

Small Grants Highlight Integration of Research and Education

For the first time in its sixteen-year history, the Consortium's Small Grants Program, generously funded by the Ernst Stiefel Foundation, has awarded a grant to a project that integrates research and education. The Consortium awarded a total of \$22,795 to six projects: three research, two education, and one combined. Since its creation in 1990, the Small Grants Program, which provides up to \$5000 for research projects and \$3000 for education projects, has awarded a total of \$365,000 to 72 research projects, 24 education projects, and now the integrated research and education project.

"The combined proposal demonstrated the power of the Consortium's unique structure," notes Executive

Director Dr. William Schuster, "linking the work of research scientists at the American Museum of Natural History with K-12 students. The Small Grants Program has directly increased our scientific knowledge in many areas, such as key Forest taxa, long-term population monitoring, and Forest biogeochemistry, especially in the Cascade Brook watershed. It has been an important stimulus to external grant funding and has supported many top-notch graduate students. In recent years, it has also supported teachers in developing model educa-

tion programs that live on as examples for others to follow or modify and that now, increasingly, provide real research-education integration."

The Technology Connection

Technology plays a key role in three of the funded projects. In the integrated project, Dr. Vladimir Ovtsharenko, a research associate at the [American Museum of Natural History](http://www.amnh.org), and his postdoctoral associate Dr. Andrei Tanasevitch will build on their successful project to study the biodiversity of the spiders of Black Rock Forest. In it, they detailed some 300 arachnid species belonging to 133 genera and 27 families, associating the distribution of each species with the major plant habitats of the Forest. They



Spider researcher Andrei Tanasevitch.

disseminated these findings on a web site (<http://research.amnh.org/entomology/blackrock>) that includes a photo gallery, a species list, a plant habitat map, and an identification key. They will now study the insects of the Forest in a similar manner and completely revise the web site to provide a multimedia identification key for both groups. Students in Museum programs will collect insects on field trips, and high school students and teachers in the Museum's Field

Green Construction

New Solar Panels on Science Center

The Center for Science and Education and the Forest Lodge were built with many "green" features, from site design to materials derived from the Forest to geothermal heating and cooling. Now, the Forest is adding solar power to that list. The 24-kilowatt (kW) array of photovoltaic panels is projected to offset some 50 percent of the Science Center's electricity costs, saving the Consortium an estimated \$7000 per year. With generous contributions of \$120,000 from the New York State Energy Research and Development Authority and \$40,000 from the state Department of Environmental Conservation (backed by the efforts of State Senator William Larkin), the Consortium's remaining investment should be recouped in less than nine years.

The architects for the Science Center, [Fox and Fowle](http://www.foxandfowle.com), planned for the installation of solar panels on its roof when they designed the building. Additional panels will be mounted on two new structures designed by Paul Tapogna of Fox and Fowle: on a roof to be built over the steps from the parking area and on an outdoor teaching pavilion to be built adjacent to the Center. Together, these will provide some 34,000 kilowatt-hours per year (including estimated losses due to inverter efficiency and other factors), according to projections by Northern Power Systems, which will supply the photovoltaic arrays and inverters and will serve as the prime contractor for the project. Black Rock Forest staff and local contractors will build the new stair cover and teaching pavilion. The entire system is scheduled to be in operation this fall.

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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 3800-acre Black Rock Forest in New York's Hudson Highlands.

The Black Rock Forest Consortium is a not-for-profit 501(c)(3) organization supported by membership dues, grants, and gifts.

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Black Rock Forest News

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Report from the Executive Director

The ecological health of urban areas is increasingly important as more and more people move from rural areas into cities and towns. An urban environment composed entirely of asphalt, steel, and concrete is unhealthy for humans and virtually all other organisms. Furthermore, urban areas impact a "footprint" of substantially larger size on the landscape. But cities need not be ecological wastelands.

The Nature Network, a new coalition of dozens of environmental science and education organizations in the New York metropolitan area, recently held a conference entitled "The State of Nature in the Tri-State Region—What We Know, What We Need to Know, What We Need to Do." The group seeks to create awareness of the importance of maintaining biological diversity and to foster dialogue on environmental issues in our substantially urbanized region.

