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IN THIS ISSUE

Eastern Redcedar in Oklahoma

Although eastern redcedar is native to Oklahoma, decades of fire exclusion have allowed this tree to move onto the state's tallgrass prairies. Until recently, it wasn't known just how widespread eastern redcedar was, but a nearly finished resource assessment offers insight as to its distribution and potential markets to incentivize its removal. **Page 10.**

Biometrics Bits

When a timber cruise comes back higher than we expect, something doesn't feel quite right. It doesn't match up with our experience. We might be inclined to shave the estimates down a bit. Is this just fudging the numbers? In this article, Brian Clough explores a rigorous and justifiable way to incorporate our experience and prior expectations into our inventory estimates. **Page 11.**

Jack-of-All-Trades Handheld

A Field Tech review of the "Swiss Army knife" of handheld computers: DT Research's DT301T, a rugged Windows tablet that has a dual-frequency (L1 and L2) Global Navigation Satellite System receiver capable of real-time kinematic (RTK) positioning in the one-centimeter range. **Page 12.**

A Look at SAF's ForestEd

With ForestEd, SAF's new online learning system, convenience is a key feature. The website (ForestEd.org) supports forestry and natural-resources professionals in achieving professional-development goals anywhere, anytime, and on any device—smartphone, tablet, or laptop, or desktop computer. But there's much more to ForestEd than convenience: The site offers a wealth of valuable educational resources. **Page 15.**

Forest Science & Technology Board

SAF's FS&TB serves as a conduit for the exchange of information related to forest science and technology between SAF working groups and SAF leadership. It's a volunteer board made up of both regional and subject-area representatives. For more information, see **page 16.**

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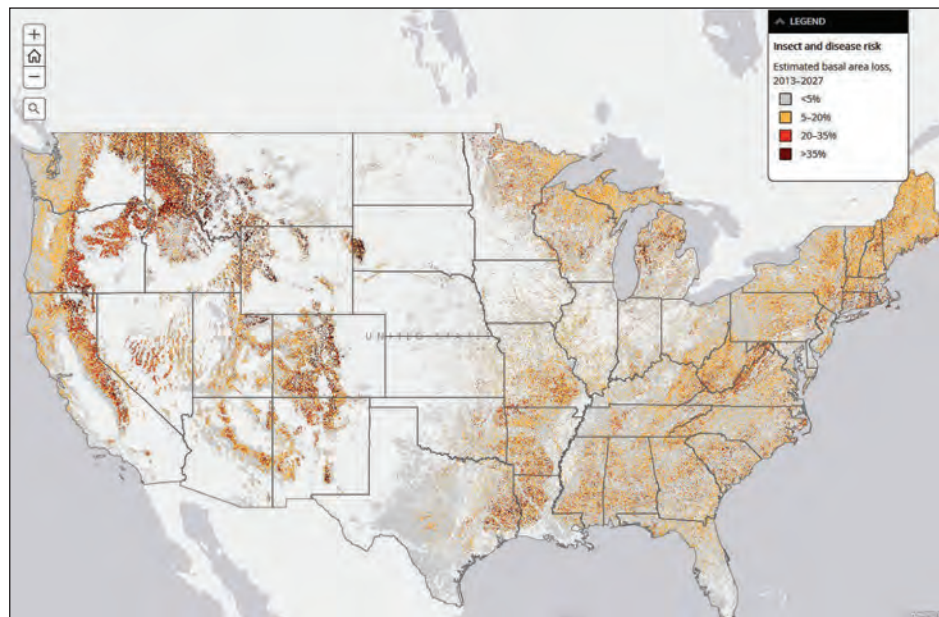
The State of America's Forests: An Interactive Guide

By Steve Wilent

The State of America's Forests: An Interactive Guide is a website that "tells a story of consumption and conservation, of conflict and collaboration. But most of all, it is a story of regrowth, renewal, and abundance." Within its online pages, the guide offers a graphical view of data from the US Forest Service's Forest Inventory and Analysis (FIA) unit and many other sources, in three main sections:

- Benefits such as water, recreation, and forest products and services
- Threats such as wildfire, invasive species, and insects and disease
- Stewardship, including forestland ownership, certification, harvesting, and reforestation

"Across the US, there is a multitude of misconceptions about our forests among both consumers and family forest owners themselves," said Tom Martin, president and CEO of the American Forest Foundation (AFF). "The State of America's Forests provides a wealth of credible information to address this. First



This interactive map from the State of America's Forests website shows the expected loss in tree basal area due to forest pests between 2013 and 2027. Users can click on an area to see risk within ecoregions.

and foremost, it showcases that family forest owners own the largest portion of our forests, a key fact that many do not realize. It also helps people better understand the benefits of forests in a modern and compelling format—wildlife, water, wood, and more, as well as the size and

scope of the threats to these forests. With so much data publically available today, having an easy-to-use, interactive format helps landowners and consumers answer their questions about our forests."

STATE ■ Page 4

THE FUTURE OF SAF

At the Intersection of Urban Forests and Wilderness

By Ryan Vogel

Editor's note: Continuing with our profiles of up-and-coming SAF members who will continue managing our nation's natural resources in the coming decades, this month we are featuring Ryan Vogel, a dual-degree master's student at Ohio State University (OSU). Vogel joined SAF in 2016 when he entered graduate school, but his career in the natural-resources field began in 2008.

Since joining SAF, he has twice been selected as an SAF Diversity Scholar, in 2016 and 2018. In 2017, he was awarded a Kurt Gottschalk Science Fund grant to support his thesis work on city and regional urban-forest planning in central Ohio. At the 2018 SAF National Convention, he presented on why foresters should be more involved in city planning. Vogel is also an active member of the SAF Diversity and Inclusion Working Group, for which he recently submitted a field-trip proposal for the upcoming national convention in Louisville—a Halloween night hike that beat out his other idea of underground urban mountain biking. (He still intends on pursuing this individually during the convention, so if anyone is interested, please get in contact with him!) Additionally, he will co-



A member of SAF since 2016, Ryan Vogel is a dual master's student at Ohio State University. Inspired by forestry work in the Peruvian Amazon, he decided to study forestry, with the goal of becoming an urban forester.

lead a workshop on diversity at the Ohio SAF

VOGEL ■ Page 3

Mentoring in Action in Colorado and Wyoming

By Andrea Watts

In recent years, numerous SAF members have drawn attention to the value of mentoring and the need for mentoring programs as a way of building the next cohort of natural-resources professionals and providing value to members.

Fortunately, chapters don't have to reinvent the wheel if they are interested in starting a mentoring program. Last year, we looked at the Kentucky-Tennessee SAF (KTSAF) mentoring program (see *The Forestry Source* May 2018). This month, Dave Cawrse and Chris Dahl talk about how the CO-WY SAF chapter built its mentoring program. The CO-WY SAF chapter includes nine local chapters and two student chapters, one at Colorado State University (CSU) and another at Front Range Community College.

Before relocating to Ohio, Dahl served as the chapter's first mentoring chair; Cawrse serves as the current mentoring chair. What follows is an edited version of my conversation with them.

How the program started

Cawrse: Our mentoring program

MENTORING ■ Page 6

Published monthly by the Society of American Foresters (SAF), *The Forestry Source* (ISSN 1084-5496) provides SAF members and other natural resource professionals with news regarding developments within the forestry profession as well as the activities and policies of SAF.

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Society of American Foresters

The mission of the Society of American Foresters is to advance the science, education, technology, and practice of forestry; to enhance the competency of its members; to establish standards of professional excellence; and to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society.

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Forest Policy Update and Priorities for 2019

By John Barnwell

The first few months of the 116th Congress came with bipartisan celebration of permanent reauthorization of the Land and Water Conservation Fund (LWCF) and unanimous frustration with the longest federal government shut-down to date.

Though pleased with Congress's recognition of the importance of conservation with the reauthorization of LWCF, SAF did not and does not take a position on this legislation. Rest assured, however, SAF's Government Affairs team and the Committee on Forest Policy are working hard to educate key leaders on Capitol Hill about the benefits of forests and forest-management professionals.

SAF was pleased to introduce SAF CEO Terry Baker when he testified before the House Subcommittee on Interior, Environment, and Related Agencies on February 26, 2019. Baker and SAF staff are working to develop new connections and foster long-term relationships with committee leaders and their staffs to show and remind them about how forests improve quality of life by providing clean water, recreation, and wildlife habitat and are engines for economic opportunity.

Here is a brief update on SAF's policy priorities for 2019:

Wildfire suppression: The 2018 Omnibus spending bill changed the budget and funding mechanisms for fire suppression. Beginning in FY 2020, the US Department of Agriculture and Department of the Interior can access up to \$2.5 billion dollars in disaster funds, if suppression costs exceed the dollars appropriated for wildland-fire control in a given year. SAF will remind Congress that this negotiated agreement also includes Healthy Forests Restoration Act (HFRA) categorical exclusions for hazardous-fuels projects and increased wildfire resilience, new HFRA categories for fuel and fire-breaks and vegetation around power lines, new stewardship contracting authorities that extend contract periods from 10 to 20 years, and other provisions. SAF will also be encouraging Congress to reimburse the more than \$700 million the US Forest Service borrowed from other accounts to combat the challenging 2018 fire season that was not repaid in the recent agreement to end the government shutdown.

Shared stewardship and streamlining environmental review processes and procedures: SAF supports the efforts of Department of Agriculture Under Secretary James Hubbard and US Forest Service Chief Vicki Christiansen to communicate and implement the vision of Secretary of Agriculture Sonny Perdue by working more closely with states to achieve forest-management objectives across boundaries using the most-advanced scientific tools to target treatments in areas with the highest payoffs. Coordinated planning and investment are critical to improving forest health and reducing risk, but forest professionals also need to be empowered



SAF on Capitol Hill on February 26, 2018 (left to right): Ed Shepard, president of the Public Lands Foundation; Alexandra Murdoch, vice president of policy for American Forests; and SAF CEO Terry Baker. Photo courtesy of Danielle Watson.

to and be confident in making management decisions. SAF sees promise in and will support USDA's work to eliminate procedural obstacles and complexity in environmental analysis and decisionmaking. This will provide forest-management professionals with the ability and the resources to support, analyze, and execute management decisions to promote greater forest resilience now and thriving forests in the future.

