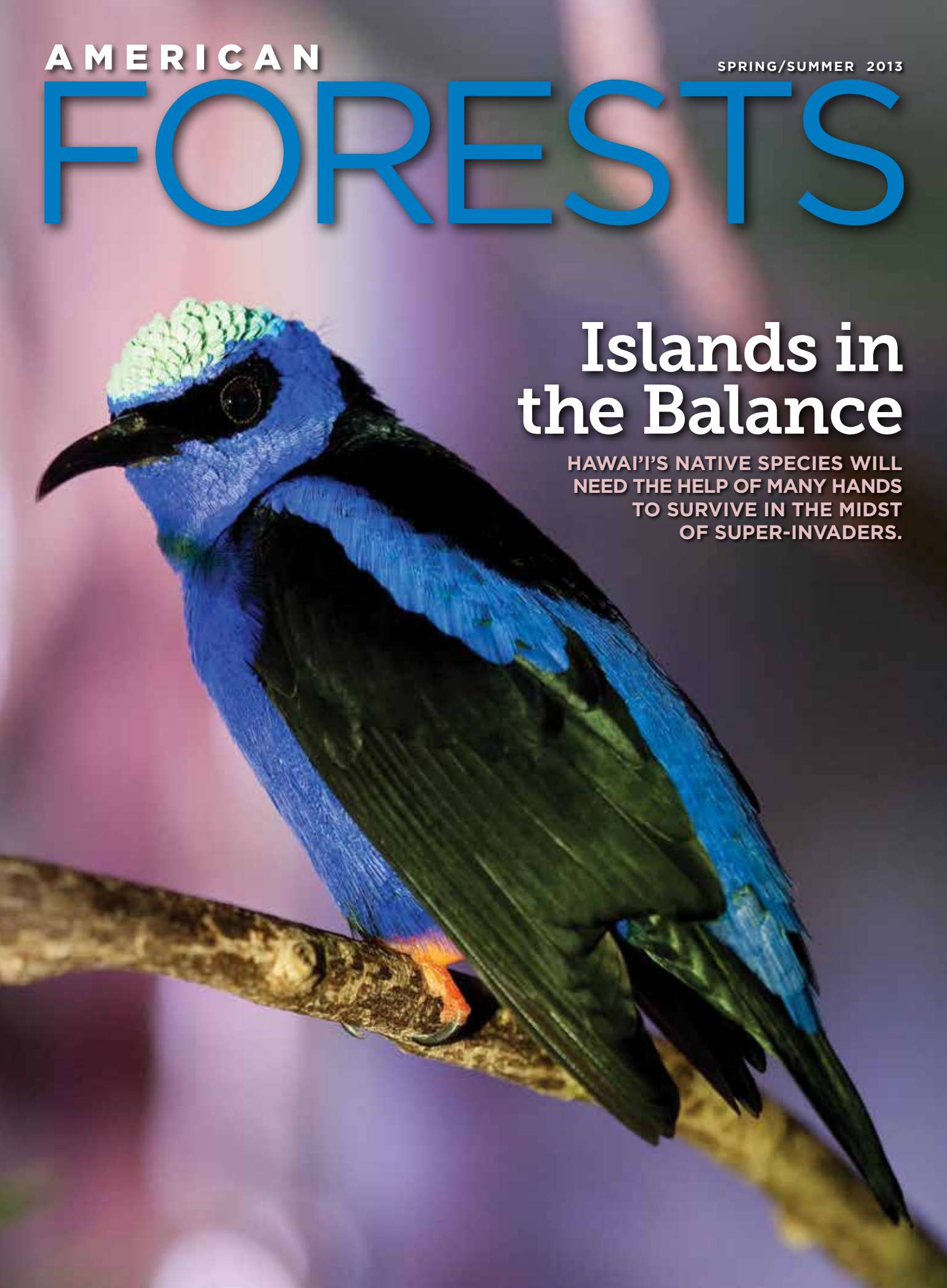
AMERICAN
FORESTS
SPRING/SUMMER 2013



Islands in the Balance

HAWAI'I'S NATIVE SPECIES WILL NEED THE HELP OF MANY HANDS TO SURVIVE IN THE MIDST OF SUPER-INVADERS.


Eddie Bauer
EST. 1920
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VOL 119 NO 1

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COVER: A.J. HAVERKAMP; THIS PAGE: [TOP] BERING LAND BRIDGE NATIONAL PRESERVE; [RIGHT] COURTESY OF THE APPALACHIAN TRAIL CONSERVANCY

Raising Conservation-minded Kids

BY SCOTT STEEN

Alexis Dilloway

WITH FORESTS BOTH IN THE U.S. and around the world under threat — and the health of the planet itself imperiled — raising environmentally literate and conservation-minded kids is more important than ever.

I recently received an email from the mother of a girl named Alexis Dilloway. Alexis helped create the Earth Lovers Club, a local group comprised of her and her friends that recruits others to share their love of nature and taking care of the planet. For her eighth birthday in January, Alexis had a forest-themed birthday party and asked her friends to make donations to American Forests in lieu of presents. She also donated $18 that she has been saving, including money she received from the tooth fairy for her two front teeth.

Alexis loves to be outside and says, "It makes me feel safe and good to be in nature." This love of the natural world and her desire to be a good steward of the environment did not come by chance. It is a value instilled by her parents.

"We've always kept an open dialogue with our children about why we do the things we do and what we can do to be even better about protecting our planet," Alexis' mom, Emily, tells me. "As a family that spends a lot of time out in nature, we have made it a priority to care for the environments we love so much. I think that our honesty with Alexis about what could happen if we didn't take care of our planet has just really sunk into her heart. For as long as I can remember, she has always had a strong desire to defend our planet and the creatures that inhabit it."

Unfortunately, there are far too few kids like Alexis today and far too many things competing for their time. A 2010 Kaiser Family Foundation study found that kids now spend 53 hours a week in front of some kind of screen. Even in 2000, a University of Michigan study found that children spent only 30 minutes in unstructured play outside per week. It is difficult to value something that you don't experience.

Fortunately, there are countless ways parents can help nurture a love of nature and a sense of responsibil-

BOTTOM LEFT AND RIGHT: EMILY DILLOWAY

TOP: ANDY SAWYER; RIGHT: EMILY DILLOWAY

Above: The McGrath family has enjoyed spending hours sitting and reading their favorite books under the former national champion Siberian elm tree.; Right: Alexis Dilloway teaches her baby brother, the smallest member of the club, about being an Earth Lover.

ity for the health and well-being of both forests and the planet. I recently asked a number of my colleagues here at American Forests for some easy ways that parents could enhance environmental literacy and instill a love of nature in kids.

Here are a few of their ideas:

- Simply and most importantly, spend time with your kids out in nature. Take them hiking, camping or for simple walks through a local wooded park. Make a game of identifying as many trees, plants and animals as you can. Identify the places where animals might live (dens and nests, for example). Use your outings as a way to teach your kids about the fragility of nature and their role as stewards. As Alexis says, "In nature, I watch out where I step, and when I see things, like wildflowers, I smell them and look at them, but always leave them for other people to enjoy. I also plant any chance I get and treat all living things with love and care."
- Read nature and environment-themed books with your children. Recommendations include Todd Carr's *The Earth Book*, Alan Zweibel's *Our Tree Named Steve*, Joanne Ryder's *Each Living Thing* and Frank Asch's *The Earth and I;* and classics like *The Lorax*, *Watership Down* and *The Wind in the Willows*.
- Put your child in charge of household recycling and explain the importance of the three Rs — reduce, reuse and recycle. Give them responsibility for carrying your reusable shopping bags into the store when you shop and have them help carry (unbagged) items when reusable bags are not available.
- Teach children never to litter and to pick up trash to throw away whenever they can.
- Encourage your kids to pick a favorite tree to get to know by sitting, thinking, writing and reading under it — making it their special spot.
- Ask kids to identify five ways that their family can reduce energy costs or be kinder to the environment around the house. Teach them to turn off the water while brushing teeth and turn off the lights (and TV) when they leave a room.

These ideas (and many others) are simple, but every action you take now to create awareness in your children will create healthier forests and a healthier planet tomorrow. Alexis' parents are blazing this trail and helping to create a kid who is destined to make a difference. "Even though her Earth Lovers Club is made up of only a couple of the neighborhood kids, we have praised her in her efforts to start a club with such an important cause and have been sure to remind her that even small kids can make big differences," Emily Dilloway says. "We always try to provide her with the tools she needs to do the things her heart desires for our earth. We will continue to teach her about our planet and the resources it provides and what we can do to take care of it."

AMERICAN FORESTS

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Art Direction and Design
Brad Latham

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Phone: 202-737-1944
http://www.americanforests.org

tree doctor


Lichen on bark

JOY VIOLA, NORTHEASTERN UNIVERSITY, BUGWOOD.ORG

Likable Lichen

Q: My ginkgo trees were planted in full sun 10 years ago. They are now covered with gray lichen, which peels off easily. Is this lichen damaging the tree? How do I control it?

A: Lichens grow on many surfaces, such as rocks, mailboxes and trees. They do not use the surface as a food source and do not damage it. They survive only in pristine environments. I would leave it alone.


Largeleaf linden during winter


Largeleaf linden foliage

BOTH PHOTOS: ROBERT VIDÉKI, DORONICUM KFT., BUGWOOD.ORG

Prune Away!

Q: There appear to be differences of opinion on when it's best to prune linden trees. What do you suggest? Also, can you get away with trimming them in winter, even if it is not the best time?

A: When the trees are dormant in winter, it is a great time to prune them. When the branching structure is visible, there's less opportunity for spread of disease, less debris to clean up and the formation of buds is not affected. Prune away!

Pipe Predicament, Part II

Reader Karen Jenkins of Savannah Tree Foundation shares another solution in response to "Pipe Predicament." (see American Forests*, Winter 2013).*

Q: I have a much-loved, old red maple whose roots cause chronic blockage in my sewer line. I've been told I should have a trench dug to pull out the old pipe and replace it, but I'm concerned this will hurt my tree.

A: You could first have your plumber use a video scope to identify the exact location of the root blockage. A chronic blockage could be caused by one crack in the sewer line, where roots were infiltrating and creating a blockage problem. This scenario can be easily fixed by a reputable plumber without destroying any of the trees' roots. If a long section of the sewer line needs to be replaced due to multiple pipe fissures and root infiltration, then, yes, some of the roots would be severed to correct the pipe problem. If the tree is healthy, it should be able to withstand some careful root "pruning."


Tree roots fill a pipe that had to be taken out. Tennis ball is used for scale.

JOEL CAYFORD

KATHY KIMPEL

Pears

Worm-hole

Q: I have a pear tree that's at least 100 years old. A hole has developed in it, and I noticed very rich, black compost, along with worms, inside the hole. This tree still bears fruit that I enjoyed this past summer. What should I do?

A: In a situation like this, you need to apply a slow-release, low-burn fertilizer, such as Arbor Green Pro, to the soil around the tree. You should also consider watering the tree to relieve the drought stress.

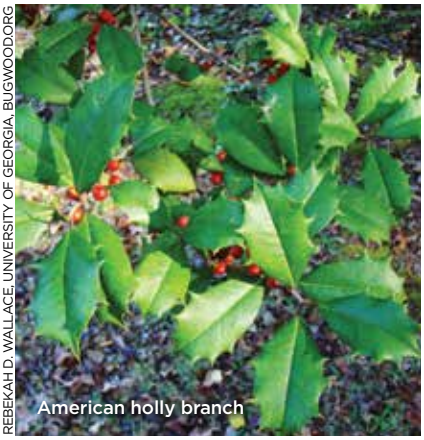
MARIO B./FLICKR

American sweetgum

Star-crossed Trees?

Q: My husband and I enjoy identifying trees in our backyard. We recently collected a variety of leaves that look similar to each other, but none fit the textbook pictures of certain types of tree. For example, some are clearly sweetgum and some are clearly maple, but others have characteristics of both. Can trees cross-pollinate to create blended offspring?

