

BLACK ROCK FOREST NEWS

Winter 2014

The Black Rock Forest Consortium

Volume XXIV, No. 1

Summer Science Camp Returns!



2014 SUMMER SCIENCE CAMP

Summer is coming, and with it the return of the Black Rock Forest Consortium's highly successful Summer Science Camp (see "Students and Teachers Rave about Summer Science Camp," Fall 2013). This year, there will be a high school week (July 14-18) and a middle school week (July 21-25) at the Forest, and a return to the University of Florida's Seahorse Key Marine Laboratory, for high school students, from June 22 to 28. Students can participate in the programs at the Forest as a day camp or can stay overnight in the Forest Lodge; with round-the-clock supervision, students who stay overnight will have the chance to participate in such fun activities as campfires, night hikes and owl calling, and games. The catalog and registration instructions are posted on the Consortium's web site.

The concept of the camp, as developed by Dr. Jeffrey Kidder, the Consortium's education director and the director of the camp program, is to harness the resources of the Consortium, in particular graduate students and faculty

from college and university member institutions, to teach hands-on science classes to middle and high school students from Consortium and other schools. This year's graduate student instructors hail from the Steinhardt School of Education at New York University, the City University of New York, and Columbia University; instructors also include a professor from Barnard College and one from Queensborough Community College (part of the City University of New York), teachers from Washingtonville and Beacon, the director of the Hudson Valley Writing Project at the State University of New York at New Paltz, the Storm King Art Center's education director, and Black Rock Forest staff.

The Classes

The high school classes at the Forest include Biodiversity Blitz, in which students will conduct a biodiversity survey examining many groups of organisms throughout the entire Forest; Flying High Ornithology, in which

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New President Studying How Forests Work

When Dr. Kevin Griffin, a professor in Columbia University's Department of Earth and Environmental Sciences, became the new president of the Black Rock Forest Consortium's board in October 2013, following the death of the Consortium's long-time president Dr. Frank Moretti, he was far from new to the Forest or its board. Dr. Griffin has been conducting research in the Forest for more than ten years, focusing on understanding the physiological mechanisms plants use to respond to environmental variation and examining what effect these mechanisms have on the ecological success of the plants. He also served as a vice president of the Consortium for seven years.

Understanding Plants

"My goal is to identify mechanisms that scale from cells to leaves, plants, canopies, and landscapes so we can gain a better understanding of ecosystem processes," Dr. Griffin explains. "Specifically, my graduate students and I have been trying to understand photosynthesis and respiration, the primary determinants of the carbon balance; nitrogen uptake and metabolism, since nitrogen is often limiting to forest growth but can be problematic at high concentrations; and plant-water relations since transpiration and ecohydrology contribute to major ecosystem services such as clean drinking water and the energy balance of the forest."

Over the years, Dr. Griffin has supervised eight graduate students who completed their doctoral or masters research at the Forest. Their studies included the ecohydrology of the Glycerine Hollow watershed; a comparison of photosynthesis, construction costs, and carbon dynamics in introduced and native plants; an extension of carbon flux studies to include tree wood (as opposed to leaf) respiration; an ecophysiological comparison of the invasive Japanese barberry and two native shrubs; calculations of chloride (Cl⁻) and hydrogen ion

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Report from the Executive Director



Deer overabundance is a nationwide problem. White-tail deer populations exploded from fewer than 1 million to more than 30 million across the United States in recent decades. Forty-eight of our 50 states now experience deer overabundance problems. The issue is very controversial, as seen in outcries over proposed deer culls around New York. In his book *Nature Wars*, Jim Sterba says conflicts about managing deer have occurred "...in thousands of towns, suburbs, townships, counties, government preserves, and other entities over the years. And ...there is virtually no learning curve from one place to another." But there are ways forward and success stories to be shared. Nationwide problems demand sharing of knowledge and working cooperatively on solutions.

