



# The Granite State Geologist

## Newsletter of the New Hampshire Geological Society

Suite 133 \* 26 South Main Street \* Concord, NH 03301  
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### President's Message

*Greg Kirby*

As this year comes to a close, I'm pleased to report the successes of the Society's endeavors for 1996. First, we enjoyed a great [line-up of guest speakers](#) this year. Richard Pendleton did a great job presenting results in mapping the surficial geology of Concord, NH 7.5 minute quadrangle. John Swallow discussed innovative technologies in the environmental sector. Suzanne O'Brien shared her interpretation of Holocene [climate changes](#) through the geochemical analyses of Greenland ice sheet cores. Noteworthy was the [annual family outing](#) to the [Isle of Shoals](#). A total of 79 participants joined John Brooks and Steve Rickerich to listen to their interpretations of the geology along the New Hampshire coastline and the Isle of Shoals. Finally, On October 10, Woody Thompson of the [Maine Geological Survey](#) will present recent findings of the moraine systems and glacial lake sequences of the Gorham-Littleton area. Many thanks to those volunteers for contributing their time and services to the Society.

Also in 1996, the Education Committee awarded two more scholarships. This year, \$300.00 was designated for the purchase of survey equipment for high school field exercises. Another \$300.00 was awarded to supplement expenses for attending an earth science convention. The mineral raffle contributed approximately \$140.00 to offset costs of the scholarships, the remainder coming from membership dues. Special thanks to those who donated mineral specimens for the raffles. Finally, the quarterly dinner meeting arrangements have been streamlined. For the next four meetings, we will be meeting at the Bedford Wayfarer Inn for a contracted price of \$17.00 for members. We feel that this location is the most convenient location for the majority of our members and hope many more can attend.

More seriously, I would like to point out that public perception of earth science reached an all time low this year. We all know about Congress' attack on geologists; which resulted in the recent elimination of the Bureau of Mines and the "downsizing" of the [USGS](#). Now it appears that the lack of geologic understanding is affecting funding of geologic endeavors in New Hampshire. First the printing of the state geologic map: In July we were number 3 on the USGS printing list, but now printing is on indefinite hold. Also, the USGS has provided funding for completion of the state [Surficial Geology Map](#), but New Hampshire has not yet been willing to allocate matching funds necessary. Many essays and newspaper articles discuss problems similar to ours. All articles stress the need for us to present the importance of geology to legislators and the educational community by focusing on the necessity to convey, in an understandable fashion, the role geology plays in everyday life and the economic contributions geology provides. Now more than ever we must consider what we can do to promote geology in New Hampshire.

I ask those members with serious concerns for the future of earth science careers in New Hampshire to contact their state representatives, or even the governor. Tell them that New Hampshire needs to have current and accurate information on the geology of this state. Most of all, convince them that without this knowledge, our economic resources will ultimately suffer. Moreover, take the time to educate the young. Children love things

like volcanoes, earthquakes and minerals, and will grow up with positive attitudes about geology if it is presented in a positive manner. So please volunteer for the public outreach program because it is public interaction that establishes a legitimacy to our profession and provides us with valued recognition. In conclusion, there still is a need for membership involvement with the Program, Education, and Membership committees. For those who have time, I'm asking that you volunteer for these, as well as the Finance committee, to strengthen and advance the science of geology in New Hampshire. As always, Tim Allen can use [material](#) for the newsletter, *The Granite State Geologist*. I look forward to seeing you in October!

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## **Slate of Candidates, NHGS Board of Directors 1997**

### **For President:**

Gregory Kirby.

BS, 1985, Geology and Geophysics, University of New Orleans. 1986-87, Graduate Studies, University of New Orleans. 1987-1991, Geologist/Project Manager, Various private consulting firms. 1991-Present, Geologist/Project Manager, NH-DES. Member NHGS since 1992: Vice President (1993-94), President, (1994-present), Program Committee Chairman (1993 -present). Member GSA and Friends of Pleistocene since 1993. 1992 to present, Merrimack Conservation Commission.

### **For Vice President:**

Gene Simmons.

BA, Electrical Engineering, 1949, Texas A & M. MA, Geology, 1958, Southern Methodist University. PhD, Geophysics, 1962, Harvard University. Vice President, Hager-Richter Geoscience, Inc. Professor Emeritus at MIT. and was Chief Scientist at NASA during the Apollo landings on the Moon. Involved in engineering and environmental geophysics and rock mechanics of building stone; current research interests include heat flow and gravity in New England. Charter member of NHGS.

