



THE GREEN MOUNTAIN GEOLOGIST

QUARTERLY NEWSLETTER OF THE VERMONT GEOLOGICAL SOCIETY

WINTER 2000 VOLUME 27 NO. 1

CALL for ABSTRACTS
VGS Spring Meeting, April 15, 2000
Middlebury College
Abstracts Due By March 24, 2000

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THE GREEN MOUNTAIN GEOLOGIST
VERMONT GEOLOGICAL SOCIETY
DEPARTMENT OF GEOLOGY
UNIVERSITY OF VERMONT
BURLINGTON, VERMONT 05405-0122

The GREEN MOUNTAIN GEOLOGIST is published quarterly by the Vermont Geological Society, a non-profit educational corporation.

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President's Letter

Greetings Members,

This is the second time I am serving as your president. I hope that you will give me feedback and comment. Please let me know what direction you feel that the society should be going in. As in my prior term of office, I feel that the society has a responsibility and the ability to effect change in Vermont classrooms. Earth science week in October is the opportunity to effect change.

Alan Liptak and Kristen Underwood did a wonderful job in association with Earth Science Week in and out of my classroom. Alan gave a wonderful talk about ground water and glaciers. Alan and Kristen showed the students the sampling process for the observation wells on Mt. Abraham Union High School property.

I am looking forward to an exciting year with VGS. We have planned a summer outing to the Cold Regions Research Center as arranged by Larry Gatto, one of our past presidents. The fall field trip will be led by Stephen Wright.

As we enter the new millenium (by some counts), I urge all members to be active and contributory to the society.

Respectfully yours,

Shelley Snyder
VGS President
Mt. Abraham Union High School
Bristol, VT 05443
802-453-2333
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EARTH SCIENCE WEEK '2000
OCTOBER 8 - 14

Call for Abstracts!!

Spring Meeting of the Vermont Geological Society
Saturday, April 15, 2000
8:30 am

Spring 2000 Presentation of Student Papers
Hosted by: Department of Geology, Middlebury College
Middlebury, Vermont

The Vermont Geological Society will hold its Spring 2000 meeting at Middlebury College in Middlebury, Vermont. The meeting is dedicated to students conducting research in the geological sciences. Undergraduate and graduate students are encouraged to submit abstracts outlining the results of their research. Abstracts covering all aspects of the geological sciences are welcome and will be published in the Spring issue of the Green Mountain Geologist. The Charles Doll Award for outstanding undergraduate paper will be presented. A cash award for "Best Paper and/or 2nd place" will also be presented based on quality of the research, the abstract, and presentation of the paper.

Abstracts should be limited to one double spaced 8.5 x 11 inch sheet and can include figures. Font size should not be less than 10. Please submit both a paper and electronic copy (e-mail or disk; e-mail preferred) of abstracts, reviewed by the student's advisor, to the editor at the address given below. Disks should include both a formatted and "text only" version of the abstract (either Mac or IBM; IBM preferred). Abstracts submitted by e-mail should be sent to marjieg@dec.anr.state.vt.us . Oral presentations will be limited to 15 minutes with 5 minutes for questions. Two slide projectors and an overhead projector will be available.

Deadline for Abstracts: Friday, March 24, 2000

Send abstracts to:

Marjorie Gale
Vermont Geological Survey
103 South Main St., The Laundry Building
Waterbury, VT 05671-0301

For additional information contact Shelley Snyder at 658-0575 or Marjie Gale at 241-3608 (o) or 899-5002 (h).

