



One Tree Planted for Every Tree Sold

When you shop fresh ingredients for your holiday feast, pick a tree, too. Because with every in-store purchase of a full-size Christmas tree, Whole Foods Market® makes a donation to American Forests to plant new evergreens in state and national forests.

So go ahead: deck the halls, set the table, and *help us fill the forest*.



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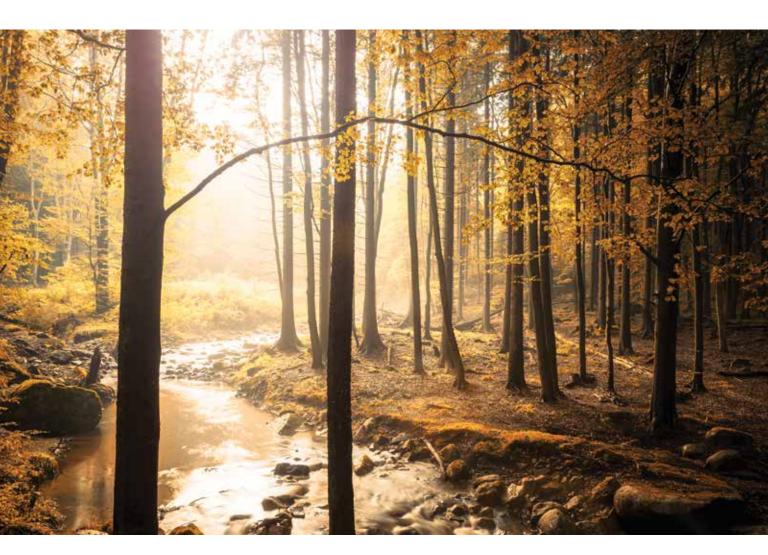
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offshoots



Planting Hope

BY JAD DALEY, VICE PRESIDENT OF CONSERVATION PROGRAMS

AMERICA HAS NEVER HAD more power or more promise, and yet we live in a time when our ties as a nation feel frayed and many people struggle to feel hopeful for our future. As a newcomer to American Forests, I have immediately been uplifted by the potential for the work of restoring for-

ests to also restore our hope and our unity as a nation.

All across the United States, we are having difficult, and often politically partisan, debates about issues like health care and the future of our economy.

These are real and important issues for our country, and sometimes neces-

sitate hard conversations where we won't always easily agree.

Yet, bring up the topic of America's trees and forests, and our deep common bonds as a country become immediately apparent. Our country was literally built with timber from our forests like white pine and white oak. Our forests were an early source of national power. Even today, if you like to sip a glass of bourbon or wine, you are drinking from American white oak barrels that flavor these beverages. Many of our fellow Americans — 2.4 million in total — still make a living from forestry work like creating whiskey and wine barrels



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and other forest products. Our forests unite and enrich us.

Speaking of drinking, our forests also collect and filter more than half of the drinking water that Americans consume each day. Red states and blue states alike, our country was developed around certain water-rich forests that provide for the cities down below. In fact, our 193

million acres of national forests owned together by every American were situated in certain locations precisely so that they could assure permanent protection for our most important water supplies.

During this "crazy busy" age when we have never more urgently needed restorative time

outdoors, our forests also stand ready to rejuvenate Americans one and all. Whether you are a fan of contemplative "forest bathing" and wildlife viewing or prefer high-energy activities, like mountain biking and hiking, forests offer us all refuge - and even a chance to reconnect with each other.

But, as we all share in bounty of our forests, we all share in the obligation to care for this critical resource. This, too, can and must bring us together.

Our forests face incredible pressures. Raging "super fires" in the West and rapidly growing pest infestations, like emerald ash borer, create unprecedented restoration challenges such as replanting vast areas devastated by wildfire and replacing entire city tree canopies that will be lost to pests. Climate change is already creating its own stress on forests, including worsened drought and widespread tree mortality in some areas. We also have many "former forests" that remain a challenge to our nation's resolve - like abandoned mine lands in the Central Appalachians and Heartland

states where American Forests has begun to rip and replant desolate mining hardscapes that will once again become soaring native forests.

While taking care of our forests requires shared investment of time, money and commitment, this challenge actually offers one last gift to our country - shared purpose. American Forests

"As a newcomer to

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long ago adopted an organizational commitment to working in partnership everywhere we go. This means replanting trees on vacant city lots with passionate neighborhood groups that create employment and educational opportunities for local residents. It means partnering with

community-based forest restoration groups in rural areas to help empower local people and employment, And, it means engaging volunteers everywhere we can, so as many people as possible can participate in the healing act of planting trees and caring for our forests.

It was Teddy Roosevelt who said, "When you help to plant trees and preserve forests, you are acting the part of good citizens." Right now, that kind of shared sense of citizenship is especially important for our country. So, as we push our forest restoration work to an unprecedented scale of ambition, in cities and landscapes alike, American Forests is going to work harder than ever to create opportunities for Americans of all backgrounds to play a part in this work, planting hope together. Surely this is a vision we can all agree on.

I A. Daley III



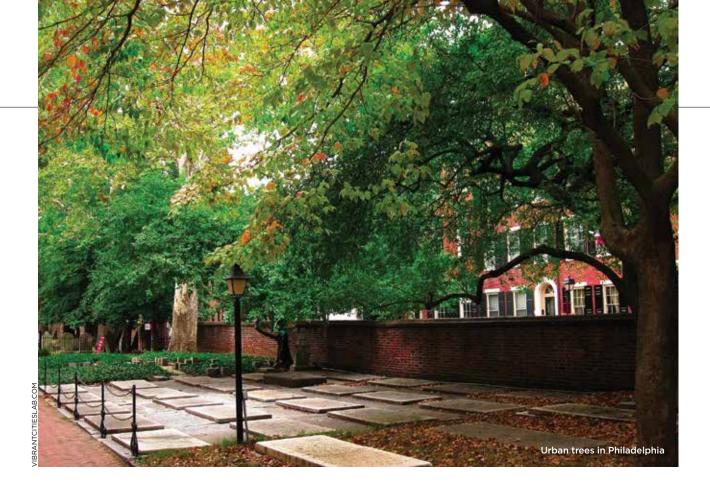
FOREST FRONTIERS

Laurence Wiseman

LAURENCE WISEMAN formed CenterLine Strategy after a 29-year career as founding president and CEO of American Forest Foundation. In 2010, he was given the Legacy Award from

the Arbor Day Foundation, for career achievement in forestry. That same year, he began a consulting practice providing strategy and organizational development services to government agencies, companies, nonprofits and foundations on matters related to environment, natural resources and sustainability. He's lectured frequently at leading universities and served as Chair of the National Urban and Community Forestry Advisory Council.





What led you to want to work in urban forestry?

I spent about 30 years working in rural forestry - basically working to get better stewardship on family-owned forests. About 4 million families own most of the woodlands in the U.S. And, many are very special people. They care about their woodlands, but even more they understand all the benefits that trees bring to wildlife, the environment and, most of all, people. They're passionate about that. And, that passion is infectious. So, when I left my previous job, I figured I'd find that same level of passion among the folks in urban forestry. I was right. And, I've been involved ever since.

Why did you want the National Association of Regional Councils (NARC) to get involved with the Vibrant Cities Lab?

Every community that embraces urban forestry begins with a plan. Or, if they don't, they should. Plans at the neighborhood, local and regional level dictate the kind of environment we'll live in - for better or worse. A tree might grow in Brooklyn, N.Y., but thousands of trees can't thrive without engaging dozens of

"Every community that embraces urban forestry begins with a plan. Or, if they don't, they should."

policymakers and advocates in figuring out what, where and, most importantly, why trees should be planted.

NARC brings together and serves as a "knowledge hub" for most of the nation's metropolitan planning organizations. Every one of these communities brings different concerns to the table. NARC is committed to helping them make urban forestry part of the solution to their economic, environmental and social issues.

What was your favorite aspect of your job?

The look on people's faces when they finally understand all the things trees can do for their community. For them, it's a "jeez, I didn't know that" moment; for me, it's the sound of progress.

What do you think is the biggest issue facing urban forestry today?

There's so much new research being published and new urban forestry practices tested. It seems the pool of knowledge is overflowing. But, we need to find better ways to put this information in the hands of people who can use it. That's why American Forests and NARC teamed up with the U.S. Forest Service to create the Vibrant Cities Lab.

Who is your favorite fictional scientist and why?

Real scientists are so much more interesting than fictional ones. My favorite was actually a mathematician, John Kemeny. He was a renaissance man: he invented the nation's first distributed computing system in the '60s and a programming protocol for non-professionals; he became president of my college. The only thing I know he failed at was teaching me calculus. 🍁

PROJECT SHOWCASE

Rising from the Ashes: Restoring Kentucky's Appalachian Forests

NATURE AND INDUSTRY are like oil and water: You can put them together, but they'll never really mix. In Kentucky, what once was a thriving wonderland of flora and fauna has been tragically tainted by the material motives of man. In Daniel Boone National Forest, 29 percent of the land is detrimentally affected by legacy coal mining. Sure, it's a grim vision of ash and soot when put plainly, but the situation is far from hopeless.

Daniel Boone National Forest is a home to a vast variety of species, including black bears, deer and migratory birds, as well as unique populations of salamanders and mussels. Without a lush habitat provided by the forest landscape, the ecosystem could cease to function in its naturally harmonious fashion.

This synergy has, unfortunately, been threatened. When regions of the Central Appalachians were deforested in the early 1800s for the construction of surface-level coal mines, the oak, hickory, chestnut and maple trees that once blanketed the mountainous terrain were never replaced. The mines stopped operating in the 1970s, but a notorious quick fix trumped the more environmentally sustainable alternative of restoring the native vegetation. Instead, non-native species were hastily planted to prevent soil erosion. This has significantly disrupted the local ecosystem, and indigenous plants and animals are struggling to survive in what must now feel to them like an alien landscape.

"The combination of the compacted land and non-native species can inhibit the return of the natural vegetation community for hundreds, if not thousands, of years," says Christopher Barton, Director of the University of Kentucky Appalachian Center and Professor of Watershed Management.

While this may give the impression of an unpromising future, Barton makes it clear that the future is bright for this Kentucky national forest.

"The forest is beloved," he says, "and the staff on the Daniel Boone National Forest are very dedicated to protecting and managing the forest for the future."

However, there is still much work to be done before these areas can be restored to their former harmonious glory. Invasive species must be removed, compacted soils ripped and seedlings grown, planted and nour-



PROJECT SHOWCASE

A Long and Bright Future for **Longleaf Pine**

THE ROLLING HILLS OF THE OAKMULGEE RANGER DISTRICT in Alabama's Talladega National Forest is once again beginning to thrive with the longleaf pine trees that belong there. What makes this land so unique is the complex and long history it has survived.

Before being settled, the land we now call Talladega National Forest was dominated by longleaf pine. But now, longleaf only exists in about 3.4 million acres of the original 90 million acres that used to thrive — that's roughly 3 percent.

Settlers converted the area to farmland, but the farms eventually failed during the Great Depression. President Roosevelt then designated 157,000 acres as a national forest in 1936, and began restoration efforts. Unfortunately, non-native trees were planted, and the forest became stressed and at major risk of wildfire. In 1986, the U.S. Forest Service began to replace the dying trees with native longleaf pines and started implementing more responsible fire management practices. The forest is recovering, allowing for even more successful restoration efforts and recuperation of wildlife.

Much of the wildlife native to the area had been forced onto the endangered list due to the decades of widespread habitat loss. For example, the red-cockaded woodpecker, a keystone species that is essential for the survival of 27 other animal species is endangered, and the gopher tortoise, another keystone species that digs burrows that provide shelter for more than 360 species, is threatened. Additionally, the forest is home to 100 bird, 36 mammal and 170 reptile and amphibian species, as well as more than 900 plant species, including 29 that are endangered.