The conference included a methodical review of current ecological conditions by subregion, stretching from the forested interior to coastal and marine areas. The presentations illustrated that there is not just a simple linear decline in biodiversity and ecological health along this rural-to-urban gradient.

The High Allegheny Plateau region was described by Alan White from the [Nature Conservancy](#) as a mosaic of human settlements and preserved wildlands that still retains much of its biological legacy, including the largest tracts of intact forest in our region. But recent increases in second homes and resorts represent a source of fragmentation that may imperil interior forest species. My comments described how food webs, chemical cycling, and disturbance regimes in the New York-New Jersey Highlands have been altered, producing changes in forest structure and composition. This portends even bigger changes in the future that could endanger some of the ecosystem services these forests provide. In the New Jersey piedmont, Emile DeVito from the [New Jersey Conservation Foundation](#) described an alarming situation in which nearly no trees or shrubs, even in preserves and parks, are able to regenerate unless deer are excluded by fences. When

woody plants die, the resulting light gaps rapidly fill with invasive species such as stilt grass and garlic mustard that aggressively spread, retarding successional development.

In the coastal ecosystem, Susan Antenen from the [Nature Conservancy](#) described losses of grasslands, inappropriate development, and "hardening" of shorelines. But she also noted that many coastal pine-lands have been preserved and that increased understanding of natural coastal dynamics has led to the successful restoration of coastal communities. In the New York City ecosystem, [City Parks](#) Chief Naturalist Michael Feller showed stunning photographs of the nature and biodiversity still found in the metropolitan area, including images of parks where native trees are regenerating and wildflowers bloom profusely, in part because deer are absent from this heavily urbanized core. David Conover, Director of the [Marine Sciences Research Center at Stony Brook University](#), noted that the New York Bay ecosystem has seen much renewal and recovery from abuses of the nineteenth and twentieth centuries. He credits the 1970 Clean Air Act with producing significant improvements in dissolved oxygen and other water quality components. But many shellfish populations are still imperiled and some rebounding animal populations may harbor contaminants.

None of these ecoregions exists in isolation. All are interconnected, especially in terms of human experience. Many people live in one subregion, get their water from another, and recreate in still others. And many other animals and plants, some benign and some problematic, readily traverse the boundaries. All around the region, there are many heartening stories as well as disturbing facts and trends. Our Black Rock Forest Consortium is purposefully focusing on enhancing our understanding of the relationships between urbanization and ecological systems. As we increasingly congregate in and around cities, we must learn the ecological implications of our actions and understand how we can function as components of, not threats to, healthy ecological systems. ■

— Dr. William Schuster

New Program Brings Researchers to Urban Schools

The Black Rock Forest Consortium's [School in the Forest](#) program usually brings students from New York City public schools to the Forest (see "Fall in the Forest for City Public Schools," [Winter 2004](#)). But, on April 21, it brought the Forest to fifth and sixth graders at [PS/IS 311](#) in the Inwood section of northern Manhattan – in the form of Will Bowman, a doctoral student in Columbia University's Department of Ecology, Evolution, and Environmental Biology and in Dr. Kevin Griffin's lab at Lamont-Doherty Earth Observatory. Last year, the Visiting Scientist project brought Executive Director Dr. William Schuster to [PS 220](#) in the Bronx.

Along with Joyce Baron, the Forest's Education Coordinator, and experienced educator Norman Baron, Will Bowman introduced the students to the biology of trees using tree "cookies," or slices of trunks, from the Forest, and real scientific tools, including an increment borer and an hypsometer (a device for measuring the height of trees). The students

learned how trees grow and use chemicals from the atmosphere and the soil, why scientists study tree growth, and how trees and forests benefit people. They also examined deer pelts, jawbones, teeth, and other animal material.

Back at Black Rock, the School in the Forest program was in full swing this spring, with multiple expeditions from both City public schools: two-day overnight visits for fourth graders and day trips for students in the

third, fifth, and sixth grades. At PS 220, fifth graders who had experienced a night in the Forest Lodge last fall convinced Principal Michele Kahn to provide the \$1200 cost for another two-day visit this spring. Noting that PS/IS 311 Principal Miriam Pedraja requested that the program be expanded, Joyce Baron says, "the chances of creating a long-term interest in science and environmental stewardship are greatly enhanced when students can visit the Forest several times a year for five years."