Disaster recovery assistance: While the focus is often on the devastation caused by wildfire, a common misperception is that only public lands are impacted. However, forest landowners across the US experienced tremendous loss of forest assets from hurricanes, fires, floods, insects, and disease in 2018. Several programs already are in place that could aid landowners trying to recover from these devastating losses. SAF will work with its partners to make Congress aware of these existing provisions and encourage members to consider forests and the need for salvage and reforestation as all disaster-relief funding packages are written and amended.

2018 Farm Bill: SAF will continue to be engaged with USDA leadership, the US Forest Service, and the members of the Forest and the Farm Bill Coalition to ensure that Farm Bill programs are funded and implemented to improve the health, resiliency, and productivity of America's forests. This includes fostering new markets and innovation and expanding use of wood products through the Timber Innovation Act and Community Wood Energy and Wood Innovation Program; continuing the use of expanded authorities to address federal lands impacted by insects and disease; extending the Good Neighbor Authority to allow counties and tribes to enter agreements with federal government agencies on cross-boundary forest-health initiatives; reauthorizing the

Collaborative Forest Landscape Restoration Program (CFLRP) for 10 years; codifying landscape-scale restoration (LSR); and providing adequate funding levels for the Environmental Quality Incentives Program (EQIP), Regional Conservation Partnership Program (RCPP), and Healthy Forests Reserve Program (HFRP), among others.

Executive and secretarial orders encouraging improved forest resilience: President Trump's executive order and Secretary of the Interior Ryan Zinke's secretarial order on forest resilience were overlooked due to the government shutdown, but both orders encouraged increasing the pace and scale of projects designed to improve fire resilience on public lands. SAF appreciated the attention paid by the president and secretary to the scale of the threat and actions needed. Fire suppression should be and is a main priority of USDA and Department of the Interior, and SAF will be working with these agencies and Congress to ensure that funding is available to address threats and build forest resilience while continuing to advocate for implementation of these orders to not be overly prescriptive. Implementation should be aligned with the most-current science to provide forest managers with the degree of professional discretion and flexibility to develop and implement plans suited specifically to the forest conditions they observe.

Appropriations: SAF will continue to work with Congress and the land-management agencies to support adequate funding for forest research and development, public-land management, cooperative forestry in tandem with state forestry agencies, and the promotion of forest management among private forest landowners. Through letters of support, meetings with members of Congress, collaboration

Winter Meeting.

In his own words, Vogel shares his path to becoming an urban-forest planner and his vision for SAF's future.

Seeing the forest for the trees

Just as every urban forest is unique, in that no two are the same, so too are the foresters who manage these forests. Growing up in New York City, I was not exposed to the “traditional” forests that students who grow up in rural areas know. Most of the parks and streets I played in as a child were covered in concrete, with only the occasional tree struggling to survive in the concrete jungle. Not until much later would I realize that every city tree played an important part in forming the urban-forest matrix.

In an effort to get out of the city, I applied to colleges across the country and, ultimately, accepted a scholarship to study architecture at the Hispanic-serving institution Florida International University (FIU). I soon realized that I did not want to design buildings, but instead wanted to apply my newly acquired spatial design skills toward the natural environment. As I continued to explore the Florida Everglades, I learned about many fascinating tropical trees native to Miami that don't grow anywhere else in the country. I also had the opportunity to do forestry work in the Peruvian Amazon that involved inventorying trees and testing sustainable palm-fruit harvesting techniques. This experience changed my life. I returned from that trip and immediately changed my major. I knew that regardless of the color of my skin or my urban upbringing, I wanted to become a forester.

The value of interdisciplinarity

Being a dual-degree student is demanding, but I would not trade it for anything. Splitting my time between three on-campus departments and one off-campus department forces me to constantly navigate among multidisciplinary courses, faculty, literature, and professional jargon, as well as across the student, staff, and professional realms. At OSU, I am part of the School of Environment & Natural Resources, the Knowlton School of Architecture, and the Office of Diversity & Inclusion, and off-campus, I work for Franklin County Metro Parks' Natural Resource Management department. I feel that this rigorous (and hectic at times) schedule and diverse workload is preparing me to work as a bridge among agencies, departments, and disciplines while in graduate school and throughout my professional career. I recommend that other up-and-coming forestry students embrace innovative ways to learn from and work with a broad variety of people, since being versed in multiple fields has proven very beneficial to me, as well as to the trees I work to protect.

Learning on the job

Prior to attending OSU, I worked full-time for several years as an urban-park manager, and it was absolutely fundamental to my professional development as an urban forester. As an undergraduate student, I

worked part-time at the university nature preserve on campus doing trail work and leading hikes. This helped me land a seasonal position at Everglades National Park in the Aquatic Ecology department, which ultimately led to my being hired as a back-country park ranger at Yosemite. For several years thereafter, I would traverse the Yosemite wilderness during the summers and provide urban-forest programming during the school year. I was constantly taking what I learned from one forest and applying it to the other. This back-and-forth process, working as a lowly ranger in a large park and working my way to the top of a small park, has laid the foundation for my career.

Embracing Latinidad

Moving to Miami, Florida, was a big change for me. While not as densely developed as New York City, it is still a large city—just with a uniquely tropical twist. Living in Miami for nine years, I learned so much about Latin American cultures and was even able to travel on several school-funded trips to Nicaragua, Brazil, and Guatemala.

Yet it wasn't until I moved to Ohio that I realized what it truly meant to be Latino. New York City is such a melting pot that most New Yorkers consider themselves, first and foremost, New Yorkers before anything else. Miami is so Latin that everyone is automatically assumed to be Latin, since white Americans are such a minority. However, being brown in rural America is an uncomfortable feeling, one that many people who look like me still face every day across much of our country. This feeling was strange, since I had never experienced racism before moving to the Midwest. So I began to connect with the Latinx community on campus, made some very close friends, and, eventually, was offered a job. I'm working to break down barriers of bigotry in hopes of creating a more peaceful (and forested) future for everyone, as well as continuing to open doors for young brown foresters, because we all know there are already enough barriers in their way.

What he brings to the natural-resources profession

Flexibility, to me, means being able to adapt to different situations as new information is gathered. I believe I am skilled at working in a wide variety of settings with a broad spectrum of people. I believe my diverse background and life experiences have allowed me to relate to people, places, and things everywhere I go. Ever since I was young, I have been independent. Having never ridden a yellow school bus in my life, I was handed a MetroCard and expected to get myself safely to and from school every day, navigating any potential hazards along the way. Early on, I discovered that hard work does pay off, taking my first, second, and third jobs all before the age of 15, and essentially never being out of work since then.

I am also very passionate about my work: If I don't enjoy it, then I simply won't do it. Life is too short to waste time doing work that doesn't make you happy and make the world a better place. As an experienced public employee skilled at



Ryan Vogel recommends that forestry students “embrace innovative ways to learn from and work with a broad variety of people.”

navigating bureaucracy, I intend throughout my career to overhaul and modernize antiquated local land-use policies, many of which have long, terrible histories of oppression toward minorities and destruction of natural resources. Teddy Roosevelt once said: “Far and away the best prize that life has to offer is the chance to work hard at work worth doing.” I appreciate every day that I can put more urban trees in the ground and will strive to keep them there for as long as possible.

What SAF can do to attract more talented young professionals

SAF should reward those people who do great forestry work and rebuke those individuals and policies that fail the American

people. Too many people become complacent in their roles, sailing by decade after decade without keeping up with the most-current science, technology, and best practices. Similarly, too many policies are only altered incrementally through minor amendments and never receive the comprehensive overhauls they deserve. While some policies hold people back from producing the best solutions to the world's biggest problems, some people fail to combat deeply rooted policy issues in their organizations for fear of being reprimanded for disturbing the water or losing an easy paycheck. I'd like to encourage all SAF members to think big about what they can do for the field of forestry in their roles and to work hard to accomplish novel and profound progress, or else a hungry and talented young forester may snatch their comfy chair out from under them before they know it.

Finally, being a member of SAF has to be fun! If SAF hopes to attract more members, the organization needs to make the annual convention absolutely spectacular, something nobody would want to miss. If the convention became known for throwing the wildest awards banquets (within reason, of course) and coolest field trips (e.g., backpacking, tree climbing, mist-netting), SAF may start to attract a different and more-diverse membership. While business, finance, computer science, and medical organizations may design their annual meetings to be indoor, sterile, cold, and

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AFF's primary mission is to "[ensure] the sustainability of America's family forests for present and future generations in conjunction with our strategic partners." Its American Tree Farm System, the largest and oldest sustainable family woodland system and community in the US, includes more than 74,000 members who collectively manage more than 20.5 million acres of forestland.

The site, usaforests.org, was produced by Mila Alvarez, principal of Solutions for Nature, a consulting firm specializing in research and analysis in the fields of domestic and international natural-resources policy and sustainable management. She also works for the Inter-American Development Bank and is a senior specialist in natural resources. Alvarez, who holds bachelor's and master's degrees in forest engineering from the Universidad Politécnica de Madrid and a PhD in forest resources from the University of Maine, produced a *State of America's Forests* report in 2007, which was published by SAF (see tinyurl.com/yyhlwnwj).

The first State of America's Forests website was launched in 2017 by the US Endowment for Forestry and Communities. Since then, Alvarez has worked to expand and enhance the site, and the Endowment announced a significant update in February 2019.

