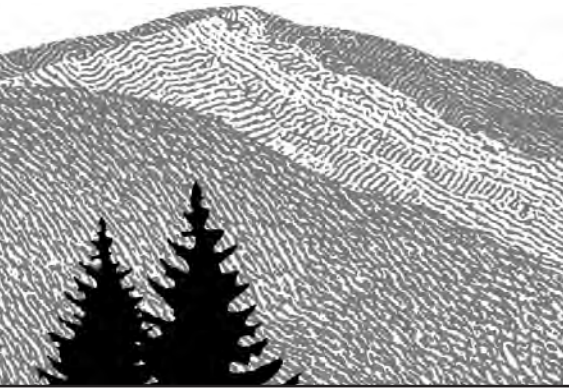


BLACK ROCK FOREST NEWS

Black Rock Forest Consortium Fall 2017

Celebrating a New Trail and Endowment Gift at Black Rock Forest

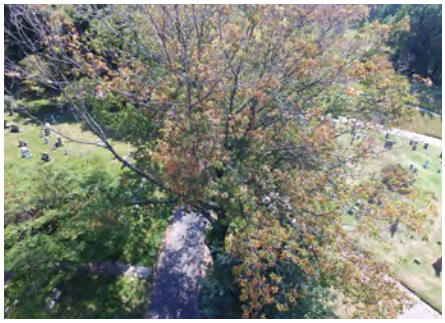
In an informal ceremony on June 18, 2017, members of Black Rock Forest Consortium's staff and the Stern family celebrated the naming of the H. Peter Stern Trail in Black Rock Forest, hiking out on a sunny day to enjoy the trail's western views of the Hudson Valley, Storm King Art Center, and Schunnemunk Mountain.

The new trail celebrates the permanence of three things: Peter Stern's contributions to our region as a former board member of Black Rock Forest Consortium and the founding chair of neighboring Storm King Art Center; public access to the Forest from the Mine Hill Road community and the Hudson Highlands Nature Museum's trail network; and the Consortium's future ability to serve its mission of *increasing scientific understanding of the natural world.* A $250,000 endowment gift from the Stern family through the Ralph E. Ogden Foundation helps to ensure that Black Rock Forest Consortium's research, education and conservation programs, as well as its stewardship of Forest lands, will endure in perpetuity.

The Stern family's gift was generously matched by Sibyl Golden, the board co-chair for Black Rock Forest Consortium. Both gifts were allocated to the board-designated William T. Golden Endowment Fund, named after the Consortium's late founder. "Peter played an influential role in the Hudson Valley and in New York City in gaining acceptance for Bill Golden's experiment to transform Black Rock Forest into a productive component of our nation's research and education infrastructure," said Bill Schuster, the executive director for Black Rock Forest Consortium. "Sibyl and I felt it would be fitting to dedicate this trail in Peter's name, running as it does down the length of this beautiful ridge, with Storm King Art Center on one side, and Golden Ridge,

(continued on page 5)

Members of the Stern family and Consortium staff celebrated the naming of the new H. Peter Stern Trail on June 18, 2017. photo: Sara Pace



Rapid Response to Oak Wilt

Black Rock Forest Consortium, partnering with Columbia University, is taking a leading role in a campaign devoted to the early detection of Oak Wilt — an arboreal disease spread by fungus that, if unchecked, could have catastrophic effects on the forests of New York.

Oak wilt is spread by the *Ceratocystis fagacearum* fungus and causes the vessels of infected trees to clog, preventing water uptake to leaves and quickly killing the tree. Red oaks, which are common throughout the Highlands, are particularly susceptible to the disease.

Between 2008 and 2016, oak wilt was confirmed in four places in New York: in Glenville, Schenectady County; Islip, Riverhead, and Southold in Suffolk County; Brooklyn in Kings County; and most recently in Canandaigua in Ontario County.

