

Spring 2007

The Black Rock Forest Consortium

Collaborative Research

The Conservancy is also participating in the Forest's urban-rural gradient

study by providing the most urban

site for the project in a plot just north

of the Park's East 102nd Street en-

trance. The other sites for the pro-

ject, which aims to estimate New

Volume XVII, No. 2

Central Park Conservancy Enjoys Multiple Forest Activities

 $\mathbf{I}_{\mathrm{Central}}^{\mathrm{ow}}$ is ecological restoration in Rock Forest is on the other side of Central Park connected to Black the Hudson River and has different Rock Forest? It's just one of the soils, it still gives us a good view of ways the Central Park Conservancy natural forest that is nowadays hard is taking advantage of its Consortium to see close to an urban center." membership, along with participating in a research project and bringing students to the Forest.

Woodland Restoration

In the spring of 2006, in the North Woods section of Central Park, the Conservancy planted some 150 bareroot saplings from the Black Rock Forest nursery, including white oak York City's "ecological impact" on (Quercus alba), red oak (Q. rubra), surrounding areas, extend north American sycamore (Platanus occiden- through the suburban Lamonttalis), and black walnut (Juglans ni- Doherty Earth Observatory and cengra), all grown from seed and acorns trally located Black Rock Forest to a from For-

est trees. "This project is part modern ecological restoration and Frepart derick Law Olmsted,' according to Matthew Brown, supervisor of the Conservancy's Soil, Water. and



Dr. William Schuster with Central Park Scholars in Black Rock Forest.

Ecology Lab, who is working with For- ceous plants, cocklebur (Xanthium est Executive Director Dr. William stromarium) and fireweed (Erechtites Schuster and Forest Manager John hieracifolia) (see "Field Season Yields Brady on this project. that, back in the 1850s, when Olmsted designed Central Park, he envi- urban-rural gradients in environsioned giving city residents the experience of visiting the woods of upstate New York, while modern restoration efforts focus on mimicking the original ecosystem. "Although Black

He explains Plant Growth Data," Winter 2007).

The multiyear study examines mental variables (such as day- and night-time temperatures, growing season length, solar radiation scat-

(continued on page 4)

oak

rubra) and

two herba-

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Research

Mercury Research Takes Off in Forest

 $B_{
m regional}$ center for mercury research, with a mercury deposition monitoring station and ongoing studies of mercury emissions, deposition, and impacts on songbirds and bats. A 2006 New York Times article discussed the bird research, which included sites around the northeast in addition to the Forest.

Mercury, a toxic chemical that affects human, animal, and environmental health, enters the environment in several ways. On a global scale, some 40% comes from emissions from coal-burning power plants, waste and medical waste incinerators, and other industrial sources; another 40% from mercury that was previously deposited on soil and water surfaces and is reemitted: and about 20% from natural sources such as mineral deposits, volcanoes, and forest fires. These global figures are just estimates; even less is known about the amounts on the local scale of the Hudson Valley. But now researchers are beginning to learn more about regional mercury levels.

How Much Mercury?

Black Rock Forest recently joined the national Mercury Deposition Network (MDN) by establishing a monitoring site on West Point land adjacent to its National Atmospheric Deposition Program (NADP) monitoring station, thanks to Dr. Anthony Carpi of John Jay College (part of the City University of New York, CUNY) and Dr. Allan Frei of Hunter College (also part of CUNY), guest researchers in the Forest. With more than 85 sites around the country, the MDN is creating a na-

Black Rock Forest Consortium

Black Rock Forest News is published three times a year by the Black Rock Forest Consortium.

The Black Rock Forest Consortium is an alliance of public and private schools, colleges, universities, and scientific and cultural institutions engaged in research, education, and conservation in the 3835acre Black Rock Forest in New York's Hudson Highlands.

