



QUARTERLY NEWSLETTER OF THE VERMONT GEOLOGICAL SOCIETY

VGS Website: <http://www.uvm.org/vtgeologicalsociety/>

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PRESIDENT'S LETTER

The combined 2018 New England Intercollegiate Geological Conference (NEIGC)/ New York State Geological Association (NYSGA) meeting was held in Lake George, NY from October 12-14. The Fort William Henry Hotel and Conference Center was the base venue. Thanks to Tim Grover and Helen Mango for organizing this event. It was great to spend three days in the field with good friends and colleagues. As per usual, I learned an enormous amount. A short photo album of each trip follows.

*Respectfully submitted,
Jon Kim, President*



Figure 1. William Peck (left) and Martin Wong explaining basic Adirondack geology.

Friday Trip A2. Geology of the Carthage-Colton Shear Zone and Lyon Mountain Granite: An Adirondack Field Trip in Honor of Bruce Selleck- William Peck (Colgate U.), Eric Johnson (Hartwick College), and Martin Wong (Colgate U.).



Figure 2. Lyon Mountain Granite dikes (pink) that intrude calcsilicate granulite.



Figure 3. Mylonite in the Dana Hill Metagabbro along the Carthage-Colton Shear Zone which separates the Adirondack Highlands from the Lowlands.

Fault Systems of the Taconic Foreland: Whitehall, NY to West Haven, Vermont [All Kinds of Faults!]-
William Kidd, Steve Howe, and Chul Lim (SUNY at Albany).



Figure 4. A rainbow appeared following brief showers at the last field trip stop.



Figure 5. Ordovician Shoreham Thrust that juxtaposes tan-weathering Providence Island dolostones (hanging wall) with the Hortonville gray shales (foot wall).

The Cheever and Mineville Iron Oxide-Apatite (IOA) Deposits- *Marian Lupulescu (N.Y. State Museum), Jeff Chiarenzelli (St. Lawrence U.), David Bailey (Hamilton College), Sean Regan University of Alaska/Fairbanks), and Jared Singer (RPI).*



Figure 6. Metagabbro face with foliation-parallel magnetite-fluoroapatite ore zones in the Cheever Mine.



Figure 7. Waiting our turn to crawl into an excavated ore zone in metagabbros of the Mineville Mine.



Figure 8. Magnetite ore on the roof of excavated zone in the Mineville Mine. Pencil magnet for scale.

TREASURER’S REPORT

Finances: The Society is in sound financial health, maintaining a relatively steady-state as regards income and expenses. We have a new mailing address:

Vermont Geological Society
PO Box 213
Montpelier, VT 05601

Membership Renewal: The majority of members paid their dues, and we have several new members join the society in the second half of 2018.

Expenses:

\$343.28	spring meeting expenses
\$300.00	Samuel Cartwright – 1 st place student prize
\$200.00	Sophie Leiter – 2 nd place student prize
\$100.00	Andrew Hollyday – 3 rd place student prize
\$1,000.00	John Mark Brigham – VGS Research Grant
\$141.80	Peter Gale – newsletter expenses (fall 2017 & winter 2018)

Income:

\$1,314.00	Dues
\$1,065.00	Research Program

Balance: Our current balance as of October 30, 2018 is \$10,330.

The following members generously donated to the VGS Research Grant Program: Laurence Becker, Alice Blount, David Butterfield, Bruce & Cheryl Cox, Jeanne C. Detenbeck, Brett Engstrom, Barbara L. Hennig, Jefferson P. Hoffer, Jon Kim, Chris Koteas, Ronald B. Krauth, Eric Lapp, John Malter, J. Gregory & Nancy W. McHone, Andrew & Laura McIntosh, Jeffrey Pelton, George Springston, Sharon Strassner, Stuart Strife, Art Stukey, Peter J. & Thelma B. Thompson, Roger & Terry Thompson, Laura Webb.

New Members:

Ed Delhagen, Vermont Public Service Department, Randolph, VT

Dorothy Rosensweig, Retired, South Burlington, VT

Bruce & Cheryl Cox, Horizons Engineering, Perkinsville, VT

Patrick Korths, Carriage House Consulting, Peru, NY

Respectfully submitted,

Carey Hengstenberg, Treasurer

SECRETARY'S REPORT

Summer Field Trip, August 25, 2018 – Landslides of Washington County

Trip Leader: George Springston

Participants: Lori Barg, Larry Becker, Graham Bradley, Colin Dowey, Marjorie Gale, Peter Gale, David Gross, David Mitchell, John Moore.