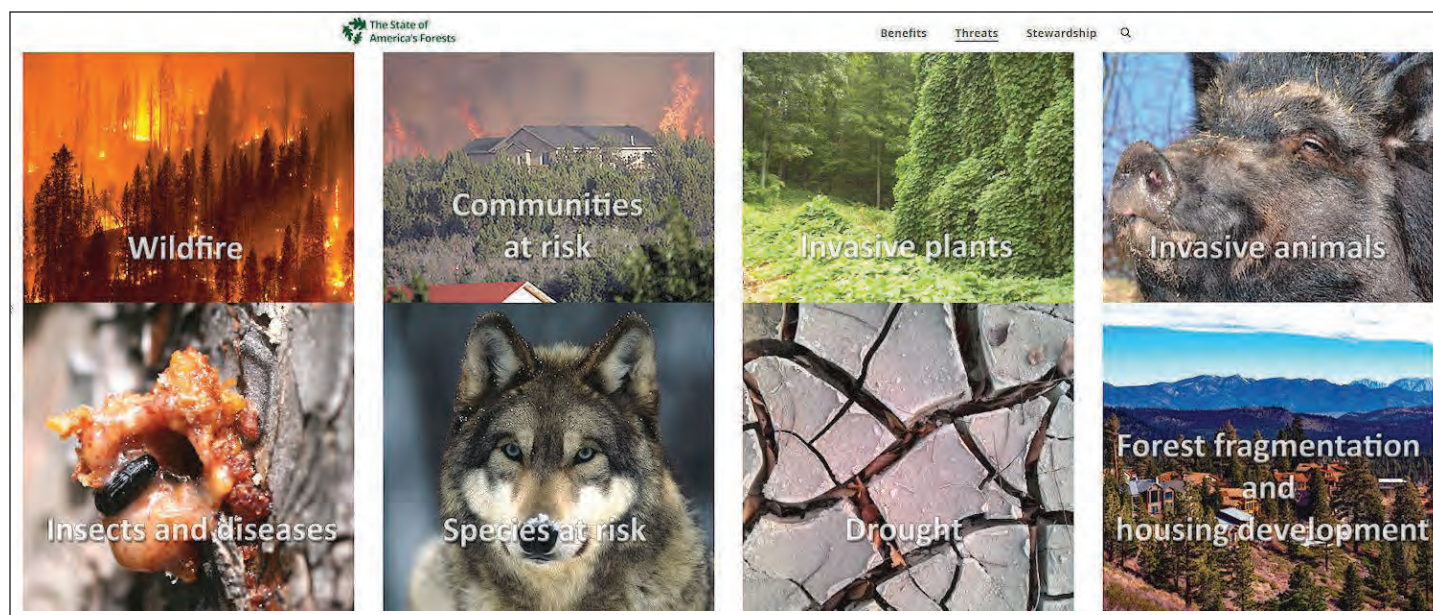
"We are excited about the visually compelling story this website tells about the many initiatives, landscapes, and communities we touch through our programs and partnerships," said Endowment president and CEO Carlton Owen. "We hope that visitors gain an appreciation for the breadth and depth of our ongoing work for forests and the rural communities that rely on them."

Alvarez said that the Endowment and its partners had two main objectives for the site.

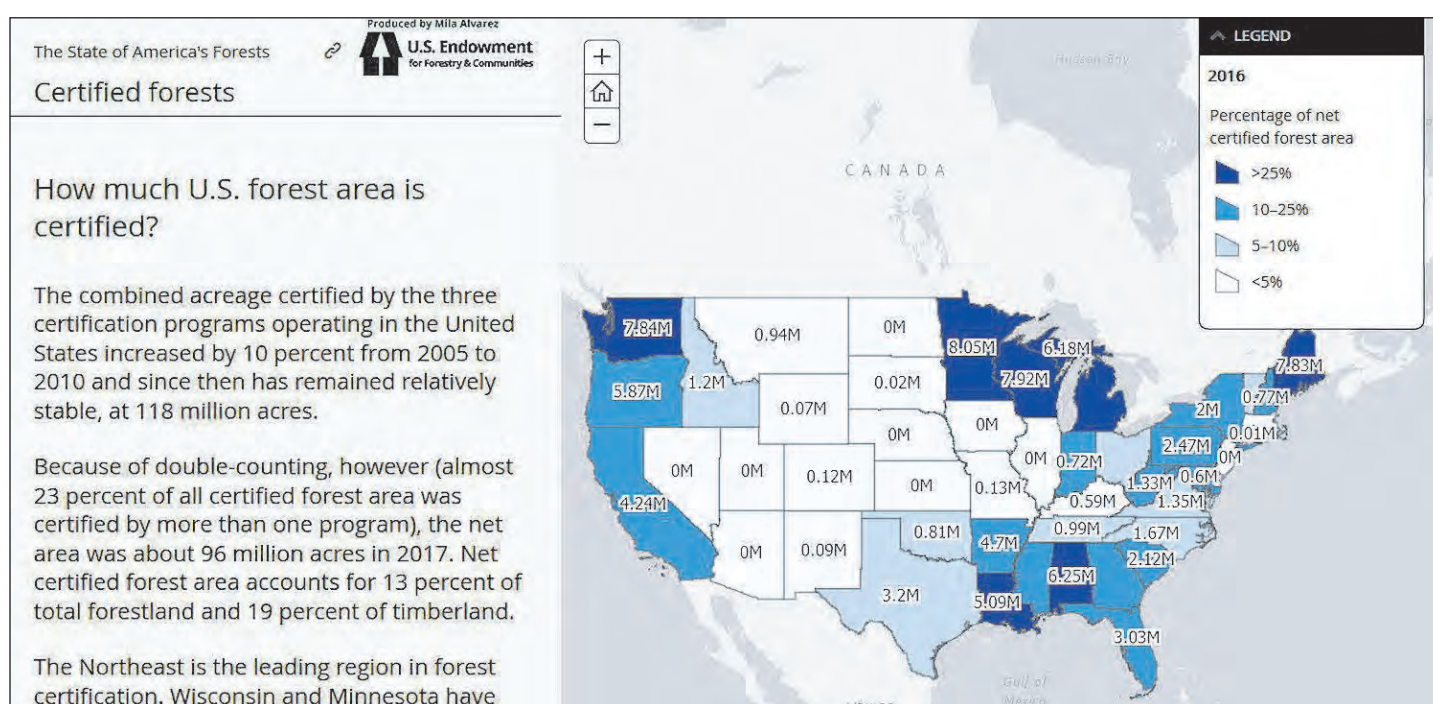
"The first objective was to produce an assessment of the nation's forests—where are we heading?" she said. "We provide a comprehensive examination that takes the latest and greatest published information that gives you some understanding of the current state of our forests and the trends over the years. And we tried to put all of this complex information in a format that creates understanding."

Martin said that the site helps landowners and managers understand how their forestland fits into larger regional ecosystems.

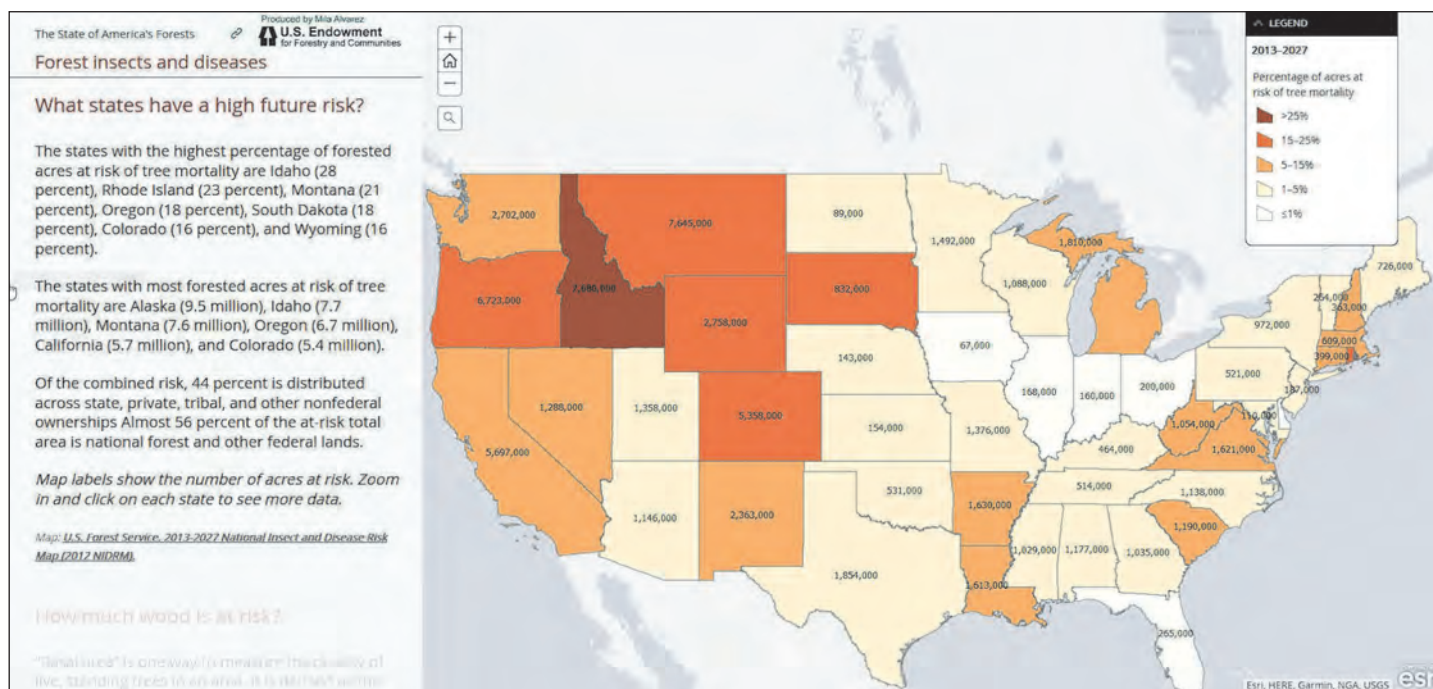
"The average family forest owner owns just shy of 68 acres, yet wildlife and water do not recognize property lines, nor does a threat like wildfire. Which means challenges must be addressed at the landscape level," Martin said. "The actions of private landowners, as well as the actions of public owners, can both contribute to the larger good of conservation of the region. We need all types and sizes of ownerships to be good stewards of their land for healthier, more-resilient forests. Helping people with this perspective is crucial—and motivating. State does that."



The State of America's Forests website offers information about major threats to US forests and communities.



According to the State of America's Forests website, the combined acreage certified by the three certification programs operating in the United States increased by 10 percent from 2005 to 2010 and since then has remained relatively stable, at 118 million acres.



The states with the highest percentage of forested acres at risk of tree mortality are Idaho (28 percent), Rhode Island (23 percent), Montana (21 percent), Oregon (18 percent), South Dakota (18 percent), Colorado (16 percent), and Wyoming (16 percent), according to the State of America's Forests website, usaforests.org.

Leveraging Research

A secondary objective of the project was to showcase "the outstanding forest-research capabilities of agencies, universities, nonprofits, and other institutions," said Alvarez.

"It was an opportunity to bring all of that information together and add value through the creation of interactive maps, videos, and story maps, and to do addi-

tional analysis based on pieces of information that could be connected into a larger picture," she said. "Certified forests, for example. We have three certification systems operating in the US—FSC, SFI, and American Tree Farm—and there is no place where data from those three systems is presented in a nationwide map, in one visual representation of where certification is happening, regardless of the

certification system."

The idea is to provide a one-stop shop for data, stories, and exploration, she said.

