Hubbard Brook Research Foundation

A Report for 2007



Promoting the understanding and stewardship of ecosystems through scientific research, policy outreach, and education

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Mission



The Hubbard Brook Research Foundation's mission is to promote the understanding and stewardship of ecosystems through scientific research, long-term monitoring, and education. Founded in 1993, HBRF works to sustain and enhance the Hubbard Brook

Ecosystem Study, in partnership with the USDA Forest Service, the National Science Foundation's LTER program, and many colleges, universities, and other institutions.

Hubbard Brook Consortium, Charter Members:

Dartmouth College, Plymouth State University, Syracuse University, USDA Forest Service/Northern Research Station, and Wellesley College.

Cover photo by Buck Sleeper. Inside photos by Buck Sleeper, Nick Rodenbouse, Scott Schwenk, Judy Brown, Chris Eagar, Hubbard Brook archives.

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Letter from Hubbard Brook

ubbard Brook is at once complex and very simple. Complex because it represents almost 50 years of cutting-edge science and ecological monitoring, performed by hundreds of researchers from dozens of research institutions at a 7,800-acre experimental forest in New Hampshire. But Hubbard Brook is simple, too. It is the idea that human beings must understand how ecosystems function, and how they can change as a result of natural and manmade disturbances. Only through a thorough and unbiased scientific understanding of ecosystems can we hope to prevent serious, irreversible damage to nature and to ourselves.

The Hubbard Brook Research Foundation (HBRF) supports the community of researchers at Hubbard Brook by providing housing, laboratories, and other services. HBRF also plays a special role in translating and packaging key ecological findings from Hubbard Brook and beyond in order to share this science with policymakers, land managers, educators, and others. The pages that follow give a glimpse of the extensive work of the Hubbard Brook enterprise in the realms of science, policy, and education.

Looking back at 2007, we would like to highlight three important partnerships for HBRF, two of which are just beginning, and one that has come to a close. The first new partnership is the founding of the Hubbard Brook Consortium. Hubbard Brook by its very nature is a collaborative activity, with many institutions working together to conduct ecosystem science and to train the next generation of ecosystem scientists. The Hubbard Brook Consortium represents formal recognition by research and educational institutions of HBRF's central role in sustaining activities at Hubbard Brook. Consortium dues will help support vital facilities and programs, and fund a new student scholarship program. HBRF is very pleased to welcome the five charter members of the Hubbard Brook Consortium: Dartmouth College, Plymouth State University, Syracuse University, USDA Forest Service/Northern Research Station, and Wellesley College.

The second new partnership is an education initiative called the Environmental Literacy Program, done in partnership with the USDA Forest Service and Plymouth State University. This dynamic three-way institutional partnership has vastly enriched HBRF's Education Program already, and will continue to expand its reach in the years to come.

The third partnership was with the Open Space Institute (OSI), the organization instrumental in HBRF's purchase of the Mirror Lake property. Without OSI's cornerstone emergency loan, the Mirror Lake property would have been lost to science. Thanks to the leadership of New Hampshire Senator Judd Gregg, and the support of many individual and foundation donors, HBRF paid off the emergency loan in 2007 and completed 75 percent of its Campaign goal. This year, HBRF will launch a capital campaign to pay off a final commercial loan and to enhance the conservation campus at Mirror Lake—now at the heart of the Hubbard Brook experience. We are grateful to OSI and to the many donors who made this significant success possible.

We thank all of HBRF's donors for their steadfast support of the Hubbard Brook vision: meticulous ecosystem science, performed over the long term, to enlighten our collective understanding of the natural world.