"Hopefully oak wilt has not yet made its way to the Highlands, where 70 percent of our forests are oak," says Bill Schuster, the executive director of the Black Rock Forest Consortium, "but if it does spread, it would have devastating ecological, environmental and economic impacts. That is precisely why Columbia and Consortium researchers are mobilizing teams now to focus on early detec-

(continued on page 5)

TOP: A red oak killed by oak wilt in Brooklyn. Photo courtesy of Eric Barna, Greenwood Cemetary.

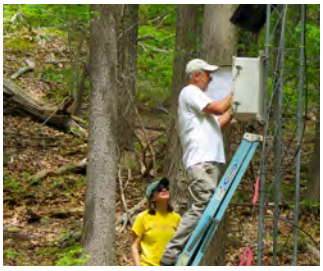
Report from the Executive Director

Wow, what a year. Our annual report for Fiscal Year 2016 includes many big changes, some that had been in process for decades, and others signaling long-term changes that are just beginning. Ecosystems like Black Rock Forest are never static, always changing, and so are human activities in the Forest.

Two of our longest-planned changes will have significant impact on our future. In 2016 we constructed Phase I of our Visitor Access Pathway (VAP), a 10-foot wide, gently sloping pedestrian path that took decades from envisioning to completion because of the difficulty of the terrain and the expense of the project. The VAP is destined to become the primary access and egress for tens of thousands of visitors for far into the future, once Phase II is completed in Spring 2018, connecting the VAP to our trail network.

In research, three papers published in prestigious journals (Proceedings of the National Academy of Sciences; Oikos: Synthesizing Ecology; Canadian Journal of Forest Research) placed Black Rock Forest in a global perspective relative to other forests in world-wide studies of tree and forest respiration and how forests are likely to respond to future changes in climate. These teams of scientists also helped us learn how forests respond to large-scale losses to pathogens, and provided analysis of organizing principles of forest ecosystems.

Dr. Mary Heskel's first Black Rock Forest study, on temperature response of leaf respiration, published in PNAS in April 2016.



Consortium scientists wire a dendrometer network.

In another project many years in the making, we studied habitats, evaluated landscape resilience, and worked with land owners and the Open Space Institute to lay groundwork for future strategic land and easement purchases through a $1.5 million Highlands Conservation Fund created as part of a conservation easement agreement for Black Rock Forest.

In the fall, a new technology to study tree growth in real time (digital point dendrometers) was installed on two sets of oak trees and the data began streaming online in real time. Also last fall, information on 700 plant species in Black Rock Forest, including digital images, was made freely available on the Internet through the iDigBio database.

We were honored to receive, from a couple of long term supporters, significant bequests that allowed the beginnings of a long-term endowment for the Consortium — a very positive change, and a sign that our mission of *increasing scientific understanding of the natural world* matters greatly to people.

We also discovered that not everything is changing. Our 2016 censuses of the deer populations in Black Rock Forest documented that they have been remaining steady from year to year at a level of about 12 deer per square mile. The deer are healthier, the forest is greener, and the trees are regenerating more successfully than they have in 50 years. Let's hope that does not change!

— William Schuster

Editor: Brienne Cliadakis
Photographer: Sara J. Pace
Design: Jenkins & Page (NYC)

BLACK ROCK FOREST CONSORTIUM

65 Reservoir Road, Cornwall NY 12518
Phone: (845) 534-4517
E-Mail: brfoffice @ blackrockforest.org
Web: www.blackrockforest.org
facebook.com/blackrockforestconsortium/

Annual Report, Fiscal 2016: Program Impact

CONSERVATION

15,000 acres, including Black Rock Forest, awarded designation as an Audubon Important Bird Area based on documentation by Black Rock Forest Consortium and partners

5 threatened species on Audubon's watchlist, including cerulean, worm-eating, prairie and blue-winged warblers and the wood thrush, documented in nesting pairs at Black Rock Forest by Dr. Terryanne Maenza-Gmelch and partners

1 ADA-compliant forest trail constructed, providing public access to the disability community

RESEARCH

$551,254 raised to date to establish a postdoctoral research fellowship program in forest ecology at Black Rock Forest