The Forest has made arrangements with the city's Board of Education that allow the public school members to pay directly for some of the services previously provided by the Consortium through contributions from foundations and individuals: busing, lodging, and food expenses. "It's exciting to have this support from the Board and the Parents' Associations," notes Joyce Baron, "but the Consortium still urgently needs grants and contributions to cover Consortium memberships for the schools and staff costs." ■



It's Easy to Plan Your Lodge Visit!

Spring always brings more visitors to the Forest – and this year many of them have taken advantage of the new Forest Lodge to plan overnight trips. Universities, public and private schools, and research institutions have all reserved rooms in the Lodge for class trips, including teacher training and long-term programs. Now, the Consortium has made it even easier to plan overnight Forest visits and book space in the Lodge.

On the Lodge index page on the Forest web site (www.blackrockforest.org/consortium/lodge/index.html), visitors will find links to an informational brochure about the Lodge, reservation materials (a list of the steps for reserving space and a reservation form and activity planning form that must be filled out and returned to the Forest), and a calendar showing most current reservations. "Call us at 845-534-4517, extension 10, to check for up-to-date information about available dates," notes Jack Caldwell, the Forest's operations manager.

The information sheet provides details about the Lodge's ten bedrooms (holding 56 beds) and their furnishings; its bathroom facilities; the large central Commons that can be used for activities, lectures, and dining; food services and kitchen facilities; transportation to the Forest; and the availability (for a fee) of an overnight nurse on call. The reservation information sheet identifies issues to consider when planning a trip for school-aged children: securing medical information, planning activity schedules, arranging meals, ensuring adequate supervision (one adult for five students is strongly recommended), bringing supplies, assigning chores to students, and organizing sleeping arrangements. The reservation and activity planning forms are designed to help teachers plan their trips. Once Jack Caldwell receives these, he requests information specific to each group.

"Planning activities that support the academic concerns important to

the school, the teacher, and the class is a key consideration," Jack Caldwell explains, encouraging teachers to review the Forest's newly designed curriculum matrix. Available on the web (www.blackrockforest.org/education/classmatrix.htm), the matrix groups activities by topic (math, science, technology, social studies, language arts, and visual arts) and by grade level. He also encourages teachers to contact him for assistance in planning their trips. "Often," he notes, "teachers will modify the Forest curriculum to accommodate their needs, or develop terrific interdisciplinary units."

Jack Caldwell adds that it's equally important for teachers to consider the physical, social, and emotional aspects of an overnight trip; he is developing a set of life skills activity plans – such as physical education and team building – that teachers will be able to use. "Good preparation at the school enables teachers to plan successful trips to the Forest." ■

Small Grants (continued from page 1)

Biodiversity project will concentrate on arachnids and insects during their visits to Black Rock Forest. The data generated in the field will also be used in a Museum distance-learning course for high school teachers, "The Study of Spiders." "Without arachnids and insects we could not exist," Dr. Ovtsharenko explains, citing their role in pollination, decomposition of organic materials, control of other invertebrate species, food production, and manufacture of useful products.

In one research effort, Dr. Frank Moretti, Executive Director of Columbia University's [Center for New Media Teaching and Learning](#), and his colleague Dr. Ryan Kelsey plan to customize FieldWorker, a software program that allows students and researchers to easily and accurately record data in Pocket PC handheld computers, for at least one long-term scientific study underway in the Forest. FieldWorker can connect with GPS devices for additional data input, store data in a variety of database formats, and export data to GIS and other systems for analysis. Dr. Kelsey will also demonstrate how researchers and middle- and high-school students can use the system; in 2004, in 15-minute sessions, he trained 500 Columbia University freshmen to use FieldWorker for a class project.

For the past eight years, middle school, high school, and undergraduate students in educational programs at the [American Museum of Natural History](#) have been studying the painted turtles (*Chrysemys picta*) in Black Rock Forest's ponds (see "Student Research Spotlight," [Winter 2005](#), and "Research Symposium," [Fall 2003](#)). Based on protocols developed by Museum scientist Dr. Christopher Raxworthy and former Museum educator Dave Karrmann, the research uses PIT (passive integrated transponder) tags, a rigorous mark-recapture effort, and extensive data recording and analysis to obtain an accurate census of the turtles.