One and a half million people are involved in deer-vehicle collisions every year, killing about 200 and injuring 29,000. The white-tail has been termed the most dangerous mammal in North America. The collisions cost \$3.8 billion to drivers and insurance companies, more after adding costs to those with no collision insurance. Wildlife underpasses and road signage help and should be expanded but do not address the underlying issue. Other direct costs include \$850 million annually in agriculture and forestry damage and another \$250 million in damage to gardens and landscaping. Human health costs are no less significant. Deer host adult deer ticks, enabling them to reproduce and disperse. Deer expansion has increased substantially the transmission of Lyme and associated diseases and thus human suffering and medical costs. This has greatly reduced public recreation and enjoyment of nature in some areas. Overall, deer overabundance costs us some \$100 billion every decade.

Harder to quantify but no less important is the ecosystem damage and harm to other species. We depend on functioning ecological systems, even in many developed landscapes, to provide clean water, oxygen, food, energy, and materials, and to moderate climate, absorb floods, and provide a host of important services. Deer can have major impacts on ecosystems because each animal consumes about 3000 pounds of plant material every year. Populations fluctuate but can increase rapidly; beyond about 20 deer per square mile they directly damage ecosystems. Preferential feeding on slow-growing perennials like trillium, ladyslippers, and lilies can completely eliminate them. Overbrowsing of native shrubs causes

them to decline and fail to regenerate. Diminished herb and shrub layers aid the expansion of invasive species that deer do not eat like stiltgrass and garlic mustard. In winter, deer browse on woody tree seedlings and can prevent them from ever becoming the young trees needed for future forests. Unpalatable tree species may benefit, but forest composition is greatly altered over time, reducing productivity and forestry options while threatening water quality and other ecosystem services. Small mammals suffer from the reduced food, nesting habitat, and shelter in impacted woodlands, as do bird species like warblers, phoebes, and especially ground nesters like ovenbirds and grouse. When deer densities approach the land's carrying capacity, they themselves become malnourished and can die from starvation during rough winters. The future of many species depends on healthy forests and woodlands and we must recognize that they are endangered, with deer and *Homo sapiens* at the heart of the matter.

This has all occurred because human actions in past decades created a patchwork of disturbed lands, suburbs, and fragmented landscapes that were tasty and nutritious for deer and fueled their population growth. At the same time, we decapitated food webs across the continent by removing predators. Released from any top-down regulation and provided with abundant food, deer populations responded by becoming tenfold or more higher in some areas than they ever were in the past. Widespread game management policies like "buck-only" hunting initially helped deer populations but now only perpetuate unnaturally high densities.

Deer will remain part of the system but we have responsibility to help them get to healthier and more sustainable population levels. The system is altered and will not fix itself. We particularly cannot continue to place a priority on the abundance of one species above the good of all others.

In large part due to Black Rock Forest management, deer densities in the Forest are now lower than they have been in 60 years, resulting in new tree production. You can notice new stands of young trees along the entrance road and the Duggan Trail, on parts of the north slope of Black Rock Mountain, and all along Hill of Pines ridge. In the next issue I'll share knowledge of how this occurred, discuss successes elsewhere in the country, and indicate how we might cooperate to create a future with fewer deer to the benefit of all.

— Dr. William Schuster

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The Black Rock Forest Consortium advances scientific understanding through research, education and conservation programs. It is a not-for-profit 501(c)(3) organization supported by membership dues, grants, and gifts.

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Editor: Sibyl R. Golden
 Design: Jenkins & Page (NYC)
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65 Reservoir Road, Cornwall NY 12518
 Phone: (845) 534-4517
 E-Mail: brfoffice@blackrockforest.org
 Web: www.blackrockforest.org

New President

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(H*) budgets for Cascade Brook; quantifying soil respiration in the experimental plots for the Future of Oak Forests study (see Spring 2012 issue); connecting above- and below-ground processes in the experimental oak plots by examining nitrogen uptake and removal; and a comparison of respiratory and photosynthetic physiology of red oaks along an urban-rural gradient. These students have gone on to positions in universities, government agencies, and consulting firms.

Currently, one of Dr. Griffin's graduate students is examining how the photosynthetic properties of trees in the Forest vary depending on whether they are at the northern or southern ends of their ranges, or in the middle of it, as a way of understanding changes in the species composition of the Forest over the last 80 years and making predictions about the future of the Forest. Another graduate student will study the soil mesofauna (invertebrates between 0.1 and 2.0 mm) in the oak removal plots; Dr. Griffin is excited to add this dimension to the study.