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Consortium Institutions

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Black Rock Forest News Sibyl R. Golden, Editor Terry Murray, Photo Editor © 2007 Black Rock Forest Consortium

Report from the Executive Director

offered our first Earth Day events its founder, Pete Seeger, hopes to this year, leading Green Building visit us that afternoon, fresh from tours, planting a few trees, and mak- serving up "the best strawberry ing our first trout release of the year. shortcake you have ever imagined" at We were pleased and surprised when the Beacon Strawberry Festival. hundreds of people showed up to take part in the events and to enjoy musical/environmental leaders, we the Forest. We take that as a clear demonstration of people's commitment to our environment and were glad to hear that other Earth Day celebrations in the area were also very well attended.

The Forest has received some good public exposure recently, with our snow research facility featured in the New York Times in January (see "Forest News in Brief," p. 7). Thanks to our colleague Professor Shahid Naeem of Columbia University, the Forest was also shown in a recent Horizons show, filmed by the BBC, focusing mainly on worldwide efforts to save endangered species. Shahid was interviewed in the Forest while walking among research plots. He made abundantly clear that diverse living organisms underlie the functioning of most major processes on earth and that the loss of species, even tiny nondescript creatures in the soil and elsewhere, may have major repercussions which we do not yet know enough about to realize.

Our Consortium has gained a new Chairman, Sibyl R. Golden. Those of you who know Sibyl understand how dedicated she is to our Forest and our Consortium, and know that we will be in extremely good hands as we enter this new era. All of us, and many more people than will ever read this column, owe a debt of gratitude to her father, William T. Golden, now Chairman Emeritus, for his vision and actions over the past decades as the founder of our Consortium and the only Chairman we have ever known. He will no doubt remain close to our continuing progress.

Next month, we will celebrate our sixteenth Consortium Day on June 10. Many of you know what a fun and interesting day this has become as we gather to hear from some of the bright and energetic people who are guiding and pursuing projects in the Forest. We will honor our outstanding sister organization, Clear-

OTS of new things to report from water, on that day (see "Forest News in and around the Forest! We in Brief," p. 7) and are thrilled that

Speaking of our area's illustrious are pleased to have heard from Paul Winter, who last fall gave us an unforgettable experience playing many of his "living music" masterpieces, inspired by nature around the globe. He is embarking on a project to record an album of music celebrating the Hudson River. We look forward to hearing the sounds of nature from our own region, captured and embellished by Paul's magic. He will, by the way, be playing at Clearwater's Hudson River Revival on June 16.

Also next month, we will host our fifth Forest Research Symposium, on June 25-26, but with a new twist. We are collaborating with HEnRI, the Highlands Environmental Research Institute, and other cosponsors to make this a Highlands region-wide research conference. As much Black Rock Forest research relates directly to the larger ecosystem and much research elsewhere in the Highlands is pertinent to our Forest, it should foster a natural and beneficial crossfertilization of ideas and information.

Finally, I would like to ask all of our readers to support Black Rock and our region through an exciting event: the "Green Ride," a longdistance bike ride fundraiser (estimated at 240 miles!) on Columbus Day weekend. We are seeking up to 100 bike riders to ride through and around protected properties and beautiful natural areas of the Hudson River Valley to raise awareness and funds for environmental education and preservation. Many riders will be teachers, scientists, and others from Consortium institutions; we also need sponsors and volunteers to support their efforts. We are teaming up with other leading environmental organizations, and the Ride's web site will launch very soon (we will link from our own wonderfully redesigned site, www.blackrockforest.org). As I said, LOTS of new things are happening, and each of us can play a part. — Dr. William Schuster

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Trevor Adds Art and Leadership to Forest Activities

ike many new Consortium mem-Lebers, Trevor Day School, an independent K-12 school, enthusiastically began bringing students from most elementary and middle school grades to Black Rock Forest last fall and participating in many of the activities that longer-term members have already enjoyed: scientific exploration, hikes, team-building, preparing food, and maintaining their living space.