With the help of a Small Grant, the project will now be expanded to the [Cornwall Central High School](#). Sue Mitchell, a science teacher at the school and the advisor for its Environmental club, says the project will give students in her Environmental Science elective and in the Environmental Club the opportunity to conduct independent scientific research.

Trees and Streams

Dr. H. James Simpson and Dr. Kevin Griffin, of [Lamont-Doherty Earth Observatory](#) and Columbia University's [Department of Earth and Environmental Sciences](#), are each using Small Grants to support graduate student work on their ongoing research projects in the Forest this summer. Overall, Dr. Simpson is investigating the biogeochemistry of the Forest by focusing in detail on the Cascade Brook watershed. He notes that "empirical data on the chemistry of regional precipitation and of surface waters within the Forest can provide fundamental information on many processes of broad interest for current and future research" (see "Precipitation, Stream Chemistry Key to Ecosystem Processes," [Winter 2005](#)).

His Small Grant will allow doctoral student Josslyn Shapiro to analyze stream samples from several locations on Cascade Brook for pH, chloride, sulfate, and nitrate ions. Samples from two locations have been collected over the past several years, making it possible to compare the composition of surface runoff over an extended period of time and to combine this information with data on water discharge from the Forest's Cascade Brook gauging station.

Dr. Simpson notes that a large fraction of the initial acidity delivered to the Forest through precipitation (acid rain) is taken up within the ecosystem. Ms. Shapiro and an undergraduate student will analyze stream chemistry over the length of Cascade Brook. They will collect stream samples from approximately 16 locations, including tributaries, starting at Old West Point Road and going as far upstream as feasible, at various times during the year. "The overall goal," Dr. Simpson says, "is to improve understanding of the rate and locations of the uptake of precipitation acidity by Black Rock's forested ecosystem."

Dr. Griffin's research aims to quantify the carbon balance of forest ecosystems and identify the environmental and physiological variables that limit carbon uptake (see "Understanding What Controls Tree Growth," [Spring 2004](#)). "Ultimately," he notes, "a predictive understanding of ecosystem productivity requires a mechanistic understanding of the basic biogeochemistry of carbon, nitrogen, and water." He plans to use

his Small Grant to quantify the carbon and nitrogen in the above-ground biomass of three tree species in the Forest: red oak (*Quercus rubra*), chestnut oak (*Q. prinus*), and red maple (*Acer rubrum*). "These species are representative of the forest canopy," he explains, "yet are ecologically distinct, differing in their sensitivity to water availability, for example."

Dr. Griffin and his doctoral student will collect tree cores from three trees of each species in the 150- to 200-year-old range, choosing trees from sites with varying water availability, and will take 15 to 40 samples from each core, reflecting different times in the tree's life. After drying and grinding each sample, they will measure carbon and nitrogen concentrations, providing an indication of the range of values, trends as a function of tree age, and a comparison between sites. By combining these results with information about the total biomass and species distribution within the Forest, they hope to establish a first-order inventory of total carbon and nitrogen in the above-ground biomass. "This will provide an important baseline for future studies of how climate variation and/or human impacts may alter carbon sequestration, forest function, and biogeochemical cycling of carbon, nitrogen, and water," Dr. Griffin notes.

Investigating Pond Life

Tara Parker and Cara Martinisi, first-grade teachers at the [Willow Avenue Elementary School](#) in Cornwall, received a Small Grant for a project that will bring their students to the Forest to study pond life and aquatic habitats. By visiting Black Rock four times over the school year, the students will explore how water temperature fluctuates over time and at different depths and, by comparing ponds in the Forest with a pond in Cornwall, how pollution affects pond life. The students will learn to use thermometers; observe and record data about insects, waterfowl, human activity, and seasonal changes using tally sheets, drawings, and digital photos; and collect and examine water samples. The teachers, who have correlated all the activities with New York State standards, plan to share the results of this project with the community through a traveling exhibit to be displayed at the Forest and other locations. ■