In addition to these doctoral and masters students, Dr. Griffin has supervised numerous undergraduate theses of students working in the Forest, including studies of the respiratory quotient, the temperature response of respiration, chlorophyll fluorescence, and woody debris.

"The Forest is so important as a local field station with long-term records, experimental manipulations, and amazing staff," Dr. Griffin

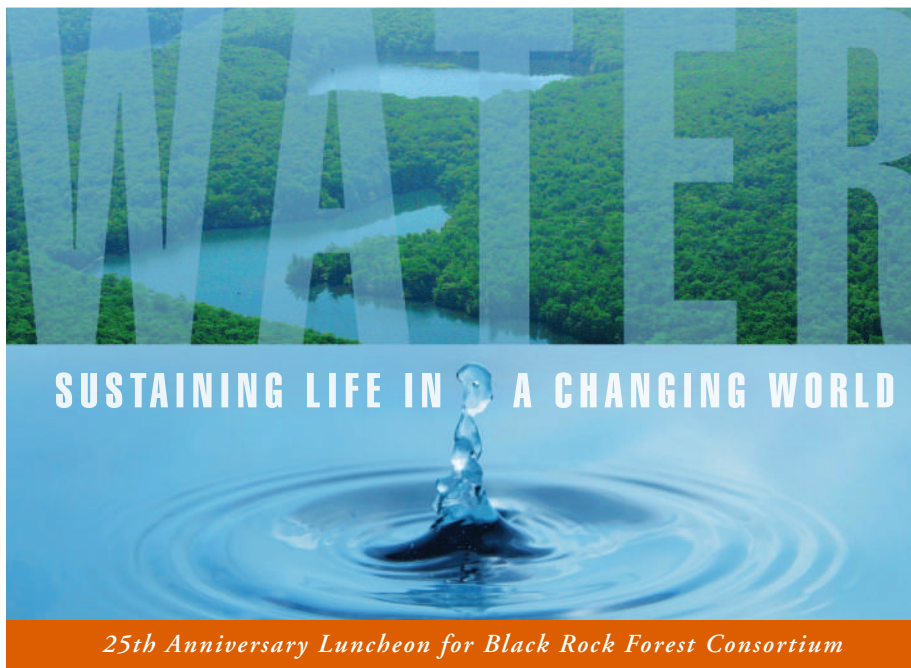


Christine Gritsch, a student in Dr. Griffin's class, measures the litter layer in an area where soil carbon dioxide flux has been measured using the instrument shown.

explains. "These have made Black Rock a key research site for the questions my students and I are interested in. Much of our work is related to global change, both climate change and more general human-caused changes in ecosystem function such as nitrogen deposition or species introduction. By gaining a better understanding of how forests work, this research should inform decision-making and planning activities that affect forests and, therefore, humanity, since all of us depend in some way on healthy forest functioning."

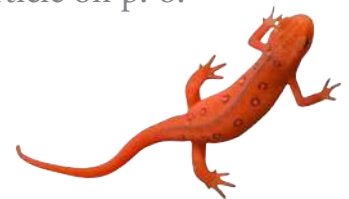
Looking Ahead

Thinking about the next steps for the Consortium now that he is its president, Dr. Griffin says that "tremendous opportunities lie ahead. I am reminded of the way my predecessor, Frank Moretti, would always urge us to do more and reach higher goals. We have just scratched the surface of what we can learn from this Forest, and I am eager to build even stronger ties and collaborations among the Consortium members and to continue to link education and research." 🌱



The Black Rock Forest Consortium will celebrate its 25th anniversary with a luncheon on May 7 at the Metropolitan Club.

See the article on p. 6.



Summer Science Camp (cont. from p. 1)

students will learn to identify birds by sight and sound in a variety of habitats, including in wetlands by kayak; Surveying Turtles, which will allow students to contribute to a long-term research project that has tracked turtles, and recorded demographic data about them, in the Forest's ponds for 15 years; The World of Insects, an introduction to insect evolution, morphology, and diversity in which students will make their own insect collections; and Find Your Creative Nature, a nature journaling course in which students will learn to sketch from nature with different media and record scientific observations from the Forest. With the exception of the Biodiversity Blitz, which is a full-day course, the other classes are half-day,

so students can pick one class for the morning and one for the afternoon.

