

HUBBARD BROOK RESEARCH FOUNDATION

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



A REPORT FOR 2010



Founded in 1993, HBRF works to sustain and enhance the Hubbard Brook Ecosystem Study in New Hampshire, in partnership with the U.S. Forest Service/Northern Research Station, the National Science Foundation's Long-Term Ecological Research Network (LTER), the Hubbard Brook Consortium, and many colleges, universities, and other research institutions. Our goals are:

- » To sustain and expand long-term ecological monitoring and research at the Hubbard Brook Experimental Forest.
- » To bridge the gap between ecosystem science and public policy by enhancing the exchange of information among scientists, policymakers, and land managers.
- » To foster public understanding of the functions of ecosystems and their importance to society.

HUBBARD BROOK CONSORTIUM

The Hubbard Brook Consortium is a membership group of research and educational institutions that supports the work of HBRF and the Hubbard Brook Ecosystem Study (HBES), with special emphasis on field research opportunities for undergraduates and public outreach events. In 2010, the Second Annual Hubbard Brook Consortium Lecture for the Environment featured HBES co-founder Dr. Gene Likens on his decades-long research at Mirror Lake. Consortium members include the **Cary Institute of Ecosystem Studies, Dartmouth College, Plymouth State University, Syracuse University, the Urban Ecology Institute, U.S. Forest Service/Northern Research Station, and Wellesley College.**

Letter from the Executive Director



I am pleased to share the recent accomplishments and activities of the Hubbard Brook Research Foundation (HBRF), a private nonprofit organization founded to support and sustain the long-term ecological science conducted at the Hubbard Brook Experimental Forest in New Hampshire. Although this 7,800-acre forest laboratory, set aside for research in 1955, is perhaps best known for the discovery of acid rain in the 1960s, the long-term data collected and landscape-scale experiments conducted there continue to help scientists unravel the complexities of how ecosystems function. The Hubbard Brook Ecosystem Study has become a world force in ecosystem thinking, making major discoveries regarding the ecology of forests and the effects of timber harvesting, climate change, acid rain, and other natural and manmade disturbances.

Beyond our role of providing housing, laboratories, and other facilities for scientists to use as they conduct research at the forest, we are increasingly called upon to help communicate scientific findings to wider public audiences. Working with Hubbard Brook and other ecosystem scientists, we translate and disseminate critical scientific information through our **Science Links** and **Hubbard Brook Roundtable** programs; we organize “proof of concept” projects—on markets for ecosystem services and wood biomass energy, for example—that test innovative ways communities can protect natural resources; and in partnership with the U.S. Forest Service, our **Environmental Literacy Program** conducts education programs aimed at students in grades 7-12. This year’s annual report lists some of the accomplishments in our policy and education programs. Additional information can be found at our new and improved web site: www.hubbardbrookfoundation.org.

The Hubbard Brook Ecosystem Study has become a world force in ecosystem thinking.

Our work is funded from a variety of private and public sources, but none is more critical than the support we receive from donors who value the importance of science and science education in determining the future of a healthy environment. We thank all our contributors heartily. In this era of global economic challenges and severe fiscal constraints at both federal and state levels, the kind of work performed at Hubbard Brook is more important than ever, and more threatened. The long-term ecological record meticulously compiled by Hubbard Brook scientists sets a baseline against which our environmental progress—and shortcomings—can be gauged.

Sincerely,

A handwritten signature in dark ink, appearing to read 'David Sleeper', is written in a cursive style.

David Sleeper
Executive Director



Science and Policy

HBRF launched its hallmark **Science Links** program in 2001 in an effort to bridge the gap between ecosystem science and public policy. Science Links projects convene teams of scientists and policy advisors to define critical public policy questions related to specific issues affecting forest ecosystems. The teams collect and analyze existing data, evaluate the relative effectiveness of policy options under consideration, and work with HBRF staff and a team of communications and graphic design experts to translate and share the findings to appropriate audiences: high-level policy makers, the media, land managers, local government officials, and interested members of the public. Previous projects have addressed acid rain, nitrogen pollution, mercury pollution, and long-term ecological monitoring.