David Sleeper Executive Director

March 2008

Stuart V. Smith, Jr. *Chair*



Mike Smith and David Sleeper

Since 1963, when the Hubbard Brook Ecosystem Study began, researchers using Hubbard Brook data have produced 1,322 scientific papers, 87 Ph.D. theses, 52 Master's theses, and 57 Honors theses. Please find a list of publications at www.hubbardbrook. org/ (click on Publications).



he USDA Forest Service established the Hubbard Brook Experimental Forest in 1955 for hydrological research, and conducted studies focused on the relationships among forest-management practices, erosion, and stream flow. In 1963, a remarkable and prescient quartet of scientists—Herb Bormann, Gene Likens, and Noye Johnson from Dartmouth College, and Bob Pierce from the Forest Service—recognized that the many distinct watersheds of the Hubbard Brook valley could provide a "living laboratory" to study and compare nutrient flows and other aspects of forest ecology over time. The four researchers established the Hubbard Brook Ecosystem Study (HBES) and thus pioneered the "small watershed approach" to ecosystem research, the groundbreaking method of onsite, long-term forest research.

The HBES founders asked a central question that has echoed through the years to the present day: *What are the ecological patterns and processes that govern the landscape at Hubbard Brook and how do natural and anthropogenic disturbances affect forested ecosystems?*

The scope of research expanded again when Hubbard Brook joined the National Science Foundation's Long-Term Ecological Research (LTER) network in 1988, connecting Hubbard Brook to similar sites around the country. LTER involves major long-term ecological research priorities encompassing much of the ongoing research at Hubbard Brook, including effects from air pollution, forest perturbations, and climate change. Another important body of Hubbard Brook research focuses on the nearby 37-acre Mirror Lake, often called "the most studied lake in the world." Hubbard Brook is known for a combination of research, long-term monitoring, and whole ecosystem manipulations.

Major Scientific Achievements

• Acid rain was first identified in North America at Hubbard Brook in the mid-1960s and later shown to result



from long-range transport from power plants. This research influenced national and international acid rain policies, including the 1990 Clean Air Act Amendments. Scientists continue to study the effects of acid rain on ecosystems. ► Long-term biogeochemical measurements at Hubbard Brook have documented a marked reduction in calcium in soils, primarily due to both leaching losses through acid deposition and earlier forest harvest. In 1999, scientists added the amount of calcium calculated to have been lost due to these processes back to the soils of one of the watersheds, and have observed significant responses



in the condition of both sugar maple and red spruce trees, key components of the region's forests.

► Interstate highway construction and subsequent road salting caused increases in chloride concentrations in Mirror Lake, demonstrating how land-use changes can have significant environmental effects on adjoining aquatic and forest ecosystems, and influencing road salt laws and regulations.

► Hubbard Brook research documented that conspicuous losses of critical elements such as calcium, potassium, and nitrogen occur after forest disturbances such as clear-cutting or ice storms. These findings have been instrumental in developing protocols for sustainable forestry practices.

► Hubbard Brook research confirmed that long-term declines in lead emissions associated with elimination of leaded fuels nationwide corresponded to marked decreases of lead in precipitation and in the chemical makeup of the forest floor at local scales.

► Hubbard Brook's bird research is one of the longest continuously-running avian studies in the world, and has documented that climate change, food limitation, and changes in forest structure account for most changes in the abundances of neotropical migrant birds, indicating that breeding season events are critical for maintaining these species' populations.

The original four Hubbard Brook scientists have now grown to 75 in number, representing 39 colleges, universities, government agencies, and other research institutions. Today dozens of studies at Hubbard Brook are conducted on a variety of scales, ranging from forest plots, to small watersheds, to the entire Hubbard Brook Valley and the Northern Forest region. To view descriptions of recently completed and current projects, visit www.hubbardbrook.org and click on the Research tab.

Ecosystem Monitoring

Long-term ecosystem monitoring is at the core of research conducted at Hubbard Brook. Monitoring is conducted on a year-round basis with support from the USDA Forest Service, National Science Foundation, and private funding sources. The monitoring program includes, in part:

- A network of meteorological stations and stream-flow gauges, measuring rainfall, snowpack, and stream flow in nine watersheds in the Hubbard Brook valley.
- Chemical analyses of the nutrients and acidity of rain, snow, and stream water.
- Measurements of forest growth and species composition.
- Below-ground measurements of microbial activity, root activity, soil water, and soil.
- Water levels, groundwater flow, water chemistry, and biology in Mirror Lake.
- Abundances of forest bird, mammal, amphibian, snail, and insect populations.

