilities, composting facilities, or incinerators. | This bill prohibits the disposal of wet-cell and lithium-ion batteries and electronic devices in any solid waste landfill facility or incinerator in New Hampshire. The amendment also requires towns, solid waste districts and owners/operators of landfills and incinerators to make educational materials available on the prohibition. | Full House approved motion to pass with amendment on 07-Mar-2024. |
| HB-1490 | Title: AN ACT relative to the solid waste management act. | This bill makes various changes to the solid waste management act. | Full House approved motion to pass 07-Mar-2024. |
| Key Word "Professional" as potentially related to Geologists | | | |
| HB-518 | Title: AN ACT relative to the administration of occupations by the office of professional licensure and certification. | This bill makes various changes to the administrative statutes of the office of professional licensure and certification including definitions, lapse and reinstatement of licenses, disciplinary proceedings, and sanctions. | Full House approved motion to pass with amendment on 04-Jan-2024. Referred to Senate Committee on Executive Departments and Administration. |
| HB-1622-FN | Title: AN ACT relative to administrative rulemaking and license renewals by the office of professional licensure and certification. | This bill requires rulemaking relative to the recordkeeping of the executive director of the office of professional licensure and certification and expands categories included in license renewal time frames. This bill also updates several provisions about expired rules. | Referred to House Committee on Executive Departments and Administration. Scheduled for vote on 13-Mar-2024. No report yet. |
| HB-1410-FN | Title: AN ACT relative to certain professional licenses. | This bill repeals the chapter on the board of registration of medical technicians. This bill further makes changes to the nurse practice act. | Availability of full text reveals the bill is not germane to professional geologists |
| Key Word "Soil" | | | |
| HB-1613-FN | Title: AN ACT establishing a trust fund for money from soil and water environmental contamination court settlements. | This bill establishes a trust fund for money from soil and water environmental contamination court settlements. | Referred to House Ways and Means Committee. |

Key word searches with no returns: **geology, mineral, rock**

April Dinner Meeting Announcement

On April 18, Ethan Baxter will give a presentation on “The Story of Garnet: Tectonics, Water, and Time”.

- Ethan Baxter is a Boston native and lifelong Red Sox fan. Born in New England, he still has rocks and minerals he collected in his neighborhood as a child. He received his B.S. in Geology and Geophysics from Yale University in 1995 and his Ph.D. in Geology from the University of California, Berkeley in 2000. After a two year postdoc at the California Institute of Technology (Caltech), he was a member of the Department of Earth Sciences at Boston University from 2002-2015. He joined the faculty at Boston College 2015, where he is now professor of Earth & Environmental Sciences and Associate Dean for the STEM Disciplines.
- Ethan is a geochemist interested in the broad processes occurring within and between the Earth’s crust, mantle, and surface. An interest in unraveling the history of the Earth's inner workings is at the heart of much of his research. His research group has developed particular expertise in garnet geochronology.
- In 2020, during the COVID lockdown, Ethan started a YouTube Channel for kids called "Every Rock Has A Story". Now in its fourth season, Ethan and diverse co-hosts share the remarkable stories locked inside every rock. Season Three was even nominated for a Regional New England Emmy award.

The YouTube link for “Every Rock Has A Story” is here:

<https://www.youtube.com/@EveryRockHasAStory>

Geology learning resources

Geology Bites (<https://www.geologybites.com/>) is a podcast series with more than 80 episodes, each one featuring a different geologist and their research. We highly recommend checking it out!

The **Lakes Region Conservation Trust** (<https://lrct.org/>) has published a pamphlet on the Geologic History of the Ossipee Mountains of New Hampshire. It’s available on their web store here:

<https://lakes-region-conservation-trust.square.site/>

New study demonstrates how climate and irrigation influence salinity of waters in the Upper Colorado River Basin

By [Alexandra \(Allie\) Weill](#) and [Olivia Miller](#), USGS. February 8, 2023.