American Forests and our partner organization, The Longleaf Alliance, has been and will continue restoring this precious longleaf pine habitat. Toished. It's no easy task, but American Forests is up for the challenge.

In 2017, with the help of the U.S. Forest Service, we're planting 11,000 trees of 14 different species across 16 acres of Daniel Boone National Forest.

Barton says his goals for the project extend beyond reforesting the land. Additionally, the project will provide economic opportunities for local citizens through jobs and services needed to do the restoration work. He hopes to educate them on the issues associated with surface coal mining in Appalachia and empower them to help repair the degraded ecosystem.

This is the second project conducted by the Forest Service in the past two years that has focused on restoring and revitalizing the ecosystems surrounding former mine lands. Forest communities are not the only ones who benefit, either. According to Barton, re-establishing balance in these areas also helps mitigate climate change and improve watershed quality. We'd argue that the promotion of an inhabitable planet and clean drinking water is a cause we can all get behind. *

Allie Wisniewski was American Forests' Summer 2017 communications intern and is a rising senior at Florida State University, studying English and Studio Art.

gether, we are planting nearly 88,000 trees in 2017, during our Oakmulgee Ranger District Restoration project, part of American Forests' longleaf restoration mission that includes projects across the Southeastern U.S., from Louisiana to Virginia. This project will continue through 2019, and the Longleaf Alliance plans to establish 8 million acres of longleaf by 2025.

The Longleaf Alliance's mission is to "ensure a sustainable future for the longleaf pine ecosystem through partnerships, landowner assistance and science-based education and outreach." Its president, Robert Abernethy, has devoted himself to this project in order to restore what he calls "one of the most diverse forests in North America."

According to Abernethy, the soil, vegetation, topography and historical land use have created a one-of-a-kind mosaic of habitats that is waiting to flourish again.

"The opportunity to accelerate forest restoration has presented itself because of the mix of tree species as well as the mix of soil types," he says.

Almost 10,000 acres of the forest still need to be restored. With the longleaf pines we are planting this year, American Forests and The Longleaf Alliance will bring the forest a few steps closer to where it needs to be to support everything and everyone that depends on it. And, in the words of Abernethy, "we can get it done." *

To learn more about longleaf pine ecosystems and the woodpecker species that inhabit them, check

out "Woodpeckers: The Engineers of Ecosystems" on page 16.

Melanie Friedel was American Forests' Summer 2017 communications intern and is a rising junior at American University, studying Environmental Science.



FROM THE FIELD

NORTHERN MINNESOTA

Justin Hynicka, Manager of Forest Conservation

WORKING AT AMERICAN FOR-ESTS, I did not expect to find myself here: It is dark, loud, and although it smells like pine, the scent is stronger than I have ever experienced before. Yet, here I am with five IKEA iWitness Ambassadors touring the Potlatch Sawmill near Bemidji, Minn., on a series of stops designed to provide a holistic experience of forests from tree planting to maturity and the challenges they face along the way.

The group leaving the black ash research site

Our group is in northern Minnesota to help restore part of Chippewa

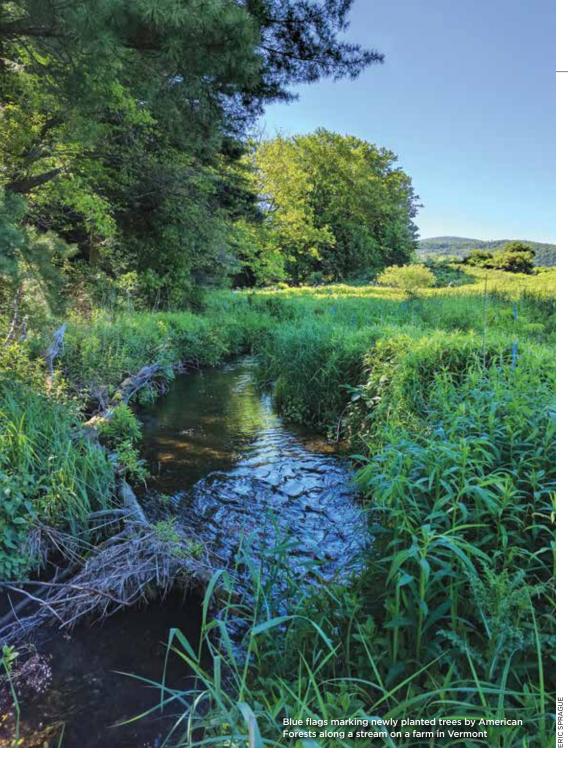
National Forest. The forest was damaged by an intense storm in 2012 that snapped and uprooted mature conifer trees across 95,000 acres. We have to use our imaginations to picture what it must have looked like following the storm because the most difficult work — removing the fallen trees — has already been completed. The site is $nearly\,barren-ideal\,conditions\,for$ white spruce seedlings — beckoning us to give it new life and accelerate the natural process of forest succession.

After planting, we head north to a different location to learn about the impacts of the emerald ash borer (EAB). Donning knee-high boots, our group enters a swamp, carefully stepping on clumps of grass and sedge so we don't sink into the amber water. We learn the purpose of the work here is to mimic EAB on a small scale. Groups of black ash trees in the swamp are girdled and changes in the environment monitored

over several years. With the loss of ash, water levels rose to a point that other tree species may no longer tolerate the wet conditions. This implies that the arrival of EAB may cause a transition from forested to non-forested swamps in the future.

Chippewa National Forest has experienced this type of loss before, but our last stop offered hope that pieces of the forest can be put back together. American elm trees have been decimated across the eastern United States by Dutch elm disease. Mature surviving trees likely have natural resistance to the disease, and seedlings grown from survivors have been planted as part of a disease resistance experiment. The trees will be exposed to Dutch elm disease in the coming months and, based on their response, may well produce the next generation of American elm seedlings returned to the landscape.





LAKE CHAMPLAIN, VT.

Jad Daley, Vice President of **Conservation Programs**

AS A FORMER RESIDENT OF Vermont and the new Vice President of Conservation Programs at American Forests, I was excited to join a field tour in July to visit new American Forests tree planting projects in the Green Mountain State, designed to curb polluted farm runoff that is fouling beautiful Lake Champlain. Cue the blue skies and puffy white clouds, green mountains and idyllic farms dotted with cows!

While most of American Forests' tree planting helps create large blocks of forest, the projects in Vermont are testing a new innovation - planting skinny forests along stream corridors as they cross farms.

Why is this important? Vermont's Lake Champlain is like a mini-Great Lake that touches multiple states and stretches into Canada. The lake

is at the receiving end of rivers covering most of Vermont, ones that run through the state's beautiful farms. Farms can generate a lot of polluted runoff to these rivers from cow manure, fertilizer for fields of feed corn and other sources. Combine that with a big water body like Lake Champlain and it creates major pollution problems.

That is where American Forests' skinny forests strategy comes in. Forests are powerful filters, pulling out pollutants and discharging clean water, even when the forests are narrow bands of trees planted along a river or stream.

It was inspiring to meet with our partners for these projects - farmers who care passionately about protecting the environment and also producing great food. As we toured the tree plantings made possible by American Forests' financial and technical support, we heard the farmers' stories of almost immediate

improvements in reduced flooding and water pollution.

The pinnacle of the trip was tasting homemade maple gelato on one stunningly beautiful farm, knowing that this classic "Made in Vermont" food can now be produced with less impact on the waters of nearby trout streams and, ultimately, Lake Champlain. This kind of win-win use of forests to heal our environment embodies a new focus at American Forests on using forests to provide solutions to our environmental and economic needs. *

CORPORATE PARTNER PROFILE

Strengthening a **Force for Good**

AT UNCOMMONGOODS, which offers remarkable designs by independent makers, social responsibility has been in the company's DNA since it opened for business in 1999.

UncommonGoods has donated \$1 to a customerselected charitable partner through its Better to Give program

since 2001, totaling more than \$1 million. American Forests' dollar-a-tree model was a perfect fit, and we became UncommonGoods' first environmental nonprofit partner in 2010.

Historically, the company and its founder have voiced support for a variety of causes, working with elected officials to champion those issues. Inspired by other members of the business community, Uncommon-

Goods wanted to encourage a deeper relationship between its customers, nonprofit partners and the missions they all support.

"We turned to our Better to Give partners to learn which policies were most important to their causes and how we could help advocate on their behalf," said Jennifer Coleman, PR & Social Media Manager at Uncommon-Goods. "After speaking with the team at American Forests, we decided that

Many UncommonGoods customers have been very supportive of both the partnership with American Forests and the issue-specific campaigns. In addition to the positive response from customers, Coleman and her colleagues at UncommonGoods realize the valuable role businesses play in making a positive impact on the world.

"What we're hoping to do is raise awareness and build resources to take action," she said. "The voice of the business community is incredibly powerful, and has great potential to create everlasting change." *

Take action for the Endangered Species Act at americanforests.org/ProtectESA.

uncommongoods

we needed to take a stand to protect the Endangered Species Act."

From those conversations, the Endangered Species Act (ESA) Toolkit was built. The toolkit features a variety of resources to help concerned citizens learn more about the ESA and the various ways they can contact their elected officials to voice opposition to the proposed "modernization" of the legislation.

Northern Hills Middle School students making a tally poster during the week of the fundraiser

money to plant enough trees to replace the amount of paper the school uses in one year. They planned to donate that money to American Forests, so we could plant the trees and support the school's efforts to reduce its carbon footprint.

DONOR PROFILE

Northern Hills Middle School

"THIS IS THE ONLY HOME we have... and all of us need to take care of it."

I read this sentence again and again after receiving it in an email interview response from science teacher Terri Dufendach. I was in awe at the way. in just a few words, she could express everything we need to know about the importance of our Earth.

Terri teaches at Northern Hills Middle School, and with her passion for nature and science, it's no surprise that her students are following along the conservationist path she is paving.

Northern Hills is a seventh and eighth grade middle school nestled in Grand

Rapids, Mich. The school has always prided itself on being environmentally conscious. All students study Earth conservation, natural cycles, plant reproduction and tree types, and the administration tries to limit the amount of paper used. The school is surrounded by forest land and, according to Terri, students even spend time in the neighboring forest during an outdoor education class.

In honor of Earth Day 2017, the school's science teachers and their devoted students decided to take their passion one step further. The school announced that they would be conducting a fundraiser with the goal of collecting



Front, kneeling L to R: Eliza Kretzmann, Charles Gardner and Larry Tucei; Back, standing L to R: Harry Van Guilder, Eric Wiseman, Joli McCathran, Carrie Blair, Jared Lockwood, Monica Leverett, Bob Leverett, Kevin Sigmon, John Bunch, Byron Carmean, Joel Koci, Elijah Whitcomb. Jon Rockett and John Peterson

CHAMPION TREE SHOWCASE

Osage Orange

SCIENTIFIC NAME: Maclura pomifera

LOCATION: Charlotte, Va.

NOMINATED: 2011

NOMINATED BY: Patrick Henry

Memorial Foundation **TOTAL POINTS: 431**

HEIGHT: 60 feet

CIRCUMFERENCE: 349 inches **CROWN SPREAD:** 88 feet

Attendees of a recent Champion Tree measuring workshop gathered under the Champion Osage orange tree. Many attendees are part of the elite American Forests National Cadre of Big Tree Measurers, started by Don

Bertolette and Bob Leverett, American Forests relies on the National Cadre to assist with and verify measurements of unusual and complex national Champion Trees. *

The calculations began. The students discovered that their middle school alone uses 179 cases of paper every year, which is derived from about 110 trees. So, they set the goal at \$110 to plant that many trees. But, that wasn't enough for this group of motivated kids.