Student Research Spotlight: Urbanization and Protected Areas

by Liz Nichols

When faced with human activities leading to ecological degradation, the most commonly invoked conservation response is to create a protected area. The land surrounding protected areas is called a matrix and can be used in a variety of ways, such as farming, logging, or urban or suburban development. Understanding the influence of a human-dominated matrix on the ecosystem functioning of protected areas is crucial if we are to maintain the ecosystem services human economies and welfare depend upon. In my Master's thesis at Columbia University, I sought to understand the impacts of matrix urbanization on a group of insects that mediate a suite of crucial ecosystem services: dung beetles.

Adults of the two families of globally distributed and ecologically crucial dung beetles (Aphodiinae and Scarabaeinae) feed on mammalian dung and lay their eggs in balls made by rolling bits of the dung away and burying them underground. In this

way, beetles conduct a series of ecosystem services, including nutrient recycling and waste removal, soil conditioning and aeration, suppression of dung-dwelling vertebrate parasites, and secondary seed dispersal.

In 2003, I sampled both dung beetles and the dung flies with which they compete for access to dung resources. When present in abundance, dung flies prevent dung beetle females from laying eggs on the dung. The study involved 50 sites: 10 in contiguous forest (Black Rock and Sterling Forest) and 10 forest fragments in each of four different matrices in New York and New Jersey: fragmented forest, agricultural lands, suburban, and urban. Using pitfall traps baited with fresh dung, I captured more than 3400 dung beetles (12 species) and 2300 dung flies (11 morphospecies, or clearly unique, though unidentified, species).

I found that as the matrix surrounding the protected areas became increasingly urbanized, the species

richness of native dung beetles declined while that of non-native species increased, and the total abundance of dung beetles dropped dramatically, reaching its lowest point in suburban and urban parks. Conversely, the number of fly species increased along the urbanization gradient, and the number of individuals reached its peak in urban areas. Thus, urbanization appears to shift the scales in favor of dung flies, reducing the ecosystem services mediated by dung beetles. Though short term and limited in scope, this study suggests that the creation of protected areas without regard to the surrounding matrix may fail to preserve all of the ecosystem services upon which we depend. ■

Liz Nichols received her [Masters in Conservation Biology](#) from Columbia University in 2004. She is an Invertebrate Biodiversity Specialist with the [Center for Biodiversity and Conservation](#) of the American Museum of Natural History.

Solar Energy (continued from page 1)

Besides reducing the Forest's utility bills, the solar power system will reduce the solar heat load on the south roof of the Center for Science and Education, as there will be free airflow underneath the roof array, thus reducing cooling expenses. It will also produce environmental benefits by reducing the load for the local power system, particularly at times of peak use, with a resulting decrease in power plant emissions. And it will demonstrate that, even in the relatively cool and moist Hudson River valley, photovoltaic cells can be used to generate electricity, supplementing the power generated by local utilities and reducing operating expenditures.

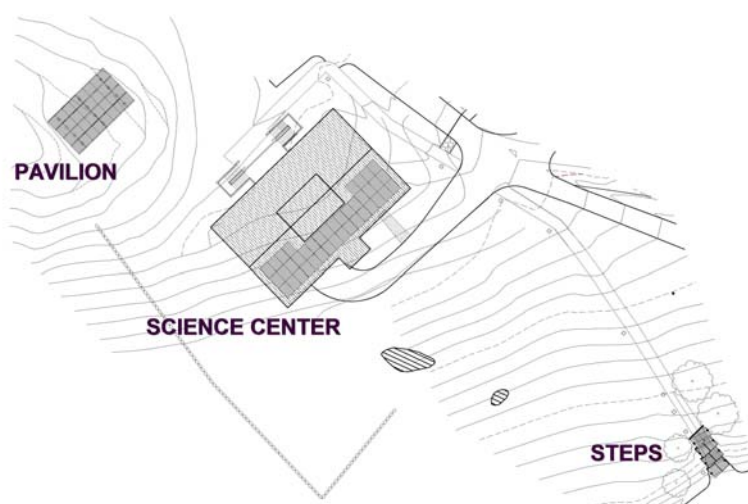
In addition to generating electricity, the solar power system will produce performance data that will be

integrated into the Forest's existing environmental monitoring system for use by researchers and educators. The data it will provide include hourly plots of power (kW) and irradiance (W/m^2), daily irradiance summaries (W/m^2), measured daily and monthly energy summaries (kWh), simulated daily and monthly energy summaries (calculated based on meteorological

data, kWh), monthly performance indexes comparing the measured and simulated values, and monthly plots of peak power and system availability.