The theme of the 2018 VGS summer field trip was landslides of Washington County, which also gave us the opportunity to examine the surficial geology in the towns of Calais and Plainfield. The enthusiastic group met on an ideal sunny day in August to scramble above, below, and on landslides previously studied by Barg and Springston (2001), Clift and Springston (2012), Springston and Thomas (2013), Springston (2017), Springston and Gale (2018), and Springston and Thomas (2018).

The day began with a steep climb down a slide on the east shore of North Montpelier Pond, where George Springston described the late Pleistocene history of glacial retreat to the group while we stood (precariously) on glacial Lake Winooski, shallow water, medium-grained, sandy deposits.



The second location was a small landslide on the outside of a meander bend on the Winooski River at Cate Farm, Plainfield, where the group observed Lake Winooski deep water, fine-grained varves, overlain by recent alluvial deposits.

The third location was observed from above the scarp face of one of a series of larger rotational failures in poorly to moderately sorted, coarse-grained, ice contact deposits and sandy glaciolacustrine sediment, on the north bank of the Winooski River, south of Goddard College.

The group then travelled through Plainfield village, across the Holocene alluvial fan to the Great Brook, a southern tributary of the Winooski River. The narrow valley of the Great Brook south of Plainfield is incised in dense silt-matrix till, sandy till, ice-contact sand and gravel deposits, coarse- and fine-grained lacustrine deposits, stream terrace deposits, and modern alluvium (Springston and Thomas, 2014, 2018).



The most abundant surficial geologic material is the dense silt-matrix till. This is firm to very firm, very poorly to extremely poorly sorted, and contains abundant boulders, cobbles, and pebbles in a matrix of silt and sand with minor clay.

The ice-contact deposits consist of moderately to very poorly sorted, medium to fine sand and silty fine sand and gravel deposited. Faulting and/or contortion of layers is common.

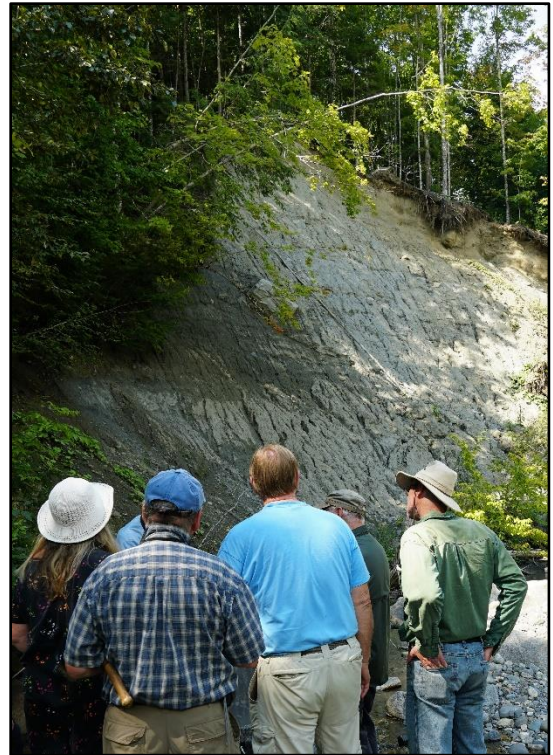
Glaciolacustrine sediment is common in the lower parts of the watershed. The fine-grained deposits consist of varved fine sand, silty fine sand, silty clay, and clay, with abundant dropstones. The coarse-grained shallow water glaciolacustrine deposits consist of silty sand and silty fine sand with ripple-drift cross lamination.

At Stop 4, George pointed out to the group a sequence of horizontal sets of dense gray silt-matrix diamict, overlain by very fine to fine sand, in turn overlain by very thin beds of silty clay or clay, which are interpreted to be interbedded lacustrine debris-flow and turbidity-flow deposits. These are in turn overlain by a thick, massive, matrix-supported diamict. Dunn and others (2018) interpret the environment of deposition of the interbedded debris-flow and turbidity flow deposits to have been a grounding zone wedge formed as ice readvanced into the Winooski valley. The upper massive diamict is thus a lodgement till deposited during the readvance.