The middle school classes include versions of all the high school classes as well as three additional ones: Writing on America's River, an exploration of the role the Hudson River Valley has played in shaping America's identity, with hikes, a kayak expedition, and writing short pieces; The Amazing World of Trees, in which students will conduct tree species surveys, create tree field guides with illustrations, examine bark, leaves, seeds, and tree rings, and even climb trees; and a return of the popular collaboration with the Storm King Art Center, The Art of Scientific Observation, which gives students a unique opportunity to combine field ecology and artistic practice by exploring

the Art Center's forests, fields, ponds, and sculptures while creating field journals. Again, with the exception of the Biodiversity Blitz, students can choose one morning and one afternoon class.

High school students who take the class at Seahorse Key will stay in an 1854 lighthouse and study conservation biology with different researchers each day, and will experience the process of science through their own oyster-based research projects. See below for a look at last year's trip to Seahorse Key.

Last year's classes were a big hit with students, parents, and instructors, and this year's camp promises to be just as exciting. Visit the Consortium's web site for a catalog and to register. 🐠



Last June, nine high school students traveled to the University of Florida's Seahorse Key Marine Laboratory on Florida's Gulf Coast for a week of science and exploration. Nearly all came from Consortium member institutions — the Urban Assembly School for Applied Math and Science (AMS), the Newburgh Free Academy, Cornwall Schools, and the Calhoun School — and one from a Florida high school. Instructors included Dr. Jennifer Seavey, the Marine Lab's assistant director, Annie Cushner, an AMS teacher, and Consortium Research Associate/Environmental Educator Kate Pavlis. The students explored mangrove swamps, salt marshes, ocean habitats, and a lagoon, and studied shoreline dynamics,

invasive species, local history, archaeology, fisheries management, sea grass ecology, clam farming, and astronomy. Each student designed a research project to work on throughout the week. Seeing dolphins, enjoying a southern style dinner, and working on their own projects were some of the highlights of the week. "This camp motivated me to pursue a career in biology and marine science . . . I am really thankful for this opportunity," said one AMS student. And a Newburgh student said, "This trip was helpful to me because it expanded my knowledge in science. I know now that I want to be a veterinarian with studies in marine biology. Thank you for this chance of a lifetime!" 🐠





Quantifying Above-Ground Oak Biomass

I have interned at Black Rock Forest for the past two summers and have been engaged in various field research projects. Currently, I am working on an oak tree allometry project which focuses on quantifying the above-ground biomass of two native oak species, red oak (*Quercus rubra*) and chestnut oak (*Quercus prinus*). I began working on this project during a course I took called Field Methods with Dr. Peter Bower, my advisor at Barnard College. We used data from trees that had been selectively cut down over the past 13 years. I am using data that had been collected previously, as well as data that I am collecting this year. After these trees are cut down, we physically measure the wet weight of each tree using a tractor and a scale. We then measure the initial wet weight of a few thin sections of the tree and allow the pieces to dry to a point at which the weight does not change with time. Next, we calculate a drying factor ratio. By multiplying this ratio by the total measured wet weight, we can obtain the dry weight of the tree. So far, the data set includes measurements from ten chestnut oaks and twelve red oaks, representing a range of tree diameters found in the Forest.

Another component of this project involves converting a tree's diameter at breast height into dry above-ground biomass, measured in kilograms, using previously derived equations that predict values for tree biomass (as

published by Schuster *et al.* in *Tree Physiology* in 2008). These equations include species-specific equations as well as a general hardwood equation. This semester, I will use statistical analyses to test the validity of these equations by comparing the measured values to the outputs from the allometric equations. I will also create a new unique equation for Black Rock Forest based on the collected data and compare outputs from this equation to the pre-derived allometric equations.