"The new outdoor pavilion will provide the thousands of students who visit Black Rock each year with a sheltered setting with tables and a level surface that is nonetheless outdoors in the Forest they have come to study," explains Executive Director Dr. William Schuster. "Built with wood from the Forest itself, it will be a focal point for a curriculum about solar energy and the use of features of the environment – such as the sun, natural materials, and groundwater for the geothermal system – in buildings. Students will be able to examine modern photovoltaic panels in an educational setting and then study their performance on the Forest web site, both in the Forest and when they return to their schools." ■

Architect's site plan for solar power system. Shaded squares represent individual photovoltaic panels. (Fox and Fowle)



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. ■

Effects of Hiking Trails on Arthropod and Bird Community Diversity. Ed McGowan (New York-New Jersey Trail Conference) and James Danoff-Burg ([Center for Environmental Research and Conservation at Columbia University](http://www.blackrockforest.org/consortium/centerforresearchandconservation)). *Contact: James Danoff-Burg.*

Carbon and Nitrogen Cycling in the Cascade Brook Watershed of Black Rock Forest. Kevin Griffin and H. James Simpson ([Lamont-Doherty Earth Observatory](http://www.blackrockforest.org/consortium/earthobservatory)). *Contact: Kevin Griffin or H. James Simpson.*

Long-Term Carbon Storage in Wetlands. Dorothy Peteet ([Lamont-Doherty Earth Observatory of Columbia University](http://www.blackrockforest.org/consortium/earthobservatory)) and Terryanne Maenza-Gmelch ([New York University](http://www.blackrockforest.org/consortium/newyorkuniversity)). *Contact: Dorothy Peteet.*

Taxonomic Inventory of the Black Rock Forest in Relation to Environmental Stability: A Voucher-Based Field Collection. Angélique Corthals and Julie Feinstein ([American Museum of Natural History](http://www.blackrockforest.org/consortium/americanmuseumofnaturalhistory)). *Contact Angélique Corthals.*

Effects of Host Defoliation and Distribution on Spatial Patterns in Ectomycorrhizal Fungi. J.D. Lewis ([Fordham University](http://www.blackrockforest.org/consortium/fordhamuniversity)). *Contact: J.D. Lewis.*

Variation in Native Plant Physiology and Growth on an Urban-to-Rural Gradient. Kevin Griffin ([Lamont-Doherty Earth Observatory](http://www.blackrockforest.org/consortium/earthobservatory)), Matthew Turnbull ([University of Canterbury, New Zealand](http://www.blackrockforest.org/consortium/universityofcanterbury)), David Tissue ([Texas Tech University](http://www.blackrockforest.org/consortium/texastechuniversity)), Jim Lewis (Fordham University), David Whitehead ([Landcare Research, New Zealand](http://www.blackrockforest.org/consortium/landcareresearch)) and William Schuster ([Black Rock Forest](http://www.blackrockforest.org)). *Contact: Kevin Griffin.*

Long-Term Study (75 Years) of Tree Population Dynamics and Carbon Storage. William Schuster ([Black Rock Forest](http://www.blackrockforest.org)). *Contact: William Schuster.*

FieldWorker-Enhanced Research and Educational Support. Frank Moretti and Ryan Kelsey ([Center for New Media Teaching and Learning](http://www.blackrockforest.org/consortium/centerfornewmediateachingandlearning), Columbia University). *Contact: Frank Moretti.*

Response to Canopy Disturbance in the Black Rock Forest. William Schuster and John Brady ([Black Rock Forest](http://www.blackrockforest.org)). *Contact: William Schuster.*

Coyotes of the Hudson River Highlands and the New York Bioscape Initiative. Susan Elbin ([Wildlife Trust](http://www.blackrockforest.org/consortium/wildlifetrust)). *Contact: Susan Elbin.*

The Effect of Leaf Longevity on the Carbon Gain and Growth of Japanese Barberry (*Berberis thunbergii*). Kevin Griffin ([Lamont-Doherty Earth Observatory](http://www.blackrockforest.org/consortium/earthobservatory)). *Contact: Kevin Griffin.*

Long-Term Studies of Painted Turtle Population Dynamics and Dispersal. Christopher Raxworthy ([American Museum of Natural History](http://www.blackrockforest.org/consortium/americanmuseumofnaturalhistory)).