In 2007, HBRF cooperated with the USDA Forest Service to publish and distribute *Long-term Trends from Ecosystem Research at the Hubbard Brook Experimental Forest* (General Technical Report NRS-17), which discusses the long-term research at Hubbard Brook and includes 18 charts of significant ecological trends. To receive copies of the report, please contact HBRF.





"Our work as scientists at Hubbard Brook is helped immeasurably by the nonprofit Hubbard Brook Research Foundation, which provides housing and laboratory facilities as well as networking support for our far-flung scientific community. HBRF also serves as the focus of Hubbard Brook policy and education initiatives. Performing research and publishing the results are just the first two steps of the scientific process. Sharing science with the public is also vitally important. In so many ways, HBRF is the vital link that helps connect me and my work at Hubbard Brook with the rest of the world."

- Peter M. Groffman, Ph.D.

Dr. Groffman is Chair of the Hubbard Brook Committee of Scientists and Senior Scientist at the Cary Institute of Ecosystem Studies, in Millbrook, NY.



HBRF helps organize an annual two-day Cooperators Meeting where Hubbard Brook scientists share their latest research with colleagues and students. The Cooperators Meeting has become a highlight of the summer research season, attracting hundreds of scientists, students, and other visitors.





hrough its Science Links Program, the Hubbard Brook Research Foundation attempts to bridge the gap between ecosystem science and the development of sound public policies on a variety of vexing environmental issues. Working with teams of scientists, HBRF shares cutting-edge scientific research with a range of stakeholders, including government leaders, land managers, educators, the media, and other opinion leaders. The intent is to share science *in a nonpartisan way* in order to make a tangible difference in the real world. That is the goal of HBRF's policy efforts: *compelling science, easily understood, in the right hands at the right time.*

Mercury Pollution

Our multi-year Science Links project on mercury pollution, which culminated with the publication of the report "Mercury Matters" in early 2007, is the third in our series on the effects of human alterations of major chemical cycles (sulfur and nitrogen were the first two). The mercury



project coincided with the national debate on regulating mercury emissions from coal-fired power plants. Members of the mercury science team, armed with new data on mercury concentrations in loons, fish, and other wildlife in the Northeast, traveled to Washington, DC, in January 2007 to present their findings to Congress and the Environmental Protection Agency. The HBRF mercury project was covered in more than 200 print, on-line, radio, and television media outlets nationwide. A prominent op ed piece, "The Danger Downwind," appeared in the New York Times in April 2007. In addition, mercury team members worked closely with legislators to develop priorities for a new national mercury monitoring program that would take into account the effects of mercury pollution on ecosystems and biota. HBRF's media outreach efforts were assisted by Dartmouth College, Syracuse University, and the Syracuse Center of Excellence in Environmental and Energy Systems.

The Mercury Science Links Project was supported with grants from the Henry Luce Foundation, John Merck Fund, Merck Family Fund, New York State Energy Research and Development Authority (NYSERDA), Northeastern States Research Cooperative, Orchard Foundation, and Sudbury Foundation.

Carbon Sequestration and Mitigation Strategies

The Science Links Carbon Project seeks to develop new strategies to mitigate the greenhouse effects of carbon dioxide by analyzing how various land-use activities and mitigation strategies contribute to the sequestration of carbon in Northeastern landscapes. This ambitious project will develop detailed carbon budgets at the county level,



"The Hubbard Brook Research Foundation, in particular, is an incredible resource The three Science Links publications have all been well received, well publicized, and influential with policymakers."

– National Science Foundation, 2007

and demonstrate how various land-use activities and management options can reduce greenhouse emissions and increase forests' capacity to store carbon. The Carbon Science Links team will develop a web-based, landuse carbon calculator to help communities manipulate complex data sets and make carbon-informed land-use decisions going forward. This project is supported with grants from the Jessie B. Cox Charitable Trust, Merck Family Fund, and Sudbury Foundation, and in-kind support from Cornell University.