<https://www.usgs.gov/news/state-news-release/new-study-demonstrates-how-climate-and-irrigation-influence-salinity-waters>

High salinity can limit water available for agriculture, drinking water, aquatic life and infrastructure, with significant impacts to the economy and human health. Salt occurs naturally in water, but salt loads are influenced by irrigated agriculture, geology, land cover, land-use practices and precipitation. Salinity can exacerbate corrosion of lead pipes and increase lead levels in drinking water and mobilize other metals or pollutants as well. High salinity levels in the Colorado River reduce agricultural yield, damage infrastructure and are estimated to cause \$348 million per year in damage to infrastructure and crop production.



Salt deposits along the Paria River, UT. (Olivia Miller, USGS). Sources/Usage: Public Domain. [View Media Details](#)

“This study shows us how irrigation and climate work together to influence salts going into streams,” said USGS hydrologist Olivia Miller, lead author on the study. “Future climate change in the Southwest, combined with changes in irrigation, may affect stream water quality, but we don’t yet understand how these interactions will play out, so our next step is developing a model to test scenarios of future climate change.”

Wet periods have higher salinity loads because increased runoff from rain and melting snow and increased groundwater movement bring more salts into rivers. In contrast, drier periods have lower salinity loads. Irrigation also plays an important role, contributing salts to the river more efficiently than any other source.

“Salt loading to the Upper Colorado River and tributaries is a significant economic and environmental concern which limits the utility of the Colorado River and creates economic damages to downstream water users,” said Don A. Barnett, Executive Director, Colorado River Basin Salinity Control Forum.

For the new study, USGS scientists created a dynamic model that simulates the flow of water and salts throughout the whole Upper Colorado Basin between 1986 and 2017, allowing them to estimate salinity in the river and identify its sources for every year over that time.

The study confirmed [previous findings](#) that salts come primarily from groundwater (66-82%), with smaller portions attributed to runoff and springs. The salts in groundwater may initially come from infiltration of irrigation water, but once dissolved in groundwater, tracing the source is difficult. Groundwater is stored for long periods underground, meaning that there can be a time lag between when the salts enter the groundwater and when they end up in the river. As a result, while salinity management efforts focused on surface runoff processes may produce small results in the short term, larger impacts may take longer to work through the groundwater system.

“The Upper Colorado River Basin States are taking actions to reduce salinity in the Colorado River for the benefit of the 40 million people who use the River’s water,” said Paul Kehmeier, Salinity Program Coordinator, Colorado Department of Agriculture. “This study helps clarify that the sources of salt vary over time and it will help inform managers on strategies to continue improving the quality of water in the Basin.”



The Dolores River, CO. (Olivia Miller, USGS). Sources/Usage: Public Domain. [View Media Details](#)

The study was published in the journal [Environmental Research Letters](#).

[Click here for more science from the USGS Utah Water Science Center.](#)

Recent Announcements by the NH Office of Professional Licensure and Certification

The New Hampshire Office of Professional Licensure and Certification (OPLC) sent out two announcements in February; see below.

February 9, 2024: Proposal

The OPLC is proposing to readopt Plc 313 relative to Licensure by Endorsement with amendments to add the remaining professions and establish the rules as regular (10-year) rules.

The proposed rules (“Initial Proposal”) and the Rulemaking Notice that explains what is being proposed in greater detail are available on-line under the “Proposed Rules” section of the OPLC's Laws and Rules page found [here](#).

A public hearing on the rules is scheduled for Thursday, March 7, 2024 at 2:00 PM in in the Board Room at the OPLC offices at 7 Eagle Square in Concord. You have the right to attend the hearing and provide comments by speaking or by submitting written comments. Even if you do not attend the hearing, you may submit written comments to OPLC-Rules@oplcnh.gov. The **deadline for submitting comments** is **Thursday, March 21, 2024**.

All comments received will be considered to determine whether to make changes prior to submitting the rules for review by the Joint Legislative Committee on Administrative Rules.

If you have any questions about the rules or about the process, please contact Gretchen Hamel at Gretchen.R.Hamel1@oplcnh.gov.

February 21, 2024: Notification

Dear Professional Geologists,

We would like to inform you that the Office of Professional Licensure and Certification (OPLC) has entered into a contract with CE Broker for continuing education tracking. OPLC will be hosting a Board of Professional Geologist Virtual Stakeholder Meeting on March 21, 2024, from 2:00pm to 3:00pm ahead of the CE Broker transition effective date of April 1, 2024.