Springston and Thomas (2014) recorded 47 active and 3 inactive landslides along the Great Brook, three of which were examined during the field trip. The Great Brook is susceptible to flooding and Springston and Thomas (2018) have proposed a sequence of events on competent till-dominated slopes in response to catastrophic flood events, summarized and paraphrased below.

1. Fluvial erosion at the toe of weathered till slope.
2. Translational slide of weathered till.
3. Further fluvial erosion, new weathering, and the development of irregular surface-subparallel discontinuities.
4. Irregular block detachment and sloughing, which may protect the toe.
5. Fluvial erosion of toe deposits and progressive failure of upper slope to a more stable angle.
6. In some cases, rotational failure may occur until the failure surface and slump block together form a more stable angle.

It was a fascinating and enjoyable day in good company with the added bonus of handfuls of delicious, organic, homegrown cherry tomatoes provided by Lori. We look forward to seeing many more Vermont geologists on the 2019 fieldtrips.



Barg, L., and Springston, G.E., 2001, Assessment of Fluvial Geomorphology in Relation to Hazards from Riverine Erosion and Landslides in the Great Brook Watershed in Plainfield, Vermont: manuscript report submitted to the Vermont Geological Survey, Waterbury.

Clift, A.E., and Springston, G.E., 2012, Protocol for identification of areas sensitive to landslide hazards in Vermont: Manuscript report submitted to the Vermont Geological Survey, Montpelier, 78 p. plus 2 appendices.

Dunn, R.K., Morin, Joel, and Hermanson, Tyler, 2018, a proglacial ice margin depositional sequence marked by sedimentation in a grounding zone wedge and by remobilization of basin slopes (abs.): Geological Society of America, Northeastern Section Abstracts with Programs, v. 50, no. 2, Paper no. 37-3.

Springston, G.E., and Thomas, Ethan, 2018, Landslides in the Great Brook watershed, Washington County, central Vermont (abs.): Geological Society of America, Northeastern Section Abstracts with Programs, v. 50, no. 2, Paper no. 47-1.

Springston, G.E., and Gale, M.H., 2018, A lidar-based landslide inventory of Washington County, central Vermont (abs.): Geological Society of America, Northeastern Section Abstracts with Programs, v. 50, no. 2, Paper no. 12-3.

Respectfully submitted,
Grahame Bradley, Secretary

ADVANCEMENT OF SCIENCE COMMITTEE REPORT

No proposals for the Vermont Geological Society Research Grant Program were received by the October 1st deadline. Proposals may be submitted by the April 1st and October 1st deadlines of each year. The application is at: <http://www.uvm.org/vtgeologicalsociety/grantpolicy.html>. We have raised the maximum award amount from \$700 to \$1000. If you are an undergraduate or graduate student, please consider submitting a proposal for your geologic research.

Proposals are requested for the summer and fall field trips of 2019. Contact Jon Kim at jon.kim@vermont.gov.

STATE GEOLOGIST'S REPORT

As 2018 draws to a close, we are looking back on a productive year at the Survey thanks to hard-working staff plus research partners, contractors and support from the geoscience community. The impact of geoscience on issues of groundwater and health and physical hazards was the focus for the year, and geoscience was incorporated in the State's Emergency Management Plan and the new Groundwater Management Plan. We also participated on the Drought Task Force which was called to order this summer in response to drought in northern Vermont. We held another STATEMAP Advisory Committee (SMAC) meeting in September and want to thank all the members who provided feedback and direction for our mapping program and Eric Hanson who served again as our SMAC Chair.