SOCIETY NEWS

New Officers

President - Shelley Snyder; Vice-President - Christine Massey; Treasurer-Kristin Underwood; Secretary - Jeff Hoffer. Other board and committee chairs are: Board of Directors - Kent Koptiuch, Kristin Underwood and Marjorie Gale; Geological Education Committee Chair - Christine Massey; Advancement of Science Committee Chair - Rolfe Stanley; Publications Committee Chair - Marjorie Gale. The GMG will be co-edited by Marjorie Gale, Jeff Hoffer and Peter Gale. Stephen Wright will enjoy a well-deserved vacation from the GMG and we are grateful for all the time he spent on behalf of the society as GMG editor, meeting coordinator, interim treasurer and society jack-of-all-trades. He will continue to be membership chairman and the main contact at UVM, directing information and mail to the appropriate new board and committee members and advising those members. Please welcome our new officers and offer to assist whenever possible with various tasks and activities of the society.

VGS Projects

One goal of this past year was to establish a realistic schedule of events and activities which we could all support. You may or may not have noticed the absence of the winter meeting this year and last. Low attendance at the winter meetings, combined with the likelihood of bad weather, persuaded us to abandon the winter meeting. Northeast GSA and NEIGC afford local opportunities to stay abreast of geologic research in the northeast. We are continuing to support the spring student meeting, summer field trip, fall field trip with annual meeting/dinner, and four issues of the GMG. The executive committee is very interested in maintaining or increasing the VGS role in Earth Science Week.

Earth Science Week 1999

Earth Science Week involved many of our members and is generating increased interest among teachers as we head into our third year. The Vermont Geological Society, the Vermont Geological Survey at DEC, and Perkins Museum at University of Vermont are the three primary organizations that publicize and coordinate activities for the week. Several businesses also participate. This past year we asked libraries across the state to have special displays and story hours during the week, although we do not know how many participated. The following people and

organizations volunteered to organize events, lead field trips, speak in classrooms, judge posters, offer workshops, and contribute prizes: Christine Massey (Perkins Museum), Larry Becker (Vermont Geological Survey), Shelly Snyder (Mt. Abraham Union HS), Peter Gale (Stone Environmental), Marjorie Gale (Vermont Geological Survey), Kristin Underwood (Griffin International), Alan Liptak (Griffin International), Jon Kim (Vermont Geological Survey), Helen Mango (Castleton State College), Barry Doolan (University of Vermont), Jeff Hoffer (Hoffer Consulting), Alice Blount (OMYA), Ruth Gibbud (OMYA), Tracy Rushmer (University of Vermont), Laura Cadmus (Agency of Natural Resources), Rock of Ages Visitor Center, Fleming Museum, Lake Champlain Basin Science Center, Maria Stadlmayer (Agency of Natural Resources), Green Mountain Club, and Ginger Anderson (Agency of Natural Resources).

Calendar

February 4: Pre-registration Deadline for NE GSA Meeting

March 13-15: NE Geological Society of America, New Brunswick, NJ

March 22: Deadline for student abstracts

March 22: Deadline for submission of articles for Spring 2000 GMG

April 7: Publish Spring GMG

April 15: Spring VGS Meeting, Middlebury College, Middlebury, VT

May 1: Student Research Grant Proposals Due

June 1: Research grant money awarded

June 16: Deadline for articles and news items for Summer GMG

July 22: Spring/Summer Field Trip, CRREL, Hanover, NH

Sept. 1: Deadline for articles and news items for Fall GMG

Sept. 15: Publish Fall GMG

Sept. 23: Fall Field Trip led by Stephen Wright, Business meeting, election of officers and dinner to follow field trip

Oct. 8-14: Earth Science Week

Welcome to the Perkins Geology Museum!!

When is the last time you visited the *Perkins Geology Museum* at the University of Vermont? Have you seen the T-Rex hologram? Examined the Vermont State Fossil, the Charlotte Whale, up close and personal? Seen the Dinosaur Trackway? Or just browsed among the specimens from the Vermont State Collection?

We were fortunate to have a major face lift in 1993, which updated all of the exhibits and displays. The museum showcases rocks, minerals, and fossils from Vermont and around the world. A seismograph records daily seismic activity and visitors can view hand specimens through a small microscope. A 1931 relief model shows Vermont topography, the "Dark Room" highlights fluorescent minerals, and the geologic timeline spans the entire length of the museum.