"The possibilities for scientific study are endless at this site," notes Susan Halligan, Trevor's Middle School director. "The science teachers took advantage of these amazing facilities to enhance their own science curricula." For example, sixth grade students measured water acidity and

oxygen content, seventh graders learned about tree classification and measurement. creating their own dendrology guides, and eighth graders assessed Forbiodiversity est on 0.2-acre plots.

ties to the Forest repertoire. On the third day of the eighth-grade trip, for example, the second grade visited Black Rock. The eighth graders acted as leaders for the younger students, helping them learn to observe and respect nature and guiding them through a nature scavenger hunt (left photo). "They really took to their role as mentors and naturalists," says their science teacher, Rob Quatrone.

grade environmental art project, defrom materials they found in the For-

But Trevor also added new activi- Goldsworthy sculptures and encouraging them to look around. The students used acorns, berries, leaves, and little rocks, displaying their work on tree trunks, grates, and other objects they found, and crushing berries to add color. (The art work pictured here was used on the Trevor holiday card.) The students also used digital cameras to record their art, playing with angles and lights.

"The most important component Another novel activity was a sixth of these trips has been an introduction to a real forest," adds Rob signed by Jackie Maraziti, the sixth Quatrone, "a place where scientific grade dean and a trip facilitator. She research is conducted and alternative engaged the students in creating art power sources are put into action. The students loved being in such a

really enjoyed cooking! Their appreciation of forest ecology will grow each year they visit, and we hope to develop more and more sophisticated research for them to conduct."



Six Small Grants Awarded for Research in the Forest

For 18 years, the Black Rock Forest Consortium has awarded small grants to researchers and educators working in the Forest. This year, the sixth generously funded by the Ernst C. Stiefel Foundation, the Consortium awarded \$25,134 for six grants, bringing the overall total to 114 grants and more than \$425,000.

Several of the grants connect to the Forest's multiyear study, using experimental manipulations, of oak forest sustainability and responses to canopy disturbance (see "What Will Happen to Our Forests?," Spring 2006).

Before major manipulations begin next year, it is critical to understand the characteristics of the 18 study plots that have been established. Dr. Kevin Griffin of Lamont-Doherty Earth Observatory will study below-ground carbon storage both in these plots and in other plots in which a pilot study is already underway. Belowground carbon is stored in large quantities in soil, roots, and the litter layer.

Dr. Marina Cords from Columbia (traits that vary in response to envi-University's Department of Ecology, Evolution, and Environmental Biology (E3B), working with Dr. Catherine Burns of WildMetro, is assessing the species composition and relative abundance of small mammals in the study plots. They will use track-tubing, a new noninvasive field technique: small mammals enter baited, open-ended tubes and exit at the other end; special paper on the base of the tubes captures each animal's footprints.

Dr. Maria Uriarte (also of Columbia's E3B department) is using a computer simulation program, SOR-TIE, that models forest growth to understand the potential impact of the loss of oaks in the Forest. The system is parameterized with field data; she will collect data on black oak (Quercus velutina) and chestnut oak (Q. prinus), two species not yet parameterized.

Dr. Hilary Callahan from Barnard College studies the ecology and genetics of complex plastic traits in plants ronmental changes). Along with Dr. Louise Comas, she will begin research on plastic variations in fine root traits; fine roots are difficult to study but critical to nutrient cycling and other ecosystem functions.

Dr. Shahid Naeem (Columbia's E3B department) will use communities of mosses and microarthropods to test the impact of experimental disturbances on biodiversity and ecosystem processes. Moss communities are ideal for this purpose because they are an "important component of forest ecosystems" and support a "rich array of microfauna."

Drs. Gavin Gong (Columbia Earth and Environmental Engineering), Jason Smerdon (Lamont-Doherty), and Jessie Cherry (University of Alaska) are studying land-atmosphere energy coupling (see "Let It Snow!," Winter 2006). The grant allows automatic uploading of data collected by the Forest's snow stations to the Lamont online data library.