If you have previously signed up for CE Broker, you will be able to keep your current CE Broker credentials. Additionally, you will now have more time to complete and report your continuing education hours. Rather than submitting all CE's to the Board before the close of your renewal cycle, you will now have until your licensure renewal deadline to submit all required continuing education.

Board of Professional Geologists Virtual Stakeholder Meeting Information

You are invited to a Zoom meeting.

When: Mar 21, 2024 02:00 PM Eastern Time (US and Canada)

Register in advance for this meeting: [Meeting Registration - Zoom](#)

After registering, you will receive a confirmation email containing information about joining the meeting.

If you have any questions, please contact customer support at: customersupport@oplcnh.gov

Other Geology News:

See below for a roundup of recent geology articles that caught the interest of GSNH members:

Study: From NYC to D.C. and beyond, cities on the East Coast are sinking

By Virginia Tech News, January 2, 2024.

<https://news.vt.edu/articles/2024/01/COS-PNAS-subsidence.html>

Major cities along the Atlantic coast are sinking, in some cases as much as 5 millimeters per year, which is much faster than global sea level rise. Population centers that are particularly hard hit include New York City, Long Island, Baltimore, Virginia Beach, and Norfolk. Another issue is that the subsidence is uneven, causing damage to critical infrastructure as well as increased flood risk. Researchers used satellite data to build high-resolution terrain maps, which can be used to pinpoint areas of highest concern.

Original study:

Slowly but surely: Exposure of communities and infrastructure to subsidence on the US east coast

Leonard O Ohenhen, Manoochehr Shirzaei, and Patrick L Barnard

PNAS Nexus, Volume 3, Issue 1, January 2024, pgad426

<https://doi.org/10.1093/pnasnexus/pgad426>

The ‘Dolomite Problem’ Has Baffled Scientists for 2 Centuries – and Now They’ve Solved It

By [Darren Orf](#). From Popular Mechanics, January 24, 2024.

<https://www.popularmechanics.com/science/environment/a46318892/dolomite-problem-solved/>

Dolomite is relatively plentiful in rocks that are more than 100 million years old, but scientists have not been able to replicate the geological process that formed dolomite for almost 200 years. However, scientists were able to finally figure it out by dissolving defects with an electron beam, speeding up the crystalline growth process. Understanding how dolomite forms could help to grow materials for semiconductors.

Original study: Dissolution enables dolomite crystal growth near ambient conditions

Joonsoo Kim, Yuki Kimura, Brian Puchala, Tomoya Yamazaki, Udo Becker, and Wenhao Sun

Science 23 November 2023 Vol 382, Issu3 6673, pp. 915-920

[DOI: 10.1126/science.adi3690](https://doi.org/10.1126/science.adi3690)

Further reading: *The Dolomite Problem: A Matter of Time*

Carlos M. Pina, Carlos Pimentel, and Ángel Crespo

ACS Earth and Space Chemistry **2022** 6 (6), 1468-1471

[DOI: 10.1021/acsearthspacechem.2c00078](https://doi.org/10.1021/acsearthspacechem.2c00078)

The Six Most Amazing Discoveries We've Made by Exploring Venus

By [Shi En Kim](#). From Smithsonian Magazine, February 14, 2024.

<https://www.smithsonianmag.com/science-nature/the-six-most-amazing-discoveries-weve-made-by-exploring-venus-180983787/>

While Earth and Venus have similar size and planetary composition, Venus is uniquely inhospitable to life. The United States, Europe, China, and India all have missions planned to visit Venus in the near future, but we have already learned so much from the more than 40 robotic missions that have already sent back data, overturning centuries of misconceptions.

80 mph speed record for glacier fracture helps reveal the physics of ice sheet collapse

By [Hannah Hickey](#). From the University of Washington, February 28, 2024.