The main focus of this project is on forest above-ground biomass, including the total carbon content of red oak and chestnut oak trees. These measurements are important for studying forest carbon storage and changes over time. Because allometric equations provide useful information that allows biomass to be easily calculated, it is important to use the best equations for each tree species and geographic location. Determining the effectiveness of allometric equations for Black Rock Forest could allow changes in carbon storage over time to be more accurately calculated. By the end of this project, we hope to find the best biomass equations to use at Black Rock Forest for each tree diameter and species. 🌲

— Madeline Hirshan is a senior at Barnard College majoring in environmental biology.

Infrared Cameras Capture Forest Wildlife

The Black Rock Forest Consortium has installed motion-sensitive cameras at several key locations around the Forest to non-invasively capture photographs of wildlife. They are especially valuable for providing information about animals that may not show themselves when people are around. The cameras take a picture when an animal walks in front of the infrared beam: some just take one photo, some take three, and some take videos. According to Matthew Munson, the Consortium's data manager, "I usually get a lot of deer and squirrels, but I also get bear, turkeys, raccoons, chipmunks, small birds, coyotes, and red fox, and I have gotten several photos of bobcats from three different locations within the Forest, and one fisher." Otters have been recorded in the past as well. Not only do the cameras document Forest wildlife, but they have also been used to evaluate areas that might become part of a wildlife connectivity corridor (see "Addition to Forest Land Helps Build Wildlife Connectivity Corridor," Spring 2011) and in research by a CUNY masters student on the effects of anthropogenic disturbance on carnivore communities and research. 🌲





RESEARCH STUDIES IN THE BLACK ROCK FOREST 2013

Nitrogen Fixation and Nutrient Cycling Experiments in Black Rock Forest.

Duncan Menge (Columbia University). *Contact: dm2972@columbia.edu*

Resolving Advection Issues in Eddy-Flux Measurements in Complex Terrain.

Chuixiang Yi, Xiyan Xu, Eric Kutter, and George Hendrey (Queens College). *Contact: Chuixiang Yi (Chuixiang.Yi@qc.cuny.edu)*

Are Garlic Mustard Effects on Soil Processes and Microbial Communities

Reversible? Kristina Stinson (Harvard Forest) and Serita Frey (University of New Hampshire). *Contact Kristina Stinson (kstinson@harvard.edu)*

Mercury Concentrations and Exposure Levels in Terrestrial Foodwebs: Pathways for Mercury Bioaccumulation in Insectivorous, Songbird Communities in New York State.

David Evers (Biodiversity Research Institute). *Contact: devers@bri.com*

Linking Holocene Vegetation and Carbon Accumulation with Hydrological Change Using Macrofossils, C/N, Stable Isotopes and Biomarkers from

Sutherland Pond/Fen and Tamarack Pond. Dorothy Peteet (Lamont-Doherty Earth Observatory of Columbia University). *Contact: peteet@ldeo.columbia.edu*

Analysis of Avian Diversity in Relation to Vegetation Composition and Structure in the Black Rock Forest – Schunemunk Mountain Wildlife Corridor.

Sarah Gilly and Terryanne Maenza-Gmelch (Barnard College). *Contact: Terryanne Maenza-Gmelch (tm263@columbia.edu)*

Scaling of Variability in Populations, Individuals, and Ecosystems: Taylor's Law

and Beyond. Joel E. Cohen and Meng Xu (Rockefeller University), and William Schuster (Black Rock Forest). *Contact: Joel Cohen (jcohen@rockefeller.edu)*

Physiological Response to Temperature across Nine Tree Species in a

Northeastern Temperate Forest. Angelica Patterson and Kevin Griffin. *Contact: Kevin Griffin (griff@ldeo.columbia.edu)*

The Future of Oak Forests.

William Schuster (Black Rock Forest), Kevin Griffin (Lamont-Doherty Earth Observatory of Columbia University), Shahid Naeem (Columbia University), Kathleen Weathers and Amanda Elliott Lindsey (Cary Institute for Ecosystem Studies), and Jerry Melillo (The Ecosystems Center, Marine Biological Laboratory). *Contact: William Schuster (wschuster@blackrockforest.org)*

Consequences of Oak Loss on Microbial Community Composition and Function.