Black Rock Forest News

Student Research Spotlight: Roles of Understory Biodiversity by Jason Sircely

"he ecosystems of our planet cur-I rently face dramatic and unprecedented changes. Two of these changes, the loss of biodiversity and biological invasions, will alter how ecosystems function. My master's thesis research at Columbia examined the impact of understory plant diversity on ecosystem processes and on the abundance of exotic invasive plants. My work also provided information for Black Rock's study on the threat of oak loss in northeastern forests [Ed. Note: See "What Will Happen If the Oaks Die?," Spring 2006].

diversity on several fundamental ecosystem processes (productivity, or growth, of understory plants; decomposition; and the conversion of nitrogen and calcium to inorganic forms during decomposition), and on exotic plant invasions. I also examined the influence of environmental conditions such as light, soil moisture, soil depth, and soil nitrogen content to compare their importance with plant

Central Park (continued from page 1) tered by the atmosphere, chemical deposition, and ozone and carbon dioxide concentrations) and then investigates their individual and interacting influences on plant growth. The research team includes Dr. Schuster, Dr. Kevin Griffin of Lamont-Doherty, Dr. Matthew Turnbull of the University of Canterbury in New Zealand, Dr. David Tissue of Texas Tech University, and Dr. James D. Lewis of Fordham University.

Youth Programs

The Conservancy runs many education programs for students in New York City schools. Two of these, the Central Park Scholars (for 7th through 9th graders) and the Youth Leadership Program (for high school students), have brought participants to Black Rock Forest.

Last summer, 25 Youth Leadership Program interns took a two-day overnight trip to Black Rock, where they identified, measured, and cored trees, hiked to the Stone House, cooked dinner over an open fire, told stories around the campfire, and then took their first-ever night hike back to the Forest Lodge. "We wanted the

diversity. Finally, I assessed the role of scale (scale of ecological association) by examining how the effects of plant diversity and environmental conditions differed for wetter (seeps) and drier (mesic) areas and analyzing them both separately and together.

Plant diversity appeared to increase productivity and decomposition in the forest understory; decomposition was unaffected by diversity in seeps. In contrast, plant diversity appeared to decrease nitrogen mineralization in seeps, possibly indicating in understanding how biodiversity greater uptake of nitrogen (calcium I looked at the influence of plant results are forthcoming). Still, other mechanisms could be responsible. which future studies could test.

> While environmental differences resulted in greater productivity in seeps than in mesic areas, they had no effect on productivity, decomposition, or nitrogen mineralization within either zone. This suggests that loss of understory plant diversity could reduce productivity, slow mesic decomposition, and alter seep nitrogen cycling.

> students to experience a real Forest and get out of the City," explains Terri Carta, the Conservancy's director of Recreation and Community Programs. "Many of these urban youth were terrified at first about the night hike, but that was the challenge. On our return to the Lodge, our staff helped the students process the fears they had just overcome; it was rather moving for most of them, and something they will never forget."

> The Youth Leadership Program trip served as a pilot for this year's Central Park Scholars' activities. Each Saturday, students come from around the city to explore and improve Central Park. Each grade works with a community partner: this year, the 7th grade Scholars are collaborating with Black Rock Forest.

> Their project involves understanding the natural environment, examining the health of trees in different parts of Central Park, and comparing the Park trees to those in the Forest; it will culminate on May 19 with an interactive ecology exhibit in the Park's Charles A. Dana Discovery Center.

First, John Brady visited Central Park's North Woods to introduce the

Both invasive plant abundance and the number of native species were greater in the more fertile seeps, so invasion and native plant diversity were positively correlated. However, there were no such correlations within the seep and mesic areas. This supports an emerging consensus that plant diversity does not facilitate invasions at finer ecological scales, despite positive relationships between diversity and invasibility at greater scales.

The study provides a step forward loss will affect our ecosystems over coming decades. Losses of understory plant diversity appear likely to decrease ecosystem process rates and, depending on the ecological scale, to exert even more control over ecosystem processes than fine-scale environmental differences.

Jason Sircely just received his MA from Columbia University in Conservation Biology and will begin his doctoral studies in ecology and evolutionary biology at Columbia in the fall.

Scholars to forest ecology. Then, the students traveled to the Forest. "Black Rock gave the Scholars a chance to experience woodlands and scenery different from their everyday urban life," says Lisa Ochs, one of the Scholars program educators. "The students loved the opportunity to skate on a frozen-over pond, something they could never do in the city. They are fascinated by the skins and animal skulls in the Science Center. We are trying to replicate the same activities in the Park and in the Forest, including water testing, tree coring, and general tree management."