Who Needs Environmental Monitoring?

A hallmark of the Hubbard Brook Ecosystem Study is the rich interplay of research and long-term ecological datasets. Indeed, Hubbard Brook science has demonstrated clearly the pivotal importance of long-term monitoring to inform our knowledge of ecosystems, help shape effective policy, and track progress in the fight against pollution and environmental degradation.

But funding for monitoring programs is not always assured. In partnership with the Northeastern Ecosystem Research Cooperative, HBRF convened a team of scientists to discuss the implications and importance of environmental monitoring, resulting in the publication of "Who Needs Environmental Monitoring?" in the June 2007 issue of the journal Frontiers in Ecology and the *Environment*. The article contends that monitoring costs relatively little compared to the policy it informs and should be considered a fundamental component of environmental science and policy. Team members then traveled to Washington, DC, to voice their concerns about funding cuts for federal monitoring programs. The project also conducted a media outreach effort that included press releases and op ed articles. The Environmental Monitoring Project is supported by a grant from the Northeastern Ecosystem Research Cooperative (NERC).

Hubbard Brook Roundtable

The Hubbard Brook Roundtable brings together ecosystem scientists with representatives of diverse stakeholder groups to discuss threats to the Northern Forest region. The approach utilizes "ecosystem thinking" as a framework to identify and recommend specific actions that can be taken to protect ecosystems while encouraging the economic health of the region. A hallmark of the first two-day meeting, held in 2006 at HBRF's Mirror Lake facility, was the sharing of cutting-edge scientific information about forested ecosystems in ways useful to policymakers and land managers. Some top environmental threats discussed included acid rain, mercury pollution, invasive species and diseases, salinization of waterways, fragmentation of the landscape, and climate change. In



Stream water collected from this automatic sampling unit will later be analyzed for its chemical content.



Roundtable members pictured here (left to right): Tom Gross, David Sleeper, Ann Bartuska, John Aber, Clark Binkley, Sandy Brawders, Gene Likens, Norman Johnson, Hank Swan, Herb Bormann, John Hagan, and Jerry Franklin.

2007, the Roundtable added new members, prepared white papers and other publications, and participated with the Northern Forest Center's Sustainable Economy Initiative, a project intended to make policy recommendations to the region's four governors and congressional delegations. The Hubbard Brook Roundtable is supported with grants from the Harold Whitworth Pierce Charitable Trust, Northern Forest Partnership Program, and Maverick Lloyd Foundation; and in-kind support from Tom Gross/Genesis Consulting, S.A.

Education and Outreach



Since its inception, HBRF has been deeply committed to environmental and science education. In 2007, HBRF cooperated with the USDA Forest Service to develop its signature Environmental Literacy Program, which seeks to use ecological knowledge to promote informed decision-making for a sustainable future. The Environmental Literacy Program serves as the intellectual framework for all education projects at Hubbard Brook, focusing on professional-development opportunities for teachers, curriculum development, and forging working partnerships with local schools. The program is strengthened by a close relationship with educators at Plymouth State University.

Exploring Acid Rain

In an effort to extend the reach of its successful Science Links products, HBRF produced a web-based curriculum based on its acid rain project. Exploring Acid Rain is a guide to acid rain science for secondary school teachers, supported by training sessions and outreach activities. HBRF unveiled the guide in the fall of 2007 at a workshop at the North Country Professional Development Day (sponsored by North Country Education Services) in Whitefield, NH. A pre- and post-workshop survey administered to the 12 participants demonstrated a significant increase in acid rain science comprehension after the workshop. Future workshops will be held in participating schools throughout New England in 2008, and HBRF will exhibit the product at the National Science Teachers' Conference. This project is supported with grants from the USDA Forest Service, Mascoma Savings Bank, and the New Hampshire Charitable Foundation's Wellborn Ecology Fund.