They progressively increased their goal number throughout the collection period, using their continuous success as inspiration to meet the next goal, and they eventually raised enough money to balance out the paper that not just their school uses in a year, but that their entire district uses.

The Forest Hills Public School District includes 18 schools ranging from K-12 and more than 10.000 students. The district's mission is to provide all learners with opportunities to acquire

the knowledge, skills and experiences necessary to build meaningful and productive lives. And, judging by the looks of this story, it's succeeding.

Even before this fundraiser. Terri had noticed that her students were particularly concerned with the amount of paper they use, and she was excited to share with us Northern Hills' plans to further reduce its environmental impact. The school intends to limit its paper use by sending parents electronic news and transitioning to online conference sign-ups.

Throughout Earth Week, students donated and collected money, and by the end of the week they had met their final goal. The school raised and donated \$2,090 to American Forests to plant 2.090 trees. Terri thinks her students felt especially "connected to the cause" and "gave generously" for this fundraiser in comparison with others the school holds since they learned about the impact of their work every day in science classes.

The students of Northern Hills are certainly making a meaningful and productive difference, and American Forests is excited to see where their passion for the environment leads them next. 🍁

Melanie Friedel was American Forests' summer 2017 communications intern and is a rising junior at American University, studying Environmental Science.

NEW ONLINE

From the Community

This summer, we took to social media to find out why you think wildlife conservation is important. Here's what you had to say!

"Wildlife conservation is not only important for our ecosystems but for man as well. Keystone species, and other indicator species, are important for us to know if an area is thriving. From pikas to hellbenders, it is important that we focus on all creatures from the top to the bottom of our ecosystems. The conservation of wildlife is also important for our nation's forests. Foresters, such as myself, have to account for all elements within a forest system, and it is up to us to ensure that our forests are utilized sustainably for all forms of use. Without wildlife, our forested regions wouldn't be what they are today."

- CARLY C., IN

"Nature is a system of individual parts, all working as a whole. Like every machine, if one part fails, the rest of the machine might also fail. Wildlife conservation maintains those integral cogs, keeping our ecological machine running for future generations."

- ROB D., CA



Learn more about the Evergreen Society by visiting americanforests.org/EvergreenSociety or by contacting Emily Russell, Director of Major Gifts, at (202) 370-4522.





The red-cockaded woodpecker became federally protected under the **Endangered Species** Act in 1973



The threatened gopher tortoise builds burrows that help shelter more than 360 other species



There are only around 50 ocelots left in the U.S.

"The animals can only do so much to protect themselves. Unfortunately, the addition of humans in the world has made survival harder for every living thing. It's, therefore, the duty of the people, those who care about other living beings and plants, to protect them."

•••••

- BRIDGET H., NC

"I want my grandchildren and generations to follow to be able to experience the woods, wetlands and the animals that live in them. not in a faux habitat with a few near-extinct animals. The beauty of the earth is the forest and creatures who live there. There is nothing more relaxing than time spent in the forest and seeing the wildlife that reside there. Mankind has done enough damage already."

- VICKI L., WI

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WASHINGTON OUTLOOK

Countering the President's **Budget Proposal**

THE PRESIDENT delivered his detailed budget proposal to Congress in late May, drastically cutting and zeroing out forestry and conservation programs important to American Forests' work in urban and native forest landscapes. This proposal clearly shows what the Administration deems important and what it does not. While American Forests understands the desire to reduce government spending, cutting vital programs that produce tangible results, leverage private funds and make our communities stronger is not the best way to reach that goal. These programs help create jobs in the communities that need them the most, engage people with their forests, enhance wildlife habitat and protect our watersheds.

To ensure these proposed levels do not make it into the Fiscal Year 2018 appropriations bill, we reached out to our Congressional friends on both sides of the aisle, advocating strongly to return these programs to their existing funding levels. Many Republican appropriators admonished the Administration for such drastic cuts across the land management agencies, further proving that forest issues are not partisan.

Here are a few of these programs and why they are important to our work:

THE TREES WHERE WE LIVE: Urban and Community Forestry (U&CF) plays an integral part in promoting sound stewardship of our nation's urban and community forests and trees. By providing important technical and financial

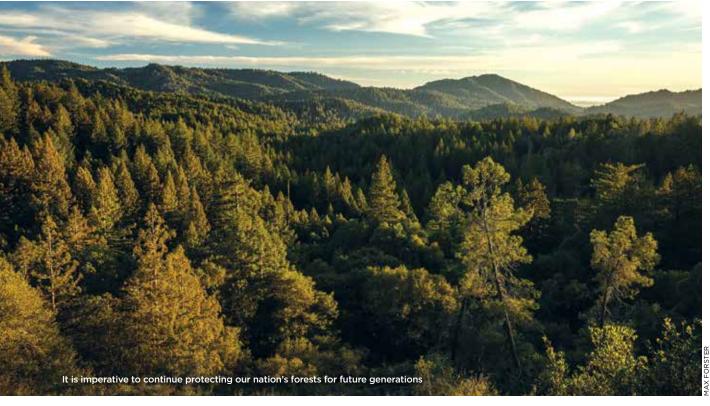
support, U&CF helps cities and towns across the nation enhance tree and forest cover, prepare for storms and other disturbance events, contain threats from native and invasive pests, and maximize the economic, social and ecological benefits of their tree resources.

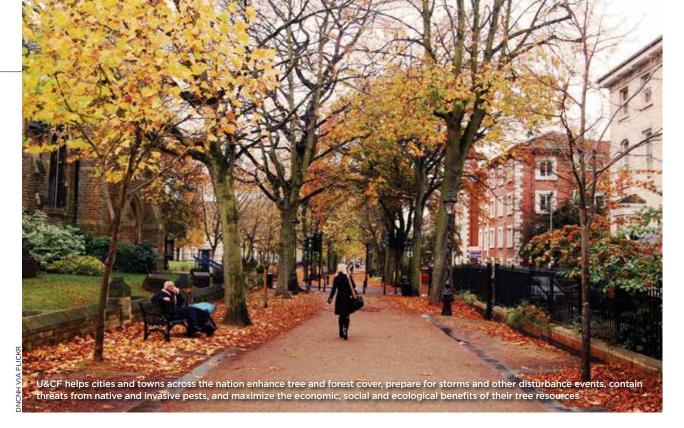
CONNECTING TOWNS TO THEIR

FORESTS: Community Forests and Open Space (CFP) has made substantial progress in preserving forests by increasing opportunities for Americans to connect with forests in their own communities and fostering new publicprivate partnerships. CFP has supported nearly three dozen community forest projects in cities and towns across 17 states and territories.

KEEPING FORESTS WORKING

AND THRIVING: Since authorization in 1990, the Forest Legacy Program has protected 2.61 million acres of private forests through voluntary conservation easements. It is imperative to continue protecting our nation's forests for future generations. Although still in private ownership, these lands provide





a myriad of ecosystem services to Americans today.

LARGE-SCALE FOREST MANAGE-MENT WITH PARTNERS: The Collaborative Forest Landscape Restoration Program (CFLRP) was created to promote job stability, a reliable wood supply and forest health while reducing emergency wildfire costs and risks. As of 2017, the CFLRP has met or exceeded its targets for a majority of performance measures, including timber volume sold, hazardous fuels reduction and wildlife habitat improved, and is on track to meeting its lifetime goals over its 10vear timeframe.

COORDINATING CONSERVATION ACROSS THE LANDSCAPE: The 22 dis-

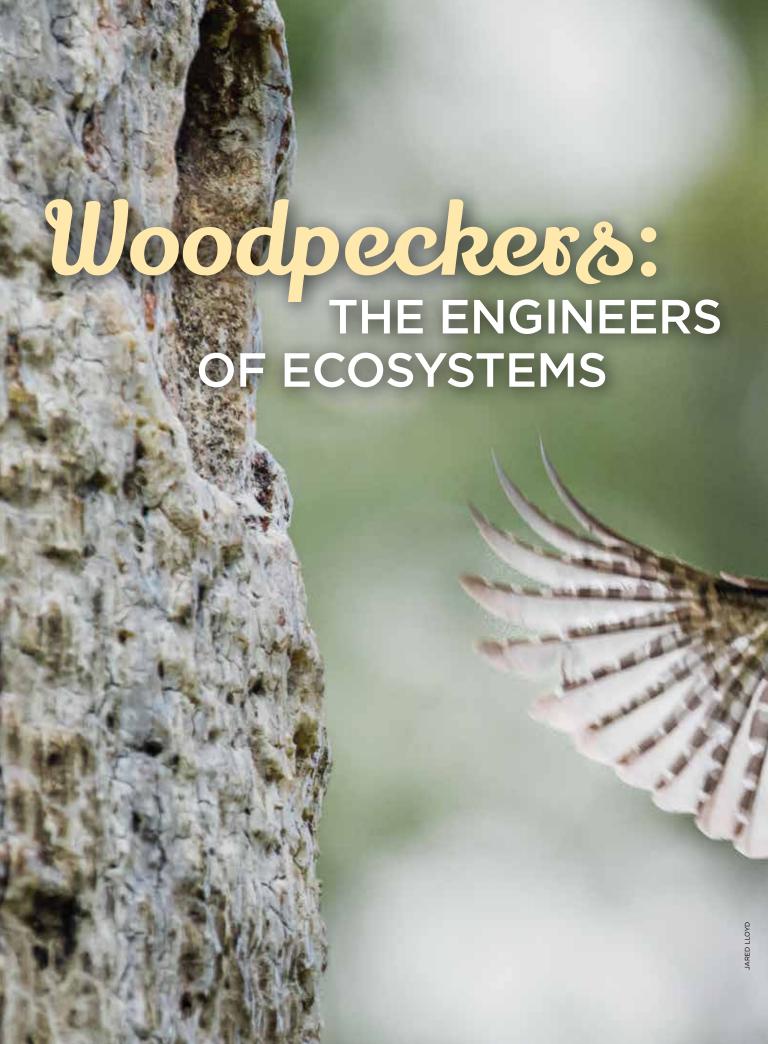
tinct Landscape Conservation Cooperatives (LCCs), which in total encompass the entire United States, are playing an essential role in bringing together federal, state, local and private sector conservation efforts. The LCCs foster effective natural resource conservation and good governance by helping to assure that public and private investments in conservation science, planning and implementation are well coordinated across sectors and political boundaries.

Thankfully, our concerns were heard by House Appropriators, and we saw programs that were drastically cut return to near-level funding. The Senate Interior Appropriations bill is expected in early September once Congress returns from recess. With the fiscal year ending the last day of September, we are expecting to see a short-term continuing resolution to keep the government running as Congress comes to agreement on the final appropriation levels. 🍁

Rebecca Turner writes from Washington, D.C., and is American Forests' senior director of programs and policy.