### **For Secretary:**

Leland (Lee) A. Wilder.

BA, Geology, 1964, University of New Hampshire. MEd, 1993, Administration and Supervision, University of New Hampshire. Board of Directors, NH Science Teachers Association-one of his major functions here is to organize and lead field trips and workshops for NH Earth-Space Science teachers. State contact person for the National Earth Science Teachers Association. Member, Hopkinton Conservation Commission. NH native. Current Secretary of the NHGS. Teaches Earth-Space Science at Rundlett Junior High School, Concord. Adjunct college professor in Earth-Space Science courses. Married to Betsy (Osgood) and lives in Hopkinton, NH. They have a (married) daughter, Samantha, living and working in Boston, MA.

### **For Treasurer:**

Gretchen Rich

BS, Geology, 1979, University of New Hampshire. MS, Hydrogeology, 1986, Wright State University. Since 1980 working for consulting firms in the New York and New England area. She currently is office manager of the New Hampshire office of Coastal Environmental Corporation, a Bangor, Maine based company. Charter member of NHGS and current Treasurer. Member of AIPG since 1989, registered professional geologist in the state of Florida. Resident of Epping for seven years.

Adam Galonski.

BS, Geology, 1994, University of New Hampshire. 1993-1995, Technician/Analyst, US Army Corps of Engineers Environmental Laboratory. 1995-present, Hydrogeologist, Leggette, Brashears & Graham.

Member of NGWA and NHGS since 1995.

### **For Member-at-Large (one position, two year term):**

Dorothy Richter

B.A., Geology, 1970, Bates College. M.S., Geology, 1973, Boston College. Graduate studies in geology, Harvard University. 1972-76, Staff Research Geologist and Consultant, M.I.T. 1976-84, Chief Geologist, Rock of Ages Corporation. 1984-present, Principal and Senior Geologist, Hager-Richter Geoscience, Inc. 1992-94, Treasurer, NHGS Board of Directors.

Nominating Committee: Julie Spencer, Peter McGlew.

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## **Proposed Surficial Mapping Program**

*Carl Kotteff*

Of the 213 topographic map "tiles" (7.5 minute quadrangles) that cover the state of New Hampshire, large-scale (1:24,000) surficial geologic mapping is complete, or nearly so, for only 43; these maps are in various stages of availability, some published, some awaiting review, and some in need of revision. Maps of New Hampshire at smaller scales exist, but are not useful for modern-day requirements. Information on these earlier maps is generalized, often incomplete, and sometimes inaccurate. Planners, consultants, and other users find it necessary to enlarge these maps to 1:24,000 or larger for their specific needs, compounding the implicit shortcomings and errors of the smaller scale source maps. A ten-year program of modern, multi-purpose surficial geologic mapping at a scale of 1:24,000 has been proposed to provide complete coverage for the entire State.

In the last 25 years surficial geologic mapping techniques have significantly improved on the descriptive approaches and methods of landscape classification (geomorphology) used in the past. The multipurpose modern map at large scale emphasizes the distribution and texture of important materials such as sand, gravel, silt, clay, and till (hardpan), the distribution of swamps, exposed bedrock and areas where underlying rock is shallow, using this information to document the recent geologic history of the mapped area. Additional data portrayed on these maps include well locations, depth to bedrock, areas that contain thick amounts of clayey and silty compact till (drumlins), artificial fill masses for dams, railroads (including abandoned features), and areas that have been modified or altered because of construction (such as shopping centers, industrial complexes, sanitary landfills and major highways).

One of the most important technological advances in modern mapping is the ability to record those field data in digital form, in a Geographic Information System (GIS). GIS provides a more economical and flexible alternative to traditionally printed maps, as results can be made available almost immediately to users in a variety of forms (including CD-ROM) emphasizing their particular needs.

The users who will benefit from these new maps include individual property owners, local land-use regulators, planning agencies and environmental groups, state and regional regulatory agencies, construction industry, and any user requiring good-quality, preliminary subsurface information. The consequences of land-use and regulatory decisions often depend on what is "going on" beneath the surface. The better our knowledge, the more successful our decision-making can be. Multipurpose large-scale surficial geologic maps provide an essential foundation for a critically needed data base.