The Potential Role of Physiology in the Age-Related Decline of Red Oak Productivity at Black Rock Forest. Kevin L. Griffin ([Lamont-Doherty Earth Observatory](http://www.blackrockforest.org/consortium/earthobservatory)) and Will Bowman ([Center for Environmental Research and Conservation](http://www.blackrockforest.org/consortium/centerforenvironmentalresearchandconservation) at Columbia University). *Contact Kevin Griffin.*

The Insect and Arachnid Diversity of Black Rock Forest. Vladimir I. Ovtsharenko ([American Museum of Natural History](http://www.blackrockforest.org/consortium/americanmuseumofnaturalhistory)). *Contact: Vladimir I. Ovtsharenko.* ■

Web Site Upgrade

Renovations are in progress on the Black Rock Forest web site (www.blackrockforest.org). “We want to make the web site richer in content and easier for visitors to navigate,” explains Executive Director Dr. William Schuster. “It’s an ongoing project, and we’re making several important improvements.” These first steps include adding new material to the site and changing its structure so the pages appear full screen, instead of in frames (particularly important for the newsletter files), and so individual pages have their own addresses, making them easier to bookmark, reference, and find again.

Some of the new material added to the site can be found in the Forest Lodge section (www.blackrockforest.org/consortium/lodge/index.html), which provides links to information needed for planning trips and making reservations (see “It’s Easy to Plan Your Lodge Visit,” [p. 3](#)). An important new resource is a matrix of the variety of educational opportunities available in the Forest (www.blackrockforest.org/education/classmatrix.htm), organized both by level (elementary, intermediate, and high school, and undergraduate and continuing education) and by field (living environment, earth science, chemistry, physics, math and technology, visual arts, social studies, and language arts).

Other new features include checklists of the Forest’s birds (www.blackrockforest.org/forest/birdsofblackrock.htm) and trees (www.blackrockforest.org/forest/treesofblackrock.htm) and information on supporting the Consortium’s efforts (www.blackrockforest.org/consortium/joinfriendsoftheforest.htm). “We are grateful to Dr. Jean Taylor, one of the Consortium’s directors, for her dedicated volunteer effort to reformat the web site, add new content, and update existing material,” notes Dr. Schuster.

Plans for further improvements include real-time access to environmental monitoring data, images from a web camera that has been installed on the fire tower in the middle of the Forest, and descriptive write-ups of curriculum units for teachers. ■

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Please mail this coupon with your contribution to: Black Rock Forest, 129 Continental Road, Cornwall NY 12518-2119.

Please make checks payable to the Black Rock Forest Consortium.

Thank you!

All contributions are tax-deductible as the Black Rock Forest Consortium is a 501(c)(3) organization.

Forest News in Brief

Join Us on Consortium Day! This year's Consortium Day, on Sunday June 12 from noon to 5:00 PM, will highlight the Forest's solar energy system (see "New Solar Panels on Science Center," [page 1](#)). The day will begin with hikes and demonstrations by scientists and school groups; visitors will be able to view, pan, and zoom on a remote "web camera" mounted on the fire tower. The Stillman Award will be presented to Carol Ash, Executive Director of the [Palisades Interstate Park Commission](#). Refreshments and camaraderie will round out the day.

Fourth Forest Research Symposium on June 20. Faculty members and graduate students working in Black Rock Forest have been invited to present their research at the Forest's fourth biennial research symposium. At the last symposium, in 2003, there were 16 talks covering a wide variety of fields (see "Research Symposium: Scientists Present Diverse Studies," [Fall 2003](#)). This year's symposium will last from 9 AM to 4 PM, and box lunches will be available. Major topics include invasive species, biogeochemistry, response to disturbances, and below-ground diversity. For more information, please contact the Forest office.