A: Trees can and frequently do cross-breed with the same species and occasionally the same genus. However, sweetgum and maple are not in the same family and, therefore, would never cross-breed. But there are many varieties of maples, particularly, some of which have been cultivated by professional growers in recent decades. You may be able to find a match for your leaves online.



REBEKAH D. WALLACE, UNIVERSITY OF GEORGIA, BUGWOOD.ORG

American holly branch

Transplant Timing

Q: I found a small, young holly tree in my woods while deer hunting. I want to transplant it near my house, where I have a couple of other trees that I found years ago. What is the best time to transplant a holly tree?

A: Transplant the holly tree during the dormant season. Roots will grow as long as the ground is not frozen. Be sure to water the tree to prevent drought stress.

CRAPCHICK/FLICKR

Beech leaves ready to drop

Late Leaf Loss

Q: Every year, by the end of October, the trees in our area lose most of their leaves. It is now the end of November and most of the leaves are still hanging on to our healthy-looking trees. Does this have to do with last year's drought?

A: This is more likely related to this year's drought rather than prior years' droughts. Variables include duration of growing season (last to first frost) and weather (storms or calm) in mid-autumn, after the formation of the abscission layer — the layer of cells that forms between twig and leaf to enable leaf-drop.

Tree Doctor questions are answered by The Davey Tree Expert Company. Got questions? Visit www.americanforests.org/treedoctor.

BOB KEANE

FOREST FRONTIERS

Forest Ecologist Robert E. Keane

AMERICAN FORESTS SCIENCE Advisory Board member Dr. Robert E. Keane is a research ecologist with the U.S. Forest Service's Rocky Mountain Research Station at the Missoula Fire Sciences Laboratory in Missoula, Mont. He received his doctorate in forest ecology from the University of Idaho-Moscow. Dr. Keane has researched novel restoration techniques for conserving declining whitebark pine populations in western North America and has developed models predicting the effect of climate change on fire regimes, landscape dynamics and vegetation composition and structure.

Why did you choose to go into forest ecology?

My undergraduate degree was in forest engineering, and after four years of engineering coursework and some summer engineering jobs, it was obvious to me that the engineering way of life wasn't all that appealing to me. However, I did like the forestry part and pursued employment in that area. Right after I graduated, I accepted a job doing research in fire ecology and knew right away that this was my dream job. The noted fire ecologist Steve Arno introduced me to whitebark pine ecosystems in the mid-1980s, and I was hooked like a Montana trout. I guess you could say that the field picked me rather than the opposite.

What is the most surprising thing that you have learned or discovered?

When you're working in whitebark pine, you are always learning something new. Perhaps the most surprising observation was that small seedling and sapling whitebark pine can often be as old as the overstory. This is important because many believe that these small trees will release seeds following restoration treatments or wildfire. Our research has shown that this may not always be the case, as some of these five-foot-tall trees can be more than 200 years old.

What do you think the biggest issue facing forest health is today?

As an ecologist, I would have to say exotic diseases and insects. If you objectively evaluate the ecological damage wrought by just three agents — white pine blister rust, chestnut blight and gypsy moth — it would be obvious that these introduced agents have altered more ecosystems, and have changed more lands, than other anthropogenic factors.

Where was the most impactful place you were able to travel to in the name of science and why?

Over the last 25 years, I've spent part of my summers in the Bob Marshall Wilderness Complex in central Montana. It holds a special place in my heart. There is a guard station in the center of this special wilderness area that is one of my favorite places on Earth: Big Prairie. When you hike there, it is like stepping back in time, where life slows down and you can hear the heartbeat of the landscape. I've sampled many plant communities in the landscapes surrounding Big Prairie and have enjoyed many campfires with those dedicated people who manage our wilderness. It is truly a state of mind rather than a place .

For an extended interview with Dr. Keane and other web-exclusive content, visit www.americanforests.org/magazine.

PHOTOS, THIS PAGE: MUSKEGON CONSERVATION DISTRICT

GLOBAL RELEAF SHOWCASE

Woods for Wildlife Initiative Muskegon County, Michigan

EIGHTY YEARS AGO, AMERICAN FORESTS PLAYED AN INSTRUMENTAL ROLE in the creation of the Civilian Conservation Corps (CCC), working with President Franklin D. Roosevelt to put the nation back to work while developing the country's natural resources. The CCC — also known as Roosevelt's Tree Army — created a legacy of land stewardship through their many projects constructing park facilities and planting trees.

Right: Pine stands in Muskegon County have suffered from insects and disease. Below: Populations of red pines were depleted due to harvesting practices in the 1800s.

In the 1930s, the CCC planted red pine throughout Michigan to reestablish this native species which had been depleted in the 1800s due to over-harvesting. Today, many of the pine stands they planted in Muskegon County have suffered from insects and disease, and Michigan's forests need our help once more.

American Forests is partnering with Alcoa Foundation and the Muskegon Conservation District on the Woods for Wildlife Initiative, part of our 2012 Alcoa Foundation and American Forests Global ReLeaf Partnership for Trees. Now in its third year, the Partnership for Trees restores forestlands around the world, engaging local communities to plant more trees and help restore wildlife habitat. Through the Woods for Wildlife project, we're planting 20,000 native trees and shrubs — including cedar, hemlock, spruce and others — across 26 acres in Muskegon, continuing the CCC's legacy of protecting and restoring this important ecosystem. The project aims to increase the forest's wildlife population by restoring this barren landscape, home to songbirds, wild turkey and others, to a more diverse forest that can provide for their needs year-round.

Another important aspect of the Woods for Wildlife project is education. This project is engaging 150 local students and volunteers as tree stewards. After helping with the plantings, the students will continue to monitor the project year to year, using forestry kits that include essential forestry tools like core-extraction borers, digital thermometers and pocket wind meters. Local teachers will also be provided with materials to help cultivate an interest in forestry studies through their science classes.

Just as we continue the CCC's legacy of land stewardship, so, too, we hope that future generations will continue to care for these lands.

For more Global ReLeaf projects, visit www.americanforests.org/global-releaf.

Students and volunteers act as tree stewards for the Woods for Wildlife Initiative.

ANDY SAWYER

DID YOU KNOW?

Forests are home to **80 percent** of the world's terrestrial biodiversity.

BIG TREE SHOWCASE

Green Ash

SPECIES NAME: Green ash, *Fraxinus pennsylvanica*
LOCATION: Cass, Michigan
CIRCUMFERENCE: 271 inches
HEIGHT: 91 feet
CROWN SPREAD: 66.5 feet
TOTAL POINTS: 262
NOMINATED: 1981
NOMINATED BY: Andy and Noah Sawyer

FUN FACT: Though showing signs of emerald ash borer, this big tree has found the strength to fight off the infestation over the last three years. This national champion is one of the oldest trees on Michigan's state register.

Discover more champion trees at www.americanforests.org/bigtree.

PARTNERS

Evergreen Society

AMERICAN FORESTS is pleased to announce our new Evergreen Society for those who wish to leave a legacy of healthy forests, clean air and water and a healthier planet by including American Forests in their estate plans. Such planned giving is a meaningful way to ensure that your love for the natural world will have a lasting impact by supporting the mission of protecting and restoring forests. Evergreen Society members receive benefits such as recognition in our annual report and invitations to exclusive events.

You can learn more about the Evergreen Society at www.americanforests.org/evergreensociety.

With profound appreciation, but heavy hearts, we thank Brian A. Kopf for his years of devotion to healthy landscapes and charitable giving, which included donations to nonprofits from his estate. Last May, at age 56, Brian passed away while experiencing life to its fullest, doing what he loves best: enjoying the great outdoors in Canyonlands National Park. Ever the avid hiker and wilderness supporter, Brian had also become a voracious fly-fisherman over the years and had recently been named as Volunteer of the Year by charitable organization St. Vincent de Paul for his outstanding, selfless efforts in helping those less-fortunate. Brian's recent generous gift to American Forests serves as a touching example of the positive impact planned giving can have on our environment.

DID YOU KNOW?

41.7 million acres of western forest are estimated to be dead or dying due to **mountain pine beetle** infestation.

Dawson Falls, Wells Gray Provincial Park.

AMANDA TAI/AMERICAN FORESTS

American Forests and forest advocates from the Midwest meet on Capitol Hill. From left to right: David Forsell (Keep Indianapolis Beautiful), Scott Jamieson (Bartlett Tree Experts), Daniella Pereira (Openlands) and Lydia Scott (Morton Arboretum)

FROM THE FIELD

WASHINGTON, D.C.

Rebecca Turner, Senior Director of Programs and Policy

ON FEBRUARY 28, I joined more than 50 urban forest advocates from the Sustainable Urban Forest Coalition (SUFC) on Capitol Hill to advocate for federal programs that support healthy forests in our towns and cities. SUFC, comprised of nearly 30 national organizations and of which American Forests sits on the steering committee, advances a unified urban forest agenda: "To integrate trees as a vital component of sustainable infrastructure for every community where people live, work and play." American Forests staff attended 15 meetings that day, bringing SUFC folks from Florida, Maine, Illinois, Oregon and Washington, D.C., to visit their congressional members.

We asked for support for the U.S. Forest Service's Urban and Community Forestry Program (U&CF) and Forest Health Management Program, and we highlighted the importance of the Urban Waters Federal Partnership within the Environmental Protection Agency. In fiscal year 2012, the U&CF delivered technical, financial, educational and research assistance to 7,499 communities in all 50 states, the District of Columbia, U.S. territories and affiliated Pacific island nations. The Forest Health Management Program helps combat native and invasive pests impacting forests and trees in urban and rural areas, while the Urban Waters Federal Partnership works to revitalize urban waterways and the communities around them, focusing on underserved urban communities of all sizes by bringing state and local governments, nonprofits and community partners together.

These advocacy days are an important tool we use to ensure continued support for urban forests at the federal level.

ARLINGTON, VA.

Matthew Boyer, Vice President of Individual Giving

IN MID-DECEMBER, some colleagues and I joined American Forests volunteers to help the Arlington Department of Parks and Recreation and the Arlington Tree Stewards plant

MEGAN HIGGS/AMERICAN FORESTS

Volunteers joined American Forests, the Arlington Department of Parks and Recreation and the Arlington Tree Stewards to plant trees along Arlington, Va.'s Bluemont Junction Trail.

several new trees along the Bluemont Trail in Arlington, Va., as part of our Global ReLeaf program.

The Bluemont Trail and 70-acre Bluemont Park are important recreation areas, where community members can hike, bike, fish, picnic or take advantage of the many courts and fields. The 1.3-mile Bluemont Trail serves as a connection between some of the area's major hiking and biking paths, giving community members access to more than 50 miles of trails.

This was a wonderful opportunity for American Forests members to not only plant trees that future generations will be able to enjoy, but to also see how some of their generosity to American Forests is invested back into one of their local urban forests. In the coming months, American Forests will alert its members about exciting opportunities to volunteer to plant trees or participate in hikes through forested areas of the country. I hope you come and join us!

SHERI SHANNON/AMERICAN FORESTS

Big tree hunters Gary Williamson (left) and Byron Carmean (right) with National Big Tree Program coordinator, Sheri Shannon

MULTIPLE CITIES, VA.

Sheri Shannon, National Big Tree Program Coordinator

THE FIRST WEEKEND IN MARCH, I visited an address I'd seen on dozens of big tree nominations: the Virginia residence of big tree hunter Byron Carmean. The stacks of wood, numerous plant and tree species, chicken coop and goat named Hatfield reminded me of my grandfather's farm. I knew I was going to come away from this big tree tour, led by hunting partners Byron and Gary Williamson, with plenty of stories.

I visited six national champions and four state champions, most of which were in people's front and back yards. You would think that we would have to have driven hours across the state to see this many trees, but the trees were all in a concentrated area. There was no way you could miss the laurel oak, willow oak and swamp bay that towered over their owners' houses or the impressive girth of the yellow-poplar estimated to be 500-600 years old.