3 publications by Consortium scientists accepted for publication in peer-reviewed journals on forest responses to warming and pathogens; organizing principles of ecosystems

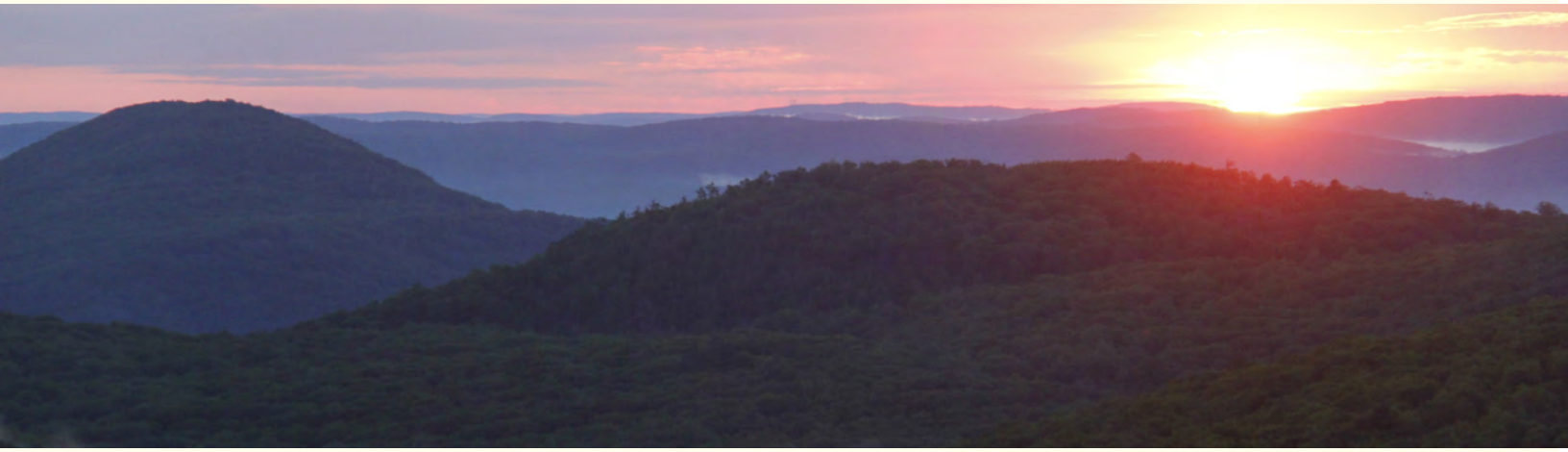
4 early career scientists mentored while completing undergraduate theses at Black Rock Forest

EDUCATION & OUTREACH

13,600 visitor days by K-16 students and scientists supported this year

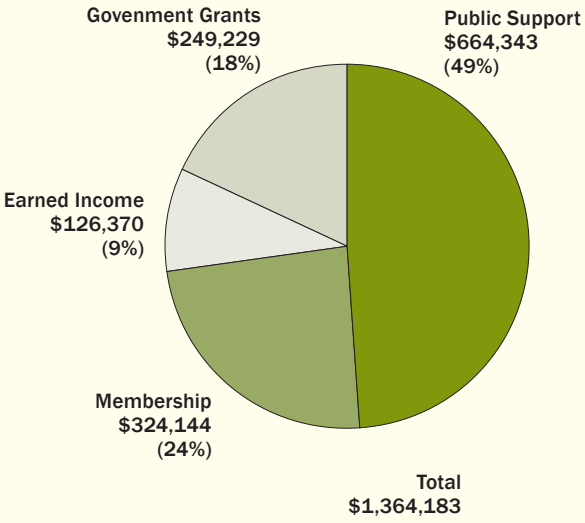
150 need-based scholarships awarded to Summer Science Camp students through a partnership with Charter Communications and the Boys & Girls Club of Newburgh

1 eco-friendly, energy efficient tiny house constructed by 10th grade Avenues students as lodging for visiting scientists