Lodge Increases Forest Use. In 2004, 9156 students and scientists from Consortium member institution visited the Forest, up from annual averages of 7483 over the past several years and 6348 between 1991 and 2003. In addition, the number of visitor nights (a measurement that combines the number of visitors with the number of nights each spends at the Forest) increased dramatically

with the opening of the Forest Lodge last summer. Visitor nights jumped to 1522 in 2004, up 33% from both the recent and long-term averages of 1147 and 1145, respectively. Space in the Lodge is still available for summer and fall trips; see "It's Easy to Plan Your Lodge Visit!" on [page 3](#) for more information.

SEE-U at Black Rock. A group of college students will spend five weeks at the Forest starting on May 28 as part of the [Summer Ecosystem Experience for Undergraduates](#) (SEE-U) program run by the [Center for Environmental Research and Conservation](#) at Columbia University in collaboration with the [Columbia Center for New Media Teaching and Learning](#). The participants will study biomes, biotic and abiotic processes, and conservation biology issues through a combination of lectures, field and lab work, independent projects, and web-based exercises, and will digitally network with students at SEE-U sites in Brazil and the Caribbean.

Apples for the Teachers? Thanks to a generous donation from Phil Faurot, a long-time resident of Cornwall and Friend of the Forest (see above), Forest staff have planted 40 heritage apple trees in the new deer enclosure near Continental Road. The northern spy and greening trees in the new orchard are thought to be the original varieties planted in the area.

New Reptile and Amphibian Brochure. A new brochure on the reptiles and amphibians of Black Rock Forest will be available by Consortium Day. It joins existing brochures on the [birds](#) and [trees](#) of the Forest. ■

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Consortium Day 6/12
Research Symposium 6/20
See page 7

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Report from the Forest Manager

Lambs had little to do with March this winter. March came in like a lion and left as one.

This winter's snowiest month, March produced 33 inches of the winter's 80-inch total. The grandest snowfall of the winter fell on March 1 – 12 inches. This came during a time when overwintering birds and mammals are most vulnerable. After three months of coping with winter's hardships, the Forest's winter residents crave the open snowless grounds to begin their recovery diet and reach peak fitness.

March is also the month when many female mammals are expecting. Fox and coyote, who breed in the silence of winter (mid January – early February), are nearing their April birthings. Deer, the most noticeably winter-active large mammal, are continuing pregnancies that last from November until a birth date in late May. Black bear and beaver have already given birth and are comforting their developing young. Thus,

there are many expectant mothers and newly born babies during a very dangerous month. Surviving the unexpected rigors of this March is now being rewarded by the abundance of spring.

Winter left grudgingly at the end of March. A rain event, beginning as snow, poured 5 inches of rain on a dense foot-deep pack of snow remaining from early March. The quick thaw could not be absorbed by the already saturated ground, and dormant trees had not yet begun their huge water demands of spring leaf-out (late April). This resulted in a major erosion event, realigning stream beds and damaging Forest roads. The damage was comparable to that from hurricane Floyd in September 1999. That 11-inch rain event followed a summer drought when trees were actively seeking water.

The early springtime gush of water did bring the Forest alive with amphibian life. This coincided perfectly with the breeding season of frogs and

salamanders, and the Forest was deafening with mate calling.

As spring arrives in the woods during early May, the harsh March becomes a memory and the feeling of urgency has calmed. Now the flowering of oak trees turns our attention to the future. Speculation about successful pollination and subsequent mast crops occurs. Hopefully, Mother Nature will provide the proper weather conditions to assist the future fall acorn crop that will help feed and drive the population growth of many newborn acorn-eating animals this coming fall and winter.

Shade in Black Rock Forest arrives the first week of the month of May. Leaf-out is noted on the day northern red oak, the dominant forest canopy tree, has new growing leaves that are 1 inch in length at an elevation of 1000 feet. Soon the long view into the Forest will be blocked by new leaves and growth. Wildlife will not only be camouflaged but will also be fed. ■

— John Brady