Byron and Gary were human GPS systems as they navigated Chesapeake, Suffolk, Newport News and Hampton like they had a map on the palm of their hands. They named every swamp, tributary and river we drove past and the ecological habitats in each area. The two big tree hunters are also walking tree identification guides, even pointing out plants we could eat. We spotted wild turkeys, bald eagles and hawks and saw the remnants of a beaver's work on a tree. This trip was a perfect example of the dedicated and knowledgeable individuals who devote their time to make big tree programs everywhere successful. I look forward to canoeing with Byron and Gary this spring to see more champion trees.

Read an extended version of Sheri's big tree tour at www.americanforests.org/magazine.

Emerald ash borer

DAVID CAPPAERT

FROM *LOOSE LEAF*

EAB Goes Global

WHILE THE UNITED STATES HAS BEEN DEALING WITH AN emerald ash borer (EAB) infestation since 2002 (see *American Forests*, Winter 2013), this tree pest has begun to spread internationally. Although native to some eastern parts of Russia, EAB has recently swept across the country, infecting and killing ash trees in Moscow. Researchers believe that EAB spread to western Russia by way of the Trans-Siberian Railroad. In January, four Russian scientists visited the United States to learn more about this deadly species. Dr. Deborah McCullough, a forest entomologist and American Forests Science Advisory Board member, met with these scientists at Michigan State University, where she has been studying the emerald ash borer. Due to the rapid spread of EAB across Russia, Dr. McCullough believes that it "won't be long until EAB has circumnavigated the whole northern hemisphere," unless drastic action is taken to combat this insect.

Tigers' Welcome Return

THE WILDLIFE CONSERVATION SOCIETY recently announced that the number of Siberian tigers has increased in Russia, signaling a possible recovery of the species. In the early 2000s, American Forests supported an effort to reforest Siberian tiger habitat in Russia with Korean pine trees to help this species thrive in the wild. While Siberian tigers were on the brink of extinction in the mid-1990s, the population now hovers between 350 and 500 tigers in Russia. Although still listed as an endangered species on the International Union for Conservation of Nature's Red List, this study offers hope for these big cats.

Amur tiger

ART G.

WENDY VANDYK EVANS/BUGWOOD.ORG

Budding Out of Season

A TEAM FROM PRINCETON UNIVERSITY published a paper in *Geophysical Research Letters* on a new model that shows how budburst — leaves and flowers budding at the start of the growing season — is expected to shift this century due to rising temperatures. Their model shows budburst for deciduous trees shifting earlier by as much as 40 days for some species and climate zones by 2100. The earlier budburst could alter forest composition and even affect springtime weather.

New research estimates that by 2100, a red maple like this one will bud eight to 40 days earlier than it does now.

Public Land: The Latest Job Perk

EMPLOYMENT GROWTH IN THE LAST 40 YEARS has been twice as high in the West — 152 percent — as in the rest of the country. A November report in *Headwaters Economics* titled "West Is Best: How Public Lands in the West Create a Competitive Economic Advantage" attributes this difference to how the natural landscapes of the West are used to recruit top companies and talented workers. In fact, counties where at least a third of the land is federally protected — such as national forests and parks — showed the most employment growth: 345 percent. The report suggests that natural beauty may be the ultimate job perk.

Fly fishing

THE_LAZY_DAISY/FLICKR

Some of the best thinking and creating takes place in nature.

MICHAEL QUINN/NATIONAL PARK SERVICE

Creativity in the Wild

A STUDY PUBLISHED IN *PLOS ONE* by University of Utah cognitive scientist Dr. David Strayer suggests that time in nature has a positive effect on creative problem-solving abilities. Dr. Strayer administered a creative problem-solving test called the Remote Associates Test to participants on a trip led by outdoor leadership program provider Outward Bound. Participants who took the test after four days in the wilderness performed 50 percent better than those who took the test before departure, suggesting that their time in the wilderness gave them an advantage.

Painting at the Grand Canyon

MICHAEL QUINN/NATIONAL PARK SERVICE

For *Loose Leaf* every day, follow our blog at www.americanforests.org/blog.

WASHINGTON OUTLOOK

The Collaborative Forest Landscape Restoration Program

FORESTS ARE FUNDAMENTAL to our nation's prosperity. They cover half of the United States, store and filter half of the country's water supply, provide jobs to more than a million product workers, absorb between 10 and 20 percent of U.S. carbon emissions and provide habitat for thousands of wildlife species. Forests are also responsible for generating more than $13 billion in recreation and other economic activity on U.S. Forest Service land alone.

With multiple stakeholders depending on our nation's forests, wouldn't it be great if we had a program where conservationists, wood industry members, nonprofits and federal workers were willing to work together to keep forests healthy so all parties could benefit from the results?

In two years, the projects have surpassed their short-term goals by creating or maintaining 7,949 jobs.

We do! The Collaborative Forest Landscape Restoration (CFLR) program, created in 2009, encourages the collaboration of unlikely partners to undertake science-based restoration on priority forest landscapes. The CFLR program aims to promote job stability, reliable wood supply and forest health while reducing the costs and risks of wildfire.

When Congress established the CFLR program, it set aside limited funding for up to 10 projects for 10 years. The program requires projects to provide matching funding sources; it is estimated that $152.3 million of private and nonfederal funding will be leveraged in those 10 years. Through American Forests' action as a founding member of the CFLR Coalition, we have been able to garner full support from Congress in fiscal year 2012 with $40 million dedicated to the CFLR program. This has enabled the Forest Service to select 10 more projects under the CLFR program and designate three others as high-priority landscapes, for a total of 23 projects working to restore our forested landscapes.

Red-cockaded woodpecker

ANDY RAEGO

An incredible diversity of plants and animals, such as the Diana fritillary butterfly, benefited from restoration of red-cockaded woodpecker habitat in the Shortleaf-Bluestem Community of Ouachita National Forest in Arkansas and Oklahoma.

DR. THOMAS G. BARNES, U.S. FISH AND WILDLIFE SERVICE

Projects are selected based on their capacity to improve forest health and provide jobs and services for people. Some projects work to decrease the destruction and cost of wildfires while others aim to increase resilience to drought and climate change. Through our longleaf pine restoration work in Florida as part of our Global ReLeaf program and our work with high-elevation pines in our Endangered Western

Forests initiative, American Forests has witnessed firsthand the extensive help these forests demand.

While restoring forests, the projects' activities also provide sustainable jobs in the rural communities that depend on them. Other goals for the program include the protection or improvement of 1.6 million acres of wildlife habitat and the protection of communities from wildfire destruction through fuel reduction on 1.4 million acres. In two years, the projects have surpassed their short-term goals for job creation by creating or maintaining 7,949 jobs.

Not only does the CFLR program take a comprehensive approach to forest health, it also follows the all-lands approach to forest restoration. It requires close coordination with other landowners to encourage collaborative solutions through landscape-scale operations. It helps the U.S. Forest Service work directly with communities and local organizations, accelerating the restoration work on thousands of acres of forests.

ANDY RAEGO

Collaborators hope to reestablish the Bachman's sparrow in the Missouri Pine-Oak Woodlands Restoration Project area. At least 82 breeding bird species, 47 migrant birds and 87 overwintering birds occur in this area.

In the beginning of the 20th century, American Forests was instrumental in the passage of the Weeks Act, which provided a road map to conserve our nation's forests and water resources. Now, we are part of a program that offers a path away from the historic "timber wars" by meeting the needs of local communities, conservation groups, recreationists and the timber industry. As agency budgets are continuously slashed and programs cut, there is always work needed. American Forests proudly supports the continuation and expansion of the CFLR program. Visit American Forests' Action Center at www.americanforests.org/action-center to let Congress know that you support the CFLR program, too.

Jami Westerhold, Esq., writes from Washington, D.C., and is American Forests' director of forest restoration.

ISLANDS IN THE

Can the native species of Hawai'i hold out against invasives? Their recovery will

DAVID EICKHOFF

A.J. HAVERKAMP

Left: Koa tree; Above: Honeycreeper

BALANCE

rely on science, technology and the work of many hands.

BY SOPHIA V. SCHWEITZER

'Ōhi'a lehua

DAVID EICKHOFF

FOR THE PAST FOUR YEARS, DURING MISTY morning hours, Dr. David Flaspohler has been tramping around remote, lava-ringed forest pockets on the slopes of still-active Mauna Loa, Earth's largest volcano, on the island of Hawai'i. Far removed from human noise, the ocean shimmering 4,500 feet below, the conservation biologist and avian ecologist from Michigan Technological University stops frequently to listen and look for birds, among them the crimson 'i'iwi, elusive 'ōma'o and little Hawai'i 'elepaio, all species found nowhere else in the world.

In these forests, damp logs populated with lichen and ferns sidle up to native 'ōlapa trees. Tree ferns with giant fronds reaching 40 feet tall grow alongside gnarly 'ōhi'a lehua trees. You may see tall, sturdy koa, a uniquely Hawai'ian rainforest tree, sheltering a universe of epiphytes — plants that grow on other plants — in the crannies of its trunk, while giving plentiful habitat to native species of birds, spiders and insects. The air is heavy with the scent of decaying leaves, the pulse of new and dying life.

Hawai'i's rainforests generally include three "structural" species. Koa, 'ōhi'a and tree ferns provide the conditions for balanced ecosystems. Under this triad of canopy trees and ferns, a biodiverse understory can exist. Yet, where the forests have vanished, rainforest recovery and restoration aren't nearly as simple as ensuring the presence of these three species. The reason? Wherever a native species was cleared in the past, a problematic non-native has taken hold.

INVASION

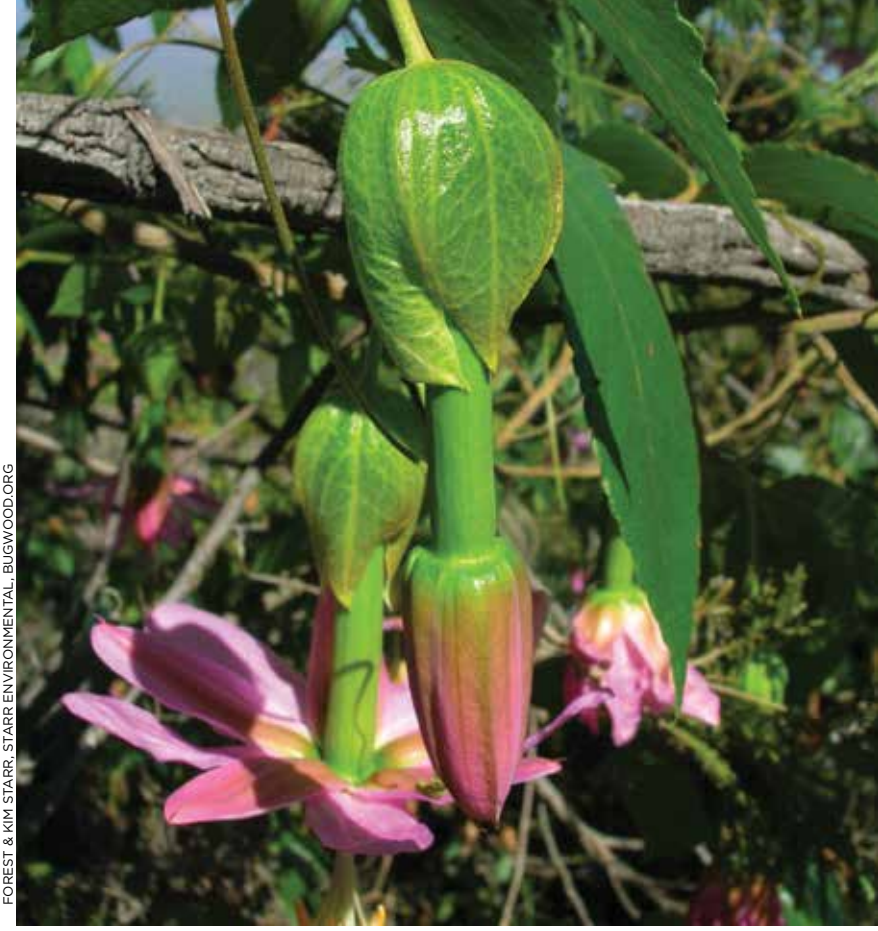
The forest patches of Mauna Loa are known in the Hawai'ian language as kipuka, isolated land areas of varying size surrounded by lava flows dating back to the mid-1800s. They host some of the nation's most fragile native ecosystems that contain an imperiled biodiversity without equal in the country. "Here's an evolutionary legacy that's unique in this world," Dr. Flaspohler says. "In the history of life on Earth, evolution happened just one time in this way, and it will never happen again."