FY18 Appropriations Comparison

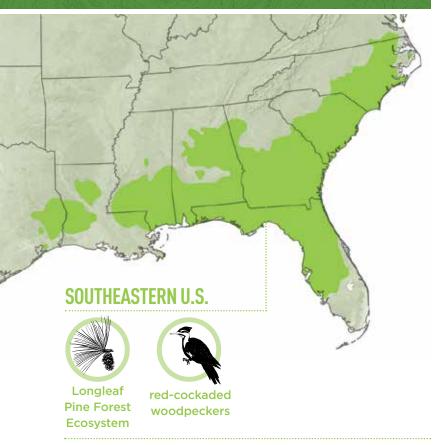
PROGRAM/AGENCY	FY17 ENACTED	FY18 AMERICAN FORESTS' PROPOSAL	FY18 PRESIDENT'S REQUEST	FY18 HOUSE INTERIOR (PASSED COMMITTEE)	FY18 SENATE INTERIOR (EXPECTED IN SEPT.)
FOREST SERVICE					
State and Private Forestry					
Forest Legacy	\$62.29m	\$62.35m	\$0.00m	\$36.18m	
Urban and Community Forestry	\$28.04m	\$31.30m	\$0.00m	\$27.32m	
Community Forest and Open Space	\$2.00m	\$5.00m	\$0.00m	\$1.95m	
Landscape Scale Restoration	\$13.97m	\$23.00m	\$0.00m	\$13.64m	
National Forest System					
Collaborative Forest Landscape Restoration	\$40m	\$40m	\$0.00m	\$38.9m	
FISH AND WILDLIFE SERVICE					
"Landscape Conservation Cooperative and Adaptive Science "	\$23.50m	\$23.50m	\$0.00m	\$21.50m	
LAND AND WATER CONSERVATION FUND	\$400.00m	\$900.00m	\$64.00m	\$275.00m	





Woodpeckers

WILDLANDS FOR WILDLIFE PRIORITY ECOSYSTEMS



The Southeastern U.S. is a Wildlands for Wildlife focal region.



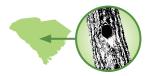
American Forests has planted over 7.8 million longleaf pines across nearly 21,000 acres since 1991.



American Forests is working with the Longleaf Alliance and other local partners to restore endangered populations of red-cockaded woodpeckers.



In South Carolina, we have supported efforts to create 50 new nesting cavities in longleaf pines on state and private lands



In Mississippi, we supported the creation 100 new nesting cavities in Desoto National Forest

Watch out for the boot-sucking mud. The tangle of vines, thorns, the litany of evergreen shrubs species that interlock forming a veritable fortress a mile thick and the occasional cypress knee to test your balance. In 1539, the chroniclers of the De Soto expedition wrote of a trackless wilderness near this place, one that took days to travel just a few miles. Men were bogged down in mud, drowned by the weight of armor and they all nearly starved to death. Survival was as bleak, and the danger as extreme, as any ambush by local tribes. A classic pocosin experience, if you ask me.

Stepping out of the swamp and into the savanna is abrupt and shocking. From dark humid jungle, to open and dry grasslands interspersed with longleaf pines in a park-like setting — all within the span of a mere heartbeat.

This is the realm of fire, and species here begin to stretch the limits of imagination in their adaptations to this brutal fact. Consider the plants: The harshness of life in the longleaf pine savannas has tweaked and molded many into insect-eating monsters. Several species of pitcher plants, for instance, can be seen with a cursory glance across the landscape — each with their own unique way in which to lure in unsuspecting insects to their sweetsmelling, yet toxic, brew of digestive enzymes. In all, there are 17 different species of carnivorous plants here, including the Venus flytrap, an evolutionary rock star in this savage garden.

In the thick tussocks of wiregrass that so characterizes this habitat, I take note of the shocking array of life. Several different species of orchids can be found blooming across this grassland right now. Spreading pogonia, grass pink and a variety of different Spiranthes give the impression of some sort of grandiose Jackson Pollock painting, with random explosions of vibrant colors splattered with abstract expression over the otherwise monochromatic green hue of the savanna in the spring.

Before me stands a cluster of old pines. These are longleafs, as is everything standing in the savanna. But, this bunch comes with white rings painted around their base by researchers to signify their importance.

The normally reddish hue of one particularly heart-rotted pine is plastered in what must be several hundred pounds of sap. Each of the marked longleafs here have sap oozing down the trunk, glistening and baking in the overhead sun. But, this one stands apart from the rest. Towering above the savanna, the bottom two-thirds of the pine looks as though it was literally dipped in



candle wax. This is what I have been searching for. The signs are unmistakable, and there is but one species in this forest that could have created such a spectacle: the red-cockaded woodpecker.

THE LIFEBLOOD OF LONGLEAF

For such a small bird, this guy packs a punch. Dwarfed by the immensity of the old-growth longleaf pines and vastness of the savanna, the red-cockaded woodpecker stands a mere 8 inches tall - about the size of an American robin. But, as Napoleon was determined to show the world, size is never a measure of importance.

When it comes to the red-cockaded woodpecker, it's tough to overstate this importance. So many species that call these longleaf pine savannas home which is basically anything and everything that makes its home in a tree cavity - owe their ability to survive to this one little bird. Eastern bluebirds, great crested flycatchers, eastern screech owls, fox squirrels, flying squirrels, tree frogs — the list goes on. In all, we know of more than 27 different vertebrate species that depend upon this one bird.

Back in 1994, Ecologist Clive Jones published a paper entitled "Organisms as Ecosystem Engineers" in the journal Oikos. In this, he posed the argument that some species go beyond the basic tenants of what we like to refer to as "keystone species" in the ways in which they impact their environment. By the very habits that their evolution has sculpted them for, these species literally engineer entire ecosystems by their presence. From beavers to alligators, elephants to prairie dogs, Jones and his co-authors on the paper called these species "ecosystem engineers" and defined this term as

any organism that creates, significantly modifies or maintains an ecosystem.

Just about every species of woodpecker falls into the category of ecosystem engineer. In most North American forests, there tends to be several species of these birds all working toward the same end: excavating cavities, raising young in them for a season then abandoning those cavities the following year to carve out a new home for a family.

All this cavity excavation really adds up. Throughout our forests, only 1-in-10 cavities are

Above: Longleaf pines; below: A red-cockaded woodpecker perched at the entrace to its nesting cavity with an insect trapped in its beak to feed its chicks inside



Woodpeckers

Woodpeckers aren't just about diversity in the forest, however. Their impact on the world around them goes way beyond that, as species become dependent upon their existence.

created naturally. This means that on average, 90 percent of all available nesting cavities are created by the handiwork of woodpeckers. The greater the number of these birds, the more cavities in a forest. The more cavities, the more secondary cavity nesters the forest can support. Diversity begets diversity.

Out here in the longleaf pines, however, things work a bit differently. Though other species of woodpeckers live here, their functional impact on the pine savannas is often negligible.

There are exceptions, of course, with both aspen and cottonwood trees in the West coming to mind, but as a rule of thumb, woodpeckers require dead standing trees to show off their master carpentry skills. They simply are not evolutionarily equipped to deal with the copious amounts of sap that comes with excavating into something like a living pine tree - especially champion sap-producers like the longleaf. Researchers have even found birds that

have tried hacking open a nesting cavity, completely entombed in the sap of longleaf pines.

This is where the red-cockaded woodpecker comes in, as they are the only species that has learned to navigate the flow of sap in a longleaf pine. A master of its niche, this woodpecker has even come to exploit this characteristic of the longleaf as a defense mechanism — hence, the sap-plastered trees around me. For the rest of woodpecker world, at least in the Southeastern U.S., they are segregated to dead standing trees the veritable "other side of the tracks" down here. But, in the longleaf forests, those requisite dead snags they so depend upon are often non-existent.

BAPTIZED IN FIRE

The longleaf pine ecosystem is a world that finds itself routinely baptized in fire. Everything about this place promotes combustibility and needs a good old-fashion inferno to continue its way of life. From the rate and pattern at which the longleaf grows, to the unique way in which the bark of the tree disperses heat by scaling off, it all functions to keep this tree alive and insure the continuation of its species in the face of flames.

Below: Prescribed burn on Eglin Air Force Base:



Lots of pines are fire-adapted. But, the longleaf is more than just evolutionarily armored against it. It's as if the entire biochemistry of this species was designed to explode after death. Dead branches littering the ground, dead trees standing or fallen, they are all incendiary devices. Couple this with the ubiquitous wiregrass that itself has evolved a host of fire-promoting traits, and you have a tinder box waiting to blow at any moment.

Why would an entire ecosystem help set fire to itself?

"Botanical arson as a means of incinerating the would-be competition" is how conservation biologist and Cambridge professor Andrew Balmford explains it. "Rather than responding to fire, longleaf has evolved to promote it..."

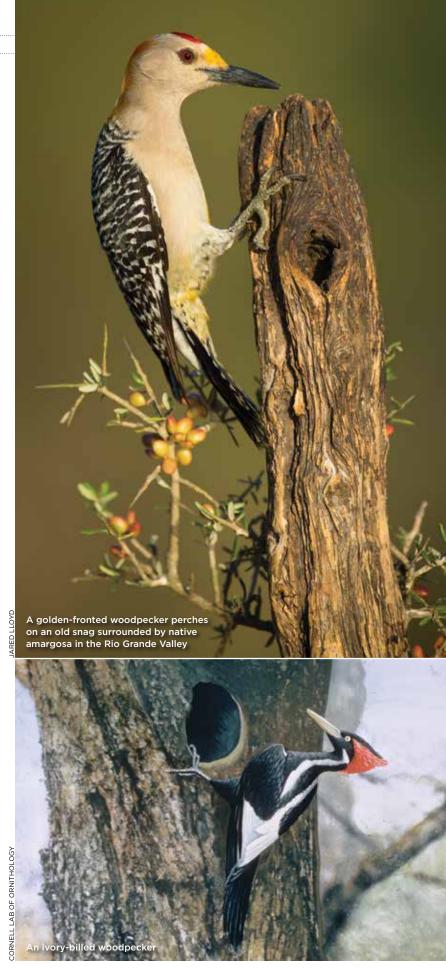
All of this fire equates to very few dead standing trees in the ecosystem. Without those dead snags, the rest of the menagerie of woodpecker species here lose their importance. And, thus, the biological diversity of this place rests largely upon the shoulders of our little sap-adapted red-cockaded woodpecker.

As the idea of ecosystem engineers took hold in academia, the number of species that make the list has grown exponentially. Once defined, we have come to realize that species as diverse as blue whales and whitebark pines meet these qualifications, adding even more imperativeness to their conservation. The loss of whitebark pines, for instance, has a cascading effect upon everything from trout to Clark's nutcrackers to grizzly bears. If we lose the red-cockaded woodpecker, the same holds true for so much of the biodiversity of the longleaf pine ecosystem.

ARCHITECTS OF EVOLUTION

Woodpeckers aren't just about diversity in the forest, however. Their impact on the world around them goes way beyond that, as species become dependent upon their existence. Though evolution may largely be a survival strategy in the face of catastrophe, it is also the handiwork of time that shapes, mutates and creates.

Outside of the fire-prone pine savannas and the impenetrable jungle-like pocosins of this coastal plain, we move into the bottomland hardwood swamps. This is a landscape of giants. Where baldcypress reach toward the heavens with outstretched arms and are dated through core samples back to the Roman Empire. Where the gnarled and twisted tupelo gum swell at the base to diameters of 10 feet or more. Red maple punctuates the understory, joined by the likes of buttonbush and highbrush blueberry. This land-





scape is neither land nor water, but some kind of tannin-stained blackwater hybrid of the two.

The tide of sightings of ivory-billed woodpeckers from these remote swamps continues across the South. Known as the "Lord God Bird" by those whose habitats overlapped the habitats these birds once haunted, the name was given for the exclamative reaction that people would have when they saw one of these pterodactyl-sized woodpeckers sail past with a 3-foot wingspan.

Down in Louisiana, the last-known living pair of ivory-billed woodpeckers carved out cavities that measured 5 ½ inches tall by 4 inches wide. But, that was the 1930s. And, an ivory-billed sighting has yet to be confirmed since. Optimism remains, of course. For as Emily Dickenson once wrote, "Hope is a thing with feathers, that perches in the soul..."

We can only speculate today, but everything from barred owls to wood ducks most likely evolved to suit the engineering handy work of the old ivory-billed woodpecker. Today, they are all but gone. But, the pileated woodpecker remains, and seems to have had no qualms about picking up were the ivory-billed left off in the world.



