

reduced from about 54 m<sup>2</sup> to 23 m<sup>2</sup>. The river has eroded back the toe at least 10 m since measurements began on May 28 and the cross sectional area at bankfull has increased to at least 45 m<sup>2</sup>. An examination of earlier reports and imagery indicates that sliding has been in progress at this site for several years. An orthophoto from 1995 shows hints of the slide, but no indications of sliding are visible on 1974 and 1962 photos.

#### HYDROLOGY AND WATER QUALITY DYNAMICS IN VERMONT'S MOUNTAIN LANDSCAPE: COMPARISON OF A DEVELOPED AND FORESTED WATERSHED

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High elevation, forested watersheds are particularly vulnerable to stresses from development. Steep slopes and thin soils rapidly transmit water, nutrients and sediment when disturbed by logging, road construction or other activities associated with development. The effects of forest harvesting practices on streamflow and water quality in high-elevation, forested watersheds have been well studied and provide relevant information about the susceptibility of these ecosystems to anthropogenic disturbance. Few studies have directly addressed the hydrologic or water quality effects of ski resort development on mountain streams, and these studies draw almost entirely from western U.S. examples. Here, we report preliminary findings of a recently initiated paired-watershed study to examine the effects of alpine ski area development on water quantity and quality. Our study area is located on the eastern slope of Mt. Mansfield, Vermont, and includes the basins of Ranch Brook (9.6 km<sup>2</sup>) and West Branch (11.7 km<sup>2</sup>). Ranch Brook is undeveloped, except for a network of cross-country ski trails and unsurfaced access roads, and serves as our control watershed. West Branch encompasses nearly an entire major ski resort, with an extensive network of alpine ski lifts and trails, day lodges, snowmaking facilities, and vacation homes. Our preliminary analysis indicates distinct differences in runoff and water quality between the two basins. Differences in basin hydrographs suggest that ski trails alter the timing and magnitude of runoff, particularly during spring snowmelt. Elevated concentrations of total suspended solids in West Branch streamwater suggest that exposed surfaces (trails, parking lots) may be

important sources of sediment in the ski resort basin. Streamwater chemistry at West Branch also indicates contamination by deicing salts. These findings provide important baseline information for ski area management in the eastern U.S., where field studies have been sparse.

#### THE LANDSCAPE CHANGE PROGRAM: A COMMUNITY DIGITAL ARCHIVE OF VERMONT LANDSCAPE IMAGERY

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Have you or your students ever wondered what Vermont looked like 100 years ago? Were there floods, landslides, or mines in your community? Were there forests on the hillslopes of your town or were those slopes clear-cut and barren?

The *Landscape Change Program* is a growing, web-based collection of Vermont landscape imagery hosted at the University of Vermont. We currently hold over 1500 digital images collected from libraries, historical societies, and private collections. All images are accessible from the project web site ([uvm.edu/perkins/landscape](http://uvm.edu/perkins/landscape)) via either text or graphical search engines. The newly redesigned web site allows anyone to contribute images to the archive along with modern re-shots of historical scenes as well descriptions of the images and of the physical landscape-change evidence they contain. We have used the site with equal success in University as well as high school classrooms. The web site includes lesson plans based on Vermont state standards. Consider using the site in your classes either as a resource or as a tool to catalyze student learning in a place-based context.

Analysis of the image database suggests that reforestation is the major physical landscape change in Vermont over the past century. Barren slopes are dotted with landslides and gullies, the result of diminished effective cohesion as tree roots rotted away or were removed after clear cutting. Floods, and the landscape change they cause, are well represented, especially the flood of record in Vermont, 1927. We have fewer images of mining and excavation but the database includes photographs of engineering geology interest including land filling, road building, and slope stabilization.

We are actively soliciting image contributions to increase the size and diversity of the archive. If you hold historic images of Vermont landscapes, please consider uploading them. We can supply scanners, computers, digital cameras, and GPS units to assist in photo collection. In some cases, our staff can do the scanning, image documentation, and uploading with you. Please contact us at the email address above if you are interested in working with the program.

## PRESIDENT'S LETTER

Dear Members:

Let me begin by extending a big thank you to Helen Mango for her stewardship of the VGS for the past year. I would also like to thank Marjorie Gale, and Stephen Wright before her, for their efforts in the editing and timely printing of the *Green Mountain Geologist*. Beginning with this issue, the GMG is now printed at Middlebury College under the editorial eye of Dave West, secretary of VGS. Thanks Dave and congratulations on your positive tenure decision! The other members of this year's VGS executive committee are Rick Dunn as vice president, Steve Howe as treasurer, and Helen Mango, Ray Coish, and Shelly Snyder on the Board of Directors.

After a successful fall field trip during which we examined Barrovian metamorphic rocks in the vicinity of the Pomfret dome, members of the executive committee met to discuss the agenda and business for VGS for the upcoming year. Several significant items of business were discussed during this meeting. The executive committee voted to extend the fall research grant deadline and this resulted in a significant increase in the number of grant applications. Please see the report by the Advancement of Science Committee in this issue for more information. Remember that the next deadline for research grant applications is April 1. The executive committee also discussed the idea of establishing funds for two different speaker programs. One of the programs involves creating a small honorarium for a local geologist to make a research presentation at approximately three colleges/universities during the course of an academic year. The other speaker program would involve providing funds for a speaker to make a presentation or conduct a workshop either during a scheduled VGS meeting or at another time that is open and accessible to

members of the VGS. The details of both of these programs have yet to be worked out but any input or comments would be most welcome. Please send them to [govert@castleton.edu](mailto:govert@castleton.edu)

I was also wondering if there was interest in the society to get more involved in public outreach. This could be an excellent opportunity to promote our science. Marjorie Gale, who has been involved with Earth Science Week for a number of years, reports that the society's involvement in the most recent Earth Science Week was minimal. We should consider a greater level of participation in this event in the future. Another method of public outreach would be the development of a collection of field trips or geological sites of interest for K-12 education or the general public. Many of us have field trips guides in various states of completion. If these were collated into a single volume and/or made available on a web page it would make a useful resource for our community. If you have any interest or suggestions regarding public outreach and the VGS please let me know.

I am looking forward to the upcoming year and would welcome any help, suggestions, or comment you may have. Thanks and I hope to see you at the February meeting.

Happy Trails,  
Tim Grover

## ANNUAL MEETING MINUTES

Saturday, October 25, 2003 in Quechee, Vermont

The annual meeting followed an outstanding field trip led by Tim Grover of Castleton State College. The trip focused on the bedrock geology of the Pomfret Dome in east-central Vermont. Trip participants saw examples of the Connecticut Valley-Gaspe Synclinorium stratigraphy (Waits River, Standing Pond and Gile Mountain Formations) in east-central Vermont and spectacular examples of small-scale structures and regional metamorphism in the region. Tim also provided participants with a multi-page field trip guide, complete with colored maps and photomicrographs (please contact Tim if you are interested in a copy).

The formal portion of the executive committee meeting was called to order by President Helen Mango. The first order of business for the committee