Millions of years ago, far removed from any continental landmass, barren volcanic mountains surfaced from the Pacific Ocean. By wind, wings and waves, spores and seeds dropped in, as well as insects, tiny snails and a bat. A pair of finches landed. Few of these accidental arrivals survived, but over time, some species established themselves, adapting to the conditions of their habitat and co-evolving with other species in the neighborhood. The descendants of the finches,

NATIONAL PARK SERVICE

HARMONYONPLANETEARTH/FLICKR

Left: An emerging frond of hapu'u, also known as fiddlehead, one of the most common tree ferns found in Hawai'i; Right: Crimson 'i'iwi



FOREST & KIM STARR, STARR ENVIRONMENTAL, BUGWOOD.ORG

for example, evolved into a diverse family of honeycreepers. Variations in bill size and shape gave some individuals an advantage in feeding on new abundant food items like flower nectar, insects and fruits. Such changes became more exaggerated over time as groups of birds moved around and responded to new conditions. In this specialization process called adaptive radiation, single colonizing species formed dozens of new species. The rainforest became one of many unique Hawai'ian ecosystems.

But ever since the arrival of human beings, beginning around 1,700 years ago, Hawai'i's ecosystems have been disturbed. Deterioration accelerated dramatically after 1778, when settlers from Europe and the continental mainland began to colonize the islands. Hawai'i's self-contained ecosystems held no defense against the thousands of new plants and animals that they brought with them. Native species readily succumbed to introduced weeds, disease and feral livestock. Of Hawai'i's 1,000 native plant species growing wild, more than 90 percent are endemic, meaning that they are found nowhere else in the world. But they struggle to maintain themselves amid the 3,000 species of non-native plants.

Some of the non-natives have become problem invaders with the forests being especially hard-hit. Banana poka, a vine introduced to Hawai'i in the 1920s as an ornamental plant, has spread throughout forests and fields to infest tens of thousands of acres. Brought in from the Azores islands, firetree, often called simply faya, a take on its Latin name, *Morella faya*, has spread equally beyond control. Hawai'i has lost 50 percent of its native forests, leading the nation in extinctions and federally listed endangered species. "There's almost no other place anywhere else in the country with such severe forest loss," says Dr. James Boyd Friday, a forester with the College of Tropical Agriculture and Human Resources at the University of Hawai'i.

CENTER: DAVID FLASPOHLER

FOREST & KIM STARR, STARR ENVIRONMENTAL, BUGWOOD.ORG

Above: Banana poka; Left center: Hawai'i 'amakihi, a honeycreeper; Bottom: Fruit of *Morella faya* or firetree

KNOWLEDGE IS POWER

Dr. Friday studies restored koa forests on mauka lands — lands toward the mountains, or inland — across the state. "We aren't clear yet how to restore rainforests on a larger scale," he says. "Native forests need so much more than koa, but there is no telling, once you plant a koa tree, if the other species will fall in place."

Dr. Flaspohler echoes a similar sentiment. "We know so little about these forest patches," he says. "Our goal, originally, was to help with forest restoration in Hawai'i because so much of the native forest has been converted to agriculture and pasture over the last centuries. We quickly realized, however, that we need to know much more to be efficient."

This seems to be a theme in Hawai'i's conservation efforts these days: The forests need help, yes, but we can only provide that help with greater understanding of how they work. Scien-

tists are learning surprising new things about the ways in which native and non-native species interact, which may lead to outside-the-box recovery plans over time. Take the kalij pheasant, introduced as a game bird in 1962, and the Japanese white-eye, a songbird intentionally introduced to the islands in 1929 for purposes of bug control. They are intruders, yes, especially the white-eye, which almost certainly competes with honeycreepers for food and habitat. But these birds possibly also fill a niche in the dispersal of native seeds, a task formerly done by native species now extinct. "We have to look much more at the roles of non-native species," Dr. Friday says. "Can some of them help recovery? Or are the disadvantages greater? It's a tricky proposition at each turn, but, for example, it may well be that a non-native forest canopy could provide the right conditions for native understory growth recovery. It's all worth considering right now."

This is where a new and powerful technology comes in — one that could replace hundreds of hours of hoofing it and prove invaluable for future strategies. For the last decade, Dr. Gregory Asner of the Carnegie Institution's Department of Global Ecology at Stanford University has been leading efforts to create remote sensing imagery of the forests by way of high-altitude aircraft. One technique maps the forest by pinpointing nutrients and other chemicals in the leaves of species. Kahili ginger, which spreads underneath the forest canopy, can be spotted this way. Chemical "fingerprints" show where ʻōhiʻa has been taken over by faya, even in incipient phases. Unexpectedly, the imagery has also shown how introduced species can pave the way for more invaders by altering soil fertility and changing the nutrient cycles of native plants.

Another airborne imaging technique identifies key plant species in a map of the forest's

> "We have to look much more at the roles of non-native species. Can some of them help recovery? Or are the disadvantages greater? It's a tricky proposition at each turn."
>
> — DR. JAMES BOYD FRIDAY

CARRIE FLASPOHLER

Dr. David Flaspohler with a non-native Japanese white-eye

CALEB SLEMMONS, BUGWOOD.ORG

Kalij pheasant

Tall, straight, forest-grown koa are the type used for canoe logs.

J.B. FRIDAY

LUIS ARGERICH

Above: Mauna Loa; Left: Kahili ginger

three-dimensional structure. Combining the "chemical fingerprints" with these 3-D images, the technology couples better detection of the distribution of invasive species with a deeper understanding of their biological effects. "The best management and conservation of Hawai'i's forests starts with understanding how they function and how both native and introduced species contribute to forest function," says Dr. Asner. "Then, we need to map the invaders, and finally, we need to take management interventions that make the most sense in terms of long-term sustainability of Hawai'i's remaining forests."

CENTER: SIDSI/FLICKR

OASES OF HOPE

Head to about 4,000 feet above sea level and you'll find the entrance to Hawai'i Volcanoes National Park, where some of that is occurring. An 'io — Hawai'ian hawk — may watch you warily. When the park's chief of natural resources management, Dr. Rhonda Loh, looks up from her computer, she might see a curious, crimson 'apapane, Hawai'i's most abundant honeycreeper, fluttering around a tree fern. Dr. Loh's real office is the forest.

Hawai'i Volcanoes National Park was established on August 1, 1916, primarily to serve visitors drawn to the drama of Hawai'i's two active volcanoes, the magnificent Mauna Loa and the smaller, more accessible Kīlauea. Rainforests comprise 47,000 acres of the park's 333,000 total acreage and are fighting to recover eight species of endangered plants, four endangered native birds, an insect and Hawai'i's only bat, the hoary bat. Forest-typical super-invaders such as faya, banana poka, strawberry guava and Kahili ginger are widespread. but many forested pockets in the park harbor native plant communities that aren't in such bad shape. Dr. Loh and her team focus their work on these Special Ecological Areas (SEAs) foremost because they stand a good chance for recovery.

The park has been successful with these SEAs. In addition to controlling the most invasive plants, the forest pockets are fenced to exclude the damaging effects of feral pigs. "Once the most disruptive plant invaders are under control here, additional measures to reintroduce or augment the number of rare plant species can begin," explains Dr. Loh. In the popular Thurston rainforest SEA, 2,000 individual plants of 13 rare species of rainforest trees and shrubs were reintroduced after weeds were cleared out. Many have caught on. Species such as a lobelia, native mints and the fragrant 'alani have taken root.

Thurston serves as a showcase site today for visitors and a research site for scientists. Studies conducted at Thurston have illustrated that the rainforests of Hawai'i aren't only beautiful and evolutionarily unique, they also perform ecosystem functions that are vital to life on the islands. Native forests, it turns out, are a prime source for freshwater, intercepting it from the clouds and reducing its runoff. Slight changes in temperature and biodiversity affect their efficiency profoundly. Other research suggests that, in east Hawai`i, invasive plants have already reduced estimated groundwater recharge by 85 million gallons per day. Native forests also capture carbon dioxide from the air much more effectively than forests dominated by invasive plants. "We are starting to understand that even a single species can make a difference to the entire ecosystem, changing the function of the forest," says Dr. Loh. "So recovery is no longer just about reintroducing or eliminating a plant, but looking at its effects on the larger system."

DAVE BOYLE/NATIONAL PARK SERVICE

BRIAN SNELSON

Right: 'Apapane and nestlings; Below: Kilauea erupting

HELPING HANDS

With this ever-evolving understanding in hand, recovery now comes down to hands-on work. Lots of it. Within the Hawai'i Volcanoes National Park SEAs, volunteer support is indispensable. Dr. Loh's passion for the experience of the pristine forest first found an outlet when she began working at the park as a volunteer 20 years ago. Others clearly feel the same: In 2011, 1,058 volunteers logged a cumulative 88,499 hours of service, the equivalent of 43 full-time employees. About 7,000 hours were dedicated to rainforest recovery. Folks happily come together to pull weeds such as Kahili ginger and faya or to locate or plant native trees and rare plants. The nonprofit Friends of Hawai'i Volcanoes National Park includes an active forest restoration committee with dozens of enthusiastic participants. "We do it because we enjoy the forest," says the committee's co-chair, Mark Johnson, who has been volunteering in the park for more than seven years. "It's wonderful to be in a native forest, to hear native birds. It's a great opportunity to visit rare places, to see beautiful specimens of native plants."

The park also offers student internships and service days for schools and community groups, while welcoming visitors for monthly projects.

Given that nature doesn't keep to any single SEA, property or even kipuka, broader perspectives and volunteer services are needed as well. Since 2007, nine federal, state and private landowners, whose lands include Hawai'i Volcanoes National Park and areas where Drs. Flaspohler and Friday work, have been coordinating their efforts voluntarily through a watershed partnership called Three Mountain Alliance. The partners cover more than one million acres altogether, containing some of the largest expanses of intact native forest remaining in Hawai'i. Three Mountain Alliance coordinates actively with volunteer groups, which has resulted in the planting of thousands of native understory and canopy species.

CAROL JOHNSON

Above: Friends of Hawai'i Volcanoes National Park volunteers clear weeds.; Left: Volunteers Carol and Mark Johnson

ABOVE: DAVE BOYLE/NATIONAL PARK SERVICE

NATIONAL PARK SERVICE

A volunteer school student carries stalks of invasive Kahili ginger near the Thurston rainforest.

Will the native forests survive?

Newly introduced species come to the forest each day at alarming rates, with one in 10 likely acting as an invader. Chances are a super-invader like faya with the ability to totally change the function and structure of the forests will show up again. Climate change makes things even more unpredictable. Unlike forests on larger landmasses, the forests of Hawai'i cannot move as average temperatures rise.

So while Hawai'i's volcanic flora and fauna are supremely adapted to this native land, their recovery may take a long, long time, with many factors affecting the process. No one is giving up the effort to save what still exists, however. Hundreds of people have joined together in a race to save what can be saved for one or more generations. As Dr. Flaspohler says, "The trend of forest bird and plant extinctions that we have seen doesn't have to continue."

Freelance author Sophia V. Schweitzer writes from Kapa'au, Hawai'i, and can be reached via her website, www.sophiavschweitzer.com.