Woodpeckers

It's a testament to the importance of woodpeckers in the forested world when we can begin to identify select species of animals that have literally evolved to keep pace with the size of these birds. With wood ducks and barred owls sized for ivory-billed woodpeckers, for instance, and screech owls fitting neatly into red-cockaded holes across the longleaf ecosystem, we quickly realize the significant role these birds play as ecosystem engineers, and, dare I say, the architects of evolution in some cases.

THE INTRICACIES OF CONSERVATION SUCCESS

It's quite a lot to take in for me sitting here in the wiregrass, leaning back against a fire-blackened pine tree as I watch this family of red-cockaded woodpeckers sail in and out to feed their young. The importance of woodpeckers. Their outsized role in the world. The unsuspecting bigness of something so small. The interconnectedness of an ecosystem, intricately woven together like delicate cotton fibers of a Navajo rug. The impermanence of it all. The fact that if we cut but one of those fibers, everything begins to unravel at our feet. And it is at our feet that it all unravels these days, for we are the ones holding the scissors.

The impact that woodpeckers have on their associated forests is undeniable. Some, like the red-cockaded, engineer ecosystems in powerful ways by functioning as the only species capable of building homes in their forest. Others, like the pileated, have taken over the roles of now extinct species, chopping open giant cavities in trees and creating a surplus of potential homes for those animals of the forest too large for anything smaller.

The longleaf ecosystem once encompassed some 90 million acres across the southeast. These trees stretched from Virginia, down along the coastal plain of the southern states, wrapping around much of Florida, and finally coming to an end in eastern Texas. Today, the longleaf pine has been clear-cut down to just 3 percent of its original range, hanging on in a handful of preserves. As conservation groups, such as American Forests, fight to both protect the remaining stands of longleaf pines, and reestablish this ecosystem across the Southeastern U.S., we find that the unsuspecting red-cockaded woodpecker has, in so many ways, become the poster child of longleaf conservation. To simply bring back the longleaf pine is not enough. Conservation success depends upon a healthy population of the



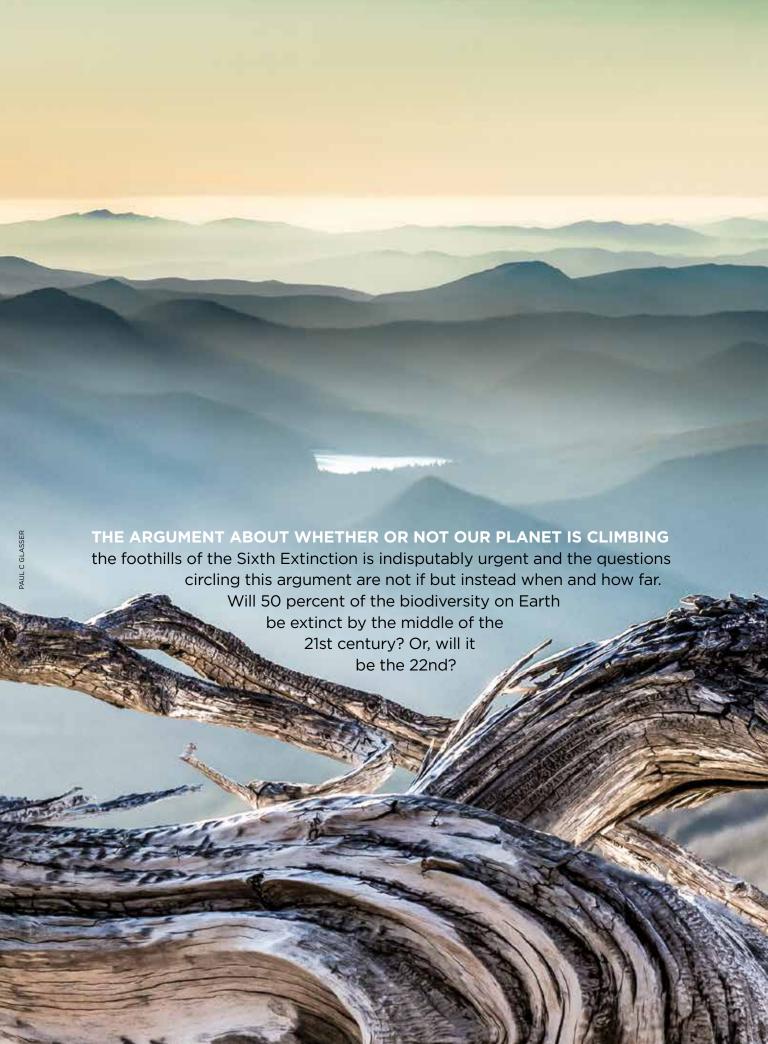
red-cockaded woodpecker. For they, like fire, are the lifeblood of this forest.

Jared Lloyd is natural history writer and wildlife photographer. From the coastal rainforests of Alaska to the high Andes of Ecuador, his work takes him all over the world in search of stories and photographs. A native of the islands off the coast of North Carolina, he now lives on the doorstep of Yellowstone in Bozeman, Mont.

Above: Pileated woodpecker creating a nesting cavity



BY DOYLE IRVIN



WILDLANDS FOR WILDLIFE PRIORITY ECOSYSTEMS



NORTHERN ROCKIES AND CASCADES







Grizzlv Bear

Whichever turns out to be the case, the reality of this situation forces environmentalists into a corner, with one prevailing question that seems almost impossible to answer:

What do you save?

"I don't think many of us are prepared to make those decisions," Darren Long told me in late July. Darren is the program director of the Climate Adaptation Fund at the Wildlife Conservation Society, and it's his job to save the present in the face of the future. "The climate is only going to create more and more of these difficult questions for all of us."

When it comes to whitebark pine, being stuck in analysis paralysis would essentially answer this question for us. Bob Keane, who lives and breathes whitebark pine as a research ecologist based in Montana, weighed in on the gloomy outlook.

"One thing we know for sure," Keane said, is that "to do nothing ensures that whitebark pine will be gone. You're definitely going to lose a species."

The reality facing whitebark pine is one of endless competition on all fronts: economic and ecological value judgments, personal ties squared up against impersonal diseases, and, ultimately, the unhealthy side effects of the American Dream. While tied to this tree are an army of passionate people, it faces many highly uncertain futures.

ARE WE SISYPHUS?

The problems began as the 19th century rolled into the 20th, when Gifford Pinchot, the first chief of the U.S. Forest Service, thought he had a good idea. Many forests in the United States had been extensively (and profitably) logged, and the country did not have the nursery infrastructure to grow all the seedlings required to reforest them. Europe, however, did. They sent white pine seeds to Germany to be grown in their nurseries before being sent back to America to be planted permanently. Along for the ride with these returning seedlings came white pine blister rust, the deadly disease that is forcing whitebark pine to the brink of extinction.

Blister rust has reduced whitebark forests across the West by as much as 95 percent, but it isn't the only problem. Increases in temperature due to climate change are more pronounced at higher altitudes, and these increased temperatures have meant that mountain pine beetles are at times able to breed twice in a season. Then, sometimes there isn't a frost harsh enough to kill them off. These variables have led to such an exponential explosion of pine beetles that often the only thing stopping them is the fact that they've already eaten everything. Increased temperatures also mean that competitor species are moving uphill and out-muscling whitebark in places where previously only it could survive. To top it all off, whitebark has also suffered from the effects of fire suppression policies — it thrives when reforesting burnt areas, and for decades wildfires were put out as much as possible. All these factors combined leave many scientists completely unsure about the future of this tree.

"The fact is that we just don't know what's going to happen," Keane said.

WHERE THERE IS A WILL...

The question is not whether we can save whitebark pine. There are proven methods to solve each of the problems whitebark faces. Instead, the question is whether enough people will deem the effort worth the expenditure.

The passion is there - it's just the money that isn't. Eric Sprague, director of forest fonservation at American Forests, told me about his recent trip through a whitebark planting in the Flathead National Forest in Montana with Keane.

"He stopped our group to bend down and shift a sheltering log 2 inches to better

the chances of a single foot-tall seedling's survival," Sprague recalls. "That's the kind of attention to detail and dedication that this tree inspires."

Whitebark restoration revolves around the hope that we can selectively breed enough blister rust resistant seedlings to plant resilient forests large

enough to sustain the ecosystem that relies on the tree species. There are 40 documented modes of rust resistance.

According to Keane, it's quite possible that the rust, which mutates much faster than trees, could easily overcome one mode of resistance. The rust re-

> generates annually, whereas the whitebark's regeneration period is hundreds of years.

"What you want is not to breed for just one of the modes," he said, "you want to breed for all of them.""

Breeding for rust resistance is an expensive process. First, you must identify a rust-resistant tree, called a "plus tree," which means you

must hike into the upper altitudes and find a forest affected by blister rust. In some forests, less than 5 percent of the whitebark are resistant, and you have to remember that resistant does not mean immune. There's a weird kind of joy when you find yourself on a hillside, surrounded by hundreds, if not thousands

Left: The large, nutritious seeds in whitebark pine cones are prized by a huge variety of wildlife, providing an important source of protein and fat to many species in the ecosystem; Below: This picture of dead whitebark pine in Esmerelda Basin, Wash., captures the harsh, rocky habitat that the trees normally survive in.









It's inspiring, because you've found a progenitor that will help secure the future of the species, and it's demoralizing, because you have to do this in the first place.

of dead trees, celebrating the one mostly-alive survivor you've found that afternoon. It's inspiring, because you've found a progenitor that will help secure the future of the species, and it's demoralizing, because you have to do this in the first place.

Once you've found a tree that has mostly survived, you climb it in the spring and put cages around the cones (because if you don't, all the seeds will be eaten). Then in the fall, you climb the tree again and retrieve the seeds.

After the seeds have reached a nursery, it takes two years to grow a seedling. Then they are taken to an orchard and inoculated with blister rust during years three, four and five. After that, they grow for another two years, you count off the trees that died, and then plant the survivors in their final destination.

Given that it would normally take another 50 to 75 years for these whitebarks to reach cone-bearing age, branches from mature "plus trees" are frequently grafted onto these nursery-bred trees. These scions remember their age and trick the 7-year-olds into bearing cones, speeding up the restoration process.

"What we're doing is hastening the process of natural selection," Dr. Diana Tomback told me. She has been working with Keane for years, and together they wrote "Whitebark

Pine Communities," and collaborated on the first range-wide restoration guide. "But we are still way, way behind. We need 100 times the restoration efforts than what's currently going on."

The devil's advocate would ask, "well, if we're already so far behind, the outlook so bleak, and the solution so much more expensive than other conservation efforts - should we even try?"

IT'S NOT JUST THE BEARS

In one of the more fascinating evolutionary developments, whitebark pine has developed a complete dependency on Clark's nutcrackers, which are their only source of seed dispersal. Wind doesn't do it. Fire won't, either. Their seeds being eaten by other animals produces no trees. It really is just these soft-gray nutcrackers, named after one half of Lewis and Clark. Nearly every aspect of whitebark pine can be tied back to this dependent relationship with the bird.

Far left: The oldest recorded whitebark clocked in at 1.376 years old - and probably looked very similar to this tree: Above: Clark's nutcrackers have a sublingual pouch that can hold 50-150 seeds at one time, helping them cache tens of thousands over the course of a summer

An important factor about whitebark is that the shade it provides retains snowpack at the highest elevations. This both prevents early summer flooding (along with flood-related ecological destruction) and maintains a supply of fresh water late into summer dry seasons for all species — including humans.

> Clark's nutcrackers bury the seeds by the thousands and, therefore, must remember where they put them. In order to do this, they prefer disturbed areas with visual markers, which are usually downed logs or stones. This means that their favorite place to plant is in recently burned (former) forests, which are easier for the birds to pick out and remember than dense unbroken vegetation, like how it's easier to find your keys on a clean table.