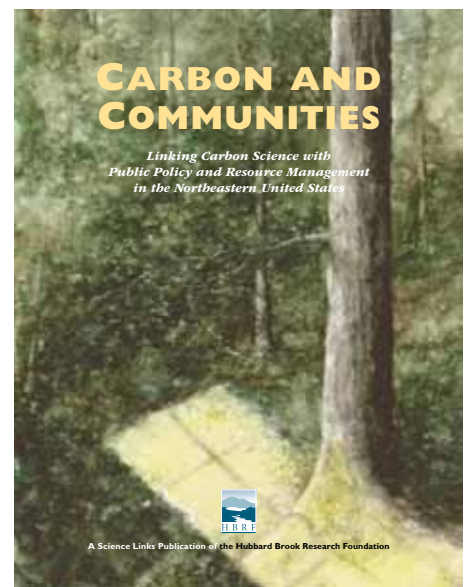
New! *Carbon and Communities*

HBRF's newest Science Links report, *Carbon and Communities: Linking Carbon Science with Public Policy and Resource Management in the Northeastern United States*, addresses climate change at the local level, where communities are increasingly interested in comparing the cost and effectiveness of strategies to reduce carbon emissions. As part of this project, scientists analyzed the carbon budgets of eight representative counties and one city in the Northeast. These case studies were selected to examine a broad spectrum of land uses found in the northeastern United States, including the industrial and privately owned forests of New Hampshire, mixed agricultural and residential landscapes of central New York and Vermont, the forested regions of Massachusetts currently undergoing expanding suburban and commercial development, and the city of Baltimore and its adjacent suburban county. The report concludes that carbon strategies must be tailored to respond to specific local human activities and land uses.

Among the report's key findings:

- » Most counties in the Northeast are net sources of carbon dioxide emissions, except for those in sparsely populated forested areas with population densities of fewer than 80 people per square mile.
- » The largest single source of carbon per capita in most counties is the transportation sector—emissions from cars, trucks, and buses used to move people and goods.
- » Some rural counties could offset most of their carbon emissions at little long-term cost to residents, whereas urban and suburban areas will need to invest additional resources to reduce emissions significantly.
- » In rural counties, wind power and fuel-wood harvesting present the most cost-effective mitigation opportunities.
- » Urban and suburban counties could offset as much as a third of carbon emissions at low cost by focusing energy-saving strategies on space and water heating, lighting, and computers and appliances.

The report and companion web site can be found at www.carbonandcommunities.org. The following funders made the project possible: Jessie B. Cox Trust, Henry Luce Foundation, Merck Family Fund, Northeastern States Research Cooperative, Orchard Foundation, Sudbury Foundation, Robert and Patricia Switzer Foundation, and in-kind support from Cornell University.



Poultney Woodshed Project

In a new joint effort, HBRF is working with Green Mountain College (GMC) in Poultney, Vermont, to secure a growing portion of the college's biomass energy requirements for its combined heat and power biomass plant from forestlands located relatively close to campus. If successful, this project will produce carbon savings resulting from lower transportation distances for woodchips, and at the same time will support the local economy by engaging traditional stewards of the forest: landowners, foresters, loggers, mill owners, and truckers. The Poultney Woodshed Project seeks to establish a network of local landowners to supply GMC and other biomass users with sustainably harvested, competitively priced woodchips. The project is funded with grants from High Meadows Fund, Riverledge Foundation, Rutland Regional Planning Commission (with funds from the U.S. Department of Energy), and Henry Luce Foundation.

Watershed Ecosystem Services in the Northern Forest

Ecosystem services are natural benefits provided by healthy, functioning ecosystems that provide advantages to humans and human societies, such as the provision of clean air and water, flood control, wildlife habitat, and recreational opportunities. Of the multitude of services forests provide, water-related services are widely recognized as among the most critical due to the pressures of climate change and development, both of which can affect water quantity and quality. Now more than ever, new strategies to protect water resources and watersheds are needed.

Working with partner organizations, HBRF has embarked on a three-year project to establish a marketplace to conserve water-related services in the Upper Connecticut River Watershed of New Hampshire and Vermont (a parallel project focuses on the Crooked River Watershed in Maine). In year one, we conducted research on potential “buyers” and “sellers” of ecosystem services; identified three regions within the watershed to concentrate our efforts; held informational meetings and webinars; and supported the first-ever “landscape auction” in the nation. Next steps will include launching a web-based marketplace that will match investors with private landowners who agree to undertake conservation measures to protect water-related services. Partners for this project include the American Forest Foundation, World Resources Institute, White River Partnership, Ammonoosuc Conservation Trust, Orange County Headwaters Project, and Dartmouth College. The project is funded by the USDA/Natural Resources Conservation Service (Conservation Innovation Grants Program), Davis Conservation Foundation, and Dartmouth College.