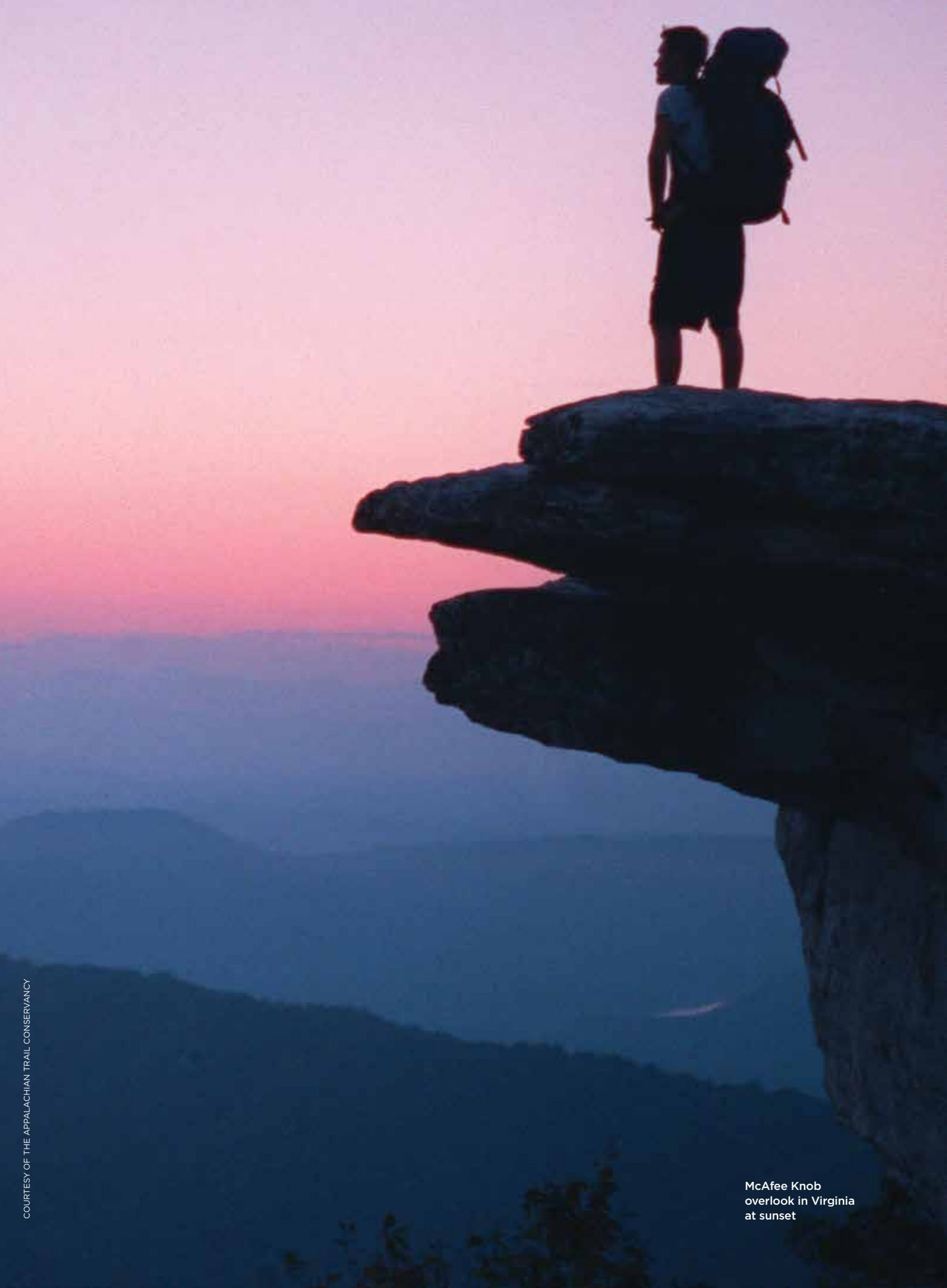
One Step at a Time

Hiking the Appalachian National Scenic Trail

BY ROBIN A. EDGAR

"A FOOTPATH FOR THOSE WHO SEEK FELLOWSHIP with the wilderness." This inscription, found on plaques at each end of the Appalachian National Scenic Trail, beautifully sums up U.S. Forest Service land-use planner Benton MacKaye's dream to create what would become the longest continuous, hiking-only footpath in the world.

MacKaye's essay, "An Appalachian Trail: A Project in Regional Planning," appeared in the October 1921 issue of *Journal of the American Institute of Architects*, and work to turn his dream into a reality began quickly, but the trail took more than 15 years to build, requiring the teamwork of a few hundred volunteers working with state



COURTESY OF THE APPALACHIAN TRAIL CONSERVANCY

McAfee Knob overlook in Virginia at sunset

NATIONAL PARK SERVICE

Above: Named by the Penobscot Indians, Katahdin means "the Greatest Mountain." Left: Appalachian National Scenic Trail map

and federal agency partners, local trail-maintenance clubs, workers from the Civilian Conservation Corps and the volunteer-based nonprofit Appalachian Trail Conservancy (ATC). The trail opened in 1937, and three decades later, the A.T., as it has affectionately come to be known, was designated as the first national scenic trail by the National Trails System Act.

The lands are still managed and maintained by the ATC today — in cooperation with the U.S. Forest Service, other state and federal agencies and 31 maintenance clubs — and are administered by the National Park Service. The ranks of volunteers have grown since the original few hundred. More than 6,000 volunteers devote more than 200,000 hours of service annually to managing the trail. In the words of the ATC, "The body of the trail is provided by the land it traverses, and its soul is the living stewardship of the volunteers and workers of the Appalachian Trail community."

The 2,180 mile-long footpath passes through 14 states, from Springer Mountain in Georgia to Katahdin in Maine. Virginia has the most miles of

The first blind person to hike the entire trail unassisted, Thomas says "trail angels" helped him the entire way.

any state — about 550 — while neighboring West Virginia lays claim to just four. Traversing the ridges of the Appalachian Mountains, the trail corridor is 94 percent forested.

Over the years, the trail has undergone a remarkable transformation due to the work of thousands of volunteers. Originally routed straight up and down mountains, trails were highly susceptible to erosion. Trail crews have relocated or rebuilt about 99 percent of the trail in order to maintain and improve the path, making it much more sustainable as well as enjoyable. The trail today is not only better protected, but traverses more scenic landscapes than the original route.

The five million steps needed to walk the entire trail take hikers through six national parks and eight national forests. More than 160,000 white blazes (marks mostly found on the trees along the path) guide them on their way. These

JEFFREY STYLOS

COURTESY OF THE APPALACHIAN TRAIL CONSERVANCY

COURTESY OF THE APPALACHIAN TRAIL CONSERVANCY

hikers must prepare physically and mentally for the hike — from building stamina and breaking in boots by hiking with a full backpack beforehand to buying freeze-dried food and planning menus. Hikers need to be sure to have enough lightweight clothing and a durable tent for any changes in the elements.

By 1969, only 59 people had completed the trail, including former ATC chair, Myron Avery, who became the first to complete the trail just before its official opening. In 1970, the numbers began to rise with 10 people completing the trail, among them Ed Garvey, who made hiking the A.T. popular with the release of his book, *Appalachian Hiker: Adventure of a Lifetime*.

The term "2,000-miler" came into use in the late 1970s as more people began to complete the trail. By 1980, the total number of 2,000-milers had increased more than tenfold, and that number would double twice by 2000. Today, the ATC has recorded more than 12,000 completions, but total visitor use is estimated to be between two and four million hikers each year.

Mark Wenger, executive director and CEO of the ATC, says, "It is amazing to see the number of people that have taken on the challenge to hike the entire A.T. The trail offers such wonder and beauty, and it is great to see more and more people enjoy this national treasure."

GOING ALL THE WAY

Some 2,000-milers are "thru hikers" — those who complete the entire trail in one year. Thru hikers will typically begin their journey in Georgia in March. Between August and October, about one in four of them will make it all the way to Maine. Mary and Lue Elder are among those few.

The Elders from Young Harris, Ga., started their thru hike on March 1, 2004, and reached the end of the trail on September 15. Flooding from a big storm prevented them from hiking about 40 miles of the footpath in Maine, but they were otherwise well-prepared. They had backpacked quite a bit together and knew how to plan ahead. They made their own dried fruits and vegetables to go with the freeze-dried meals that filled 24 boxes of supplies for friends and family to mail to several towns close to the trail.

Although Mother Nature was not kind to them towards the end, the Georgia couple experienced a good deal of what they call "trail magic" along the way. They encountered local "trail angels" at camp-

Top: Benton MacKaye (left) with former Appalachian Trail Conservancy chairman, Myron Avery; Bottom: President Lyndon B. Johnson at the signing ceremony for the National Trails System Act in 1968

COURTESY OF THE ATC CONSERVANCY

COURTESY OF THE APPALACHIAN TRAIL CONSERVANCY

Top: Zero/Zero met Rock Locks on the trail and they hiked together for many miles.; Bottom: Zero/ Zero hiking at Mt. Moosilauke in New Hampshire

sites and shelters, who would cook hamburgers and hearty breakfasts for backpackers who came through. Those angels meant so much to them that the Elders now camp out every year at a clearing on the Georgia portion of the trail known as Cheese Factory Gap to act as angels themselves.

"We cook hotdogs and hamburgers and provide drinks at night, and then cook a big breakfast for the backpackers that camp with us," Lue Elder says.

Angels like the Elders also played a major role in the adventures of successful thru-hiker Trevor Thomas from Charlotte, N.C. The first blind person to hike the entire trail unassisted, he says angels helped him the entire way.

Thomas, also known by his trail nickname Zero/Zero, used trekking poles to continually scan for obstructions in front of him while also relying on echo-locating to stay on the path. Noting the way sound refracts off rocks and trees allows him to identify his environment. When there is no ambient noise to guide him, he makes a clicking sound with his tongue, which serves a similar purpose to the squeaking sound a bat makes.

Thomas was delighted to find coolers filled with drinks, oranges and apples at trail crossings. He also got rides to town from angels when he needed to re-supply.

Hiking Through the Years

Jeff and Sherry Carter in the early years

Jeff Carter

Carol McCall in Newfound Gap in Great Smoky Mountain National Park (1991)

BOTTOM ROW: [FIRST TWO PHOTOS] BILL CROWELL, III; [ALL OTHER PHOTOS] MARK AND CAROL MCCALL

COURTESY OF THE APPALACHIAN TRAIL CONSERVANCY

ELLENMI/FLICKR

Left: Great Smoky Mountains National Park; Right: Orange azaleas

"I do not think, without the benefit of the trail magic people, I would have made it from one end to the other," he says.

ONE MILE AT A TIME

Others hike the trail section by section, spending parts of each summer covering new territory. Though their journeys are shorter, there are still angels to be encountered along the way — and demons.

Over the Halloween weekend in 2011, a freak snowstorm rolled across Chestnut Ridge above Groseclose, Va. Section-hikers Mark and Carol McCall were, at that moment, hiking along the trail overlooking Burke's Garden, which they had heard was the most beautiful part of that section of the A.T., but "we couldn't see anything because of the rain and fog," says Mark McCall. They'd heard about the snowstorm, but thought it was far enough south that it wouldn't affect them. They pushed on in the rain and kept climbing higher and higher until the wind picked up, and it began to sleet.

As daylight faded, they realized they wouldn't make it to the nearest shelter, located on the second highest point on the trail south of New Hampshire, and hastily put up a backpacking tent. Soaking wet and too cold to even make a fire, they crawled into their sleeping bags and ate granola bars and nuts for dinner. During the night, ice covered the outside

Byrd, Carter and Crowell at Charlies Bunion looking at Mount Le Conte

Chestnut Ridge shelter (2011)

McCalls having breakfast at Chestnut Ridge shelter (fall 2011)

VIRGINIA STATE PARKS STAFF

The Appalachian Trail runs through Grayson Highlands State Park. The balds are inhabited by a herd of introduced ponies, which are allowed to roam freely in the park.

of the tent as the condensation from their breath soaked the outside of their down sleeping bags.