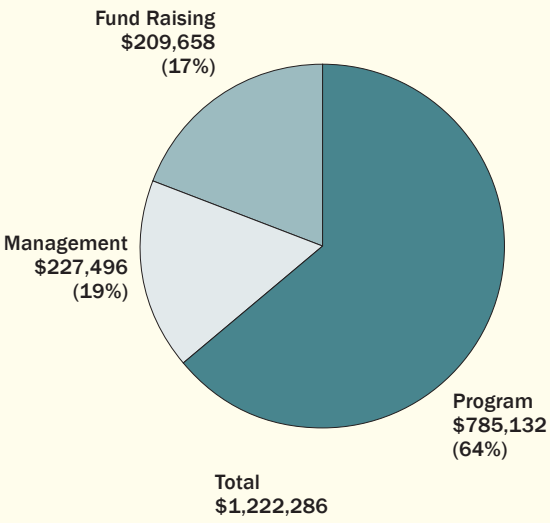


AUDITED FINANCIAL INFORMATION FOR FISCAL YEAR 2016

INCOME



EXPENSES

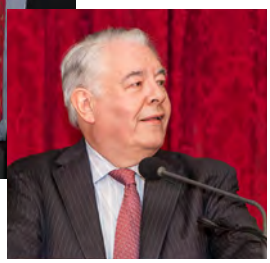


Luncheon Highlights Education and Conservation

Black Rock Forest Consortium is delighted to acknowledge our honored speakers, the Benefit Committee, and the many friends and colleagues who supported the organization's annual luncheon, held on May 11, 2017. The luncheon exceeded its goal to raise more than $200,000 in support of the Consortium's mission of increasing scientific understanding of the natural world through research, education and conservation programs. We truly thank all who participated in this event, which raised 15% of the Consortium's annual operating budget.

Stillman Award honoree Vincent Mo with David Mortimer and Kim Elliman.

Keynote speakers Kenneth Baum and David Krulwich.



Valerie Colas-Ohrstrom, Benefit Chair, and friends. RIGHT: Consortium Board Co-Chair, David N. Redden.

This year's luncheon was titled "How to Make a Great Teacher" and featured keynote remarks by Kenneth Baum and David Krulwich, Founding Principal and Current Principal of the Urban Assembly School for Applied Math and Science and co-authors of *The Artisan Teaching Model for Instructional Leadership*.

The Consortium presented the E.G. Stillman Award for conservation leadership in the mid-Hudson region to Vincent Tianquan Mo, the Chairman and CEO of Fang Holdings, Ltd., and a trustee of the New York Military Academy (NYMA). Christopher J. Elliman, CEO of the Open Space Institute, and David Mortimer, a neighbor of Black Rock Forest, co-presented the Stillman Award on behalf of the Consortium.

The 2017 benefit luncheon was chaired by Valerie Colas-Ohrstrom, a member of the Consortium's Board of Directors, and was vice-chaired by David N. Redden, Board Co-Chair of Black Rock Forest Consortium, and Jeannette Redden, a commissioner of the Palisades Interstate Park Commission.

Oak Wilt *(continued from page 1)*

tion of the disease."

Spread externally by sap beetles or tree-to-tree via root grafting — when the roots of nearby trees mix with the affected tree's roots beneath the soil — the fungus that causes oak wilt was first discovered in Wisconsin in 1944. It has since spread throughout the Midwest and Texas, killing tens of thousands of trees. The disease's nearly simultaneous appearance in the Finger Lakes, Albany, and New York City regions has heightened local concerns, as it indicates that human activities may be on the precipice of causing a new and widely dispersed outbreak of this as-yet incurable tree disease.

"We are grateful to Columbia's School of Arts and Sciences for generously funding this project," said Dr. Kevin Griffin, a professor in the Department of Ecology, Evolution and Environmental Biology at Columbia University and a principal investigator on the oak wilt study. "We are hopeful that early detection techniques built on remote sensing and local field work will help to identify fungal outbreaks and prevent their potential spread through New York's forests."