A Forest for Every Classroom

HBRF joined other New Hampshire educational groups and nonprofits to hold the second year of "A Forest for Every Classroom" (FFEC), a year-long interdisciplinary teachers' professional development program. A series of workshops at various locales enabled teachers to develop their own curricula to increase students' understanding of forested ecosystems in their home communities. The strength of FFEC comes from the synergistic contributions of its many sponsors: New Hampshire Project Learning Tree, National Wildlife Federation, White Mountain National Forest, and USDA Forest Service. In 2007, a two-day workshop was held at the Hubbard Brook Experimental Forest with the participation of five Hubbard Brook scientists. The FFEC project is supported with grants from the Bay and Paul Foundations, LTER Schoolyard Program of the National Science Foundation, and the Northeastern States Research Cooperative.



Talks & Tours

Hubbard Brook scientists continued their tradition of reaching out to the general public through the 2007 Ecosystem Science Today lecture series and educational walks. The free lectures, held at the Squam Lakes Natural Science Center in Holderness, NH, attract year-round residents and summer visitors alike. HBRF thanks Dr. Peter Groffman for his talk on the effects of winter climate change on the Northern Forest; Dr. Nick Rodenhouse who enumerated the threats to neotropical migratory songbirds in their northern habitats; Dr. Lynn Christenson for her talk on moose ecology and the effects climate change may have on this species; and Dr. Charles Cogbill who led a walk through the Hubbard Brook Experimental Forest to look for clues of past human disturbances and their impacts on the structure of the current forest. HBRF also organized many presentations at schools and nonprofit organizations, and worked closely with the USDA Forest Service to conduct group tours at Hubbard Brook, with support from the LTER Schoolyard Program of the National Science Foundation.

Research Opportunities for Undergraduates

In 2008, HBRF, the USDA Forest Service, and Plymouth State University will work together to increase opportunities for undergraduate ecology students through two new programs: the National Science Foundation's Research Experience for Undergraduates (REU) program and the new Hubbard Brook Consortium. The two programs will bring students to the forest during the summer to engage in hands-on ecological research, mentored by Hubbard Brook and PSU scientists. Both the REU and Hubbard Brook Consortium programs target underrepresented populations.

Financial Statements

December 31, 2007 and 2006 Statements of Financial Position

Deferred income

Accrued interest

Net Assets:

Unrestricted

Total net assets

Total current assets

Temporarily restricted

Note payable, current portion

Note Payable, less current portion

Total liabilities and net assets

Assets	2007	2006
Current assets:		
Cash and cash equivalents	\$ 227,588	\$ 75,814
Pledges receivable	12,500	18,650
Grants receivable	50,552	40,901
Other receivables	370	159
Deferred expenses	1,218	6,491
Prepaid expenses	5,072	3,402
Total current assets	297,300	145,417
Property and equipment:		
Buildings and improvements	1,838,930	1,838,930
Equipment	74,084	74,084
Land	470,200	470,200
	2,383,214	2,383,214
Less: accumulated depreciation	284,243	223,338
Total property and equipment	2,098,971	2,159,876
Escrow Deposit	-	35,000
Total Assets	\$ 2,396,271	\$ 2,340,293
Liabilities and Net Assets		
Accounts payable and accrued liabilities	\$ 10,950	\$ 32,526

2007 Total Income \$705,281





This is a summary of HBRF's financial statements. The complete report, including footnotes and the auditor's opinion, is available upon request or may be found on the HBRF web site.

Statements of Activities and Changes in Net Assets

		Temporarily	2007	2006
	Unrestricted	Restricted	Total	Total
Revenue & support				
Contributions and grants	\$ 261,842	\$ 357,639	\$ 619,481	\$ 1,124,115
Rental Income	76,830	-	76,830	74,458
Other Income	8,970	-	8,970	9,896
Total revenues and support	347,642	357,639	705,281	1,208,469
Net assets released from restrictions	184,649	(184,649)	-	-
Expenses				
Program costs:				
Facilities	208,919	-	208,919	252,268
Education	157,389	-	157,389	227,880
Total program expenses	366,308	-	366,308	480,148
Supporting services expense:				
Management and general	126,132	-	126,132	120,635
Fundraising	115,585	-	115,585	105,033
Total supporting services	241,717	-	241,717	225,668
Total expenses	608,025	-	608,025	705,816
Change in net assets	(75,734)	172,990	97,256	502,653
Net assets, beginning of year	1,484,600	126,038	1,610,638	1,107,985
Net assets, end of year	\$ 1,408,866	\$ 299,028	\$ 1,707,894	\$ 1,610,638