<https://www.washington.edu/news/2024/02/28/80-mph-speed-record-for-glacier-fracture-helps-reveal-the-physics-of-ice-sheet-collapse/>

A huge volume of freshwater is locked in the arctic and Antarctic glaciers, with a potential catastrophic increase in sea levels if they were to melt. So how would warmer oceans impact the speed at which glaciers would break apart? A new study shows that a 6.5-mile crack formed in 2012 on the Antarctic Pine Island Glacier in about 5.5 minutes. That means it opened at 115 feet per second, or about 80 miles per hour. This is the fastest rift-opening event observed, and much faster than can be clearly seen in satellite imagery, which is available every few days. These observations, show that under certain circumstances, an ice shelf can shatter, which is critically important as ice shelves are a stabilizing influence on the rest of the Antarctic ice sheet.

Original Study:

Ocean Coupling Limits Rupture Velocity of Fastest Observed Ice Shelf Rift Propagation Event

Stephanie D. Olinger, Bradley P. Lipovsky, and Marine A. Denolle

AGU Advances, 5, e2023AV001023

<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2023AV001023>

Call for Articles

Have a geological story you want to share with your fellow geologists? Did you go on a field trip or just see a cool geological feature in your travels? Feel free to submit to the GSNH newsletter, published quarterly. The submission deadlines are March 1, June 1, September 1, and December 1, but content can be submitted any time for inclusion in the next newsletter article. Send to jlambert@nobis-group.com. For more details, see the submission guidelines at the GSNH website:

<http://www.gsnh.org/submission-guidelines.html>.

GSNH T-Shirt Order Form

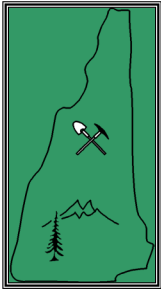
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**GSNH
P.O. Box 401
Concord, NH 03302**



Geological Society of New Hampshire



**Topic: The Story of Garnet: Tectonics, Water, and Time
Speaker: Ethan Baxter**

**Thursday, April 18, 2024
Location: Alan's of Boscawen
133 N. Main Street
Boscawen, NH 03303**

5:30 pm Social Hour - 6:30 pm Dinner - 7:15 pm Speaker Presentation

RSVP by 4 pm Friday, April 12 to get the reservation price

| | | |
|-----------------------|---|--------------------------------|
| Advance Reservations: | _____ Member (Dues Paid) | \$35.00 |
| | _____ Non-member | \$40.00 |
| • | Students \$20.00 with valid student ID card (Reservation Requested) | |
| • | Member at the Door | \$37.00 |
| • | Non-Member at the Door | \$42.00 |
| | | Checks payable to: GSNH |

_____ Please indicate special food issues – leave blank for none.

GSNH will also accept dinner reservations by e-mail, which will then allow you to pay at the door.

Reply via e-mail to mlombard603@gmail.com or

Mail to: **Melissa Lombard, GSNH Dinner Meeting,
PO Box 401,
Concord, NH 03302.**

Please note that e-mail reservations constitute an agreement with the Society for which you will be responsible to pay, whether you are able to attend or not, unless you cancel your reservation by noon the Tuesday before the dinner.

Name(s) _____

Address: _____

Your phone or e-mail: _____

The dinner and lecture program counts as 2.0 hours of CEU contact hour credit.



MEMBERSHIP & RENEWAL APPLICATION

Geological Society of New Hampshire

PO Box 401, Concord, NH 03302

Name: _____

(Please print clearly)

E-mail: _____

Renewing Members: Only update this section if you have changes to your contact information (including email) or educational history.

New applicants: please complete this section.

Preferred address/email to receive GSNH Communication: ___ Home or ___ Business

Home Address:

Business Address:

Home address lines

Business address lines (Employer):

Home Telephone: _____

Office Telephone: _____

New Hampshire PG # (if applicable) _____

Education: Degrees received or in progress:

Table with 4 columns: Year, Degree, Major, College or University

I volunteer to help with one of the following committees or tasks:

- Membership Committee, Legislative Committee, Giving a talk at a meeting, Regulations Committee, Education Committee, Events Committee, Communications Committee, Other

- Regular Member (Annual Dues \$20.00)
Student Member (Annual Dues \$10.00)...Please complete Education section above.

Make checks payable to "Geological Society of New Hampshire." Note that GSNH dues are not deductible as a charitable contribution, but may be deductible as a business expense. Please return this completed application form with any necessary corrections and a check for the appropriate dues to the GSNH at the address above. The Society's membership year runs from January 1 to December 31.

Signature: _____ Date: _____