The consequences if an outbreak were to occur in New York would be far-reaching — yet felt as close to home as at the kitchen sink, where New York City supplies clean, unfiltered water for some nine million households. Not only does the city provide the only unfiltered water supply in the country, but doing so has allowed the city, state and its municipalities to save billions of dollars instead of constructing and maintaining high-tech water filtration plants.

An abnormal change in leaf color, with brown discoloration spreading from the outer edges in, is one of the warning signs of oak wilt disease, and Black Rock Forest has been chosen as a test site where researchers hope to gain a deeper understanding of the disease. Using state-of-the-art satellite imagery and equipment, scientists are now building capacity to locate individual infected trees before the disease has spread.

In addition, a separate oak tree removal experiment at Black Rock Forest, initiated in 2008 before oak wilt came to New York State, is designed to mimic the long-term effects of the fungal infection, and is giving researchers information about the consequences of oak mortality.

Through the dissemination of this research to partnering government agencies, research institutions, and conservation organizations, Columbia University and Black Rock Forest Consortium aim to get ahead of the curve in identifying the signs and subsequent methods of containing oak wilt, before an outbreak has occurred.

In the long run, these efforts could also help save many millions of dollars by maintaining the one of the most comprehensive and effective natural water filtration systems on the planet.

—Jeff Simms

Sara Pace

Celebrating a New Trail *(continued from page 1)*
named in honor of Bill, on the other."

"Our father was especially fond of Bill Golden, and he loved hiking and cross country skiing in Black Rock Forest. We have wonderful memories of accompanying him on these excursions from very young ages," said Lisa Stern, Vice President of the Ralph E. Ogden Foundation and a member of Black Rock Forest Consortium's Nominating & Governance Committee. "He would be especially pleased by the long views of Schunnemunk Mountain, the Moodna Viaduct train trestle, and Storm King Art Center, which are all visible from the overlook on the newly created H. Peter Stern trail. We hope visitors will pause and enjoy these iconic Hudson Valley views as they're exploring this area of the forest, including the newly created access to the Hudson Highlands Nature Museum ."

"Two years ago, we made sure that Black Rock Forest would be here forever, through a new conservation easement agreement with New York State," Schuster said. "This year, thanks to very significant endowment gifts like these from the Ogden Foundation and the Golden Family Foundation, we are able to say that the Consortium will be here forever, too. We deeply appreciate the generosity and foresight of these two families."

Black Rock Forest Consortium wishes to thank the dedicated volunteers of the Hudson Highlands Nature Museum and the New York-New Jersey Trail Conference, who built the H. Peter Stern Trail and the McKeon Loop Trail, which connects Black Rock Forest to the Nature Museum's trail network.

Christine Ruppert

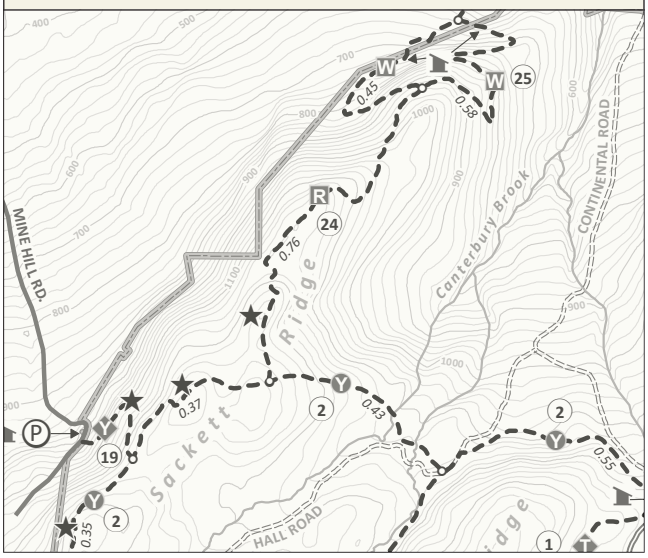
Hike The H. Peter Stern Trail!
Notes on What to Expect

Up for a challenging hike with exhilarating views this fall? Try the new H. Peter Stern Trail on Sackett Ridge, the mountainous, northwestern edge of Black Rock Forest. This .8 mile trail can be accessed by taking Mine Hill Road up nearly to the road's end. Park at our kiosk, on right, and find the trailhead across the road. Alternatively, you can access the trail from the McKeon Loop, after exploring the Hudson Highlands Nature Museum trails off Angola Road.