Krista L. McGuire and Ika Djukic (Barnard College). *Contact: Krista McGuire (kmcguire@barnard.edu)*

Native Plant Performance along an Urbanization Gradient.

Kevin Griffin (Lamont-Doherty Earth Observatory of Columbia University), William Schuster (Black Rock Forest). *Contact: Kevin Griffin (griff@ldeo.columbia.edu)*

The Carbon and Nitrogen Dynamics of Coarse Woody Debris in an Oak-

Dominated Northeastern Forest. Matthew Palmer and Dan Flynn (Department of Ecology, Evolution and Environmental Biology, Columbia University) and Kevin Griffin (Lamont-Doherty Earth Observatory of Columbia University). *Contact: Matthew Palmer (mp2434@columbia.edu)*

Loss of Foundation Tree Species: Consequences for Small Mammal Assemblages

in Forest Ecosystems. Katie Keck and Kate McFadden (Clemson University), Katie Pavlis and William Schuster (Black Rock Forest Consortium). *Contact: Katie Keck (kkeck@clemson.edu)*

Celebrating Our 25th!

The Black Rock Forest Consortium will celebrate its 25th anniversary on May 7 with a gala luncheon at the Metropolitan Club in New York City. The theme of the luncheon is Water: Sustaining Life in a Changing World. A highlight of the luncheon will be the presentation of the William T. Golden Award, given for innovative leadership in science and science education, to President Obama's top science advisor, Dr. John P. Holdren. Dr. Holdren is Assistant to the President for Science and Technology and Director of the White House Office of Science and Technology Policy. As a world-renowned scientist and policy maker, Dr. Holdren has focused on environmental change and how it relates to issues of development, energy, and technology policy.

In addition, Dr. Allan Frei will discuss climate change, water supply, and extreme events in our region. Dr. Frei is the chair of the Department of Geography at Hunter College of the City University of New York (CUNY) and Deputy Director of the CUNY Institute for Sustainable Cities; he researches climate change in New York and the Hudson Valley as it relates to future water supply. Dr. Frei has conducted research at Black Rock Forest on a variety of topics, including investigating mercury cycling, establishing a snow station, hydrologic modeling in the Moodna River basin, and studying extreme hydrologic events in the Hudson River Valley; he has also brought students to the Forest to study and learn methods in snowpack research and reservoir water supplies.

Guests will have the option of buying tables or tickets named after prominent water bodies in the New York area: they include a \$25,000 Atlantic table, a \$10,000 Hudson table, a \$5000 Ashokan table, \$1000 Croton tickets, \$500 Moodna tickets, and \$250 Sutherland tickets. Catherine Morrison Golden is serving as luncheon chair, and Consortium board members Valerie Colas-Ohrstom, Kim Elliman, and David Redden as vice-chairs; a committee is in formation.

"Our luncheon always provides a great opportunity to learn from experts about important scientific issues, hear about new Consortium programs, and see old friends and new faces," notes Dr. William Schuster, the Forest's executive director, "and our 25th anniversary lets us celebrate 25 years of remarkable Consortium accomplishments while looking ahead to the next 25 years." 🌲

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Forest News in Brief

Nature Article Mentions Forest.

The prestigious science journal *Nature* mentioned Black Rock Forest in an article on biological field stations around the globe entitled "The Great Outdoors: Field stations offer facilities and opportunities for large-scale research" (November 14, 2103). The article says, "Black Rock Forest, a field station in Cornwall, New York, already has weather and other environmental sensor data posted on a project website and plans to add hydrology and tree-growth data, as well as all of its research publications, by next year, says Bill Schuster, the station's executive director."

Birding by Ear Workshops.

The Consortium will sponsor Birding by Ear workshops on two spring Saturdays: May 31 and June 7. Dr. Terryanne Maenza-Gmelch, a Barnard professor, will lead participants on a two-hour, easy-to-moderate walk in Black Rock Forest through many different habitats to observe which birds occur in multiple locations in the Forest and which are habitat-specific. Participants with smartphones are encouraged to download Cornell University's free birding app, Merlin, prior to the date: <http://bit.ly/1frAcHC>. The Consortium will make

binoculars available for these walks. They start promptly at 8:30 AM from the upper parking lot next to Mailley's Mill Bridge. Each walk is limited to 15 participants; they are intended for adults and science-interested students 12 and older. The cost is \$10 per participant. RSVP to Emily Cunningham in the Consortium office.