The Perkins Geology Museum houses many excellent examples of fossils from the ancient reef limestones on Isle La Motte, VT and mineral assemblages from the ultramafic complex in Eden Mills, VT. Other important Vermont specimens include local Brandon lignites, Mount Holly mammoth tusks, and Vermont building stones.

We maintain a "waste" rock pile in the courtyard outside behind Perkins Hall in the event that students want to take a rock sample with them after a museum visit. Please feel free to add your "extra" samples to the pile if you are cleaning house, and would like to give your old rocks a good home. Interested K-12 students make great collectors!

Museum Hours: 9am-5pm (M-F), Weekends, & Holidays

Location: Perkins Geology Hall, University of Vermont, Burlington, Vermont 05405-0122 (just off Colchester Avenue next to the Fleming Museum)

Parking: in UVM Visitor's Lots (M-F) and next to Perkins Hall (weekends & holidays)

Geologic Information and Museum Tours: (802) 656-8694

Education Specialist, Christine Massey: (802) 656-1344

STATE GEOLOGIST'S REPORT

Laurence R. Becker, State Geologist
Vermont Geological Survey
103 South Main Street
Waterbury, Vermont 05671-0301

Surficial Geology

The Vermont Survey delivered the State's first digital surficial geologic map products supported through the STATEMAP grant program. Maps are complete for the Montpelier, and Barre West 7.5 minute quadrangles and the eastern half of the St. Johnsbury 7.5 x 15 minute sheet. The geologic mapping was performed by Frederick D. Larsen (Norwich University), Stephen Wright (University of Vermont), George Springston and George Hazelton (Clemson University Ret.) respectively. A digital database of located water wells, bridge, and hazardous waste borings accompanies each map. The data base includes depth to bedrock, depth to the top of each unit in the log, yield in gpm, static water level, lat/long, water resources #, town, and map number. Cross-sections were drawn for all maps and a thickness map of the overburden deposits is available for the eastern half of the St. Johnsbury quadrangle. Thanks go to Jonathan Kim for setting up digital protocols with the assistance of Laura Cadmus of the Information Management Section of the Agency and to Marjorie Gale for data base work and contract administration. Jon Kim digitized the maps and Laura Cadmus produced a map of well locations on a topographic base.

STATEMAP Geologic Advisory Committee Meeting

The STATEMAP advisory committee met on November 9, 1999, to advise on a policy for the STATEMAP grant submittal on November 18, 1999. As a long-range plan, the committee agreed that geologic mapping in select areas would be directed at societal problems. The mapping can lead to outcomes that improve and protect the public health and safety. It is anticipated that in future years these needs will be primarily in the area of surficial geologic mapping and the understanding of these materials in the third dimension. (Though there was considerable discussion of the applied need for bedrock information). This year's STATEMAP application focuses attention on the landslide hazard, watershed studies for flood hazard mitigation, and aquifer/recharge area identification. The intent is

to produce general resource maps that include framework geologic information with derivative products that address the societal problems linked to the three proposed subprojects.

The committee agreed that the following three proposed subprojects all have merit: Surficial geologic map and database for the Jeffersonville 7.5 minute quadrangle; Surficial geologic map and database for the Great Brook Watershed on portions of the Plainfield, Barre East, and Knox Mountain 7.5 minute quadrangles; and Surficial geologic map and database for the Arlington 7.5 minute quadrangle. For the Jeffersonville quadrangle and the Great Brook Watershed, hazard maps of slope instability and erosion are planned derivative products. An aquifer and aquifer recharge area map will accompany the Arlington quadrangle. Monies for the Vermont Survey will be included in cooperation with the University of Vermont to drill logged borings and place piezometers (to understand ground water conditions) in the existing Jeffersonville landslide area and above the school playing fields to better understand landslide risk. The Selectboard of Cambridge met on November 8 and supported the proposed geotechnical work.