"We survived the night and, packing our soggy sleeping bags, moved on to the shelter for breakfast," says Carol McCall. As they descended the other side, the day warmed up enough for them to remove their wet mittens and hats.

The McCalls had been well-prepared with warm layers and food that wouldn't need to be cooked, but lack of preparation can come back to bite even the most experienced hikers.

Jeff Carter grew up in Florence, Ala., and has been an avid hiker most of his life. He hiked with friends from medical school before moving to Tryon, N.C., in 1984. "One of the reasons I moved to this area is because it is wonderful for hiking," he says. He and his wife, Sherry, hiked the Great Smoky Mountains together for a few years before deciding to continue on to do the A.T. in 1988.

Even with their experience, they felt it was good to hike with more people in case someone was injured. They decided to invite others to hike the trail as a group. Although several friends — including, once, the McCalls — have joined the Carters over the years, only two have continued to go with them as a group on hike after hike: Bill Crowell, a local blacksmith in Tryon, N.C. who grew up hiking the backwoods in South Carolina, joined the group in 1988. Jeff Byrd, who grew up camping with the Boy Scouts in Alexandria, Va., started hiking with them in 1990 after moving to Tryon to publish its local newspaper. The Tryon group has hiked about a fourth of the trail together over the years.

Although the trail passes through towns where hikers can restock or use the local post office to receive supplies from home, sometimes lack of preparation takes its toll on the how the journey comes out. Jeff Carter remembers a time when he didn't plan for enough water for the group's hike at Angel Rock, Va. It was unbearably hot and there weren't a lot of springs. They ran out of water, turning their carefree hike in the wilderness into what he describes as a death march.

Safety is not the only advantage to hiking in a group, and it was not the Carters' only reason for inviting others along. They also gain camaraderie. Sharing the breathtaking beauty of the wilderness along the path brings the group together. Everyone has his or her own favorite vista along the A.T., from the purple rhododendron and orange azaleas lining the woods in spring that Sherry Carter fondly remembers to Crowell's favorite 360-degree view from Rocky Top, N.C.

Jeff Byrd says, "When someone told me about camping in the Southern Appalachians in North Carolina, I remember thinking that sounded like heaven, so I was thrilled when the Carters invited me to go camping with them.

The White Mountains in New Hampshire

RANDY PERTIET

NICHOLAS A. TONELLI

Left: A white blaze marks a sign at the Delaware Water Gap, reminding hikers to protect the trail.

The effects of acid rain on Mount Le Conte 20 years ago.

BILL CROWELL, III

"The hike up to Spence Field was really a rough reintroduction to backpacking for me, and I was really huffing and puffing," says Byrd about a strenuous hike in Great Smoky Mountains National Park. "Jeff Carter stood at the bend of each switchback, encouraging me that it was not that much more to go — for the last two hours. I was beginning to disbelieve him," he recalls, adding that it was worth it once they reached the ridges and camped high up in the Smokies.

PROTECTING THE TRAIL AND FORESTS

Fellow hikers are not the only ones who rely on each other's kindness on the trail. The natural environment also needs the respect of those who pass through. All hikers, whether there for a few days or the long haul, can have both a positive and negative impact on the woodlands that line the trail. Hikers can ensure that they preserve the natural setting and its creatures by following the "Leave No Trace" principles.

These principles include staying on the trail as much as possible to avoid trampling vegetation, says the ATC's Laura Belleville. The seeds of invasive species may attach to hiking boots or clothing and can crowd out the native plants that inhabit the area.

Respecting proscriptions against campfires is also an important part of Leave No Trace and can prevent wildfires that can have a devastating effect. In May 2011, an illegal and improperly extinguished fire at the Appalachian Mountain Club's Ball Brook Campsite in Connecticut demonstrated the importance of Leave No Trace when it spread south along the plateau toward the Riga Shelter half a mile away.

> They ran out of water, turning their carefree hike in the wilderness into what Carter describes as a death march.

"Conscientious hikers who are aware of the threats to forests can be a very important voice in helping to conserve and manage them," says Belleville. Well-conserved and managed forests bring A.T. hikers — 2,000-milers and day hikers alike — closer to the "fellowship with the wilderness" that they seek.

Freelance journalist Robin A. Edgar is the author of *In My Mother's Kitchen*. She writes from the Carolinas.

For more information:

Appalachian Trail Conservancy
www.appalachiantrail.org

Appalachian Mountain Club
www.outdoors.org/conservation/trails/at

ELENA NEUZIL

Staghorn sumac has an olive-green-yellow color, with streaks of brown. Sumac bark is not very fire tolerant and controlled burns consume many trees.

The Mantle Sumac

How a tree that escaped an early death finally came to rest in the most unexpected of places.

BY DR. MARK NEUZIL

IN THE 1980S, TWO MIDWESTERN MEN who were fishing buddies, neighbors and more than moderately skilled in the industrial arts came across a rare old sumac blown down on a fencerow. Unlike most sumac in rural Iowa, this one had escaped a young death, nestled as it was along the barbed wire, out of the way of the mower and the plow. Free from the shade of larger trees, it grew to an unusual height, showing at least 25 growth rings when a strong wind finally ended its life. What the two friends did with the tree was nearly as unusual as its advanced age: Much of it ended up as a mantle in the local funeral chapel, where it sits over the fireplace with a natural olive-green-yellow glow, surprising mourners and giving them something to talk about at a time when conversation can be difficult.

HADLEYGRASS IS ASPARAGUS/FLICKR

Sumac leaves

Sumac seeds are an important part of the winter diet of several species of birds and small animals.

The tree that Jack Neuzil, my father, and his buddy, Don Ochs, made use of was a staghorn sumac, the fruit — called drupes — of which were a source of a lemon-tasting drink for many Native Americans. Staghorn sumac (sometimes called stag's horn, vinegar, Virginia or velvet sumac) is so named for two reasons, both related to male deer. The branches and pinnate leaves of the staghorn grow in an upright, spreading manner, resembling the antlers of an adult deer; its shoots are covered with a fine, white hair that looks like the velvet skin on a stag's antlers.

MARK NEUZIL

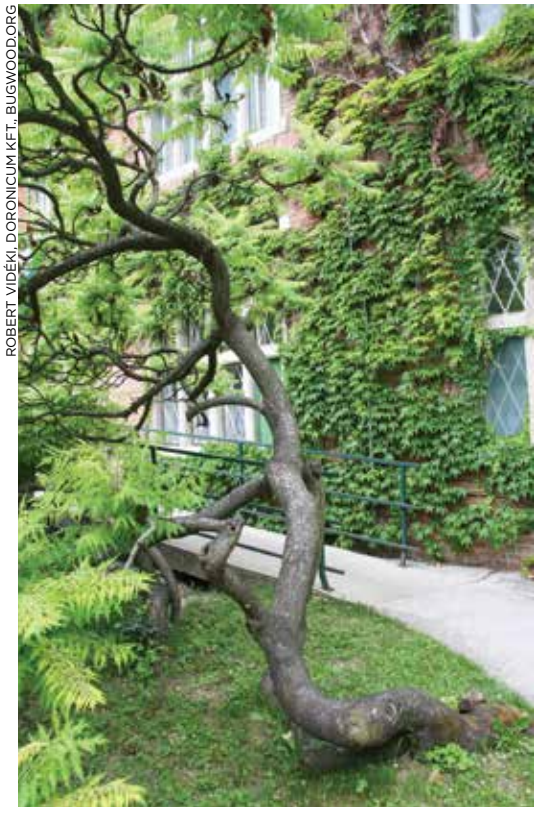
Jack Neuzil

But it was the 35- to 40-foot height of the tree, the relatively straight trunk and the strange, fluorescent quality of its wood that drew my father and Don to it. Along their journey with what became known as the mantle sumac came subtle lessons about the value of a tree often ignored if not downright scorned as a trash species or, worse, a weed.

SUMAC THROUGH THE AGES

Sumac, with about 250 species across the world, has been used throughout history for everything from medicines to a dinner garnish, an ingredient in wax, a tobacco additive and a dye. Various members of the sumac family (*Anacardiaceae*) can be found in North America, southern Africa, eastern Asia and northeastern Australia in a variety of forms, including deciduous or evergreen, shrubs, trees or woody climbers, in temperate or subtropical climates. In North America, sumacs are common in roadside ditches, known for their brilliant red or orange leaves in the fall.

Sumacs in their ubiquity have been described, catalogued and commented on since olden times. Naturalist Pliny the Elder, writing in the first century, noted the use of the juice of the fruit of the "sumach-tree of Syria" by curriers in the making of leather. Pliny compared the appear-



ROBERT VIDÉKI, DORONICUM KFT., BUGWOOD.ORG

The branches of staghorn sumac resemble the antlers of an adult male deer.

ROSALYN MURPHY

ance of the seed to that of a lentil and wrote that it "forms a necessary ingredient in various medicaments." The ancients mistakenly believed it to be a relief for fever, but they were accurate about its ability to help preserve animal skins. The Japanese, in their famous and oft-imitated black lacquers, were said to use its sap. In China, the Chinese characters for sumac literally mean "paint tree." An 11th-century shipwreck, discovered centuries later off the coast of Rhodes, Greece, was filled with containers of sumac drupes that were being shipped to market.

Native American use varied by tribe. The Abenaki mixed its leaves and berries with tobacco for smoking. The Menominee used its liquid at both ends: as a gargle for coughs and as a relief from hemorrhoids. The milky white juice from a cut twig served them as an astringent. The Cherokee and Delaware applied sumac for any number of problems that required strong medicine, including gonorrhea.

In the 19th-century United States, the tanning industry combined sumac with hemlock to treat leather, while weavers mixed it with gall nuts as a mordant to fix colors in aniline dyes. Writing in *The American Botanist* in 1909, Frank Dobbin recalled, "Our grand-mothers too had a use for the sumach. They gathered the fruit or 'bobs' as they were called,

Climbing poison ivy was perhaps the most feared and reviled plant in the New World.

and by boiling them made a dye that would produce a fine shade of silver gray."

Its value in leather making and dyes led the citizens of rural Appalachia to gather up its leaves in the fall, stuff them into bales and send them to city markets, a venture worth "tens of thousands a year to the income of the State of Virginia," according to an 1881 estimate in *Scribner's Monthly*.

None of these attributes, though, prevents the sumac from sometimes being scorned as a weed with an incorrigible personality. It can grow from seed, of course, but also from its aggressive underground stems, known as rhizomes, which can run far away from the trunk and sprout new shoots. And at least three species are highly toxic — poison oak, poison sumac and poison ivy.

Rhus vernix, poison sumac, is handsome to look at, but hard to handle. "Rhus rash" was an early epithet. A prevailing belief, bought into by no less an authority than Harvard professor Dr. Asa Gray, dean of 19th-century botanists, that smelling a sumac from as far as 20 feet away spreads infection was in error, however. So was the use of horse

PAUL WRAY, IOWA STATE UNIVERSITY, BUGWOOD.ORG

Staghorn sumac has pinnate leaves, resembling feathers.

The mantle stretches five or more feet along the top of the fireplace, where mourners can lean on it and stare into the fire or turn away and face their companions.

urine as a cure. Alfred, Lord Tennyson noted that a sumac species provided an ingredient for the "wourali poison made by the natives of Guiana," a toxin that in modern times we know as curare. And then there is climbing poison ivy, perhaps the most feared and reviled plant in the New World, the creature that the understated Captain John Smith wrote "causeth redness, itchinge, and lastly blysters ..."