31,600

1,610

44,160

644,217

1,408,866

1,707,894

\$ 2,396,271

299,028

14,150

1,979

100,000

148,655

581,000

1,484,600

1,610,638

\$ 2,340,293

126,038

Trustees

JOHN ABER is a professor of natural resources at the University of New Hampshire. A former Vice President for Research, Dr. Aber studies forest ecosystems with a particular interest in nitrogen cycling.

CHRISTOPHER C. BARTON is a professor of geological sciences at Wright State University and a senior research scientist at the Columbia Earth Institute of Columbia University. His research has focused on quantifying patterns of bedrock fracture networks.

CHARLES T. DRISCOLL is University Professor of Environmental Systems Engineering at Syracuse University. His research interests include aquatic chemistry, biogeochemistry, environmental quality modeling, ecosystem science, and soil chemistry.

TIMOTHY J. FAHEY is Liberty Hyde Bailey Professor and Stephen Weiss Presidential Fellow at Cornell University. He conducts research on forest ecosystem dynamics at Hubbard Brook and in the Dominican Republic.

RICHARD T. HOLMES is Research Professor of Biology and Harris Professor of Environmental Biology Emeritus at Dartmouth College. Dr. Holmes began studying bird populations at Hubbard Brook in the late 1960's.

THOMAS C. JORLING retired as Vice President of Environmental Affairs at International Paper Company. His career includes positions as Commissioner for the New York State Department of Environmental Conservation and Assistant Administrator of the U.S. Environmental Protection Agency.

MARK LATHAM is Associate Professor of Law at Vermont Law School. His areas of expertise include CERCLA (Superfund), environmental issues in corporate transactions and commercial real estate, and brownfields redevelopment.

GENE E. LIKENS retired as Director and President of the Cary Institute of Ecosystem Studies. A co-founder of the Hubbard Brook Ecosystem Study, he has received numerous awards including the National Medal of Science in 2002 and the Blue Planet Prize in 2003.

SARAH E. MUYSKENS is a consultant specializing in nonprofit organizations. She has served in leadership positions at ECHO/The Leahy Center for Lake Champlain, as Deputy Director of the Environmental Defense Fund, and as Director of Development for The Wilderness Society.

STUART V. SMITH, JR., retired as President of the Dartmouth Printing Company. He has chaired a number of nonprofit organizations, including the New Hampshire Charitable Foundation and the Society for the Protection of New Hampshire Forests. JANE E. S. SOKOLOW is an environmental consultant with experience in interpretive writing; exhibition development; creating and writing interpretive materials for exhibitions, trails and education programs; organizational development; and fundraising.

PETER R. STEIN, General Partner at the Lyme Timber Company, is responsible for the design and management of large-scale timberland purchases and limited-development projects in cooperation with land conservation organizations.

KATHLEEN WEATHERS is a Senior Scientist and Head of Laboratory Services at the Cary Institute of Ecosystem Studies. Her current research is focused on how linked biotic and abiotic processes influence the structure and function of ecosystems, and vice-versa.

STANTON WILLIAMS is board chair of ValleyNet, an organization he helped found in October 1994. He has 20 years of international telecommunications experience, beginning with Cellular Communications, Inc., and continuing with various spin-off corporations.

Advisors to the Board

F HERBERT BORMANN, Founding Trustee Emeritus, is a founder of the Hubbard Brook Ecosystem Study and retired professor at Yale University. Dr. Bormann is the recipient of many distinguished academic and scientific awards, including the Blue Planet Prize in 2003.

CHRISTOPHER EAGAR, ex officio member of the board, is a project leader with the USDA Forest Service/Northeast Research Station. He has witten extensively about the effects of pollutants in forest ecosystems.