"Overall, we wanted to present information in a way that was more intuitive, more interactive, and more engaging," Alvarez said. "Intuitive, meaning a website that can be easily navigated. Interactive, in terms of how we allow people

to explore and learn at different scales. And engaging in the sense of providing something that is visual, fun, dynamic, and attractive—in ways that capture the attention of the user and encourage them to spend more time there, that spark their interest in areas that perhaps they hadn't previously considered investigating.”

The intended audience includes anyone who may have an interest in forests, ranging from the general public to congressional policymakers and their staffs.

Much of the data presented on the site come from the Forestry Index and Analysis (FIA) national program.

“Without FIA's willingness to share data and collaborate in this work, this project never would have succeeded,” said Alvarez.

Other data came from numerous federal agencies, including the US Forest Service, US Geological Survey, Bureau of Land Management, National Oceanic and Atmospheric Administration, National Park Service, US Environmental Protection Agency, US Fish and Wildlife Service, NASA, and Department of Defense, as well as several state agencies, including the California Department of Forestry and Fire Protection. Nonprofit organizations, such as the American Forest Foundation, National Association of State Foresters, The Nature Conservancy, Nature Serve, National Alliance of Forest Owners, Sustainable Forestry Initiative, and Forest Stewardship Council, also provided data. Esri, a key partner, donated the GIS software and server space upon which the website operates. Funding was provided

by the US Forest Service and the US Endowment for Forestry and Communities.

Alvarez said she is pleased with the response from users of the website in the US, as well as in other countries. She said that nations such as Chile have expressed interest in producing websites for forests in their countries.

Forests in Focus

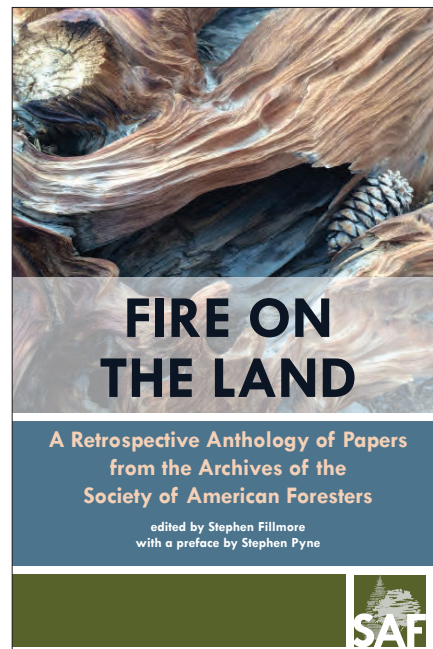
Martin said that AFF and its partners are developing a new tool, called Forests in Focus, that would complement the State of America's Forests website. Forests in Focus will offer a dynamic, landscape-level assessment of risks and opportunities for sourcing forest products.

“We at the American Forest Foundation have found the State of America's Forests' landscape-scale perspective useful when it comes to verifying sustainability and conservation impact,” Martin said. “By visualizing and analyzing data from the US Forest Service and other trusted providers, the tool allows for the verification of risk in supply chains, while complementing other sourcing tools, such as forest certification. These types of interactive landscape-scale views offer more-meaningful analysis and visibility into issues, such as high conservation-value forests or the vitality of local communities. The State of America's Forests and Forests in Focus give implicit assurance to customers that buying trees from family forests in the US is more likely to support sustainable, resilient forests than cause harm. That's great for family landowners, but even better for forests.” **FS**

Fire on the Land

Featuring a preface by Dr. Stephen Pyne

Fire on the Land brings together the best research and thinking on fire ecology, policy, and application to examine fire's place in forest management. A collection of peer-reviewed scientific articles from the SAF archives, this anthology provides a comprehensive examination of how fire has shaped America's forested landscape and the people who care for it. Each new section is led by a science synthesis introduction that bridges the history of these pivotal papers and the current practices and work that lies ahead regarding fire science in forestry.



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College of Forestry, Oregon State University



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MENTORING

■ From Page 1

started informally, with CSU students who belonged to the Alpha chapter and were looking for mentoring and creating better links to the state chapter. At national conventions, we would arrange for students to have lunch with an SAF member. That was really successful, but we wanted to formalize it beyond a one-time meet-and-greet.

I've been involved with other mentoring programs through the US Forest Service. Quite frankly, I was handed a notebook on being a mentor, and it described the importance of why you should be a mentor, but the question is really: *How do you be a mentor?* I'm a baby boomer, and we're working with millennials. How do you connect and share valuable time together?

In October 2015, I was chair of CO-WY, and we had a goal for developing chapter leadership: Start a leadership academy and improve our mentoring. We created a mentoring chair, and the first person in the position was Chris Dahl. He developed some of our guidelines, such as a Mentoring Committee charter and duties. We also elevated the mentoring chair to be on our SAF State Executive Committee.

Dahl: Bob Sturtevant was one of the leaders who gave mentoring a push in northern Colorado. Bob had for a long time been coordinating meet-and-greets at the national convention, so there were CO-WY members linked up with CSU students. It's really important to note that Bob, as well as many others within the chapter, engaged in mentoring, and there had been interest and effort occurring at smaller scales.

I credit Cawrse as the wizard behind the curtain. A few of us had been talking about the needs and benefits of mentoring, but it was really his push on the Executive Committee to vote for creating a mentoring program. Cawrse nominated me to serve as the first mentoring chair. Having a mentoring chair was really a big step for the chapter and a great example for other chapters throughout the country. Having the mentoring chair on the Executive Committee meant he/she could provide updates and engage to provide feedback on the mentoring program.

How the program is structured

Cawrse: We had a small Mentoring Committee that approved the mentoring program and then created a subcommittee for mentoring. Four or five of us worked together to develop how the program would be structured. Questions we asked were: "What information should we request from students and professionals?" and "What criteria do we use as a basis for pairing mentors and mentees, so they have a good, positive relationship?"

We put a lot of thought and effort into those little things to make for a successful pairing. The last thing we wanted was to roll out a mentoring program but not to have given any consideration to the background, interests, and career goals of the protégé and the experience of the mentor.



SAF National Conventions are an idea place to seek out and meet with mentors. Photo from 2018 convention by Wasim Muklashy.

We also realized and identified that there's a gap in terms of the young-professional cohort. How could we continue to provide formal mentoring once they're out of school and in the profession, and how do we leverage our network of foresters and natural-resources professionals?

Our program is more structured than I've seen in other mentoring programs. We have quarterly mentor-protégé meetings, and we've developed mentoring questions that can be used to help prompt conversations at each quarterly meeting. At the first meeting, a mentor asks what the protégé's career goals are and talks about how to get there. At the second meeting, hiring process, networking, and skill building are discussed. The third meeting is a work-life balance discussion, and the fourth is reverse mentoring, which we just added last year. It's an opportunity for the professional to learn from the student or young professional. The protégé raises issues that should be on the mentor's radar, such as innovations and new social-media trends.

For the first meeting, we have the mentors contact the protégés, because we recognize that it can be intimidating for a protégé to contact a mentor. After that, we ask the protégés to schedule the second, third, and fourth meetings: They asked to be mentored, and the mentors reached out to them the first time, so now it's their duty to the rest.

We recommend meeting in person, because doing so does make a difference. We did try some long-distance mentoring over the phone, but that doesn't work quite as well as meeting face-to-face. Our mentoring program focuses on just one year, and then our mentors will be assigned another student or young professional. However, I know of some examples where the mentoring goes on for several years.

Dahl: There's a lot of benefit to having a formal structure, as evidenced by the way CO-WY is still doing it five or so years later. There's the consistency that comes from having an identified position on the state committee, having someone in that role who is recognized for what

they're providing, and having identified support and commitment from the state program. It provides recognition, as well as accountability. It adds a formal timeline—there are goals and dates we're going to target.

What are mentoring activities?

Cawrse: Going out to lunch is ideal, but it's not required. Sometimes you invite the student or young professional to your workplace. If you can't meet face-to-face during that quarter, then over the phone is good.

How mentors and protégés are recruited

Cawrse: I send out a call letter for protégés and mentors: If you're interested in being a protégé, you fill out this form, and if you're interested in being a mentor, you fill out another form. We're really careful about sharing biographical information [to keep it private]. I use a spreadsheet to track responses. We're recruiting 15 to 20 protégés and that many mentors, too.

We have a lot of good connections with our members, who are in a variety of professions, so we do our best job to link up the student or young professional with that area of forestry they're interested in. We do try to match up young women with an older woman professional.

Some members are reluctant to become mentors because they don't know what to do. That's why we set up the questions, so there are ideas for what to cover during each meeting.

Dahl: There's always some apprehension the first time you do anything. From my perspective, serving as that first mentoring chair, the question was, "Oh boy, how many mentors are we going to get?" I wasn't worried about recruiting students, because Bob Sturtevant, Jamie Dahl, and others had been working with the Alpha chapter so closely that students saw the value in it. And about 30 mentors volunteered. It was really close to being one-to-one, mentor to protégé, and that was a big relief. It made me realize this had a high likelihood of succeeding.

What we did, and still do, is communicate to both the mentor and protégé that these pairings might not work. If you get a sense that you're not comfortable, then let us know, and we will rematch you with someone else. There's nothing to be embarrassed about.

Keeping the program sustainable

Cawrse: Make sure to have a Mentor Committee chair and get the procedures in the handbook. To avoid burnout, we only require that chairs service one year, but we've been successful with our mentors volunteering for one year and wanting to go again.

Dahl: Having that formal process and having the templates is the biggest piece in sustainability, in terms of process. It made it a lot easier to hand over the notebook to Dave when he became the mentoring chair. I told him to feel free to change what you need, but it's enough to keep you going.

The other piece regarding sustainability is that this model has been successful. People are coming back—students, young professionals, and professionals—to engage. As you keep doing it, there's the expectation that it's going to keep going.

How much time does it take to run your mentoring program?

Dahl: In terms of running it, I would say it is definitely in the order of hours instead of days to repeat every year, once you get the template in place.

That's another part of the formal process that I think there's a benefit to. Thought went into developing the application for the mentor and protégé. Because people took the time to think that through and do it right, they put the pairings in a good position that they were likely to succeed. By doing so, they made it that much easier for someone to come in and fill the mentoring chair in the future and have templates and time lines and expectations that they can pick up and know how to run the program.

Cawrse: Now that it's up and running, it's not that much time to fulfill the mentoring chair duties. I just use last year's



Mike Cloughesy has been a mentor to Fran Cafferata Coe for several years. Photo by Wasim Muklashy.

call letter—took me a half hour. Over the next couple of months, it will be a couple of hours a week. It really doesn't take that much time. Last year, I didn't send out quarterly reminders about the meeting, so I'll do that this year.