> These disturbed areas are particularly inhospitable. As such, whitebark evolved into one of the hardiest tree species on the planet, surviving in zones with little shelter from the elements, blasted by the winter cold and parched by high-altitude summer sun.

> Once the tree has truly begun to grow, it acts as an ecosystem initiator. Because it can survive in such extremes, whitebark is often the first to regenerate these unfriendly locations. It then provides shade and shelter for other trees and plants. This makes it invaluable to ecosystem resiliency, the process by which the natural world heals itself. You could almost think of the tree as platelets, red blood cells coagulating in a wound as the first step towards restoring normalcy after the inevitable bumps and scrapes that are part of being alive. Whitebark also provides a significant and incredibly nutritious food source for animal life, which in turn are dispersal agents for other species in the ecosystem.

"There are 110 documented species that depend on it," Keane said. "It's a keystone species and to lose it is to lose a lot."



The seeds are really a hot commodity to the animals at these altitudes. Keane told me an anecdote about a scientist's dissertation, where he was trying to see if the seeds would eventually grow into trees if they were simply put on the ground instead of buried at nutcracker-depth. Each time he tried, there was 100 percent predation by rodents. He did it again and again, and they just got them all.

An important factor about whitebark is that the shade it provides retains snowpack at the highest elevations. This both prevents early summer flooding (along with flood-related ecological destruction) and maintains a supply of fresh water, for all species, including humans, late into summer dry seasons.

CHOOSING THE FUTURE

What whitebark doesn't do is end up on a shelf at the grocery store or as a shelf in a bungalow. The timber value of other trees inspires potential investors to restore their species in such a way that groves can be sustainably logged in the future, while also meeting conservation goals. Whitebark doesn't have that going for it: It's not viable for timber, and the seeds are ignored by non-indigenous Americans. The unpretty reality of many conservation efforts is that they cannot be extricated from business.

Darren Long, the program director at the Wildlife Conservation Society, notes the strong correlation between conservation and the economy. He also admits that economics don't always make the most sense from an ecological perspective.

"One of the things you might do is look at making grants and supporting projects in ecosystems that are likely to remain functional despite the projected impacts of climate change," he said. "That's the lowhanging fruit of conservation investment right now."

Given that whitebark pine has already been impacted by climate change, it makes sense that potential investments go elsewhere. With the gloomy status of the tree, nothing about it seems low-hanging or financially fruitful.

That being said, Long followed up with an important point. "We know that functional, healthy ecosystems are by rule more resilient to climate impacts. And the species that inhabit those intact systems have the most potential to exploit their

These stately birds

received their

the legendary

expedition, Lewis and Clark

common name from one half of



own adaptive ability, in a system that is functional rather than degraded."

When you consider the situation in light of this reality, it becomes clear that investing in whitebark isn't just saving one species from the impacts of climate disruption. It's providing the 110 documented species reliant on the tree the breathing space they need to adapt to an uncertain future.

Ecologist Bob Keane expressed his frustration with the underwhelming attention whitebark receives as a conservation target.

"If you let something at the bottom of the food chain go, like whitebark, you'll see massive changes," he said. "You'll get brand new ecosystems. Maybe society will like these new ecosystems - but are you ready to bet on it?"

Call us curmudgeonly if you like, but we at American Forests are not the betting type. We know it's possible to save this species if we create the infrastructure to produce rust-resistant seedlings at

a large scale. That's why we have stepped up and joined with the Whitebark Pine Ecosystem Foundation and the U.S. Forest Service to develop the first range-wide strategic restoration plan for whitebark pine. At the summit we are bringing together this November, nonprofit conservationists, federal agency leadership and land managers, private stakeholders and scientists will establish the nationwide agenda for the salvation of this incredibly special tree. If it is listed, it will be the tree with the largest range ever put on the Endangered Species List.

American Forests' Eric Sprague recounts the pristine vastness that is whitebark habitat and all the species — from grizzles and mountain goats to the occasional wolverine — that traverse these high elevations unbroken by roads or any development. And yet, when you look around, you see swaths of dead whitebark.

"The severity of pine beetles and blister rust is

caused by us," he said. "Human impact extends across the borders supposedly protecting these wild areas, and we are responsible whether we like it or not."

It's hard, sometimes, for society to understand the value of what's out of sight and out of mind. Most people in the United States have never seen a whitebark pine, and likely never will. That, however, doesn't mean that whitebark isn't a key part of our lives. Removing through

inaction one of the most important support systems at high altitudes will send an avalanche of negative consequences downhill: What happens on top of a mountain never stays there.

Doyle Irvin contributes to American Forests magazine and Loose Leaf blog, and is passionate about protecting the environment and investing in the future of our planet.

Above: Mountain pine beetles have wreaked havoc on whitebark pine in the Greater Yellowstone ecosystem; the red trees are all dead; below: White pine blister rust affects a number of white pine species, eventually growing these sores in the process of strangling the tree

TIMBE







BY IAN VORSTER

A LITTLE POCKET MEADOW AT

the apex of the Golden Staircase climb catches my attention as I labor through what is known among backpackers as timberline, on the John Muir Trail. Roughly a good fly cast wide, a number of small waterfalls tumble through it, each creating their own diminutive ecosystem, and all linked by the hurrying Palisade Creek. The meadow, speckled with a few hardy whitebark pines, looks like something a team of landscape engineers at Disneyland might like to emulate — sculpted by seasons and weather, it leaves one with the sense that this was precisely where Muir's Creator stood and said, "It is good."

Kearsarge Pinnacles & lake from Kearsarge Pass







Mule deer browses early morning near Kearsarge Pass

Needing time to reflect, I shed my pack, shoes and socks, and placed my feet in an icy eddy of the creek. Nearby, a trout hovered delicately in the riffles. Little more than a pine needle long, no sign of anxiety appeared to unsettle him. This was a prime lie — the term used to describe the nexus of food, oxygen and temperature for a trout. A moment later, he exploded from the water to snatch a bug, splashing back into the creek to vanish from sight.

This picture seems to describe just how humancaused climate change is working at this altitude lying in wait to ambuscade nature.

Adelaide Johnson, a hydrologist with the U.S. Forest Service's Pacific Northwest Research Station, defines timberline as forestline - considered to be the upper limit of trees of large stature. The location from forestline to treeline, the upper limit of trees where growth is often stunted, is known as the alpine treeline ecotone.

"Change is occurring in many, but not all alpine treeline ecotone locations because of climate change," she says.

Johnson has observed that, in some areas, the alpine treeline ecotone is moving up in elevation. Factors, such as shade and moisture level and temperature level substrate, are playing a role on the survival of seedlings and likelihood of upward forest migration.

SHIFTING ELEVATIONS

The John Muir Trail (JMT) isn't some grand sixmonth trek up K2, but for the average person it's a pretty big deal. With around 50,000 feet of elevation gain, every hiker wakes up in the morning and thinks about the climbs they have ahead of them. There is some delightfully level trail on the hike, but there is also precious little of it.

Muir didn't walk the route in the same linear fashion modern day backpackers do, and he certainly didn't enjoy use of all the new-fangled ultralight gear. But, he did roam these mountains and their forests with a knapsack and stale loaf of bread at the beginning of the industrial period, a time when climate change was starting to gain measurable momentum. His exploration was epitomized with this quote: "When we try to pick out anything by itself we find that it is bound fast by a thousand invisible cords that cannot be broken, to everything in the universe."

That is no truer than when you consider climate change and its effects at altitude. Steven Beissinger, a professor of conservation biology at University of California Berkley's Department of Environmental Science, Policy & Management, co-led the Grinnell Resurvey Project in Yosemite and Kings Canyon national parks, and Inyo and Sequoia national forests. Joseph Grinnell was the founding Director of the Museum of Vertebrate Zoology, and realizing back in the early 1900s that California was changing rapidly, he began

John Muir Trail Route



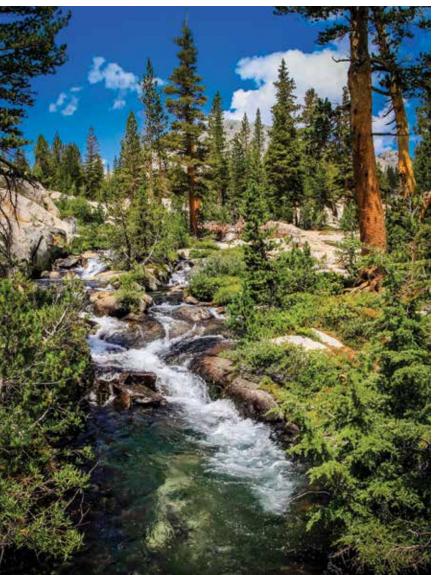
TIMBERLINE

Below: A stream flows through the Ansel Adams Wilderness at 10.000 feet above sea level and what is traditionally known as timberline by backpackers sparsely forested, granite outcrops and garden-like settings; right: Bristlecone pine forest between 10,00 and 11,000 feet above sea level. a few miles south of **Forester Pass**

conducting early inventories of terrestrial vertebrates throughout California.

"Hiking the JMT now, one cool thing is that you would have the chance to see all of the species that John Muir would have seen," Beissigner says. "Our resurveys of sites visited by Professor Grinnell and his students have documented that all of the species they detected in the 1920s can still be found in the national parks - Kings Canyon, Sequoia and Yosemite. So, the parks are doing their job!"

However, it is much harder to see them, as many species are responding to the changing climate by shifting their elevational ranges. Some of the small mammals and birds have moved further upslope as the climate has warmed. The alpine chipmunk, Belding's





ground squirrel, water shrew and pika are highelevation species of small mammals that have all retreated upslope. Birds also show some species, such as the savannah sparrow, black phoebe and white-breasted nuthatch, shifting up.

"These are patterns we would expect with climate warming, but the picture is a bit more complicated because some species of birds and mammals shifted their elevational ranges downslope," Beissinger says. "And, it was unpredictable which species responded by moving up or down. Even closely related species in the same area were shifting differently. I am hopeful that many will have the flexibility to respond. The question is whether they can respond fast enough to keep up with a rapidly changing climate."

CHANGING LANDSCAPES

Kings Canyon National Park! I had just crossed a footbridge over Piute Creek where it joins the San Joaquin River and saw a little sign that announced the boundary of the park. Yosemite National Park, Ansel Adams Wilderness and John Muir Wilderness - I had walked with a pack through these great places, and I was determined to add Kings Canyon to the list.

I made 17 miles by 2:30 p.m., passing a number of bristlecone and whitebark pine trees along the way. Bristlecone pines are the oldest known



But, he did roam these mountains and their forests with a knapsack and stale loaf of bread at the beginning of the industrial period, a time when climate change was starting to gain measurable momentum.

living things on earth. Some date to 4,600 years old, and many of these grow along portions of the JMT. It's a special species, growing only between 7,500 and 11,500 feet above sea level. The severity of the environment actually seems to be the secret to their longevity. High winds, short growing seasons and bitter cold would describe the perfect climate for a bristlecone.

The whitebark pine is no less gracious — in healthy form. But, populations of these trees are suffering from white pine blister rust and the invasive mountain pine beetle — able to thrive at that altitude because of climate change. In 2011, the National Park Service determined that the species warrants protection under the Endangered Species Act due to the fact that it faces an "imminent" risk of extinction.

As I approached the limit of timberline, I sat down with my back against a rock at the base of Muir Pass. Looking up, I saw a guy hiking up the trail with what looked like a daypack.

"What does your pack weigh?" I asked.

With a grin he called back, "With a week's food, it weighs 16 pounds."

"That's insane!" I exclaimed. "Mine weighs 23 pounds, how do you do it?"