Glacial Geomorphology - Alaska Field Trip

The State Geologist visited glacial geomorphology training areas in Alaska during a trip organized by the Midwestern State Geologists and the USGS. (They have approached Congress for an appropriation to do surficial geologic mapping in four Midwestern states). The field trip focused on the ice marginal deposits of glaciers in Prince William Sound and the Bering Glacier east of Cordova, Alaska as an analog of the many glacial deposits found in New England and the northern Midwestern States. Seeing glacial deposition in action was a real eye opener and will help Vermont develop a surficial mapping program. The Meares glacier in Prince William Sound was an excellent analog of till formation in the Taconics because of similar eroded rock types. The outwash near Weeping Pete Island at the Bering glacier displayed a gravel and sand sequence that has aquifer potential when buried. (These sequences occur in New England.) Truly a spectacular trip with hopes of a follow up slide presentation to explain glacial geomorphology and its meaning for Vermont.

New England Intercollegiate Geologic Conference and Surficial Mapping Symposium

The 91st annual New England Intercollegiate Geological Conference (NEIGC) was held October 1-3 and featured field trips highlighting recent research in Vermont. The successful "Surficial Geologic Mapping in New

England Symposium", sponsored by the Vermont Survey, the USGS, and the University of Vermont, was held on Thursday, September 30. Participants from Maine, Connecticut, Rhode Island, New York, Illinois (a leader in new map products), Vermont, and the USGS presented a range of material on current research, methods, and processes. The surficial mapping community also participated in the follow up field trips that highlighted the work supported by the Vermont Survey. Surficial geology trips by Stephen Wright, George Springston, George Hazelton, and Fred Larsen focused on results of mapping in the Montpelier, St. Johnsbury, and Barre West quadrangles.

New State Bedrock Map

In March, the State Geologist and Marjorie Gale visited the US Geological Survey in Reston, VA for two days to learn about the steps to bring the new state bedrock map from hand-drafted compilation copies to the final paper and digital products. Meetings were held with Nick Ratcliffe of the USGS, the technical editors, geologists, cartographers, and printers who will be working with the state to produce these maps. The State Map layout was presented and discussed in detail. The map is now planned to be published on five 42"x58" sheets and will include the 1:100,000 scale map plus unit descriptions, a stratigraphic correlation chart, cross-sections, references, a tectonic map, a metamorphic map, and geochronological data.

We are continuing to make progress on the bedrock map. Field work this summer focused on preparing for the NEIGC field trips, compiling and editing maps based on new field data, and mapping new areas in the Worcester Mountains in order to have consistency from north to south. Wally Bothner and Jo Laird, both from the University of New Hampshire, completed their map of the Tillotson Peak area at a scale of 1:24000. This work is the last additional new bedrock data to be added to the Mt. Mansfield one-degree sheet. Peter and Thelma Thompson spent most of the summer and fall working on revisions to the geology in numerous areas of the Mt. Mansfield sheet, dovetailing with the NEIGC field trip that they led with Barry Doolan. Peter Thompson continued to work on the compilation of both the Mt. Mansfield and Montpelier sheets through December as part of his sabbatical from Cornell College. We greatly appreciate all his contributions and commitment to the project. Jon Kim and Marjie Gale mapped in portions of 4 quadrangles in the Worcester Mountains to provide constraints for continuing and revising the geology from the Mt. Mansfield sheet south onto the Montpelier one-degree sheet. They also worked with Rolfe Stanley and Barry Doolan to compile geology from Belvidere Mountain east and south to Mt. Elmore in conjunction with

the NEIGC field trip that they led with Jo Laird. As the year draws to a close, the fieldwork for northern Vermont is complete. The northern Vermont group ended their field season reluctantly in early December, having now identified many areas that they would like to map in more detail or look at again! We plan to draft the compilation from the one-degree sheets this winter. Additional edits will be completed next summer as questions resulting from the scientific review process are resolved.