What have been measures of success?

Cawrse: The first year we did it, we had three of our protégés find jobs, and that was just through the connections the mentors had.

Final thoughts on mentoring programs

Dahl: There's definitely a need for mentoring throughout SAF, and our model could

to a general extent be adopted up to the national SAF as a template or a model to roll out to all the chapters across the country, with some minimal oversight from the national office.

If a chapter does start a mentoring program, whoever is a mentoring chair, it is critical that they are passionate about mentoring. If they just assign it to somebody who doesn't really care or prioritize it, it will have a lower likelihood of catching on in that state's chapter. That's another key piece. Finding individuals who are passionate about it.

And it's the same for mentors—make sure they're committed to it and have a

passion to do it well. For Dave, Bob, and countless others in CO-WY—but those two in particular—mentoring is one of their passions, and CO-WY wouldn't have this successful mentoring program if it hadn't been for them. Those two have just been key and instrumental in engaging professionals, young professionals, and students.

CO-WY's Mentoring Program from a Mentor's Perspective

Prior to moving to Washington State and joining the Southwest Washington SAF chapter, Teresa Ann Ciapusci was a member of the Mile High chapter and participated in the mentoring program. Here she shares her experience being a mentor.

Ciapusci: CO-WY started the mentoring program a month before I retired, so it was perfect timing to have the time to invest in a student. I signed up, and after a couple of months they paired me with a young man who was a freshman at Colorado State University, which is located in Fort Collins and about an hour and a half north of my home in Denver.

I basically tracked with him through his four-year program. I connected him to the US Forest Service's Student Temporary Employment Program (STEP) program, which brings into the Forest Service students while still in school, trains them, and upon graduation, works them directly into a position. I coached him on the classes he needed to fulfill his goal of a job in timber cruising. I also directed him to selecting electives that addressed other parts of life, because you have to

have a life outside the eight hours you're at work. Sometimes, students think that once they're in a job that's the only thing in their life and it's not.

We would mostly communicate by e-mail, but at least three times a year—when he returned to school at the start of the year, mid-way through the year, and just before summer season—we would meet in person in Fort Collins. We would talk about what he was doing and things that were important to him.

He made it through the STEP program, and two years ago, he converted and is now a regional office employee with a career ahead of him. That's what the mentoring is about—to get students into full-time employment. I'm happy to see him succeeding, and I still hear from him at Christmas.

It was a good experience from my side. I would love to see this program go national. What I heard at the PNW [Pacific Northwest] Leadership Conference in February was [that] the students [are] looking for that kind of support. The two-year and four-year students need that support to know they can make it through school and their life challenges, and that they can have a solid career in forestry.

For information about CO-WY's program, email membership@safnet.org. **FS**

Editor's note: As Cawrse mentioned in the article, their protégés are both college students and young professionals. To provide a perspective on how to mentor and the value of being a protégé, I asked Mike Cloughesy,

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director of forestry for the Oregon Forest Resources Institute, and Fran Cafferata Coe, a forestry consultant, to provide their insights on mentoring.

Essential Strategies for Effective Mentoring

By Mike Cloughesy

Mentoring is a great opportunity to give back to our profession and to put a bow on our professional achievements. One of the proudest moments of my career was when Fran Cafferata Coe, one of my favorite protégés, received the SAF Young Forester Leadership Award at the 2017 SAF National Convention in Madison. In her acceptance speech, Fran recognized me as a mentor and thanked me for my contribution to her success. That was bigger to me than winning my own national award.

This article is based on a talk I gave at the PNW SAF Leadership Conference in February 2019. I borrowed prodigiously from the resources provided at the end of the article.

Mentoring is as old as Greek mythology.

In Greek mythology, as chronicled in *The Odyssey* by Homer, Mentor was a very old friend of Odysseus, who had placed Mentor in charge of his son, Telemachus, and Odysseus' palace, while Odysseus was away fighting the Trojan War. When the

goddess Athena visited Telemachus, she took the guise of Mentor to hide herself from the suitors of Telemachus' mother Penelope. As Mentor, the goddess encouraged Telemachus to stand up against the suitors and go abroad to find out what had happened to his father.

Because of Mentor's relationship with Telemachus, and the disguised Athena's encouragement and practical plans for dealing with personal dilemmas, the personal name Mentor has been adopted in English as a term meaning someone who imparts wisdom to and shares knowledge with a less-experienced colleague. Important aspects of Greek mythological mentorship are that mentoring is a service, should be practical, and the wisdom may reflect a higher power.

What is mentoring?

Mentoring is a process through which an individual offers professional expertise, as well as support, to a less-experienced colleague. A mentor serves as a teacher, counselor, and advocate to a protégé. Mentoring results in a mutually beneficial professional relationship over time.

The intent of mentoring is not to remediate weak performance, but rather to shape a career that shows promise. Mentoring is an opportunity to give back to the profession by teaching the next generation of leaders and innovators.

What does a mentor do?

A mentor works on two levels: supporting the protégé in meeting essential professional duties and helping them envision

and take steps toward the career they desire. A mentor combines instruction in professional behavior and tasks with support. A mentor may fulfill all or a combination of roles.

The mentor:

- **Advocates:** Offers sponsorship; provides exposure and visibility within the profession.
- **Acquires resources:** Brings critical readings, opportunities, or experiences to the attention of the protégé.
- **Acts as a role model:** Offers insight on how he or she "made it" in the profession.
- **Advises:** Shares institutional and professional wisdom, critiques performance, makes suggestions.
- **Coaches:** Helps a protégé learn new skills and practice new behaviors.
- **Protects:** Helps a protégé find new and challenging opportunities while protecting them from adverse forces and "dead-end" job assignments.
- **Supports:** Listens with a sympathetic ear, explains unwritten rules, and acknowledges disappointments and triumphs.

Why should I mentor? It makes professional sense.

Mentoring is crucial to a profession's ability to retain and promote its best members. It leads to higher job satisfaction, career advancement, work success, and future compensation. Professionals who are mentored are less likely to leave a profes-

sion. Mentoring also plays a powerful role in getting young professionals up to speed on the professional culture, accelerating their integration into the profession and enhancing their effectiveness.

You will reap leadership and career rewards.

Mentoring younger protégés opens new informal networks across the sector, enhancing your visibility within the profession. Through their relationship with protégés, mentors may obtain new work and professional information. Mentoring provides you a window into what is on the mind of the younger generation in terms of new products, innovation, and work aspirations. Mentors experience learning benefits from reflecting on how they got to their current position and articulating the vision of what they want next from their careers. Through mentoring, you help your profession strengthen its workforce. It is worth noting your contribution during your own performance review. Mentors also gain valuable interpersonal communication skills through the process of mentoring.

You will experience personal rewards.

Many mentors, at the top of their professional careers, find an increased sense of purpose through giving back through mentoring and establishing a legacy as leaders. Mentors also report feeling rejuvenated and energized through interacting with their younger colleagues.

The rewards are worth the investment.



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Contrary to popular belief, mentoring does not require a disproportionate investment. Research shows that people who become mentors report significant benefits and few costs. Mentoring comes in many forms. If you cannot commit to frequent formal meetings, you can still be a mentor by agreeing to be available for more informal and ad-hoc guidance sessions.

Expectations for Mentors and Protégés
Mentors and protégés typically enter their relationships with assumed expectations of each other. At times, some can experience disappointment because expectations weren't met or even discussed. To prevent this and to help you with your planning, the following list contains some common, reasonable expectations. A mentoring relationship is a partnership, with both people showing respect and support for each other.

- Meet as often as your schedules permit.
- Ask and answer questions.
- Discuss issues relating to the protégé's career goals and development. Talk about skills the protégé could acquire to add value.
- Seek and give feedback and help your protégé look for information on the impact they are having.
- Seek and provide suggestions and advice on goals and activities that lead to effective and rewarding work in the profession.
- Work together to develop your protégé's own network, including others they might reach out to and engage.
- Keep any commitments made.
- Keep confidences.
- Work out any minor concerns about the mentor-protégé relationship.
- Evaluate the relationship at various points. **FS**

Mike Cloughesy is the director of forestry for the Oregon Forest Resources Institute. He can be reached at cloughesy@ofri.org or 503-329-1014.

Resources on Mentoring

- *The Odyssey* by Homer (Digital versions available free through Project Gutenberg.)
- Lead Together: leadtogether.org.
- Tips-for-Mentees: il.trust.coop.
- *Mentoring Basics: A Mentor's Guide to Success*. National Center for Women and Information Technology. NCWIT Mentoring-in-a-Box: Technical Women at Work (<https://www.ncwit.org/>).

Link to SAF Journals

Digital editions and archives of the *Journal of Forestry* are available at academic.oup.com/jof and *Forest Science* at academic.oup.com/forestscience.

Why Mentoring Matters

By Fran Cafferata Coe

I think some of us (maybe all of us) got into the field of resource management because, ultimately, we like working in the woods—alone. Many of the projects I work on require that I not only work alone in the woods, but that I do so at night. I've been accused of being crazy, or at least of being fiercely independent. But being independent and loving working alone doesn't mean that you don't need a mentor or that you shouldn't look to others for career advice.

Early in my career, I decided to plan a workshop for the Society of American Foresters and The Wildlife Society, with the purpose of bringing wildlife and forestry professionals together to discuss how to better manage working forests. I had no idea where to start planning that first event.

I can't remember who suggested that I talk to Mike Cloughesy, the director of forestry for the Oregon Forest Resources Institute, but it might have been my dad. So, I bravely—I still remember writing out my talking points before picking up the phone—stepped out of my comfort zone and gave Mike a call. We met for lunch—and that first lunch changed my career. Without really meaning to, I'd found my mentor. Mike took the time to meet with me and to help me find opportunities. That first lunch was more than 10 years ago, and Mike's been helping me ever since. I realized that I didn't have to compromise my independence to gain help.

Mentoring matters because it is the bridge between generations. Mentoring is a way for experienced professionals to help guide and influence the next generation. But that's not all. Mentoring is an exchange of information, and I believe that protégés help their mentors, too. We help seasoned professionals understand issues that are facing young professionals. Besides the friendship that develops through mentoring, which has been my favorite part, my mentor(s) have helped me build my career and my professional network and have helped me become the person that I am today. I am deeply grateful for the help that I have received.