The major highlights for the past few months are:

- 1) Completion of a landslide hazard inventory for three Vermont counties and funding for a 4th county (Caledonia); inventory is available on -line and as GIS data;
- 2) Inclusion of geologic mapping and studies of groundwater and health concerns (arsenic, radioactivity etc.) in the Groundwater Management Plan adopted by the Department of Environmental Conservation;
- 3) Initiation of the compilation of surficial geologic map data for the Montpelier One-Degree sheet and development of standardized map units; existing data is being transferred to a Lidar base at 1:24,000 scale and edited prior to compilation;
- 4) Initiation of mapping projects in Richmond, Huntington and Proctor;
- 5) Completion of 5 surficial geologic maps and derivative maps (see publications list below);
- 6) Contributions of Jon Kim and his cohorts (Ed Romanowicz, Pete Ryan, Dave Boutt, Marcel Belaveau and others) to the study of groundwater and PFOA contamination in Bennington;

- 7) Upgrades of water well data (posted on-line) and snow-making data by Colin Dowey to contribute to the USGS Water Use Research Program;
- 8) Multiple presentations and field trips for professional organizations and community groups.

Many thanks to all the members of the Vermont Geological Society for your continued support!

Respectfully Submitted,

Marjorie Gale

State Geologist and Director, Vermont Geological Survey

2018 Publications:

VG2018-1 Springston, G.S., 2018, Surficial Geologic Map of the Barre East 7.5 Minute Quadrangle, Vermont: Vermont Geological Survey Open File Report VG2018-1, scale 1:24,000, Report and 4 plates. GIS Data.

VG2018-2 Van Hoesen, J., 2018, Surficial Geology and Hydrogeology of the southern half of the Proctor 7.5 Minute Quadrangle, Vermont: Vermont Geological Survey Open File Report VG2018-2, scale 1:24,000, Report plus 10 plates

VG2018-3 Springston, G.S., 2018, Surficial Geology and Hydrogeology of the Joes Pond 7.5 Minute Quadrangle, Vermont: Vermont Geological Survey Open File Report VG2018-3, scale 1:24,000, Report plus 8 plates. GIS Data.

VG2018-4 Wright, S., 2018, Surficial Geology and Hydrogeology of the Bolton Mountain Quadrangle, Vermont: Vermont Geological Survey Open File Report VG2018-4, scale 1:24,000, Report and 5 plates. GIS Data.

VG2018-5 Wright, S., and Dowey, C. W., 2018, Surficial Geology and Hydrogeology of the Jeffersonville Quadrangle, Vermont: Vermont Geological Survey Open File Report VG2018-5, scale 1:24,000, 4 plates. This supersedes the maps of VG01-2. GIS Data.

VG2018-6 Springston, G., 2018, Landslide Inventory of Chittenden County, Northwest Vermont [Report, Map]: Vermont Geological Survey Open File Report VG2018-6.

VG2018-7 Maguire, H., Mehrtens, C., Kim, J., Romanowicz, E., 2018, Lower Cambrian Gamma Log Data from Wells in Western Vermont and Northeastern New York: Vermont Geological Survey Open File Report VG2018-7, 2 plates, Well Log Data (xlsx).

VG2018-8 Maguire, H., Mehrtens, C., Chiarenzelli, J., Webb, L., 2018, Detrital Zircon Ages for the Cambrian Monkton and Danby Formations, Champlain Valley, Vermont: Vermont Geological Survey Open File Report VG2018-8, 2 plates.

ANNOUNCEMENTS

Please send announcements that are pertinent to our membership to the VGS publications manager as listed below.

CALENDAR

54th Annual Geological Society of America Northeast Section Meeting

March 17-19, 2019

Portland, Maine

AIPG 2019 National Conference

September 14-17, 2019

Burlington, Vermont

2019 GSA Annual Meeting

September 22-25, 2019

Phoenix, Arizona

EXECUTIVE COMMITTEE

The **Vermont Geological Society** is a non-profit educational corporation. The **Executive Committee** of the Society is comprised of the Officers, the Board of Directors, and the Chairs of the Permanent Committees.

Officers

President	Jon Kim	(802) 522-5401	jon.kim@vermont.gov
Vice President	Keith Klepeis	(802) 656-0247	keith.klepeis@uvm.edu
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Treasurer	Carey Hengstenberg	(802) 595-1632	carey.hengstenberg@vermont.gov

Board of Directors

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Chairs of the Permanent Committees

Advancement of Science	Jon Kim	jon.kim@vermont.gov
Membership	David Westerman	westy@norwich.edu
Public Issues	Marjorie Gale	Marjorie.gale@vermont.gov
Publications	Peter Gale	pete@galegeoscience.com

ADDRESS CHANGE?

Please send it to the Treasurer