NEIGC Bedrock Trips - Studies Previously Supported by the Vermont Survey

Bedrock trips led by Peter Thompson, Thelma Thompson, Barry Doolan, Jon Kim, Marjorie Gale, and Jo Laird presented a unified transect of the geology of northern Vermont. Field trip participants came from universities throughout New England and were very receptive to the changes made to the bedrock map in Vermont. The field trip stops and accompanying geologic papers are published in the 1999 NEIGC Guidebook available through the University of Vermont.

New England and New York State Geologists: Aquifer Issues

The New England and New York State Geologists met with the USGS to discuss potential regional cooperation on aquifer issues. The thrust of the discussion was the geologic information needs for defining both bedrock and surficial aquifers. Examples of recent work by the USGS in New Hampshire to correlate well yield with data from detailed bedrock geologic mapping in two quadrangles showed statistically significant trends associated with various rock structures. New England and northern New York have similar aquifers in that water is obtained in fractured bedrock as well as surficial deposits.

In the past, the Vermont Survey has proposed studies to better define available water in fractured bedrock in growth areas where the bedrock is the primary source. The Vermont Survey has also focused surficial mapping in areas where higher yielding wells could be tapped to meet community demands. The New England and New York State Geologists agreed to meet again to focus on the geological and societal issues and discuss a vehicle for regional cooperation.

Jeffersonville Landslide

The State Geologist explained the geologic setting and the likelihood of future slide events to the Governor, State officials, Federal agencies and Senator Leahy's office at the Jeffersonville landslide. Jon Kim produced a

very useful schematic cross-section in Adobe Illustrator that facilitated the geologic explanation.

The Vermont Survey has proposed a hazard mapping initiative that will integrate the identification of the landslide and floodplain erosion hazard, both examples of slope instability. The Vermont Survey is querying other States as to how they handle the landslide issue from hazard identification through notification. The California State Geologist was contacted because he conducted a national survey of State Geological Surveys for the Association of American State Geologists. The survey indicates that California, Oregon, and Washington are most active as expected. Others that have reported property loss damage are: Colorado, Idaho, Kentucky, New York, Wyoming, Montana, North Carolina, Ohio, Missouri, Utah, and Nebraska.

St. George Villa Trailer Park

State Geologist Larry Becker, Jon Kim of the Vermont Survey, and Dennis Nealon of the Water Supply Division visited the St. George Villa trailer park and vicinity to better understand the geologic setting and factors contributing to elevated levels of radionuclides in existing wells. Representative samples were collected for chemical analyses from the various geologic domains to see if there is a rock type or unconsolidated material that is devoid of the radionuclides of concern. Practical matters such as access, ownership, and if a new clean source with sufficient yield in the vicinity of the trailer park is geologically possible were considered. Any acceptable geologic setting would also have to be capable of supplying the necessary yield to make up for well water that exceeds standards.

Slate Belt - Request to Purchase State Land

The State Geologist is meeting his statutory responsibility to provide technical information and advice regarding the management of mineral resources on state owned lands. Forest and Parks has been approached by a slate quarry owner who would like to purchase state land to expand his quarry from an existing location. There are two issues: whether there are geologically significant features on the piece of state property and determining the nature of the mineral resource and its worth to the State. The Vermont Survey visited the property in October and will analyze the resource potential during the winter of 2000.

Earth Science Week

The second annual Earth Science Week celebration, held during the week of October 10-16, 1999, provided an opportunity to encourage stewardship of the Earth and to expand public awareness and understanding of geology and its role in water and land use decisions, ecological issues, and hazard mitigation. The week was co-sponsored by the Vermont Survey, the Vermont Geological Society, Perkins Museum at the University of Vermont and the American Geological Institute. Governor Dean provided his much appreciated support by proclaiming the week. Many thanks go to Marjorie Gale, Christine Massey, Shelley Snyder, and Kristen Underwood for organizing the week's activities. Numerous geologists in Vermont volunteered as classroom speakers during the week. Geologists also participated in the Geologist-in-the Parks event at five locations in Vermont. A poster contest for school children, guest speakers at UVM, a mineral workshop sponsored by OMYA, Inc., and a field trip led by the State Geologist for the Green Mountain Club rounded out the Earth Science Week activities