I'm currently in the middle of my career, so I'm in the awkward phase of wondering, "Do I still need a mentor?" [YES] and "Shouldn't I be mentoring someone?" [also YES]. But, just like I found it intimidating and scary to find a mentor, I also don't know how to connect to someone who may need mentoring. Heck, I don't even know if I am qualified to be a mentor!

I believe that an SAF mentoring program would help build the diversity needed in our profession. I hear that some chapters already have mentor programs in place. I'd love to see a national approach to mentorship that helps build relationships at the local and national level. Sometimes these relationships form naturally, but I believe we can do better by providing a more-structured approach to mentoring for those who haven't been able to find the help they need. **FS**

Fran Cafferata Coe is the owner of Cafferata Consulting. She can be reached at fran@cafferataconsulting.com or 503-680-7939.

Mentoring Best Practices

From *Mentoring Guide: A Guide for Mentors*, by the Center for Health Leadership & Practice, a Center of the Public Health Institute (tinyurl.com/y9lsd46a).

- Think of yourself as a "learning facilitator" rather than the person with all the answers. Help your protégé find people and other resources that go beyond your experience and wisdom on a topic.
- Emphasize questions over advice giving. Use probes that help your protégé think more broadly and deeply. If he or she talks only about facts, ask about feelings. If he or she focuses on feelings, ask him or her to review the facts. If he or she seems stuck in an immediate crisis, help him or her see the big picture.
- When requested, share your own experiences, lessons learned, and advice. Emphasize how your experiences could be different from his or her experiences and are merely examples. Limit your urge to solve the problem for him or her.
- Resist the temptation to control the relationship and steer its outcomes; your protégé is responsible for his or her own growth.
- Help your protégé see alternative interpretations and approaches.
- Build your protégé's confidence through supportive feedback.
- Encourage, inspire, and challenge your protégé to achieve his or her goals.
- Help your protégé reflect on successful strategies he or she has used in the past that could apply to new challenges.
- Be spontaneous now and then. Beyond your planned conversations, call or e-mail "out of the blue" just to leave an encouraging word or piece of new information.
- Reflect on your mentoring practice. Request feedback.
- Enjoy the privilege of mentoring. Know that your efforts will likely have a significant impact on your protégé's development as well as your own. **FS**

SAF News

The Forestry Source welcomes articles and ideas for the SAF News section, which is devoted to articles about the activities and accomplishments by SAF members, chapters, or groups that highlight good forestry, enhance public understanding of forests and forest management, and provide service to the Society and society. Contact Steve Wilent, Editor, 503-622-3033, wilents@safnet.org.

VOGEL

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boring events, the Society of American Foresters is different. Our love for nature and trees is what makes SAF unique; therefore, we should embrace this in everything we do as an organization. It wouldn't hurt anybody to get a little dirty at a forestry convention; in fact, I think it might actually do this organization some good. **FS**

To connect with Ryan Vogel, e-mail him at RangerRyanVogel@gmail.com.

WOOD PELLETS NEWS

Pellet Exports: +17%

Forest2Market analyst John Greene recently posted his take on the US pellet export market on the company's blog, blog.forest2market.com. Citing data from the USDA Foreign Agricultural Service (FAS), Greene reported that the more than 6 million metric tons of wood pellets was exported from the US in 2018, up about 17 percent over the 5.1 million metric tons exported in 2017. The FAS estimated that the total value of these exports increased nearly 22 percent, to \$812 million in 2018 from \$666 million in 2017. Most US pellets go to Europe.

"While the Asian biomass market has begun to take shape in earnest and shows promise for the future, the more mature European renewable energy market continues to dominate the global trade of wood pellets," wrote Greene. "Not surprisingly, the United Kingdom alone imported a vast majority of the wood pellets manufactured in the US—roughly 4.7 million metric tons, or nearly 78% of total exports. Despite news of a maturing bioenergy market in the UK, wood pellet imports from the US were up nearly 15% year-over-year."

Drax Biomass

UK power producer Drax Group reported that its US pellet-manufacturing operations were up by 64 percent in 2018, compared to production in 2017. The increase was due in large part to the opening of its third pellet plant, in LaSalle, Louisiana; its other plants are in Bastrop, Louisiana, and Gloster, Mississippi.

Pinnacle Renewable Energy

Pinnacle Renewable Energy, which operates eight pellet production facilities in western Canada and one in Alabama, reported that it sold a record volume of 1.6 million metric tons of pellets in fiscal year 2018. The company recently secured eight new long-term contracts with customers in Japan and South Korea.

Global Outlook Bright

The global market for wood pellets is expected to exceed \$ 22.0 Billion by 2024, according to a report by Market Research Engine (\$3,500 and up, tinyurl.com/y6munfkt). The report addresses the market share of key global pellet producers. **FS**

Managing Eastern Redcedar in Oklahoma

By Andrea Watts

In Oscar Hammerstein's song "Oklahoma," Curly sings, "Oklahoma, where the wind comes sweepin' down the plain"—not where the wind comes sweeping down the woodlands. Yet that's the reality in portions of the state. Although eastern redcedar (*Juniperus virginiana*) is native to Oklahoma, decades of fire exclusion have allowed this tree to move onto the state's tallgrass prairies. Until recently, it wasn't known just how widespread eastern redcedar was, but a nearly finished resource assessment offers insight as to its distribution and potential markets to incentivize its removal.

The assessment was undertaken by Omkar Joshi, Rod Will, and Salim Hiziroglu, professors at Oklahoma State University, and Ravneet Kaur, a graduate student. In 2017, the team was awarded a grant from the Oklahoma Center for the Advancement of Science and Technology to determine if new markets could be developed to encourage the removal of eastern redcedar.

"Given the effect that eastern redcedar encroachment is having upon a broad range of ecosystem services affecting all Oklahomans, we're trying to find ways that private enterprise can be leveraged to reduce its encroachment," explained Will, an SAF member, adding that landowners consider themselves rangeland owners with degraded rangeland rather than woodland owners.

Because of its propensity to consume water, eastern redcedar decreases streamflows and reduces forage for cattle. Through its colonization of the native prairie, grass-dependent wildlife species find their habitat altered and reduced.

Although prescribed fire can kill young seedlings, Joshi, also an SAF member, said that his earlier research revealed that landowners are leery of this management option. "The biggest challenge for prescribed fire is the risk and liability coming from escaped fire," he said. "That is a major obstacle, and in the end, they [usually] decide not to use prescribed fire."

And with mechanical thinning costing \$100 or more per acre, Joshi added, it's hard for landowners to justify the expense without an incentive.

Given the statewide availability of eastern redcedar—according to Will, landowners are willing to give it away for free—the reason why a more-robust eastern redcedar market doesn't already exist is because this species is largely a tree only in name.

"It's not a high economic-use tree, because it's a small-diameter tree," said Joshi. "[A] good majority of it doesn't even qualify for pulpwood.... That's why people don't invest in management—there's no industry [that will use large quantities of] eastern redcedar."

"[However], it can be used for certain things when grown under the right conditions," Will said. "It can be cut into dimensional boards for lumber and cabinetry, but most of the trees that we have growing on the tallgrass prairies are more like giant cabbages."

The team was able to conduct the re-



Eastern redcedar (*Juniperus virginiana*) is native to Oklahoma, but due to decades of fire exclusion, it's encroaching on the tallgrass prairies. Photo courtesy of Ravneet Kaur.

sources assessment when it obtained never-before-available FIA (Forestry Inventory and Analysis) data. In 2008, the US Forest Service began inventorying central and western Oklahoma; previously, the agency only inventoried the eastern portion of the state.

In analyzing the new FIA data, Kaur found that there were more than 300 million eastern redcedar trees across the state. When Will studied the DBH distribution, what he saw troubled him. "It's a reverse J," he said. "That indicates the problem is going to get worse."

Because the resource assessment included identifying potential new markets for eastern redcedar (there are already existing niche markets for its use as mulch and essential oil), Kaur used GIS to identify regions where industries could be established. With these data, Kaur applied an input/output model analysis to determine the economic impacts if such industries were established.

"For example, if a new particleboard industry comes, how much economic opportunity can that provide to the local economy?" Joshi said. "How much would those people make?"

Using the input/output model analysis, Kaur determined the current volumes of eastern redcedar could supply:

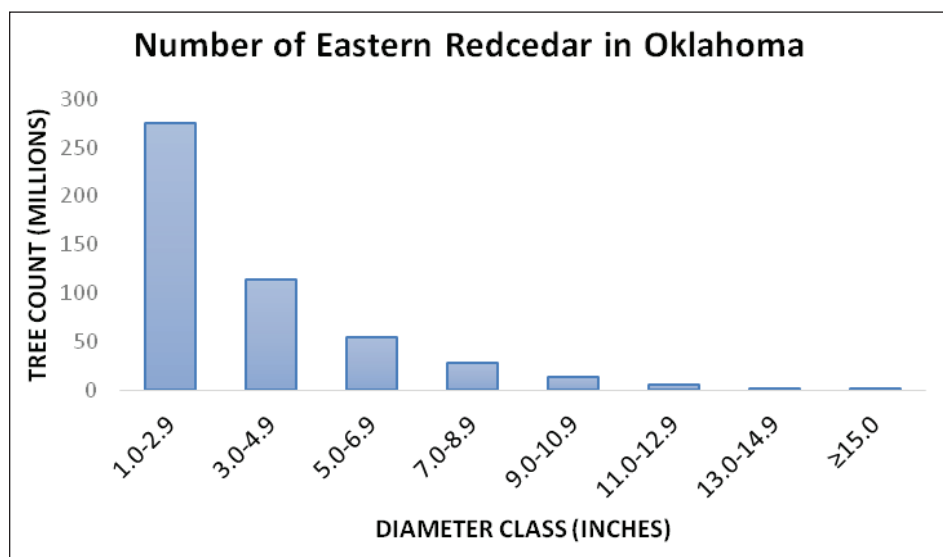
- One medium-size particleboard industry (annual capacity of 0.25 million tons) for more than 10 years, resulting in \$58 million in annual sales and more than 100 direct job opportunities;
- 50 small (>1k tons annual capacity) cedar-oil establishments for 100 years; and
- 20 small (annual capacity of 7k tons) mulch establishments for more than 40 years.

Even considering these optimistic numbers, Will cautioned that it's unlikely that these industries will eliminate eastern redcedar on the landscape, "But," he said, "it would help individual parcels of land."