"The Central Park Conservancy and Black Rock Forest Consortium have much in common" explains Dr. Schuster, "since we both focus on how to optimally manage and benefit from very large "green" areas surrounded by people. The overlap in our missions makes our partnership seem natural and has enabled us to pursue several productive programs together. The Conservancy has been doing a great job in Central Park for some time, and we are pleased to help expand their programs. We are working together to explore other exciting programs for the future." ■

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Mercury (continued from page 1) tional database of weekly figures on mercury concentrations in precipitation and seasonal and annual data on the amounts of mercury deposited through precipitation on land and surface water (wet deposition).

Drs. Frei and Carpi want to estimate how natural and anthropogenic sources of mercury contribute to the load of the metal in the Black Rock Forest ecosystem. In addition to using the MDN data on wet deposition, they are trying to quantify the emission of mercury from soil and snow surfaces in the Forest. They measure mercury concentrations inside and outside a small plastic chamber placed on the surface to determine how much mercury the soil or snow is emitting.

One of their first results is discovering that this traditional method of measuring mercury may not be accu-"Recent research in our lab," rate. says Dr. Carpi, "has shown that ultraviolet (UV) light is a primary driver of soil mercury emissions, but the polycarbonate plastic used in the chambers is not UV-transparent. Our study at Black Rock shows that these chambers significantly underestimate the emission of mercury from soil and snow surfaces." They are now experimenting with a Teflon surface chamber; preliminary research suggests that this is a more accurate method for measuring surface flux.

The two CUNY scientists also need to quantify dry mercury deposition; that is, mercury that settles out of the air onto land and water surfaces as a result of air movement rather than precipitation. "Thus, our research measures downward mercury fluxes in both wet and dry depo-

sition, and emission upward from soil and snow surfaces," Dr. Carpi explains, "so we can calculate an overall flux of mercury to the Black Rock system and whether the mercury load is increasing or decreasing."

The Forest work is part of a larger project. Drs. Frei and Carpi are examining how environmental variables (such as solar radiation, temperature, and rainfall) affect mercury emissions, and thus how the mercury cycle might respond to climate change.

Songbirds and Mercury

Researchers have often focused on wet deposition and the presence of mercury in aquatic systems, particularly in fish and in birds that eat fish; clearly, this is important for human health. But, dry deposition is also significant, and mercury falls on land as well as on water.

Dr. David Evers and his team from the <u>Biodiversity Research Insti-</u> <u>tute</u> (BRI) in Maine are looking at mercury in terrestrial wildlife, including forest-dwelling songbirds (which do not eat fish), expanding on their recently published work (<u>BioScience</u>, January 2007) on biological mercury hotspots in the northeast and aquatic species. The songbird research was highlighted in a 2006 New York Times article; it brought the scientists to Black Rock Forest in 2005 and 2006, and they will return this summer.

In the Forest, the researchers, led by BRI staff biologist Melissa Duron, sampled soil, invertebrates, songbirds (focusing on wood thrushes as an indicator species), and bats. The work at Black Rock serves three purposes, explains Dr. Evers. First, it creates a better understanding of the insectivore food web pathway for me-

thylmercury (the biologically available form). Second, the site fits into a larger study, with about 35 sampling stations from New England through North Carolina, enabling the scientists to look at spatial gradients in biotic mercury levels and analyze their relationship to emission sources and other factors.



A wood thrush tested in the study.

"Third," says Dr. Evers, "I want to look at the impact of acid rain: by acidifying some areas, it may provide a better habitat for the bacteria that methylate mercury, making it biologically available, and may also strip these areas of calcium. Both could impede wildlife's ability to reproduce." He is testing the hypothesis that the synergy of high mercury and low calcium could negatively impact biological diversity, with potential widespread effects, in collaboration with The Nature Conservancy, the New York State Department of Environmental Conservation, Syracuse University, the Cornell Lab of Ornithology, and Harvard University.