Special Thanks

HBRF gives special thanks to **Dr. Richard T. Holmes**, who stepped down as chair of the HBRF Board of Trustees in July 2007, although he remains an active and invaluable member of the board. During his tenure as chair, Dick presided over the purchase of the Mirror Lake property, the development of a new strategic plan for HBRF, and the founding of the Hubbard Brook Consortium – all pivotal events in the life of our organization. Thank you, Dick!

We also give a very warm welcome to our new Board Chair, **Stuart V. (Mike) Smith**, a long-time resident of the Upper Valley and energetic contributor to many charitable causes throughout the State of New Hampshire and beyond.

Our Supporters

he Hubbard Brook Research Foundation gratefully acknowledges the individuals, foundations, corporations, and government agencies that generously supported our programs in 2007. The work outlined in this report would not have been possible without their steadfast support. Thanks to the generosity of our donors, we collectively supported ecosystem science and scientists in a way that made a positive and enduring difference.

Two years ago, HBRF established the Stewardship Circle to honor those who give \$1,000 or more, or who double their highest previous gift to the organization. Stewardship Circle members receive special publications and alerts from HBRF, and are invited to all events and scientific presentations. HBRF wishes to extend a very special thank you to our Stewardship Circle donors, who do so much to sustain the organization and enhance the scientific enterprise at Hubbard Brook. Thank you!

Stewardship Circle

Rebecca Bormann and Gary Oehlert Charley and Kim Driscoll Mr. and Mrs. Charles T. Driscoll, Sr. Fred Ernst Peter and Helen Fahey Timothy J. and Lois Fahev Iack and Isabel Freeman Dick and Deborah Holmes B. Elizabeth Horner Timothy A. Ingraham Harold Janeway Edwin and Rita Johnson Steve Kahl and Mary Ann McGarry Pamela Kohlberg Jim and Jane Levitt Gene and Phyllis Likens Vincent and Lois Lunetta Jeff and Terry Marshall Peter Martin and Lynn Freeman Freeman-Martin Family Fund of the New Hampshire Charitable Foundation, Upper Valley Region Sarah Muyskens and Michael Green Jim and Betsy Nichols The Wapack Foundation Carol Pierce* Angus and Elisabeth Russell Jennifer and Mark Schiffman David and Cronin Sleeper Emmy-Lou Sleeper Mike and Jean Smith Jane Sokolow Peter Stein and Lisa Cashdan Cashdan-Stein Great Grandmother Fund of the Vermont Community Foundation George Tomlinson

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* Donation in honor of Robert S. Pierce, co-founder of the Hubbard Brook Ecosystem Study.





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Hubbard Brook Consortium

The Hubbard Brook Research Foundation is pleased to welcome and acknowledge the charter members of the new Hubbard Brook Consortium: Dartmouth College, Plymouth State University, Syracuse University, USDA Forest Service/ Northern Research Station, and Wellesley College. The Hubbard Brook Consortium was established in 2007 to help sustain facilities and programs at Hubbard Brook.

The Campaign for Mirror Lake is 75 Percent Complete

n 2004, the Trustees of the Hubbard Brook Research Foundation took the extraordinary and risky step of launching a \$3 million-plus capital campaign to protect a vital piece of property on the shores of Mirror Lake. The goals of the Mirror Lake purchase were threefold: 1) to protect and perpetuate the extensive scientific research and monitoring at Mirror Lake; 2) to establish a vibrant conservation campus, with housing and other facilities for a growing number of Hubbard Brook scientists, students, and educators; and 3) to preserve Mirror Lake's remarkable scenic and recreational amenities, while maintaining an important wildlife corridor linking the lake to Hubbard Brook forestland.

Today the Mirror Lake campus is thriving, with facilities that provide rich, new opportunities for scientific camaraderie and collaboration across projects and disciplines. Forestland once under threat from the development of "timeshare condominiums" is now permanently protected. And scientists have unfettered access to their monitoring equipment and other experiments, thanks to HBRF's land ownership and the donation of a research easement on an adjacent property. The science of Mirror Lake will continue unabated.