Kaur, who is in the middle of work-



To help fund the removal of eastern redcedar from tallgrass prairies, a team from Oklahoma State University is assessing markets for potential forest products, such as particleboard and mulch. Photo courtesy of Ravneet Kaur.



With newly available FIA data, Kaur calculated the number of eastern redcedar across the state. Rod Will, an SAF member and member of the assessment team, said that the number of young-diameter trees indicates the eastern redcedar issue will only worsen. Courtesy of Ravneet Kaur.

ing on her thesis, shared via e-mail her thoughts on the research. "Oklahoma has witnessed heavy ecological and economic losses over the past decades due to eastern redcedar encroachment, and we hope this research would help incentivize its active management and prevent future losses owing to eastern redcedar encroachment."

And it appears there is interest in us-

ing active management to spur new industries. Although the assessment won't be finalized until July, Joshi has shared the economic results with colleagues who, in turn, are passing it along to the state's forest-products industries. "The reception to our research has been welcoming," he said. "Any way you can use redcedar is welcome." **ES**

Adjusting Your Cruise Stats with Your Field Experience: A Rigorous Approach

By Brian Clough

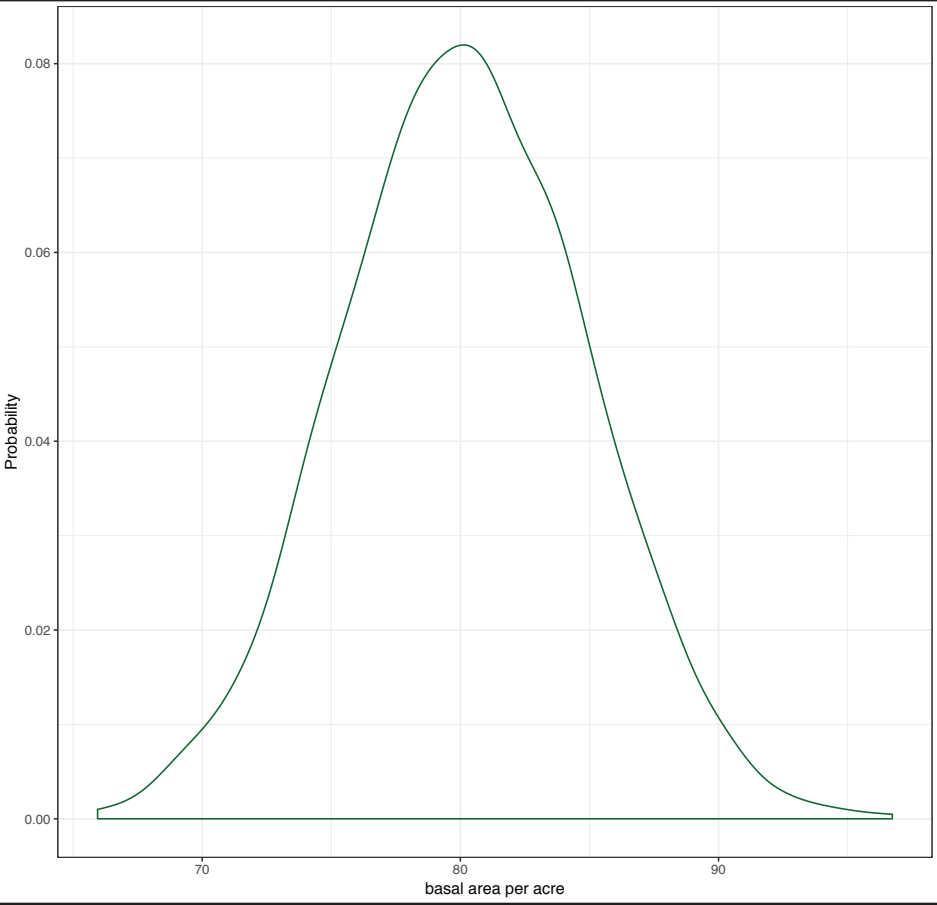


Figure 1: Visualizing expert knowledge about average basal area per acre as a statistical distribution

In these Biometrics Bits articles, my colleagues and I spend a lot of time thinking about measurements, statistics, and computer simulations. But there’s another source of information that we shouldn’t forget about: field experience and local knowledge.

When a timber cruise comes back higher than we’d expect, something doesn’t feel quite right. It doesn’t match up with our experience. We might be inclined to shave the estimates down a bit. Is this just fudging the numbers? In this article, I explore a rigorous and justifiable way to incorporate our experience and prior expectations into our inventory estimates. Using the power of Bayes’ Theorem (developed in the 1700s), we will gain a quantitative tool for incorporating our local forestry knowledge into our cruise workups.

Expert Knowledge

Before even setting foot in a stand, we probably know at least something about it. For instance, if we’re talking about a 25-year-old natural pine stand in the Southeast, we might anticipate a basal area of about 80 ft²/acre. And our experience might lead us to expect values as high as 110 or as low as 50 ft²/acre. Basal area values outside this range might occur, but they’d be a bit unusual. An experienced forester familiar with a property could likely provide even more-precise expectations without cruise data.

We can begin to transform this experience into the language of statistics. We now have an initial expectation for the average (or mean) of the basal area (80 ft²/acre). We also have a sense for what the variability (the standard deviation) of our basal area estimate might be +/- 5 ft²/acre. This intuition is represented graphically in Figure 1. The horizontal axis represents the amount of basal area we’d expect to find in the stand, while the vertical axis represents the probability that we expect to find that exact amount of basal area.

The Cruise

In forestry school, we all learned how to calculate the mean and standard deviation from a set of cruise data. These are derived purely from the cruise data and do not incorporate the expert knowledge we discussed above.

Imagine we cruised the stand described above and found a different mean, or higher standard deviation, than our prior expert opinion expected. Our immediate reaction may be to say that our prior opinion was wrong, or that perhaps stand conditions had changed since we were last out there. But what if there were issues with the cruise? It doesn’t make sense to cast aside all of our expert knowledge based on a single sample. Instead, we can get the best of both by integrating our prior knowledge with the cruise data.

Combining Cruise Data and Expert Knowledge

We can go about this thanks to a simple

(and quite old) statistical concept called Bayes’ Theorem, which provides a way to update our prior expert knowledge with information from cruise data to develop a new expectation that incorporates both sources of information.

This article takes a high-level look at the results of applying Bayes’ Theorem to a particular cruise. All the data and analysis code for the example below are available at github.com/SilviaTerra/BiometricsBits.

The example cruise consists of 50 plots collected in a mature pine stand in the southeastern United States. To illustrate the impact of combining expert knowledge and data, we’ll estimate basal area for this stand in three ways:

- 1. **Using only our expert knowledge:** Simply estimate the mean and uncertainty using the distribution defined in Figure 1.
- 2. **Using only the cruise data:** Assume we know nothing about the stand beforehand, and develop a mean and variability estimate using the methods we learned in forestry school.
- 3. **Using Bayes’ Theorem:** Integrate both expert knowledge and the cruise data. In technical terms, we will be “placing an expert knowledge of prior distribution on our cruise estimate.”

The histograms in Figure 2 represent the output of the three cases. Each is the result of thousands of simulations. Imagine we are rolling dice, but rather than the die having six faces, there are lots of different faces representing different amounts of basal area (a face for 0, 10, 20, 30—all the way up to 250 BA). Additionally, while the six sides of a die have equal probability, not all basal areas have the same chance of coming up. The chances of a particular basal area being “rolled” on our die are related to statistical distributions like those in Figure 1. In that particular distribution, we see that a basal area of 80 has the highest likelihood, and the probability of other basal areas declines the farther we get from 80.

The experience-only and data-only histograms were created by “rolling dice” according to the statistical distributions described by the means and standard deviations described above. For the third case, data and experience, we used Bayes’ Theorem to create a new combined distribution and used that to “weight” the die.

Examining histograms of these three simulations shows some stark differences. Recall that prior to looking at the data, we had a fairly strong expectation that mean basal area would be close to 80 ft²/acre, and this distribution reflects that with a large peak near that value. Both the data-only and data-plus experience simulations have a higher mean than we expected given our experience (see Table 1), but note that in both

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BIOMETRIC BITS ■ Page 19

11

DT301T-RTK: A Rugged Tablet with Centimeter GNSS Accuracy

By Steve Wilent

It is trite to call an object the “Swiss Army knife” of its kind. This knife has been used as a metaphor for countless things, including smartphones, shotguns, tractors, and sometimes even people (otherwise known as jacks-of-all-trades). So I hesitate to use Swiss Army knife to describe a handheld computer, but since the shoe fits, why not? After all, the analogy does help illustrate the versatility of DT Research’s DT301T Rugged RTK Tablet (DT301T-RTK). Here are some highlights:

- A tablet that runs either Microsoft Windows 7 Professional or Windows 10 IoT Enterprise (IoT stands for “Internet of Things,” according to Microsoft);
- An Intel 6th Generation Core i5 or i7 processor, either of which can run Windows and most any software that you may need;
- Optional 4G LTE cell phone service;
- An IP65 rating, which makes it suitable for use in the woods;
- A 10.1-inch touchscreen display;
- An optional detachable keyboard and stand that let you use the tablet as a desktop or, in a pinch, as a laptop computer;
- And, last but certainly not least, a dual-frequency (L1 and L2) Global Navigation Satellite System (GNSS) receiver capable of real-time kinematic (RTK) positioning in the one-centimeter range.

This is a computer suited to any work environment, from the office to the woods and back again. Then again, a Swiss Army knife can’t do everything—it doesn’t have a socket that will let you remove a lug nut, for example. Likewise, the DT301T-RTK won’t fit in your pocket, as an iPhone or Android phone will, and it won’t run apps these phones can run; it only runs Windows software. However, that could change one day: DT Research makes a tablet that runs both Windows and Android (See “DT Research’s Dual-Boot Tablet: Have Your Android and Windows, Too,” *The Forestry Source*, April 2016.)

DT Research recently sent me a DT301T-RTK to try out, along with several optional accessories. I focused on the hardware—how well it would suit a forester on the job—and on GNSS accuracy.

The first thing I noticed after taking the DT301T-RTK from the box is its weight: 3.1 pounds, according to the company, about three times that of a typical tablet with a similar-size screen. The Microsoft Surface Go (which includes a keyboard) and the Samsung Galaxy Tab A (no keyboard, Android operating system) each weigh 1.17 pounds. Three-plus pounds may not sound like much, but after a few hours of data entry in the woods, your arm is likely to feel the burn.