So far, the BRI scientists' work has revealed high levels of mercury in the wood thrush and in red-eved vireos, as well as in some other birds. "These results may indicate that there are several factors influencing mercury levels in songbirds," explains Ms. Duron, "and that some species may be more vulnerable to mercury contamination due to factors such as habitat, foraging strategy, prey type and body size." By returning this year, they will assess any temporal changes in mercury levels; Dr. Evers notes that they don't do that at all sites, but that the new MDN station, by recording wet deposition, makes research at the Forest particularly useful.

"High levels of mercury threaten many organisms, and should be of concern to everyone," explains Forest Executive Director Dr. William Schuster. "The work these scientists are accomplishing here and elsewhere is helping to illuminate terrestrial mercurv deposition and cycling and its implications, which has received less attention than the aquatic mercury situation. Black Rock Forest. so close to New York City and several mercury-emitting power plants, is now an important site for understanding the geographic patterns of a truly important, large-scale pollution problem." ■

Research assistant Kylie Ferguson, a Hunter College student, measuring mercury emissions from snow



Current Research at the Forest

The Black Rock Forest Consortium is committed to encouraging collaboration among member institutions and also between researchers and students. To help members learn what other members are doing and explore opportunities for collaboration, we here present a list of current research projects at the Forest, along with contact information.

Oak Forest Sustainability and Response to Canopy Disturbance. William Schuster (<u>Black Rock Forest</u>), Shahid Naeem and Maria Uriarte (<u>Columbia University</u>), Kevin Griffin (<u>Lamont-Doherty Earth Observatory of Columbia University</u>), and Jerry Melillo (<u>The Ecosystems Center, Marine Biological Laboratory</u>). *Contact William Schuster*.

Cycling of Mercury in Terrestrial Environments. Allan Frei and Anthony Carpi (<u>City University of New York</u>), David Evers (<u>Biodiversity Research Institute</u>), and Roger Claybrook (<u>US Mercury Deposition Network</u>). *Contact Anthony Carpi*.

Native Plant Performance along an Urbanization Gradient. Kevin Griffin (Lamont-Doherty Earth Observatory of Columbia University), William Schuster (Black Rock Forest), Matthew Brown (Central Park Conservancy), and J. D. Lewis (Fordham University). Contact Kevin Griffin.

Functional Ecology of Complex Plastic Traits in Forest Trees: Pilot Studies of Reproductive and Root Traits. Hilary S. Callahan (Barnard College). Contact: Hilary S. Callahan.

Carbon and Nitrogen Cycling in the Cascade Brook Watershed of Black Rock Forest. Kevin Griffin and H. James Simpson (<u>Lamont-Doherty Earth</u> <u>Observatory of Columbia University</u>). Contact: Kevin Griffin (griff @ ldeo. columbia.edu) or H. James Simpson.

Long-Term Carbon Storage in Wetlands. Dorothy Peteet (<u>Lamont-Doherty</u> <u>Earth Observatory of Columbia University</u>) and Terryanne Maenza-Gmelch (<u>Barnard College</u>). *Contact: Dorothy Peteet*.

Land-Atmosphere Coupling at Black Rock Forest: The Role of Snow, Vegetation, and Soil Thermodynamics. Gavin Gong (Department of Earth and Environmental Engineering, Columbia University), Jason Smerdon (Lamont-Doherty Earth Observatory of Columbia University), and Jessie Cherry (University of Alaska). Contact: Jason Smerdon.

Effects of Host Defoliation and Distribution on Spatial Patterns in Ectomycorhhizal Fungi. J. D. Lewis (Fordham University). Contact: J. D. Lewis.

The Tamarack Pond Core as a Rosetta Stone for Determining the History of the Black Rock Forest Region. Dallas Abbott (Lamont-Doherty Earth Observatory). Contact: Dallas Abbott.

Long-Term Study (76+ Years) of Tree Population Dynamics and Carbon Storage. William Schuster (Black Rock Forest). Contact: William Schuster.

Small Mammal Response to Landscape Disturbance. Marina Cords (Department of Ecology, Evolution, and Environmental Biology, Columbia University) and Catherine Burns (WildMetro). Contact: Catherine Burns.