Vermont Science Teachers Association

The Survey participated in a full day conference sponsored by the Vermont Institute of Science Math and Technology (VISMT), which focused on Vermont science and math education standards. We distributed about 400 publications covering topics such as the surficial geology of Vermont, guides to favorite geology web sites, and earthquake hazard curriculum. The Vermont Survey spoke with many science teachers at the middle and high school levels, other non-formal science educators, and attended a workshop sponsored by the Eisenhower National Clearinghouse for Mathematics and Science Education. The conference helped focus our attention on developing field trips, resources and activities that will align with the Vermont Framework of Standards and Learning Opportunities.

White River Watershed Association

On October 23, 1999, Jon Kim of the Vermont Survey conducted a four-hour field-based "Geology of the White River Watershed" workshop for the White River Watershed Association in Randolph, Vermont. The workshop covered bedrock and surficial geology, soils, geologic controls on the morphology of streams, and the influence of rock type on ground water quality.

Emergency Management Meeting for Towns and RPC - Natural Hazards

Emergency Management sponsored meetings in Waterbury for Regional Planning Commissions and Towns to hear from cooperators on how they can provide mitigation assistance. The State Geologist presented information on the recent landslide in Jeffersonville, stream erosion concerns, and the stream geomorphology work that is underway. As FEMA would like to address all hazard issues in project impact applications, the State Geologist discussed earthquake risk in Vermont and presented HAZUS output for the city of Burlington showing a potential damage scenario. On August 26th, the Vermont Survey received a request from the Addison County Regional Planning Commission for a letter of support for a Project Impact application to FEMA that will include a natural hazard component.

New England Association of Environmental Biologists

On March 10, the State Geologist spoke to a gathering of New England biologists at the annual meeting of NEAEB held at Ascutney, Vermont. The studies managed by the Vermont Survey that have focused on fluvial geomorphology, watershed land use, water quality, and aquatic ecosystems were discussed. Phase 1 results were summarized as human-induced land use changes cause various hydrologic and geomorphic adjustments, including alterations in the size and timing of flood peaks and in the magnitude and type of soil erosion. The Phase II watershed study seeks to identify, in Vermont, the type and magnitude of hydrologic and geomorphic reaction, alterations in sediment distribution, and the integrity of aquatic ecosystems as affected by land use activities. Mike Kline of the Water Quality Division followed with a discussion of considerations for the protection and restoration of stable stream morphology. Both made a case to the biologists that morphology of streams is definitely worth considering when approaching the problems of aquatic habitat protection and flooding/property loss concerns.

Phase II Stream Geomorphology Reports Finalized and Meeting Held

Over the last 2 years, the Vermont Survey has completed two phases of scientific study to understand the relationship between land-use change, gravel removal from streams and changes in stream morphology. The scientific information will be used as a base to develop management strategies for flood hazard mitigation and watershed hydrology protection.

Phase II of the Watershed Hydrology Protection and Flood Hazard Mitigation four phased plan is complete. On November 3, 1999, the consultants, Center For Watershed Protection, Aquafor Beech, and Step by Step, presented the results of *Watershed Hydrology Protection and Flood Mitigation Phase II - Technical Analysis, Stream Geomorphic Assessment, and Impact Assessment of Instream Management Practices (Gravel Extraction)*. Members of the Water Quality Standards Committee were invited to make comment with a number of additional invitees from the public sector. The Vermont Ski Areas Association, Vermont Natural Resources Council, and the U.S Fish and Wildlife Service from Concord, N.H. were in attendance.