"Well, I followed the standard list of bare essentials, and I eat a lot of granola bars. I've also made my own 20-degree quilt," he replied, which told me

Below: A Hexamid Twin tent, GPS locator device, map and compass at the Kern River Junction campsite





Above: Alpenglow from a passing storm paints Bubbs Creek in a roseate glow for a few ephemeral minutes: below right: Second view of Whitney from the West; below right: Guitar Lake campsite

he had been frequenting the same online ultralight forums as I had. A quilt means you don't have to sew in a zipper, which means you don't have to carry the zipper, helping to get your pack weight down!

Steve was a soil scientist from Ohio who was averaging 25 miles a day. I followed him over Muir Pass, although he quickly left me far behind. I made Muir Hut at the top of the pass at 4 p.m., spent 15 minutes at the hut, took a quick look inside and then began a slow and careful descent.

The mountains were covered in low, cold thunderclouds as I walked away from the pass. Each hiker struggles on a different pass at a different time, depending on how they feel. I was now struggling with the southern descent down the 13,000foot pass. It was a typical alpine way - something you would imagine seeing in the Himalayas. Thousands of gigantic boulders were strewn along the trail, thrown off nearby cliffs by forces of heat, cold, snow and rain. I walked very carefully, aiming for timberline far below.

At 7 p.m. I passed two tents in a glade on the right side of the trail. I would have kept on walking because the spot was full, but just then heard a voice call out from the left, "Ian, is that you?" It was Steve. Together, we enjoyed a thoroughly good 'ultralight' evening.

PEAKS & PASSES

Over our dinner, Steve made an interesting observation.

"It's weird that they named each of the peaks and passes after characters that were pretty much arch enemies," Steve said. "Muir was a protectionist, while Pinchot was the first great gooduse-guy. And, Whitney was a formal geologist who had some dislike for Muir, who, as an amateur, wrote and was published about his geological theory on the origins of Yosemite."



Muir captured the imagination of readers with his ecological-theological language. By age 11, he could quote all of the New Testament and most of the Old Testament of the Bible. Using the language of scripture, he explained the natural processes of creation. Whitney tried to discredit Muir by branding him as an amateur. They weren't friendly.

Thinking about the many peaks along the JMT, I consider other elements shifting in the wake of climate change. Glaciers - something the average hiker might notice — are retreating rapidly with the warming climate. Susan Kocher, a forestry and natural resources advisor and a registered professional forester with the University of California Cooperative Extension, Central Sierra, and Kim Ingram, a University of California Cooperative Extension Natural Resources Community Education Specialist, say in an article published in California Naturalist that, "Temperatures are increasing, though whether precipitation will increase or decrease in the long run is not yet known. An additional temperature increase of just a few degrees is enough to turn snow into rain throughout the rain-snow transition zone. Depending on the model used, the spring Sierra Nevada snowpack could be reduced by as much as 70 to 90 percent by the end of the century."

When I reached Bubbs Creek, my third-to-last night on the trail, I enjoyed a signature trailside evening. I had walked out over Kearsarge Pass to resupply and hiked back in over the same pass to make a delightful campsite just beyond Vidette Meadow. Big thunderheads were brewing, and it began to rain intermittently. As the day came to an end, I looked up and realized that the sun might break through the clouds to paint the entire landscape with alpenglow. I grabbed my camera and walked down to the creek.

There, I noticed a couple of fly fishermen casting for their supper. Wearing plaid shirts and heavy-duty shorts, these guys seemed to be outdoorsman in the mold of Huck Fin and Tom Sawyer. As they worked the water, I noted that they were fishing as best they could. They were doing everything right — keeping low, standing back from the bank, using shrub cover and moving with caution.

Two days later, Guitar Lake campsite, the last place to hunker down for a night, was filling up quickly. Small parties were filing over the nearby ridge, some would dump their packs and walk around, flicking aside rocks with a boot before deciding where to pitch their tent.

Looming above Guitar Lake stands Mt. Whitney. I stirred at 4 a.m. on the last day, stuck my head



out the tent door and gazed at a stunning star-filled heaven. The outline of the mountain was etched like a petroglyph against the eastern sky.

I had to make about 3,500 feet over four miles to gain the summit. I dropped my pack at the Trail Crest junction and fueled up with water and a couple energy bars, before setting out on the last two miles.

The summit experience was everything I had hoped for. Looking out across the Sierra Nevada mountains, my thoughts turned to some of the characters, both young and old, I had met along the trail. As we had walked together for a day or two, each had shared their motivation for hiking the John Muir Trail with me. And, winding like a track through

it all were these two things: the superlative backdrop at timberline, and the fact that some had wanted to walk it for the last 30 or 40 years, or had walked it so many years ago and were now repeating the exercise.

Perhaps that is what is so special about the trail, and about the foresight of people like Muir. We have to leave

these treasured landscapes for the generations that follow. Muir had no idea about climate change, and I wonder sometimes about the language he might use to describe his observations about it. At least, for now, despite the changing climate, we can still travel along the same path and see the same sites. We may just have to work a little harder for them.

A native South African, Ian is an award-winning photographer, designer and writer, who is passionate about environmental communications and the world of outdoor adventure. See more at: www.ianvorsterphotography.com.

Above: A meadow just east of Mirror Lake offers one of the last sublime views of Mt. Whitney in the extreme background

Perhaps that is what is so special about the trail, and about the foresight of people like Muir. We have to leave these treasured landscapes for the generations that follow.



Vibrant Cities Lab

A State-of-the-Art Platform to Connect Urban Forest Leaders

BY IAN LEAHY

AMERICA'S CITIES ARE EXPERIENCING A PERIOD OF REMARKABLE

and exhilarating renewal. City governments, community groups, nonprofits like American Forests, universities and many other institutions are all working to help shape vibrant, equitable cities for the future.

Technology can help ensure that urban forests are included as a central part of every city's future plans and investments. Despite best efforts, too often organizations trying to lead urban forestry are disconnected from other urban leaders and lack the right tools and information to plan, fund and execute a vision for urban tree canopy.



The new Vibrant Cities Lab (www.vibrantcitieslab.com), created by American Forests in partnership with the U.S. Forest Service (USFS), the National Association of Regional Councils (NARC) and numerous cohorts, uses computer technology to integrate and empower urban forest leaders. The Vibrant Cities Lab will for the first time ever provide a single online hub for all of the best tools and technical information for urban forests, including online computer mapping using tree canopy cover.

But first, a little background information about the seemingly oxymoronic field of urban forestry. (Forest + city is not intuitive for everyone!) Because trees weave throughout our cityscapes, urban forestry by definition connects such diverse fields as planning, landscape architecture, transportation, public works, public health, public safety and city management, touching each but without being embodied by any.

What sets urban forestry apart from simple tree planting is that it addresses tree canopy in the built environment on a systemic level. Effective urban

forestry must stretch across property lines and jurisdictional boundaries, addressing sometimes wildly divergent policies right across the street of one another. Yet at its best, we know from cuttingedge research that a healthy tree canopy has the potential to benefit nearly every aspect of daily life. from academic performance and crime rates to water quality and economic development.

This diverse, complicated community leading urban forestry is why we created the Vibrant Cities Lab as a single, unified online resource that delivers the research and best practices of urban forestry to the disciplines that impact tree canopy the most.

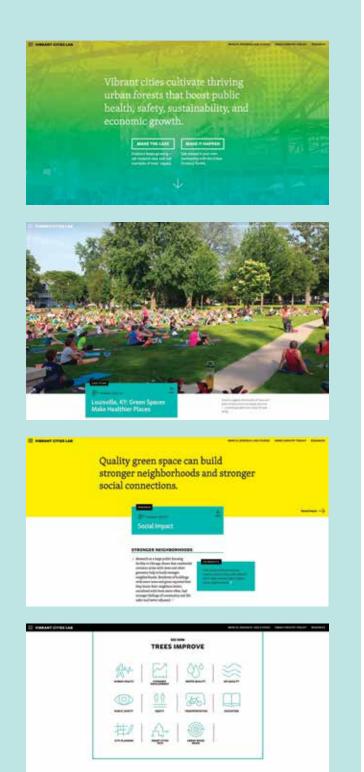
Lauren Marshall, of the USFS's Urban Technology and Science Delivery Team, sees this site as critical to fulfilling their mission.

"A key role for the U.S. Forest Service in urban and community forestry is providing communities of all sizes with the information and tools they need to sustain their forests and the benefits they provide," says Marshall. "The Vibrant Cities Lab makes those resources easily accessible in a curated way."

We paid particular attention to design and user experience — with a commitment to avoid creating another green forestry website. Vibrant Cities Lab is designed to stand out and to be welcoming to those who don't see the world through the prism of trees, providing city managers, allied professions, researchers, students and advocates an easy-to-use curated source for everything they need to begin integrating urban forestry into their objectives.

Left: Urban forests can provide tens of thousands of new jobs as arborists and urban foresters and in landscape design. development and maintenance; below: American Forests is demonstrating Vibrant Cities Lab's impact on the ground in cities nationwide through our award-winning Community ReLeaf work





The Vibrant Cities Lab contains a robust library of resources and case studies for professionals to learn best practices. and a toolkit to implement them in their communities.

THE MOST UP-TO-DATE RESEARCH

One of the most striking contributions urban forestry has made in recent decades is an ever-evolving body of research that shows the sometimes predictable, sometimes very surprising, effects of the presence of trees in the places we live on our environment, economy, social interactions and psychological well-being.

However, this research is emerging at such a rate, and from so many different sources, that it is challenging to keep up. Vibrant Cities Lab's "Make the Case" section draws upon the expertise of leading researchers and experts to create a definitive research summary across 11 areas of impact: human health, economic development, air and water quality, public safety, social equity, transportation, education, city planning, smart cities tech and urban wood reuse.

URBAN FORESTRY STEP-BY-STEP TOOLKIT

Building a comprehensive urban forestry program can be an unwieldy process, from establishing the right data to building strong coalitions and finding funding to sustain the program. The "Make it Happen" section adapts academic and professional analyses, culminating with the "The Sustainable Urban Forest: A Step-by-Step Approach" guide written by Michael Leff, into an easy-to-follow, 17-step process distilled into six phases: assess, prioritize, organize, plan, build and sustain.

SELF-ASSESSMENT AND GOAL SETTING TOOL

To figure out where one's community is in that process, Vibrant Cities Lab includes a unique self-assessment and goal setting tool for city managers and advocates to determine their community's strengths and weaknesses. This information is for their own private use unless they choose to make it public. The scale for each question can range from "-1", because lacking some components is detrimental to the tree canopy, to "5" for truly pacesetting performance in a category.

For example, not having a public tree inventory loses one point. Having a sample inventory done that's not being actively used earns one point. Using that inventory to guide decision-making is given two points. An optimally performing municipality would generate four points for having an up-todate, comprehensive tree inventory of its entire urban forest with information tailored to users and supported by mapping in a municipal GIS system.

The same process is used for other factors, such as high-resolution tree canopy assessments, species health, age and distribution, how well various agencies, diverse communities and utilities engage in the planning and management process, and whether there are markets for urban wood waste.

Particularly when budgets are limited, this tool can be used to prioritize the most important urban forestry investments a community can make to meet its own objectives.



This tool can be used to prioritize the most important urban forestry investments a community can make to meet its own objectives.

CURATED RESOURCE LIBRARY

We are often asked by our local partners across the country about best practices that are being implemented elsewhere. To date, that information has been scattered widely. Vibrant Cities Lab's Resource Library curates some of the best examples from across the country of local ordinances, urban forestry management plans, best practices for maintaining green spaces and communication products that can be directly accessed, all in an easily searched database with links to the original content.