Long-Term Studies of Painted Turtle Population Dynamics and Dispersal. Christopher Raxworthy (<u>American Museum of Natural History</u>) and Susan Mitchell (<u>Cornwall Central School District</u>).

Moss-Microarthropod Community Response and Recovery from Environmental Disturbances at Black Rock Forest. Shahid Naeem and Claire Jouseau (Department of Ecology, Evolution, and Environmental Biology, Columbia University). Contact: Shahid Naeem.

The Insect and Arachnid Diversity of Black Rock Forest. Vladimir I. Ovtsharenko (American Museum of Natural History). Contact: Vladimir I. Ovtsharenko. ■

Visit the New Web Site!

The new Black Rock Forest web site is here! It has the same address, <u>www.blackrockforest.org</u>, but a whole new look and organization.

While the old site contained much valuable information, it was difficult for visitors to find the pages they wanted and difficult for Forest staff to update. Thanks to the programmers and designers at Columbia Web Services, the new site not only is beautiful, but also is easy to navigate and, thanks to what's known as a content management system, easy for people who aren't computer experts to update and expand. In fact, after training by the Web Services staff, Forest staff and volunteers put the text and photos up on the site themselves.

Beyond ease of use and updating, the web redesign had two goals: the site should serve as a useful resource for Consortium members (to that end, two of its major sections are <u>Resources for Scientists</u> and <u>Resources for Teachers and Students</u>) and it should provide an exciting and informative introduction to the scope of the Consortium's work for other visitors, including potential funders and people interested in green buildings and sustainable design (hence the information in the About section).

In About the Forest, for example, visitors can learn about the Consortium; Forest history, geology, and biodiversity; facilities and resources; green building features; and publications. Resources for Scientists includes information on research activities, publications, and symposia; lab and housing resources; the environmental monitoring network; data resources (including links to online data); and the Small Grants program. Teachers can find descriptions of curricula (including links to some), lists of lab and field equipment, information about housing options and planning and reserving their visits, and more. Visitors can take a virtual hike through the Forest. Future plans include adding more online data, interactive features, and ways for schools and researchers to upload their own material to the site.

But there's so much more! Please visit soon — and often! ■ 2

\Box New Member or \Box Renewal		Name
 White Oak American Beech Hemlock Sugar Maple Individual Student/Over 65 	\$1000 or more \$500 \$250 \$100 \$20 \$15	Address Phone E-Mail My company will match my gift. Company name and address
□ Family \$25 Please mail this coupon with your contri- bution to: Black Rock Forest, 129 Continental Road, Cornwall NY 12518-2119. Please make checks payable to the Black Rock Forest Consortium. <i>Thank you!</i>		 Please send me information concerning: Gifts of land/real estate I would like to volunteer to help with the following:

Forest News in Brief

Day, on Sunday June 10 from 1 to 6 PM will highlight the turing a photo of Executive Director Dr. William Schuspresentation of the annual E. G. Stillman Award to the ter), the article discussed the ongoing snow research at Hudson Sloop Clearwater and its founder Pete Seeger, whop hopes to attend. Since its 1969 launching, the Clearwater has played a pivotal role in revitalizing the Hudson River. It now hosts 13,000 student visits annually and reaches thousands more through outreach programs. The day also includes hikes, tours of the Forest's Hunter College, as well as Dr. Schuster. "Still," columnist green building features and environmental monitoring Peter Applebome wrote, "the most striking thing about technology, demonstrations by scientists and school Black Rock Forest turns out to be not what it has to say groups, and refreshments.

Fifth Forest Research Symposium. This year's Black Rock Forest Research Symposium will be a two-day event, on June 25 and 26, with sessions from 9 AM to 4 PM each day. Cosponsored by the Palisades Interstate Park Commission and the US Forest Service, Northeastern Area State and Private Forestry, the Symposium will include scientists working elsewhere in the Hudson Highlands as well as in the Forest itself. Sessions will be held in the Forest Lodge; overnight housing is also available there. Symposium topics will depend on the interests of the participating scientists; the 2005 Fourth Symposium featured presentations on forest ecology, invasive species, biogeochemistry, forest fragmentation and urbanization, and biodiversity (see "Research Symposium," Fall 2005).