Knowledge of areas with less than 10 feet of cover is useful in highway planning and construction, for example, because removal of Class A rock is a very expensive procedure. Nearly all likely floodable areas are indicated on surficial geologic maps and the extent of river alluvium defined. The widths of such alluvial areas provide important information planning and the establishment of "wetland" regulations in addition to providing criteria for categorizing the areal extent of the "100-year flood," an event that is usually catastrophic in populated areas.

Detailed geologic maps are required for earthquake risk assessments. No such data base is available for the State at present, and this program could help in discussions with the [Federal Emergency Management Administration](#).

Among the multipurpose information items in the surficial geologic map data base, the most economically important is loose aggregate. Sand and gravel has been and is likely to continue to be the most important mineral commodity in the State. As successful as the sand and gravel industry has been, State reserves are not accurately known. Present reserve estimates are useful only for broad-scale planning. The limited number of recently published large-scale (1:24,000) show the exact distribution of these materials and serve as valuable exploration tools. The recently produced surficial aquifer maps do not show all the existing sand and gravel deposits, particularly in the uplands, nor do they characterize the surficial material adjacent to an aquifer, but they serve as an important springboard for the proposed work. A multipurpose surficial geologic data base will provide this critical information and the base for accurate reserve calculations for State, County, and Town. In digital form the known available reserves can be determined almost immediately when combined with other such data on exclusionary areas (national parks, national forests, densely populated or densely built areas, for example). Areas from which sand and gravel have been extracted are shown on both older and newer maps and can be used to calibrate new reserve estimates. This tool is both record and predictor of our use of this commodity, thus critical to State and local planning.

The maps will also be useful in the area of waste disposal. A surficial geologic map can be used to help identify potential safe disposal sites. Drumlins, for example, will be accurately shown on the new maps. They contain larger thicknesses of glacial till which tends to be more clayey than general till cover. Because of the relative low porosity and permeability of this material, it is better able to contain leakage from sanitary landfills and prevent infiltration from surface water when used as cover. Drumlin till (often called "old" till) is also an excellent source for subgrade fill and earthen dams. It is extremely important to know not only the local materials in places where waste-site cleanup is required, but what are the adjacent materials. Large-scale maps can provide cost-saving information for these problems.

The estimated cost to complete this program of multipurpose surficial geologic mapping over the entire state is \$3.0 million, or \$300,000 per year over a ten-year period. The [U.S. Geological Survey's State Map Program](#) currently provides for a 50% matching grant, so we are seeking state funding of \$150,000 per year, one-half the anticipated total cost.

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## NHGS News and Events

The **1996 Annual Meeting** of the New Hampshire Geological Society will be held Thursday, October 10. Woodrow (Woody) Thompson of the [Maine Geological Survey](#) will present: *Glacial Geology of the Northern White Mountains*. Woody's presentation will be a companion to the [NEIGC field trip](#) he is leading in September. He will discuss the controversies surrounding the work of early geologists on continental glaciation in the Gorham and Littleton areas, and present findings that are coming to light after an extended hiatus since work was last done in the 1930's. The dinner will take place at Wayfarer Inn in Bedford, NH. A cash bar begins at 6:00 p.m., with a buffet dinner at 7:00. The cost will be \$17.00 for members and \$18.00 for non-members. We need an accurate head count so we need your reservations no later than October 7, 1996. For more information, contact Greg Kirby at 603-271-3624. Remember if you make your reservation verbally and you wish to pay at the door, bring an extra \$2.00!

At time of publication, the NHGS had 92 "**Current**" **Members and Fellows**. Typically our membership rolls top 150. The discrepancy is due to the failure of many former members to [renew their membership](#) in a timely fashion. Of course, the many benefits of membership in the NHGS, such as *The Granite State Geologist*, reduced rates at meetings and field trips, a copy of and a listing in the *Membership Directory*, are available only to those who are members in good standing. Past experience suggests that many members pay their renewal fee at the Annual meeting itself. This is important, as only members in good standing are eligible to participate in the election of officers. Check your mailing label to check on your current membership status. In addition to

renewing your membership, please be sure to keep us updated regarding any changes in your address, so that you will continue to enjoy the benefits of membership.

[Upcoming Meetings](#), also to be held at the Wayfarer Inn in Bedford, are scheduled for: January 9, April 10, and October 9, 1997 (the second Thursday of the month). Our [summer field trip](#) is usually scheduled for the first Saturday in August, which for 1997 is August 2. The deadlines for [submissions](#) to be included in *The Granite State Geologist* are 5 weeks in advance of the meeting dates.

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