DIVERSE CASE STUDIES

Tying the whole site together are case studies that ground this information in the real world. Examples span a wide geographic and size spectrum, from small towns to midsize and major cities. Like the rest of the site, these stories will be updated quarterly to maintain fresh perspectives. For example, the site features the city of Reading, Pennsylvania's complete streets policy that was ranked best in the nation and Oregon's legislature to create markets







Urban forestry as a discipline has matured to a stage whereby it is ready to integrate into the decision-making processes of the disciplines that impact tree canopy the most.

Above: Effective urban forestry must stretch across property lines and jurisdictional boundaries, addressing sometimes wildly divergent policies: below: Urban forests can strengthen social ties in crowded inner cities by establishing a common space for leisure and recreation

for urban lumber in Clackamas County. There is also a section on how smart cities technology is being used to improve urban forest management in places like Chicago and Philadelphia.

REACHING KEY AUDIENCES

Cognizant of many well-intentioned microsites strewn throughout the desolate outreaches of the internet, urban forestry partners will spend the next year and beyond promoting this site at conferences, webinars and local events, writing guest articles and blog posts to reach targeted professions, and hosting promotions. But, the most important impact may

begin in our hometown of Washington, D.C., where we are working to link Vibrant Cities Lab into the websites of associations and other organizations that have established audiences in the disciplines urban forestry most impacts.

American Forests is also demonstrating Vibrant Cities Lab's impact on the ground in cities nationwide through our award-winning Community ReLeaf work, from Baltimore and Detroit to Dallas and Miami. We provide a uniquely comprehensive process to help cities build successful urban forestry programs. Vibrant Cities Lab helps us strategically target our investments from such partners as Bank of America and Alliance Data to maximize longterm impact.

Urban forestry as a discipline has matured to a stage whereby it is ready to integrate into the decision-making processes of the disciplines that impact tree canopy the most. Vibrant Cities Lab is an important online infrastructure to begin doing that on a national scale. Lance Davisson, chair of the National Urban and Community Forestry Advisory Council to the Secretary of the Department of Agriculture, captured this vision perfectly.

"The Vibrant Cities Lab is a valuable resource for all professionals who are charged with planning for and managing the green infrastructure of our nation's cities and towns," says Davisson. "The Vibrant Cities Lab brings together a much-needed compendium of information for urban and community forestry, and provides access to technical tools for long-term sustainable management of this critical community resource. This is a great resource for urban and community forest efforts everywhere to reach new scale and effectiveness."



lan Leahy writes from Washington, D.C., and is American Forests' director of urban forest programs.

BOTTLED AT THE SOURCE



earthkeepers



It Starts With a Fever

BY ALLIE WISNIEWSKI

"I AM THE LORAX. I speak for the trees!" goes the classic conservationist tale by Dr. Seuss. But, who speaks for the whitebark pine? Melissa Jenkins is one.

Time seems to be running out for this keystone species. If we don't take action, and fast, the whitebark pine will undoubtedly become functionally extinct.

As a silviculturist and a natural resources specialist at the U.S. Forest Service, you could say that trees are Melissa's passion. But it's the whitebark pine that's earned a special place in her heart. Struggling for life in the face of challenges — the pesky mountain pine beetle, a non-native fungal disease called white pine blister rust, and the always ominous force of climate change - the species could certainly use someone advocating for its restoration. Someone like Melissa.

"It was kind of accidental," she says of her first interactions with whitebark pine in 1991. "Very, very few people were planting whitebark pine at that time. The wildlife biologists went and collected all this seed, and they really didn't know what they were doing nobody really did. The seeds had really poor germination, so I knew that they hadn't done it correctly, and we needed to figure out why."

After only the first few minutes of speaking with Melissa, I could feel her affection for this tree oozing through the phone - a certain ecological infatuation she likes to call "the fever."

"I guess it was kind of happenstance when I first fell into it, but the more I learned about the tree and its plight, I got a passion for it," she adds. "I tell people it's like getting the fever. You just kind of get infected."



"I think, if we could wait a couple thousand years. whitebark would probably take care of itself," she concludes. "But it would take thousands and thousands of vears. And, I don't think we have the time to wait."

And infected, she was. In 1999, she became the chair of a subgroup of the Greater Yellowstone Coordinating Committee, which was dedicated to preserving and protecting the whitebark pine, leading restoration efforts and paving the way for future conservation projects. programs and research within the ecological community. In 2010, she joined the Whitebark Pine Ecosystem Foundation Board of Directors, on which she now serves as secretary.

The whitebark pine isn't just any old tree, and that's why Melissa believes in working so hard to save it. She highlights the high-calorie, high-fat seeds on which dozens of wildlife rely as an indication of how much these ecosystems need whitebark to be healthy — or even exist, in some cases.

"That's why they call it a keystone species," she says of whitebark. "So many other species depend on it. I don't think our high elevations would be the same if we didn't have whitebark pine."

Clearly, the species is in quite a predicament. What's more, it's because of humans that the tree is now so severely threatened. Melissa notes that humans introduced blister rust around the turn of the 20th century, impacting a species that had been "doing just fine" for millennia. Even worse is the uncertainty surrounding climate change and how it will affect whitebark pine.

"Humans created this problem," she says, "and because we created this problem, we have a responsibility to restore this tree."

When asked if she always pictured herself fighting for the natural world, she replied with an air of confidence that assures you of her deeply rooted love for the Earth.

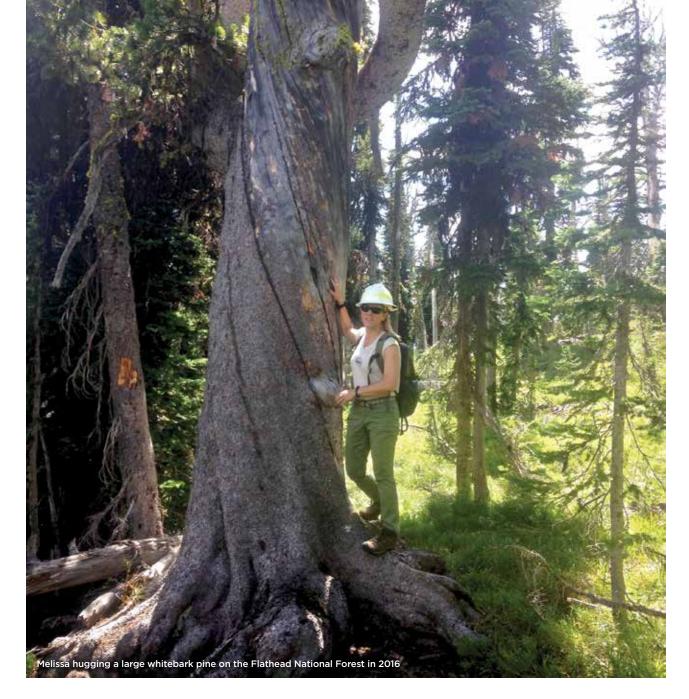
"I've always known what I wanted to do," Melissa says. "I'm one of those lucky few. I've always, always been a conservationist."

It's not exactly a job of day-to-day monotony, either.

"My job is to learn," she says. "We always have to have the best available science."

Naturally, given the limited available resources and the urgency of the situation, there's a lot of time, effort, energy and the occasional frustration involved when it comes to working to restore the whitebark pine. It's not always rainbows and butterflies out in the field.

"One time there was a tree that I found that appeared to be really resistant [to white pine blister rust], so we caged the



cones even though it hadn't been treated for the mountain pine beetle," she says. "When we came back to collect the cones, the tree was totally riddled with mountain pine beetle. That made me sick."

For Melissa, however, special moments of gratification make the minor setbacks and obstacles well worth it.

In 2009, she visited the very first seed orchard and saw a little conelet growing on a sapling. The moment, which she describes as possibly the most amazing moment she's ever had with whitebark pine, was a kind of culmination of all the hard work she and her colleagues had done over the past decade or so.

"All that effort we had put into that one little tree, and that one little conelet, kind of represented all that work for me," she reminisces. "I could see the future of whitebark in that little conelet."

Though the whitebark pine seems to have all odds stacked against it, Melissa isn't giving up. She's doing everything she can to tell the uniquely touching story of the whitebark pine and its integral role in high-elevation forest communities, vouching for the resilience she's determined to see.

For Melissa, the Lorax of the whitebark, this tree needs our help now more than ever. While she thinks there will always be whitebark pine, she still has many questions. Will it function on its own and within a functioning ecosystem? Will there be a large enough

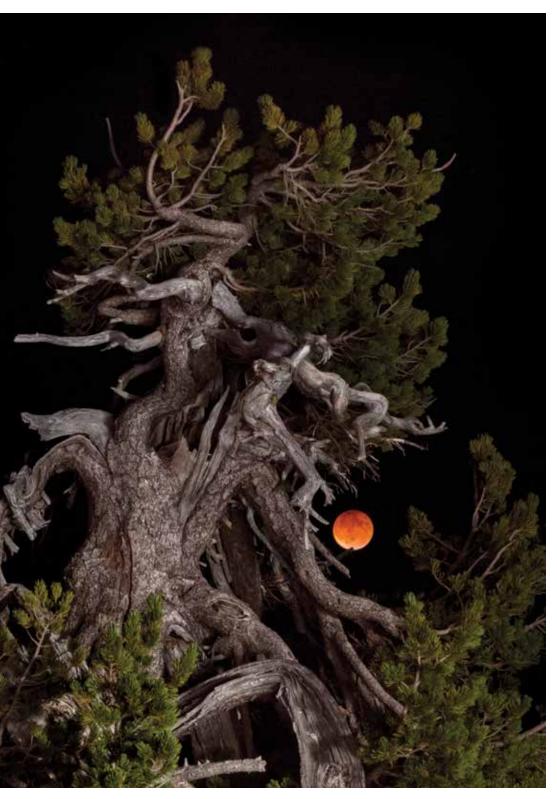
population to provide a food source like it has in the past?

"I think, if we could wait a couple thousand years, whitebark would probably take care of itself," she concludes. "But it would take thousands and thousands of years. And, I don't think we have the time to wait."

To learn more about whitebark pine and American Forests' work to save the species, check out "One Tree, Many Futures" on page 24.

Allie Wisniewski was American Forests' summer 2017 communications intern and is a rising senior at Florida State University, studying English and Studio Art.





"Guardian of the Blood Moon"

Crater Lake National Park, Ore. - 2015 During the "super blood moon" eclipse of 2015, an ancient whitebark pine embraces our shrouded satellite. To capture something a bit more intimate of this tree, I did some light-painting using my headlamp during a 6-second exposure of this old pine

For more about the challenges facing this at-risk tree species, check out "One Tree, Many Futures" on page 24.

About the Photographer

Joaquin Baldwin is a CG layout supervisor, photographer and animator, known for his award-winning independent animated shorts and his work at the Walt Disney Animation Studios, since starting there in 2010. His films have earned him more than 100 awards in festivals such as Cannes, Student Academy Awards, Cinequest, USA Film Festival and Cinanima. When not at the studio, he enjoys taking photo road trips, focusing mostly on landscapes and wildlife.

Joaquin has a bachelor's degree in animation from CCAD, and a masters in animation from UCLA. He has been a layout artist and layout supervisor in films such as "Zootopia," "Moana," "Big Hero 6," "Frozen," "Feast" and "Wreck-It Ralph."

You can see Joaquin's work at www.joaquinbaldwin.com, including his photography portfolio, 3D printed design work and animated shorts.



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Janie Stapleton illustrates the artwork for these prints in her Arizona studio. We donate \$5 to American Forests when you purchase one (at no cost to you).*





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Read our story on page 10 to learn more about how we're bringing remarkable designs by independent makers to our customers, and doing it with a positive impact on people and our planet.

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