Herpetology Curriculum in Development.

Led by Dr. Jeffrey Kidder, the Consortium's education director, a team of scientists and teachers from member institutions and Consortium staff is developing a herpetology curriculum that can be used both at the Forest and in schools. Dr. Christopher Raxworthy of the American Museum of Natural History is the science consultant; Drs. Antonia Florio and Bryan Falk, graduates of the Museum's Gilder Graduate School, are leading the development of activities and experiments; and teachers Stephanie Seto of the Browning School and Francesco Filiaci from Calhoun are, respectively, providing guidance on utility and appropriateness for elementary and upper school audiences. Dr. Falk taught a mini-course at the Urban Assembly School for Applied Math and Science using the curriculum. Its first part will be available this fall.

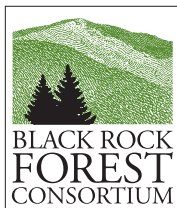


Mini-Course Funded by Time Warner Cable.

Time Warner Cable generously provided funding for a science mini-course at the Forest for students from the Mid-Hudson Valley. Working with teacher Veronica Dunham and Columbia graduate student Natalie Brey, the high school students are designing experiments growing acorns in different soils and will plant them in the Forest in the spring. The experiments created for this mini-course will be made available to all Consortium member schools.

Storm King School Service Trip to Forest.

For the second year, students and teachers from the Storm King School came to the Forest as part of its day of service on Martin Luther King Day. Twenty-six students and four faculty members participated in a tree measurement project and five students and three teachers worked on trail maintenance. Storm King students are required to provide at least 10 hours of service each year. 🌲



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Report from the Forest Manager

One of the inner strengths of the Black Rock Forest community is the work of volunteers, likely begun prior to the naming of the Black Rock itself. Pioneers worked the land by hand and horse and “conquered” the wilderness. What was learned would evolve to become our land ethic. A century of forest management redefined many perceptions of the land. With all the science involved, it still takes getting your hands dirty to experience ethical use of the land.

When Black Rock Forest was established in 1928, its owner, Dr. Ernest Stillman, and Forest Director Henry Tryon were getting a handle on their evolving “demonstration” forest. During these earlier years, friends of the Forest would enlist in fire prevention and recovery from fire and storms. Volunteer efforts were reciprocated by Forest management, resulting in the early beginnings of the Black Rock Rod and Gun Club, a successful namesake and friend of the Forest for many decades. The Club’s volunteer efforts grew into extensive road maintenance projects and providing Forest security. Today, they continue to be prepared for forest fires, to assist in responding to storm damage, and to provide volunteer patrols, always a friendly assurance for Forest visitors.

Forest volunteers experience the land ethic special to these Hudson Highland mountains. Hard physical labor blends well with the mountainous terrain. Volunteers from the New York — New Jersey Trail Conference maintain most of the Forest’s

23 miles of trails. The latest extremes in weather and trailside growth of low-bush blueberry, mountain laurel, and grasses create a never-ending chore of clearing, trimming, and marking pathways.

For decades, neighbors from Cornwall, Newburgh, and Stony Point have volunteered and donated expertise and equipment to Forest crews, a gesture softly spoken.

Since the establishment of the Consortium in 1989, volunteers continue to be eagerly received. Path and road maintenance work has a long trail of volunteers. School groups, scouts, and the young at heart take to the woods to experience and help maintain access for others. The development of education and research connected with the Forest compounded the land ethic, strengthening individual’s relationships to the earth.

A revitalized tree nursery at Old Headquarters now supplies very meaningful work for volunteers. Dirty and tired, young and old have accepted a responsibility to the land. The result has been a healthy start to the reconstruction of damaged habitats.

Aldo Leopold’s legacy is our legacy. He taught us to be active in managing the landscape, to live on the land. Include yourself in learning about and preserving the integrity of the land and its natural community. In this era of technological advances and environmental uncertainties, working the land provides a sanctuary, rebooting our greatest values of all.

— John Brady