Granville Natural Channel Design

As an outgrowth of the Phase II gravel extraction study, the Vermont Survey managed a fluvial geomorphology study resulting in a natural channel design for a 5000-foot section of the Upper White River in Granville. The design brief, final design plans, and the tender documents (bid documents for contractors) were delivered by Aquafor Beech LTD of Kingston, Ontario in August, 1999.

Land Stewardship - Pine Mountain Wildlife Management Area Biodiversity Project

Along with other element teams, the State Geologist reported on the findings and recommendations of the Geology/Soils and Climate team studying the Pine Mountain Wildlife Management Area in Groton/Topsham. Some of the geology/soils and climate recommendations are as follows: 1) Geology/soils and climate data should be collected and displayed in useful formats in the early coarse filter stage as a base of information for other element analyses; 2) For public land, the best examples of physical settings that support biodiversity within a particular eco-region that are a result of geology/soils, and climate should be preserved.

The Vermont Survey has received a number of requests for geological data as a layer of information when the physical attributes of land are assessed. Jason Benoit of the Vermont Leadership Center (VLC) in East Charleston, Vermont, which is a non-profit organization that promotes outdoor leadership skills, ecological awareness, and natural history training for students, teachers, and local residents approached the Vermont Survey about the possibility of developing a cooperative relationship. The Vermont Survey has offered limited technical assistance for their geology-based educational programs in the form of geology field and classroom seminars, construction of various geologic maps of their property (they

have access to 2500 acres), and guidance and assistance with the preparation of GIS-based educational displays for their base lodge. The Vermont Survey views this as a "train the trainers" project in which geology as an element of good land stewardship is presented to a non-profit group that will in turn promote the use of geologic information for the understanding and wise use of property.

Well Driller's Advisory Committee

As a member, the State Geologist displayed and discussed a number of bedrock map and surficial geology products that can be used by the drilling community and the hydrogeologic consultants. There was much interest in the thickness of overburden/depth to bedrock and surficial geology maps that the Vermont Survey is developing. The drillers would very much like to know the thickness and nature of the overburden when estimating costs to the homeowner. Perhaps there is a saturated coarse-grained material in the unconsolidated material over the bedrock that can be tapped to save the homeowner money. If the driller has to go through the overburden to bedrock than the overburden must be cased. The thicker the overburden the higher the estimated costs. From experience with different rock types, when the driller reaches bedrock the rock types displayed on the map can help predict whether a sufficient yield can be easily obtained or the task of collecting sufficient yield may be more difficult. Some formations have a sulfur water smell.

Bedrock maps are one of the information tools that a hydrogeologist will use to locate fractures that have the potential of producing higher yields to serve groupings of houses or commercial users. The driller's were interested in any statistical analysis of well yields for different formations in Vermont.

Association of American State Geologists - Statistician

The State Geologist, currently serving as elected Statistician for the Association of American State Geologists, delivered the Statisticians Report for 1998 to all State Surveys. The report, based on questionnaire responses from 40 State Geological Surveys, summarizes personnel, income, and expenditures. The combined total for expenditures for geological surveys of \$124,137,859.00 includes \$95,000,000.00 for geologic research and administration and the remaining funds spent on cooperative programs with federal agencies such as the US Geological Survey and the EPA. Nationally, geological surveys employ over 2000 professional and support personnel.

VERMONT GEOLOGICAL SOCIETY DUES STATEMENT 2000

Dear VGS member:

Membership dues for 2000 are \$15.00 for Members and Associate Members, \$20.00 for a family membership with one newsletter subscription, and \$8.00 for Student Members. Membership dues are used to publish the *Green Mountain Geologist*, to finance our Student Research Grants, and to cover the costs associated with meetings and field trips. If your address, phone, or e-mail address has changed since last year, please fill in this information below, if not, leave the form below blank. A new membership directory will be published with the Summer GMG. Return this form with your check for the appropriate amount made payable to the Vermont Geological Society by March 30, 2000. Send your payment to Kristin Underwood, Treasurer; Vermont Geological Society; Department of Geology; University of Vermont; Burlington, VT 05405-0122. Thank you.