A note on the Mine Hill Road entrance: our parking area has room for about 5 cars. Please do not park on the side of the road, as you would be on private property.

From the Mine Hill kiosk, it is possible to hike the H. Peter Stern Trail over Sackett Ridge, around the McKeon Loop, and back in about three hours (with breaks). From this point of access, the first 15-20 minutes are quite steep, but the terrain levels as you traverse the ridge. After about 15 minutes, when you spot two small cairns on a large rock face, keep watch for the trail markers. Note that there is a point on the McKeon Loop where the yellow trail leads to the Hudson Highlands Nature Museum. If you are heading back to the Mine Hill Road kiosk, complete the loop on the white trail.

The trail offers glimpses of views from the ridge throughout. A flat rock at one of the view points makes a nice spot for a snack. For families, we do not recommend this trail for children younger than 10, as it is approximately 3.5 miles long with some steep and moderately challenging terrain.



TOP: Hikers accessing the Forest from Mine Hill Road take the Sackett Trail to the H. Peter Stern trailhead. LEFT: The view from the Stern Trail features Schunnemunk Mountain (far left), the Moodna Viaduct (viewable to the right of Schunnemunk), and Storm King Art Center, including Maya Lin's Wave Field (top center).

Grade 4th

Unit	Lessons	Authors
Global Water Crisis/ Properties of Water 	Forest stream water quality analysis through surveying macroinvertebrates as bio-indicators, measuring water temperature, and testing levels of ph and dissolved oxygen present in their habitats. Observing natural surroundings through hiking and experiencing a period of silent observation.	**Kate Fenner & Alicia Reid** Science Teachers The Dalton School On each of several trips, we had an average of 18 students, 3 faculty members, and 4 parent chaperones.

How do you get more than 90 highly inquisitive and energetic urban fourth graders excited to learn about analyzing the quality of stream water in Black Rock Forest? We wanted our students to learn about the important matter of conservation and protection of water sources, and to develop an appreciation for nature, as well as their ability to learn through observing, while visiting the forest. We kicked off preparation for their learning experiences in the field through studying the global water crisis, a devastating situation in which millions of people throughout the world lack access to safe clean drinking water and proper sanitation facilities. For many of our students, who easily access safe drinking water, this crisis served as a startling and motivating hook to learn more about the properties of water, how to test its quality, and to consider ways to both advocate for and create change in protecting and improving access to water.

Description of main activities

Water Quality Testing: For this activity we brought our own chemistry testing kits including the Lamotte Precision pH kit and the Salifert dissolved oxygen test kit. BRFC provided thermometers. Educators from BRFC accompanied each half of our group to one of two different sites along a forest stream. Once at site, students used the pH and dissolved oxygen kits to test the chemical properties of stream water, thinking of it being a part of the greater system of watersheds surrounding New York City. They recorded these concentrations in a data table along with the temperature measurements of the stream. For macroinvertebrate identification, children wore waders and used nets to collect them. Afterwards, they surveyed the collection and used identification charts to categorize and count the macroinvertibrates. They interpreted what they found to better understand how the presence of the various species informs us about the water quality of their habitat.

Materials: Waders, seine nets, macroinvertebrate collection tools, relevant identification sheets, thermometers, dissolved oxygen kits, pH kits, water quality testing data sheets, folding leg card table, clipboards, sharpened pencils.