Education

HBRF was founded with a commitment to education and public outreach. Our educational efforts have expanded in recent years with the support from our main education partner, the U.S. Forest Service’s Northern Research Station. HBRF’s **Environmental Literacy Program** uses the research activities and findings of the Hubbard Brook Ecosystem Study to inform the teaching of science-inquiry skills to middle and high school students by providing teachers with resources and training. A list of new education tools is included at right.

HBRF educators support public school teachers at many levels. In 2010, two teachers spent the summer in field research as part of the National Science Foundation’s **Research Experience for Teachers** program. HBRF educators are active participants in the New Hampshire Science Teachers’ Association and the New Hampshire Education and Environment Team. We also engage in school partnerships with local teachers and schools in order to develop and test new materials to aid in their science instruction.

HBRF supports higher education through its **Research Experience for Undergraduates** program, done in partnership with Plymouth State University and funded by the National Science Foundation. In 2010, 12 top undergraduate ecology students from around the country spent 10 weeks immersed in field research under the mentorship of Hubbard Brook scientists. The culmination of

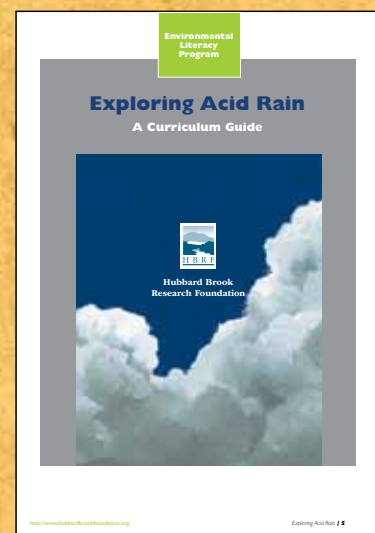
their work is a communications project for public audiences, in partnership with area agencies and nonprofit organizations.

A new **Winter Ecosystems Field Course** for undergraduates was piloted in 2010, a precursor of a more comprehensive winter program of study at Hubbard Brook. Seven scientists and staff presented a four-day module as a major part of a course offered at neighboring Plymouth State University.



NEW EDUCATIONAL RESOURCES:

- **Exploring Acid Rain** is an on-line teaching guide for teachers of middle and high school students, based on *Acid Rain Revisited*, a Science Links report. The protocols, activities, and resources are designed to help secondary educators teach complex ecological concepts through classroom and outdoor activities.
- **What Limits the Reproductive Success of Migratory Birds?** is a new online bird population ecology module. Developed by graduate students using long term data from Hubbard Brook, it is designed to complement classroom materials to help students understand population dynamics and the environmental influences on bird populations.
- **New England Common Assessment Program (NECAP) Mock Exams.** HBRF educators have compiled practice questions and answers as mock NECAP exams using real data from Hubbard Brook to help teachers prepare their students for mandatory state science exams in grades 8 and 11.





HUBBARD BROOK ROUNDTABLE

The Hubbard Brook Roundtable was established by HBRF in 2006 as a way to convene a wide range of stakeholders to identify and address pressing threats to the Northern Forest. Through intense facilitated dialogues—often held in the safe, nonpartisan, and private setting of HBRF’s Mirror Lake Campus—Roundtable participants attempt to reach consensus on specific actions to address vexing environmental problems. Roundtables have convened distinguished leaders from ecosystem science and other academic disciplines, government service, the timber industry, and public-interest organizations to discuss issues including carbon-sequestration policies, wood biomass energy, ecosystem services, and long-term ecological monitoring. Hubbard Brook Roundtables have laid the groundwork for new initiatives, including our current Watershed Ecosystem Services and Poultney Woodshed projects.

Facilities

HBRF owns and operates two residential and research facilities adjacent to the Hubbard Brook Experimental Forest. The facilities are available to researchers, visiting scholars, students, and nonprofit organizations throughout the year.



Mirror Lake Campus comprises a classroom and six cottages with eight separate living units that can accommodate up to 60 people. The facility is used in the off-season for scientific and educational meetings, including the Hubbard Brook Roundtable. When not occupied, the facility may be rented by nonprofit groups for meetings, retreats, and long-term rentals. Please inquire at 603-653-0390.