While these poison sumac varieties are more easily identified by the fruits, which droop from the branch and are white or gray, staghorn sumacs and other non-poisonous varieties can be spotted by the deeply crimson, round and somewhat-hairy drupes they sport on their upright stalks. These stalks are about eight inches high on the female tree and are eaten by dozens of songbirds and game birds, as well as rodents, rabbits and squirrels. Nature writer John Burroughs, in *Wake-Robin*, described the flavor of the berry appearing in the honey of particular bees in his neighborhood, who mixed sumac nectar with clover, thyme and linden.

TAKING A CHANCE ON SUMAC

In a small Iowa town in 2003, the local funeral home director, Terry Brosch, was building a new chapel a bit farther off the noisy state highway than his old digs. In the large common room, he wanted

Staghorn sumac fruit

ROBERT VIDÉKI, DORONICUM KFT., BUGWOOD.ORG

The funeral chapel in Solon, Iowa, features a hearth with a mantle made from a staghorn sumac tree that was at least 25 years old.

LORI LINDNER

JAMES H. MILLER & TED BODNER, SOUTHERN WEED SCIENCE SOCIETY, BUGWOOD.ORG

DOCENTJOYCE/FLICKR

KEITH KANOTI, MAINE FOREST SERVICE, BUGWOOD.ORG

Top: Poison ivy; Left: Poison oak; Right: Poison sumac

a red, brick fireplace to stretch along one wall. Terry also wanted a locally sourced mantle over the hearth, so he went to local woodworker Jack Neuzil for ideas. The two spent part of an afternoon digging through foot after foot of board lumber in Jack's shop before they came to several quarter-sawn boards, about six feet long and 10 inches wide, of an unusual coloration: an almost glowing yellow-green, with bold flowing streaks of dark brown. In fact, under a black light, medium to bright streaks of sumac green glow fluorescently. The boards had been leaning in the stacks for perhaps two decades.

"That's sumac," Jack said.

"That's what I want," Terry replied. "Will it work?"

Jack showed him a child's stepstool with a dinosaur carved on its step made from the tree.

The sumac, lighter than oak, but heavier than cedar, was sawn, shaped and dropped into place as the mantle for the town's new funeral chapel. It stretches five or more feet along the top of the fireplace, where mourners can lean on it and stare into the fire or turn away and face their companions. One board from the original staghorn sumac remained.

Minneapolis artist Thomas Schrunk with the table pedestal

The completed table made from the staghorn sumac and black walnut

Thomas Schrunk applying finish

TOP RIGHT: ELENA NEUZIL; BOTTOM LEFT AND RIGHT: MARK NEUZIL

Seven years passed, until luck visited my house in the person of one of the elite artists and woodworkers in the Midwest, Thomas Schrunk. Among his many accomplishments, Tom provides Steinway with the veneers for its pianos. He has redone a kitchen for the Royal Crescent Hotel (dating from 1767) in Bath, England, and tabletops for the Prince and Princess of Jodhpur. He has counted Ronald Reagan and Sophia Loren as clients.

Each year, Tom holds a fundraising drawing to benefit one of his wife's projects, with the winner getting a Schrunk veneer table. This time, Tom drew 200 names from a hat, but "just for fun, I decided to award the prize to the last name drawn, rather than the first," he said. My name was the very final one drawn. By being last, I won.

Rather than select one of his beautiful tables as my prize, I asked Tom if he would be amenable to building a table a bit out of the ordinary, although from a common species. "Sure," he said. "What kind of wood did you have in mind?"

"Sumac. There is one board left, from a prodigious tree."

Silence. Then, "Sounds like fun. Let's have a look at it."

Tom was not dubious when he saw the sumac, but he was realistic. "There's a reason that there are only 20 main furniture-grade species in North America," he said. I was reminded of Thoreau's tale in *Walden* of a kitchen table made of "the apple-tree wood." If apple, why not sumac?

The reasons for "why not" are many. "There are species that grow straight and tall and drop their lower limbs and have very little in terms of knots," Tom said. Sumac is not one of those species. But we forged ahead.

I found a pattern for a hexagon table from a 1917 Chicago Public Schools industrial arts manual; it looked like it belonged in my early 20th-century bungalow. Twelve small pieces were all we could manage from our remaining board, which had about five inches of usable width. Tom used air-dried black walnut for the table's pedestal, base and as a frame for the top — we didn't have enough sumac left for a complete surface. We carefully laid six five-sided pieces of sumac into the outer part of the top; six more two-inch, equilateral-shaped pieces sat inside.

After the table was complete, Tom and I carefully saved the few sumac scraps of various sizes in a paper sack. None of the pieces was more than two or three inches long and an inch wide, but I had an idea. Jim Kuebelbeck, my father-in-law, was fond of turning multi-wood bowls on his old Sears Craftsman lathe. I dropped off the sack, and in a few weeks, he combined them with black walnut to turn a seven-inch candy dish. Now, about all that remained of our mantle tree was sawdust and shavings.

ELENA NEUZIL

Jim Kuebelbeck used pieces of leftover sumac from the table and black walnut to complete the bowl.

At the time, none of us thought of our work as being in sustainable wood, but that's what happened. Iowa, where our tree was found, is among the farthest western homes for the staghorn sumac in the United States. After our exhaustion of the lumber from the mantle tree, my father and I went on a search for one of similar size in late 2012. Some can grow, as it did, up to 40 feet high and live decades, but we could only find younger trees, nothing more than 12- to 15-feet tall. Spraying, mowing and controlled burns (the thin bark is not fire tolerant) kept any from reaching older age. No longer collected by Virginians for tanning or dye or by Native Americans for a drinkable ade, the staghorn sumac's only remaining economic importance, according to the U.S. Department of Agriculture, is erosion control.

As our experience showed, this focus on economics overlooks cultural uses. In *A Place of My Own*, Michael Pollan tells of being "struck by the amount of cultural freight the various wood species had been made to carry, at least the ones we've seen fit to bring indoors." Pollan was thinking of Danish modern furniture usually made of clear maple or arts and crafts rendered in oak. We were at the other end of this idea: a wood that signified nothing indoors to 21st-century westerners because it almost always stayed outside, uncut. The more my father and I looked at the twisted and bent trunks of smaller trees, the more we appreciated the straight, wide section of our mantle sumac, and its use in furniture, a fireplace and a bowl are extraordinary examples of an ordinary tree that lives on.

Dr. Mark Neuzil teaches environmental communication at the University of St. Thomas in St. Paul, Minn.

Caribou

MADELENE HOLLAND

Unlikely Allies

Industry and environmental groups join forces to make forestry sustainable in Canada's boreal forest and to protect the boreal woodland caribou.

BY ROISIN REID

CANADA'S BOREAL FOREST IS ONE OF THE LAST GREAT wildernesses, making up a quarter of the original intact, unlogged forest that remains on Earth. This vast expanse is home to about 20 tree species, predominantly white and black spruce, jack pine, tamarack and balsam fir. It provides a home to a wide array of wildlife, including nearly 200 bird species. It is also home to the boreal woodland caribou, an endangered species under Canada's Species at Risk Act.

The boreal is also the source of about half of Canada's annual timber harvest, and many of the communities in the area rely heavily on forestry industry jobs.

"Forestry is the lifeblood of many rural communities across Canada," says Mark Hubert, vice president of environmental leadership for the Forest Products Association of Canada (FPAC). "These communities need certainty that they will be able to continue to feed the mills that support them, but at the same time, they appreciate the inherent value of nature and recognize that we need to protect species at risk and wild spaces."

CANADIAN BOREAL FOREST AGREEMENT SECRETARIAT

More than 90 percent of the Canadian boreal is publicly owned, but the federal and provincial governments have zoned about a third of the total for industry. Much of this area is set aside for forestry through public forest management tenures, which are long-term licenses to forestry companies designed to encourage sustainable practices, such as replanting harvested areas.

Despite these efforts to manage Canada's boreal forest responsibly, nearly 50 percent of the boreal woodland caribou's range has been lost to human activities that fragment or disturb their habitat — activities like forestry, oil and gas exploration and road building. Meanwhile, Canada's federal and provincial governments have come under fire for dragging their feet on recovery plans for the species. But a group of forestry companies and environmental organizations has come up with an innovative solution: the Canadian Boreal Forest Agreement (CBFA).

COMPROMISE IN ACTION

"This agreement necessitates a different way of thinking for the signatories," says Hubert. "Rather than working as individual companies and organizations, the CBFA has mandated us to think holistically about conservation and economic outcomes."

The agreement entails a commitment by the environmental groups to stop organizing boycotts of the signatory companies, while the companies have committed to suspending logging operations on nearly 72 million acres of boreal forest representing virtually all boreal woodland caribou habitat within company tenures.

The suspension of forestry activities gives the signatories a window to work together on a number of initiatives, including producing ecosystem-based management guidelines that participating companies can use to improve their practices and developing action plans for the recovery of caribou in specific areas. Once negotiated, these plans are given to the provincial governments to be incorporated into formal forestry management plans.

"The agreement is a solution to a problem we've had for a while — caribou are endangered — and now, the provinces have to do caribou action plans for the ranges," says Janet Sumner, executive director of the Canadian Parks and Wilderness Society Wildlands League.

MAP: CEPHAS/WIKIMEDIA COMMONS

Major habitats of Canada and the U.S., with boreal forests shaded in dark blue

JEFF BROWN

Left: Janet Sumner and Natural Resources Minister Michael Gravelle; Right: Grapple skidders are used to clear forests and move logs.

WESTERN ARCTIC NATIONAL PARKLANDS

Caribou use their hooves as paddles to swim, and their hollow hair provides buoyancy.

"Some of the forestry companies wanted to get out ahead of regulations they knew were coming, rather than waiting to be told what they had to do."

The CBFA, signed in May 2010 by FPAC and its 21 member companies and by nine leading Canadian environmental organizations, including the Canadian Parks and Wilderness Society and ForestEthics, now applies to more than 187 million acres of public forests licensed to FPAC member companies across Canada.

The agreement recognizes that although the responsibility for the future of forestry and conservation in Canada's boreal forest rests primarily with governments, both industry and environmentalists have a responsibility to help define that future. The CBFA gives both parties a way to work towards a stronger, more competitive forestry industry and a better-protected, more sustainably managed boreal forest.

The process seems simple at first glance: The environmental groups, working with some of the best scientists in the country, identify caribou ranges as "areas of interest." Then, bilateral agreements are worked out with the forestry companies to improve management in those areas. In practice, the process involves multiple stakeholders, including aboriginal groups, local communities and the provincial governments.

"Stakeholders don't necessarily have to sign onto the plan, but including them in the process is a smarter way to do it," says Sumner. "For example, in Alberta, where forestry is not the largest footprint on the landscape, we know we have to talk to oil and gas companies, the energy

Collaboration in Montana's Southwestern Crown

As in Canada, diverse stakeholders here in the U.S. have realized the value of collaboration. In Montana's Southwestern Crown of the Continent — part of the Bob Marshall Wilderness Complex — timber, environmental and recreation groups are teaming with state and federal governments to restore and improve 10 million acres of land.

One of the country's most biologically diverse ecosystems, this rugged piece of the Rocky Mountains boasts glaciers, prairies, forests and streams. Roughly 250 species of birds, 60 species of mammals and 25 species of fish call this region home, along with nearly 9,000 people. The majority of those residents live in forested areas, and they depend heavily upon the land for agriculture, timber and tourism. In recent years, however, the whole region — people, animals and plants — was feeling the strain of escalating environmental problems.

Noxious and invasive weeds were choking out native plants; old and deteriorating logging roads were polluting streams and harming fish; and declining timber markets had raised unemployment and rocked the local economy. Historic fire suppression policies had disrupted the forests' natural state, and the area suffered from over-fueled, massive blazes, such as the one that forced the 2007 evacuation of the area's largest town, Seeley Lake. To top it off, climate change was exacerbating these issues. The Southwestern Crown of the Continent was in decline.

But many groups were invested in this region, and although they had their differences, they reached a compromise for the sake of the land: a project with the Collaborative Forest Landscape Restoration (CFLR) program, which is dedicated to comprehensive and sustainable forest health. American Forests is proud to be a founding member of the CFLR Coalition.