Silent time in the Forest: We determined how students would experience a period of silence while in the forest given what seemed to best suit the dynamics of our day. Ideally, everyone had at least a brief opportunity to experience and observe the surroundings while remaining quiet in the forest. We had two ways of hiking in silence, in both BRFC staff helped teachers and parent chaperones find discrete spots along the trail, to be available in case any person needed assistance. Students then silently walked along this 15-20 minute trail loop either alone or with a partner while adults stood by to assure their safety. Another experience was after enjoying a group hike up Honey Hill, students and adults selected well spaced out seats within a clearing, then engaged in at least 5 minutes of silence and afterwards shared their observations with the rest of the group.

Materials: A watch or timer if interested in timing periods of silence, hiking sticks if allowed.

GENERAL ITINERARY

Each day required slight shifts given weather and other factors.

9:30 AM: **Arrival**
Bathroom breaks, apply insect repellant/sunscreen. Brief orientation to Black Rock Forest Consortium and highlights of its green building features in the Science Center lobby.

10:00 AM: Water Quality Testing Activity
Group divided in half and walked to two separate locations; Black Rock Brook (past Mailley's Mill Bridge), and the Rusty Wagon Bridge (past the Upper Reservoir). At the sites, students took turns doing water chemistry testing and temperature measurements with their teachers, and the macroinvertebrate collection with BRFC staff. Survey and identification of the macroinvertebrates was conducted with everyone prior to leaving the site.

11:45 AM: Lunch at a convenient location, ideally outside.

12:30 PM: Silent Time in the Forest
The groups met up for their hike and silent time in the forest.

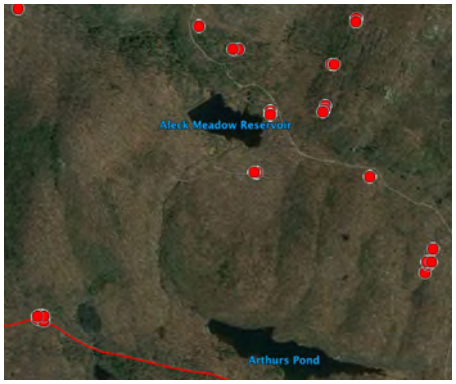
2:00 PM: Departure
Return to Science Center for water and bathroom use before boarding buses to leave.

Annual Deer Survey

Each year, BRFC estimates deer herd size through winter tracking and citizen-science deer counts. These estimates, combined with information from the fall deer hunt, are used to keep the deer herd and the forest healthy. When there are too many deer, the natural understory vegetation is eaten away, destroying habitat for birds. There are few wildflowers or sapling trees, and invasive plants often take over. Additionally, the deer can suffer from malnutrition and disease.

Deer pellet counts are a very simple survey technique that anyone who enjoys being in the woods can enjoy and successfully partake.

The key to this method is to know that deer, on average, produce 25 piles of deer pellets per day over the winter season. That's almost 4,000 piles of droppings for every deer during the winter, or 50,000 piles/square mile for an optimal-sized herd of about 12 — 15 deer/square mile. Participants survey a series of circular segments of the forest floor for deer pellet piles while walking parallel transects that are about a mile long and 1000' apart. Every 100' you stop and count the pellet piles in a 4' radius circle.



An aerial infrared deer survey complemented on-the-ground surveys for the first time in 2017. The survey methods had different results. Analysis of how we plan to reconcile or adjust survey methodologies will be shared when complete.

The key to a good count is to have lots of folks go out to survey and get lots of samples. You don't have to be experienced, you don't have to follow the compass bearing exactly, and the samples don't have to be exactly 100' apart to get good data. We had small children up through experienced hikers participating and all everyone had to do was to count only the pellet piles in their sample areas, carefully record the data, and have fun.

We all had a great time and many of us hope to do this again.

—*Bob Fuller,* Black Rock Forest volunteer

Forest News in Brief

Join us on Sunday, September 10th, for "Hike & Sketch: Learn to Keep a Field Notebook," led by Emilie Wolf, Science Chair of The Browning School, from 10 AM — 12 PM. Bring a notebook and drawing tools -- no drawing skills required. Cost: $10/person. Free for Friends of the Forest (annual supporters). RSVP to Brienne Cliadakis at bcliadakis@blackrockforest.org.