Forest Featured in the New York Times. The New York Times highlighted snow research at Black Rock Forest in a January 7, 2007, article, "Taking the Measure of Snow-

Join Us on Consortium Day. This year's Consortium falls, or the Lack of Them." Datelined Cornwall (and feathe Forest (see "Let It Snow!," Winter 2006), and the potential impact of changes in the amount of snow in the region on water supplies. It quoted researchers Dr. Jessie Cherry (who received her Ph.D. from Columbia and is now at the University of Alaska) and Dr. Allan Frei of about snow. It turns out to be what it has to say about everything else."

> Earth Day Events at the Forest. April 22 was Earth Day, and some 100 Friends of the Forest, neighbors, and Consortium visitors attended a series of events at the Forest. They helped plant two flowering dogwoods (one given in honor of a wedding and one given as a memorial) and one large white pine (Pinus strobus), given by the Forest staff and the Consortium in memory of Pat Yazgi, founder of Friends of Fishes, who was very important in the development of the Forest's trout program (see "Brookies at Black Rock," Spring 2003). The visitors also helped release 150 of those brook trout, the first fingerlings of the season, into a Black Rock Brook tributary and toured the Science Center and Forest Lodge to learn about the buildings' award-winning green features, including geothermal heating and cooling, solar panel arrays, waterless composting toilets, and materials from the Forest itself.

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C^{onsortium} June 10 See P. 7

Report from the Forest Manager

Will there be more deer to be seen usually assumed to represent fawns print can be hard to find. Accurate The last time I felt confidence to pre- to the previous year's good growing the habits of wild creatures. dict Mother Nature was just before- season, abundant acorns, and/or April 15, 2007. Then, many of the mild winter. Another origin is from the walking, running, sauntering, and Forest's dirt roads had been graded the dispersal of densely populated and drainage cleared, and I was confi- deer groups in suburbia. dent they would withstand heavy spring rains. Seven inches of rain in the rate of population change. The clues to the animal's height as it one day humbled that thought!

Based on more fact than confidence, there appears to be an upward trend in the Forest's population of white-tailed deer. Overwintering deer numbers are calculated during tracking indexes after each snow event. populated neighboring areas can con- identification of the remains of di-Ten snow events occurred from December 1 through April 1, totaling growing Forest population. 40.5 inches, slightly below average. Observations during these snow to intervene, we should see more deer its to read in the snow are the moveevents enable trackers to define deer in Black Rock Forest. groups and their wintering range.

aged 2.2 to 3.7 deer per group. The frozen in time lies proof of the exisnumber of groups tracked has ranged tence and the habits of many woodfrom 20 to 40 and is used to estimate minimum overwintering density.

can drastically influence overall popu- size can be difficult to read in varying stincts within, you will be back. ■ lation trends. Slight increases are snow conditions. The perfect foot-

overwintering fawn contributes little leaps or bends, negotiating fallen to reproduction potential. Only the trees. Discovering feeding and resthealthiest fawns occasionally give ing sites will clarify the size of the birth to a single offspring (0.25 fawns body by the imprint of its bed. Evenper female). But each adult doe enter- tually the animal will leave droppings ing the group by dispersal from over- or scat; since you are what you eat, tribute twins or triplets to a faster gested plants and animals can solidify

Unless Mother Nature has plans

There are other footprints in the Since 1987, group size has aver- woods in addition to deer. Briefly land creatures. Identification of individual prints can be challenging. Ar- enough you will find it difficult to Small fluctuations in group size rangements of an animal's digits and turn and leave: awakened are the in-

in Black Rock Forest in 2007? from the previous spring, thriving due identification needs investigation into

Following animal prints will show hopping that can give clues to the animal's size, length and gait. Fol-The exact origin is important to lowing tracks though obstacles gives proper identification.

Some of the most interesting habments of coyote and fox as they advertise for mates in January and February. Their breeding season tracks demonstrate scent marking behavior and the relentless urge to find a mate.

If you follow a wild animal long