"I have seen, firsthand, the benefits to people, water and wildlife the work of this program is doing," Jeanetter Nordahl, a long-time local resident, tells the CLFR Coalition Steering Committee.

Now in its third year, this CFLR project consists of 21 partners, ranging from fishing enthusiasts to the U.S. Forest Service, from timber companies to other conservation organizations. The collaboration works toward 10-year goals in areas such as fire risk reduction, job creation, clean water restoration, timber harvest and invasive species control. Congress invested $4 million in the project last year, and that funding leveraged $6.7 million more through in-kind contributions and partnerships. So far, this program has produced 156 jobs, 52 miles of restored streams, more than 7,500 acres of restored or enhanced wildlife habitat and more than 12,000 acres of reduced hazardous fuels.

Read more about the Collaborative Forest Landscape Restoration Program and how American Forests is helping make it possible on page 14.

sector. Then, once the bilateral agreements are completed, we have to sell the package, which means working with local mayors, getting on the radio, doing presentations for the provincial government on how implementation might work — whatever it takes."

ONTARIO'S EXAMPLE

The initial agreement in 2010 set out a three-year road map for progress under the CBFA. Progress has not always been easy, and the détente between the traditional rivals in the conservation and industry camps can be fragile; in December 2012, Greenpeace Canada pulled out of the agreement, in part because it says that progress on concrete objectives has been too slow.

Top: The calypso bulbosa, or fairy slipper, grows in the shade of the boreal forest. Bottom: Tamarack cones

WALTER SIEGMUND

STEVEN KATOVICH, U.S. FOREST SERVICE, BUGWOOD.ORG

But while the timeline has slipped, important progress is being made. In June 2012, the signatories announced a major breakthrough: The province of Ontario supported the signatories' joint recommendations on an action plan for around 1,200 square miles of the province's boreal forest — an area almost five times the size of metro Toronto.

The action plan recommendations aim to conserve critical parts of the more than seven million acres of caribou range in northeastern Ontario's Abitibi River Forest, as well as to maintain hundreds of jobs in forestry. The recommendations would exclude around two million acres of critical caribou habitat from harvest. The remaining 5.4 million acres would remain open to forestry, with high standards of sustainable forestry practices — such as protecting mature conifer and caribou corridors — put in place to safeguard wildlife and ecosystems.

This solution is win-win-win for conservationists, the forestry industry and the communities that rely on the jobs it provides. It will conserve forested areas that are critical caribou habitat, but also allow for increased harvesting in areas where caribou have not been present for some time; in fact, it will provide an estimated 20 percent increase in wood supply over the next 30 years. Now that the provincial government has supported the plan, the CBFA signatories are eagerly anticipating implementation.

Ontario's support shows that the CBFA strategy is working: Industry and environmentalists can collaborate closely and make governments take notice.

"It's not enough to write something and have it sit on a shelf," says Sumner. "It's a strange situation that companies and [environmental groups] go out together to try to sell the package, but it's happening. Because we were able to sit down and get to know each other's issues well. We understand: 'I don't get my caribou recovery plan unless you get the economic viability you're looking for' — and vice versa."

With the northeast Ontario plan finalized, the CBFA signatories are working hard to expand progress in other areas of the country for the benefit of the caribou and the Canadian forestry industry.

JEREMY MEYER

CEPHAS/WIKIMEDIA COMMONS

Top: Three of every four Canadian warblers — 27 species and as many as one billion birds — nest in Canada's boreal forest. Bottom: Canada grouse

"From the industry perspective, we're getting market recognition for what we're doing — we want to be globally recognized as providers of sustainable forest products," says Hubert. "This is the most comprehensive agreement of its kind in the world. It's complex and progress has sometimes been slower than we had hoped, but we're all pushing to keep the ball rolling and we're thrilled with what we've accomplished."

Based in Ottawa, Canada, Roisin Reid is a freelance writer focusing on environmental issues.

Leif Haugen, Fire Lookout

BY TOM PERSINGER

THE OLD TENT CREAKS and buckles under the force of the fierce wind blowing from the west as I sleep. The tall windows of the nearby fire lookout tower rattle and shake. The sun sets behind a distant peak, clouds roll in and the clear blue sky slowly turns to the burnt orange of dusk. It took the better part of a day's travel to get to the top of this mountain.

The journey began at a small town on a gravel road. With only a general store, a handful of houses, a seasonal restaurant and a hostel, it is really more like an outpost than a town. Where the twisted gravel road stopped, a footpath began. The narrow path moved through a moss-encrusted forest riddled with downed trees and followed the drainage of a cold, clear alpine creek. Near the top, the trees separated on the ridge to reveal an expansive view of a long valley. Just beyond this spot was my destination, a tiny shack balanced on the brow of a mountain. This is the place where Leif Haugen has spent the past several summers. I've come to talk with Haugen and get a first-hand peek behind the often-romanticized veneer of what it means to be a fire lookout.

TOM PERSINGER

LAWRENCE ONG/NASA

TOM PERSINGER

Top left: Tent and Haugen's lookout; Bottom left: Leif Haugen; Above: Satellite view of the brown landscape in northwest Montana after the Wedge Canyon Fire

Haugen is a fire lookout with the U.S. Forest Service. During the summer months, his job is to maintain watch over the pristine wilderness that surrounds his remote post a few miles south of the Canadian border in northwest Montana. He's from Minnesota and learned about the lookout life through literature, securing his first job as a lookout with the help of a friend in 1994. He's been returning ever since. "It's a great way to spend the summer," he says. "There aren't a lot of choices, but all of the choices are things I enjoy doing: walking, reading, writing, carpentry and taking a good long look around."

Haugen's days on the mountain are usually a mix of routine, yet solitary, tasks that include maintaining the lookout, checking in on the radio (twice daily), reporting weather conditions, greeting the occasional visitor and, most importantly, scanning the landscape for signs of fire. In the event of fire, the simple routine is derailed, and he finds himself riveted to a map, radio, binoculars and the incredibly accurate Osborne Fire Finder — a primitive tool that helps him provide critical, up-to-the-minute coordinates and routes of safe passage — for 16 hours a day, supporting those fighting the blaze.

Haugen has spotted numerous fires, several of which were quite large, but none of which was more impressive than the Wedge Canyon Fire of 2003. "The fire conditions that year were unlike anything I'd ever seen," says Haugen. There had been 10 or 15 fires in the area when he saw smoke behind Hornet Peak and immediately began mapping and gathering coordinates. Within three or four minutes, the fire grew so significantly that he quit mapping and radioed dispatch with a report of a highly active fire. He'd "never seen a fire that looked so benign grow so quickly." Ten minutes after initial detection, he radioed dispatch again, this time simply saying, "You might want to get someone in the air for this one." The Wedge Canyon Fire burned from July through September, destroying 29 buildings and seven residences while consuming more than 53,000 acres of land.

In the winter months, when Haugen works as a carpenter and builder, he often donates his spare time to rebuilding his lookout in a "way that suits its historic nature." Using old drawings and photographs, he's slowly been rebuilding the lookout piece by piece. It has a steeply pitched roof, wooden shingles and a stovepipe and is one of only four of its kind — known as the L4 design — remaining. In the few days prior to my arrival, he used an external frame backpack to carry a new screen door and large, heavy wooden cabinet for the station.

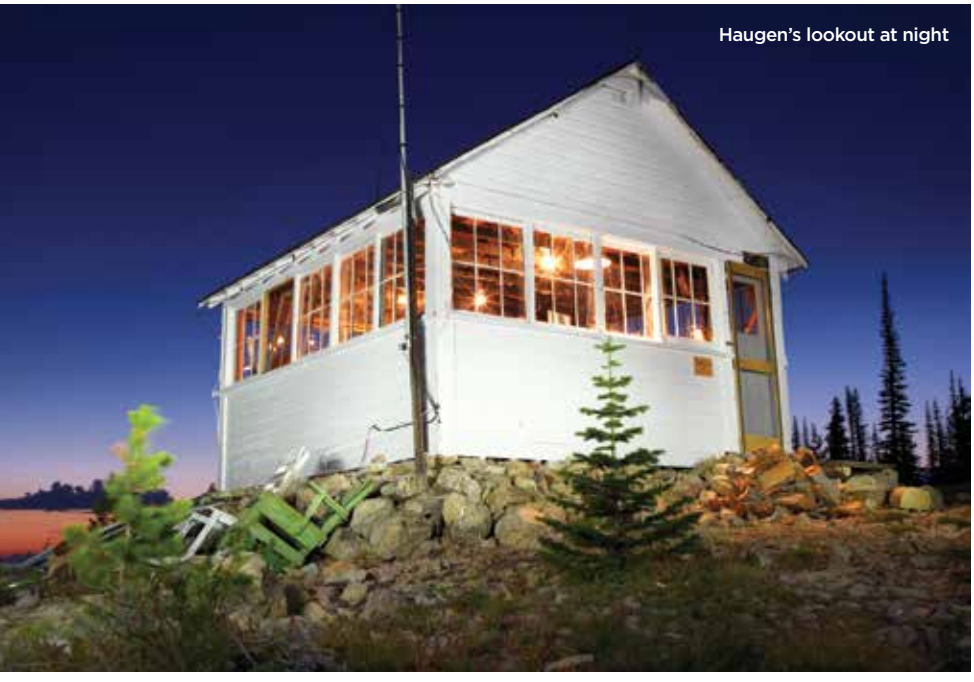
LEFT: THE FOREST HISTORY SOCIETY; RIGHT: U.S. FOREST SERVICE

Left: Helen Dowe, one of the first female fire lookout rangers, using the Osborne Fire Finder; Right: Osborne Fire Finder

Fire lookouts have been in existence since 1870 when a watchtower was constructed in Helena, Mont. In 1879, the Southern Pacific Railroad posted a watchman over a field of trees in northern California. Following the massive fires of 1910, fire detection became a priority with the Forest Service, and the lookout program peaked in the 1930s when the Civilian Conservation Corps constructed more than 5,000 towers across the country. Frequently built in remote and inaccessible locations, the materials necessary for construction were often carried on the backs of men or mules. Since the 1970s, many lookout jobs have been eliminated because of advances in satellite and imaging technology. Today, only about 250 actively staffed lookouts remain and exist mostly in remote or highly sensitive areas.

Haugen is one of many who are maintaining the fire lookout tradition into the 21st century. Some come for just one season, but others return year after year and structure their lives around their time in the wilderness. No one chooses to be a lookout for money. Instead, they reap the intangible rewards of a life lived simply and directly, in rhythm with the time of nature, receiving bonuses that cannot be measured by conventional means while protecting some of our last wild places.

In the first light of dawn, I unzip the tent and immediately feel a cold, sharp wind. I peek out to see the sun rising over the mountains. It illuminates the soft bed of clouds that fill the valley and makes silhouettes of the eastern peaks. And I see why Haugen comes back year after year.



Haugen's lookout at night

TOM PERSINGER

Tom Persinger is a photographer and writer based in Pittsburgh, Pa. Read more at www.tompersinger.com.

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last look

ERIC G. BROWN

Morning Light

My favorite time of the day to take photos is sunrise. I wanted to get a different take on this iconic view of Washington, D.C. The light, fog and the tulips in the foreground added elements to make this photo unique.

Eric G. Brown's journey with photography started in the early 1980s in a high school art class, where he learned how to use a manual 35 mm film camera and to develop black and white film. He credits his high school art teacher with starting him on his path.

Currently, Brown's areas of photographic interest are landscapes, portraits, fine art and historical documentation. Other than his high school experience, he is a self-taught photographer. He enjoys looking at subjects in ways that most people would pass by or ignore and has trained his eye to always be aware of his surroundings. Still, he says, "Sometimes you are just plain lucky to capture a good photo!"

Brown is based in Arlington, Va., and considers himself fortunate to live in an area that offers many places to be creative — from urban landscapes to countless national parks and monuments, mountains and rivers.

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