New MicroEYE Videomicroscope available in the Science Center! Our new videomicroscope is located in the second-floor dry lab in the Science Center. We gratefully acknowledge this generous donation from an anonymous donor! Photo: Peter Terezakis, NYU artist in residence and Summer Science Camp instructor uses the scope and a projector with students to view a feather up close.

The Orange County Water Authority (OCWA) has invited Black Rock Forest Consortium to help develop curriculum for their recently awarded Estuary Stewardship Through Education (ESTE) Grant. Content will be developed for four public kiosks and student field stations placed in Hudson River waterfront parks in Newburgh and Cornwall. *Interested in this project? Contact Jack Caldwell at the Consortium office.*

A special thanks to our Calhoun School intern, Josh Blank! In May, 2017 the Consortium welcomed Josh Blank, a high school intern and gifted photographer, for a brief stay at Black Rock Forest. His forest photography will have lasting impact — and you'll see it on our website, Facebook page, and print communications for many months to come. This photo shows Josh setting up to photograph the Mineral Springs waterfall.

NFA Excelsior Academy students volunteer to combat invasives at Spagnum Pond (Marsh)! BRFC volunteers were joined by nearly a dozen NFA students, their English teacher, and their principal to knock down and pull up invasive phragmites. The students were diligent, didn't mind getting wet, and loved discovering forest creatures while they weeded and worked. Many thanks for a job well done!

Telescope Available in the Science Center! We gratefully acknowledge the donation of a Meade Model 231 telescope by Dr. Terryanne Maenza-Gmelch. The telescope is available for use on site, for observations of the night sky.

BLACK ROCK
FOREST
CONSORTIUM
65 Reservoir Road
Cornwall, NY 12518

Fall 2017 Newsletter & Annual Report

Report from the Field

The summer at Black Rock Forest was a good growing season for plants and animals as well the minds of young students. The forest's Summer Science Camp continues to place young interns into environments of hidden histories, animals and plants. They travelled forest roads and trails that have served the forest's primary mission since 1927, providing access to sites that inspire and install thoughts of science, history and visionary enchantment.

Many friends of the forest have realized the importance of maintaining this accessibility.

John Blenninger in Black Rock Forest

Volunteers like John Blenninger give their greatest gift — time — critical for furthering the forest's potential. Serving for decades as Black Rock Forest's main trail volunteer, John meticulously attended to detail. Chance meetings on the trail were always enjoyable, John's wit as sharp as the corners of his painted trail marks. He used specialized tools to carefully prune tunnels through Mountain Laurel or strategically place stones at water crossings. Presenting the trail to the foot traveler was the mindset. The passing of John this year unites his spirit with those before him, creating a strong historical legacy of forest vision and work.

Not long ago, John commented on the re-location of the old Chatfield Trail. "Are you sure? A shame to lose part of a historic pathway. It should be remembered why it was put there." It was created as a horse path when James Chatfield was working the farm of his name (a.k.a. the "Stone House") in the mid-1800s. It linked the Chatfield Place to fertile land along the outlying swamp at Sutherland Pond and probably connected with the Odell's mountain farms. The horse path became a foot trail after the farmhouse burned in 1907. Since then, foot travel has created seasonal water flows and a small creek where horse handlers would surely have led their horses to water. The newly elevated portion adds a new peak to the Black Rock Forest trail network: Raup's Rock. Dr. Hugh M. Raup of the Arnold Arboretum authored the seminal Forest Bulletin #7 titled "Biological studies in the Black Rock Forest." Its name only appears on the map that Henry Tryon made in 1936. The large rock table inspires thoughts of nature's grandeur. Perhaps Tryon's high regard for Dr. Raup's work and philosophy instigated the naming of this remote vantage point. The view from Raup's Rock is of the southwestern greenway from Mount Rascal to the southern half of Schunnemunk Mountain and southward to the Hudson Highland State Parks. Like the old Chatfield Trail, John may be gone but will not be forgotten.

— *John Brady*, Forest Manager