Moreover, HBRF is pleased to announce that it has now met a remarkable 75 percent of the original campaign goal, thanks to generous leadership gifts by a number of individuals and foundations, as well as \$1.4 million in federal appropriations spearheaded by Senator Judd Gregg of New Hampshire. At the close of 2007, HRBF retired its original loan with the Open Space Institute, and took out a new, smaller Mirror Lake loan from Ledyard National Bank, HBRF's long-time commercial banker.



HBRF is now launching the final phase of the Campaign for Mirror Lake, and we ask that all members of the Hubbard Brook community help us meet our Campaign goal over the next three years. The Mirror Lake acquisition added key acreage to the Hubbard Brook Experimental Forest, established as a research site by the USDA Forest Service in 1955. Our goal is to celebrate the completion of the Mirror Campaign in 2010 during the 55th anniversary of that farsighted act. Please join us!

HBRF looks forward to announcing further details of its capital campaign in the coming year. For more information on how you can contribute to the Campaign for Mirror Lake, please visit our web site at www. hubbardbrookfoundation.org or contact Emily Bateson, ebateson@bbresearchfoundation.org.

2007 Contributors to the Campaign for Mirror Lake



HBRF is very grateful to the donors who gave so generously to the Mirror Lake Campaign in 2007 and helped us reach our 75 percent Campaign target. Thank you and congratulations one and all!

Susan Arnold Fred Ernst Peter and Helen Fahey Jack and Isabel Freeman Tom and Lia Kehler Gene and Phyllis Likens Wilhelm M. Merck Larry and Eleanor Spencer Cyrus and Barbara Sweet The Tarleton Fund of the NH Charitable Foundation Dr. Thomas C. Winter Anonymous (1)

Celebrate HBRF's 15th Anniversary with a Donation or Bequest

BRF turns 15 in 2008—please help us celebrate with a special donation or bequest! The Hubbard Brook Research Foundation is a nonprofit 501(3)(c) charitable organization that relies on donor support to achieve its goals. We hope you will consider a tax-deductible 15th anniversary donation in support of our vital ecological mission.

You can also make a long-lasting contribution by setting up a bequest in your will, ensuring that the long-term ecological studies at Hubbard Brook continue to benefit your children and grandchildren. If you would like additional information on planned giving opportunities, please contact Emily Bateson at 617-926-8563 or ebateson@hbresearchfoundation.org.

Contributions may be made on-line

(www.hubbardbrookfoundation.org/donate) or mailed to: HBRF, 16 Buck Road, Hanover, NH 03755. *We thank you for your valuable support.*



"We have been Stewardship Circle donors since 2004, because we believe understanding ecosystems is the vital first step toward protecting our natural world. And since science is often published in journals that nonscientists don't read, we are particularly impressed with HBRF's programs to "translate" that science and get it in the bands of people who can make a difference."

- Ginny Loeb and Jim Sperling



Home Institutions

The following colleges, universities, government agencies, and other research institutions had one or more scientists participating in the Hubbard Brook Ecosystem Study in 2007. Bolded names are charter members of the new Hubbard Brook Consortium, which helps sustain facilities and programs at Hubbard Brook.

Allegheny College Boston University Brown University Cary Institute for Ecosystem Studies Cornell University **Dartmouth College** Duke University U.S. Army Cold Regions Research and Engineering Laboratory Lund University Miami University NASA Ames Research Center **NOAA** Fisheries Northern Kentucky University Oregon State University **Plymouth State University** Rochester Institute of Technology Smithsonian Institution State University of New York-Syracuse Syracuse University

The Nature Conservancy/Michigan Universität für Bodenkultur University of Bayreuth University of California Berkeley University of Illinois University of Louisville University of Montana University of New Hampshire University of Maine University of Michigan University of Vermont University of Wisconsin/Oshkosh University of Wyoming **USDA Forest Service** U.S. Environmental Protection Agency U.S. Geological Survey

Washington State University Wellesley College Wright State University Yale University



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