Name:	Date:	
Street or Box:		
City, State, ZIP:		
Work Phone:	Home Phone:	
e-mail address:	Fax No.:	
<u>Circle Type of Membership:</u>		
Member (\$15)	Student Member (\$8)	Family (\$20)
		Amount Due: _____
Additional Contribution to VGS Research Grants: _____		
Total Enclosed: _____		

Vermont Geological Society Student Research Grants

are designed to aid our future geologists investigate Vermont's geo-history.

Help the VGS to promote a deeper insight into Vermont Geology.

Students receiving assistance through the program will present their research results at the VGS Spring Meetings. Your generosity will help cover a lot of terrane!

To contribute to the **VGS Student Research Grant Program**, clip or copy this form and send it, along with your check or money order made payable to VGS, to:

Kristen Underwood, Treasurer, Vermont Geological Society
Department of Geology, University of Vermont
Burlington, Vermont 05405-0122

- *I'VE ENCLOSED MY TAX-DEDUCTIBLE CONTRIBUTION TO BE DEDICATED TO THE VGS STUDENT RESEARCH GRANT PROGRAM.*

TOTAL GIFT: \$ _____

NAME: _____

ORGANIZATION: _____

ADDRESS: _____

CITY: _____ STATE: _____

VGS MEETINGS in 2000

SPRING - April 15, Student Papers, Middlebury College

SUMMER - July 22, Field Trip to CRREL, Hanover, NH

FALL - September 23, Field Trip TBA

Editors' Favorite Web Sites

Volcano World (beautiful images):

<http://volcano.und.nodak.edu/vw.html>

Canadian Center for Remote Sensing (tutorials; images)

<http://www.ccrs.nrcan.gc.ca/ccrs/eduref/edurefe.html>

Ocean Planet Homepage (turn your speakers on):

http://seawifs.gsfa.nasa.gov/ocean_planet.html

Rob's Granite Page (rocks with a sense of humor):

<http://uts.cc.utexas.edu/~rnr/index.html>

The Talk.Origins Archive (evolution discussion):

<http://www.talkorigins.org/origins/faqs.html>

A Geologist's Lifetime Field List:

<http://www.uc.edu/geology/geologylist>

Triassic-Jurassic Working Group at Rutgers

<http://www-rci.rutgers.edu/~schlich/>

e-mail the address of your favorite web site to marjieg@dec.anr.state.vt.us

Other news items:

Vermont Field Trip Guidebooks Available:

1999 NEIGC Field Trip Guides for Vermont are available through the Geology Dept., Perkins Hall, UVM, Burlington, VT 05405 for \$18.00 plus \$3.00 shipping.

1997 NEIGC Field Trip Guides for Vermont are available through the Dept. of Natural Sciences, Castleton State College, Castleton, VT 05735 for \$18.00 plus \$3.00 shipping.

VGS Treasurer's Report

December 16, 1999

Dear President and Board:

I have received nearly the last of the Treasurer's records, as of yesterday. Based on my brief review of the records, the financial position of the Society remains strong. Once I have had a few weeks to fully review the set of records, I will forward to the Board a more detailed financial report.

Checking Account Balance, 12/16/99: \$1,759.61

Paperwork has been processed to permit my signature on the Society's checking account. Our account has remained with Vermont National Bank, during the initial phases of recent banking mergers/ buyouts. However, it will be transferred from VNB to Chittenden Bank in early March of 2000 when the banking merger/ buyout process is completed.

Thanks to Steven Wright's extra efforts, following the resignation of Alan Carpenter as treasurer, the 1999 membership dues were deposited in July 1999. Three additional checks for member dues, received within the last couple of months, were deposited today and are reflected in the above balance.

I look forward to continuing to serve the Society in a new role as Treasurer. I welcome any feedback and suggestions from the Board and from the membership.

Respectfully submitted,

Kristen L. Underwood