Pleasant View Farm is a dormitory-style house with shared kitchen and common areas including a large wrap-around screened porch where students and researchers meet for “Science Nights,” potluck dinners, and other social and academic activities. The adjacent Towers Laboratory offers on-site laboratory facilities for scientists.



Hubbard Brook Research Foundation

December 31, 2010 and 2009

Statement of Financial Position

ASSETS	2010	2009
Current assets:		
Cash and cash equivalents	\$ 90,934	\$ 89,228
Pledges receivable	18,020	12,235
Grants receivable	16,971	10,389
Other receivables	198	1,232
Deferred expenses	74	1,116
Prepaid expenses	2,908	2,908
Total current assets	129,105	117,108
Property and equipment:		
Buildings and improvements	1,913,757	1,905,857
Equipment	68,682	68,867
Land	470,200	470,200
	2,452,639	2,444,924
Less: accumulated depreciation	451,094	393,124
Total property and equipment	2,001,545	2,051,800
Total Assets	\$ 2,130,650	\$ 2,168,908
LIABILITIES AND NET ASSETS		
Current Liabilities:		
Accounts payable and accrued liabilities	\$ 11,580	\$ 9,461
Deferred income	27,885	8,763
Accrued interest	819	819
Total current liabilities	40,284	19,043
Note Payable	707,934	707,934
Net Assets:		
Unrestricted	1,277,420	1,300,182
Temporarily restricted	105,012	141,749
Total net assets	1,382,432	1,441,931
Total liabilities and net assets	\$ 2,130,650	\$ 2,168,908
STATEMENT OF ACTIVITIES AND CHANGES IN NET ASSETS		
Revenue & support		
Contributions and grants	\$ 439,008	\$ 338,476
Rental Income	74,190	69,560
HBRF Consortium dues	63,078	77,829
Donated Services	47,170	-
Other Income	9,802	6,831
Total revenues and support	633,248	492,696
Expenses		
Program costs:		
Facilities	167,946	213,886
Education	348,699	259,888
Total program expenses	516,645	473,774
Supporting services expense:		
Management and general	126,196	134,800
Fundraising	49,906	46,191
Total supporting services	176,102	180,991
Total expenses	692,747	654,765
Change in net assets	(59,499)	(162,069)
Net assets, beginning of year	1,441,931	1,604,000
Net assets, end of year	\$ 1,382,432	\$ 1,441,931



Note: These schedules should not be confused with HBRF's 2010 audited financial statements. That report, including footnotes and the auditor's opinion, is available upon request or may be found on the HBRF website.

Piggy Bank Challenge successfully met!

In 2010, with help from an anonymous donor who provided matching funds, HBRF established a special trustees' fund intended to help the organization weather short-term financial uncertainties and also to explore new opportunities for projects and collaborations. Dubbed the *Piggy Bank Challenge*, this special effort attracted 32 donors and succeeded in providing HBRF with the financial flexibility to respond to opportunities for future growth. Thank you to all who helped meet this challenge!

¹ Piggy Bank Challenge

² In honor of Dr. Robert S. Pierce

³ In memory of Dr. George H. Tomlinson, II

⁴ In honor of Mike Smith

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In Memoriam

We regret the passing in 2010 of long-time Mirror Lake researcher and HBRF supporter, **Dr. Thomas C. Winter**, scientist emeritus at the U.S. Geologic Survey. Tom was a preeminent leader in the field of lake and wetland hydrology. With Gene E. Likens, he co-edited the book, *Mirror Lake: Interactions Among Air, Land and Water* (University of California Press, 2009), which was updated and re-released in 2009. Tom received many national and international awards during and following his career with USGS. His service to the Hubbard Brook Ecosystem Study, the USGS, the hydrogeology and limnology communities, and the public will be sorely missed.

Dr. George Tomlinson, II, an avid environmental researcher, science writer, and life-long student of ecology, passed away in 2010 at the age of 95. He is remembered for his frequent visits to HBRF events and lectures, and his dedicated support of HBRF over the years. We thank his family and friends who chose to honor him by making memorial gifts to HBRF in his name.





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Hubbard Brook Experimental Forest

Robert S. Pierce Laboratory

Owned and operated by the

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Foliage samples