Figure 1. DT Research’s DT301T Rugged RTK Tablet with the detachable Harxon GNSS antenna. Photo by Steve Wilent.

However, true ruggedness means added weight in the case, bumpers, and so on. A sturdy rubber strap on the back of the DT301T-RTK lets you maintain a firm grip. However, if you are left-handed, a raised portion of the housing makes holding the device with your right hand under the strap uncomfortable.

The DT301T-RTK’s LED backlit screen is easily readable in all but the brightest sunlight and offers plenty of real estate and resolution for working with data, images, and maps. Although the capacitive multitouch screen is responsive to finger taps, swipes, and other motions, I found DT Research’s optional digital pen made using buttons and menus much easier, even with the Windows scale and layout setting at 200 percent of normal. It is possible to use a custom setting of up to 500 percent, but Microsoft recommends against doing so; I found that a setting of 300 percent left some icons hidden.

When you snap the optional keyboard (\$100) into a plug on the bottom edge of the tablet, Windows immediately recognizes it. Fold out the keyboard’s stand to use the tablet as a desktop computer. Although it can be used as a literal laptop, it isn’t designed for doing so. The stand isn’t made for laps, and the weight of the tablet makes it top-heavy.

Is it rugged? It is, but less so than Cedar Tree Technologies’s CP3 Android phone, which I reviewed in the January edition of *The Forestry Source*. The CP3’s Ingress Protection (IP) rating of IP68 makes it both dust tight and submersible; the article included a photo of the CP3 in a puddle. The DT301T-RTK’s rating of IP65 makes it similarly dust tight (indicated by the numeral 6) and water resistant (5). In other words, it isn’t submersible, but it will not be damaged by rain, as long as you keep the cover to the USB and

other ports snapped into position and the rubber plug on the keyboard-connection socket firmly in place. Like the CP3, the DT301T-RTK meets the US military MIL-STD-810G standard for the ability to withstand physical shocks, such as being dropped onto a concrete floor.

Battery life is adequate. After I used the tablet for about three hours of GNSS testing, in Windows’s “better performance” power mode, battery power dropped from 100 percent to 72 percent. For daylong field use, I recommend using power-conserving modes and carrying one or more optional high-capacity batteries (\$200). The DT301T-RTK’s batteries can be hot swapped (changed without having to shut down the tablet).

RTK GNSS

DT Research sent me two external antennas to try out, both of which connect to the tablet via a coaxial cable connection to an internal Hemisphere GNSS receiver. Unlike some receivers, this one cannot operate without an external antenna. Both of the external antennas worked well, but the lack of documentation about them was frustrating. Most foresters would be well served by the one shown in Figure 1. By Googling the model number on a sticker on the antenna, I learned that it is a Harxon HX-CH4605A Helix antenna. With this dual-frequency antenna, Hemisphere’s PocketMax GNSS utility reported reception from as many as 18 satellites, including US GPS, Russian Glonass, Chinese BeiDou, and one or more SBAS satellites; and 2D position accuracies of about a half-meter and 3D accuracies of 1 to 1.25 meters. Excellent.

A sticker on the second antenna indicated it was an Ayia HY-GLRC04R, but Googling this resulted in little information about it. I suspect that Ayia, a Chi-

Parameter	Value	Option
Serial Port	COM23	
Date	2019/01/08	
Time	13:58:35	Local
Latitude	37 23 46.04496	DMS
Longitude	-121 53 38.60713	DMS
Height	-14.685	m
Speed	0.04	m/s
Precision(2D)	0.009	1σ (66%)
Precision(3D)	0.015	1σ (66%)
COG	154.54	
HDOP	2.4	
Sats Used	5	
Diff Requested	SBAS	
Diff Used	RTCM3	
Diff Status	RTK Integer fixed	
Diff Age	1	
Reference ID	1	

Figure 2. DT Research’s DT301T Rugged RTK Tablet is capable of centimeter GNSS position accuracy.

nese company, may be out of business. This dome-shaped antenna is designed to attach to a pole or tripod and connect to a receiver via a cable, which DT Research supplied. In my tests, with the antenna on a tripod, PocketMax reported accuracies similar to the Helix readings. (There are several RTK antennas on the market from reputable companies, such as the SXBlue G10, as well as sub-meter antennas such as Juniper’s Geode.)

Both antennas are suitable for RTK positioning, thus making the DT301T-RTK a professional- or survey-grade GNSS system. I’ve never used an RTK system, and with no documentation from DT Research, I was flying blind, until I talked with Kevin Tsai, the company’s senior technical engineer, who kindly gave me a quick tutorial on the technology. I also read a bit about it. Eos Positioning Systems offers an introduction: “High-Accuracy Data Collection for Beginners: How to Choose a GNSS Field Solution,” at tinyurl.com/ydfyg5kr. In the end, I decided not to attempt a review of the RTK positioning with this tablet. Here’s an opportunity for one of you readers who is conversant with the technology: Let me know if you’re interested in writing an “Intro to RTK for Foresters” or similar article for *The Forestry Source*. Contact me at wilents@safnet.org.

DT Research documentation states that the DT301T-RTK is capable of one-centimeter accuracy, and I have no reason to doubt that this is true. Tsai sent me a PocketMax screenshot taken while he was in RTK mode—see Figure 2, in which the precision readings are 0.009 meters (2D) and 0.015 meters (3D), or 0.9 and 1.5 centimeters, respectively. (Note that Hemisphere’s PocketMax user guide states that the “Precision tab gives a graphical representation of horizontal accuracy”—an important distinction, since GNSS position coordinates might be precise, but not accurate.)

Value Proposition

If you need all the tools provided by this jack-of-all-trades tablet, its price might well be worth it: The list price is \$3,415. Add a GNSS antenna: \$583 for the Helix model or \$525 for the pole-mounted one, along with \$248 for a pole and mounting kit. Throw in \$400 for a couple



An optional keyboard connects easily to the DT301T Rugged RTK Tablet. Photo by Steve Wilent.

of high-capacity batteries and pick up a charger, carrying case, and few other accessories, and you're looking at spending \$5,000 or more.

If an all-in-one isn't to your liking, or if you don't need RTK, you could start with another of DT Research's rugged tab-

lets or those of other manufacturers, such as Juniper Systems' Mesa 2 (\$1,599) or the Dell Latitude 7212 Rugged Extreme Tablet (\$1,899), and build your own system. Either way, you're looking at a significant investment. With the DT301T-RTK, the return on that investment is well-built

rugged tablet and a comprehensive suite of the tools of the forestry trade. **FS**

DT Research is based in San Jose, California. The DT301T-RTK is available from DT Research authorized resellers and partners—see dtresearch.com.



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COMMENTARY

Do Warmer Average Temperatures Increase Wildfire Risk? No

By Conrad J. Franz

I have been following the discussion regarding the reported increase in wildfire numbers and wildfire intensity, and the frequent reference to climate change, which was previously referred to as “global warming.” Let me begin with something I think we can all agree on: the fire triangle. Fire requires heat, oxygen, and fuel. Take one of these components away, and the fire goes out or does not start.

In “Understanding Climate’s Influences on Wildfires,” in the October 2018 issue of *The Forestry Source*, Mike Flannigan, a fire scientist at the University of Alberta, is quoted as saying in part: “The warmer it is, the more fire we see.” That is a faulty generalization. Flannigan may very well be correct in the case of the Rocky Mountain West of the United States and Canada, but it is certainly not true of the southeastern US. In the Gulf south, the frequency and intensity of wildfires are greatest during the winter months and negligible during the hottest months of July and August. Why? Relative humidity and its impact on fuel moisture.

Temperature is not the culprit. Relative humidity is. Because lower relative humidity typically occurs at higher temperatures in the western US and because the largest wildfires occur in the West, many erroneously assume higher temperatures are increasing fire intensity rather than the lower relative humidity. This can be verified by entering wildfire data into the US Forest Service’s BEHAVEPlus fire modeling system and keeping all inputs constant except for temperature. Increasing temperature does not increase fire intensity, but decreasing relative humidity definitely does so.

Subsequently, in a Commentary in the November 2018 issue of *The Forestry Source*, Jim Coufal writes: “The simple fire triangle shows heat, fuel, and oxygen as the critical factors in fire.” So far so good, but he continues: “Increased heat—global warming—doesn’t cause wildfires—humans and lightning are still the major causes—but increased heat clearly increases risk” (emphasis mine). The “heat” referenced in the fire triangle does not refer to ambient air temperature; it refers to the temperature necessary to ignite the fuel, and no climatologist I am aware of is forecasting that high an ambient air temperature.

Coufal also conflates fire hazard with fire risk. The National Wildfire Coordinating Group holds the most-appropriate definition for fire hazard: “A fuel complex, defined by volume, type, condition, arrangement, and location that determines

the degree of ease of ignition and the resistance to control.” Therefore, it is the fuel component of the fire triangle that constitutes the fire hazard. Alternatively, fire risk is defined as “the chance that a fire might start, as affected by the nature and incidence of causative agents.” Fire risk is increased by introducing human activity into the wildland environment, for example, power lines, railroads, recreational camping, and, of course, the most significant factor in the last half century, the wildland-urban interface. While increasing temperatures will increase the likelihood of igniting spot fires, the BEHAVEPlus fuel modeling system predicts that a temperature increase of four degrees is necessary to prompt a mere one percent increase in probability of ignition from a firebrand. I would hazard a guess to say that one percent is not a statistically significant increase in ignition probability (no pun intended).

In another commentary in the November edition, William M. Ciesla argues that both climate change and lack of active forest management are the cause of increased numbers and intensity of wildfires. However, most of his commentary addresses the impact of climate change. Frankly, the climate-change argument is unnecessary and irrelevant, because fire is solely dependent upon the three factors in the fire triangle. Some examples of what I mean: If global temperature doubled or tripled, it would not raise the ambient air temperature sufficiently to spontaneously ignite a wildfire. If climate change doubled or tripled wind speeds, fire would not burn if there were no fuel or source of ignition.

Immediately following publication of the November edition of *The Forestry Source*, the Camp Fire broke out; Paradise, California, was incinerated, and possibly hundreds of people lost their lives. Gov. Jerry Brown blamed the boogeyman du jour—climate change. I disagree. The Camp Fire was human-caused—and the loss of human life and property was indeed human-caused—but the fire was not caused by climate change. The fire and its aftermath were reportedly caused by a faulty Pacific Gas and Electric transmission line that raised the fuel temperature to the point of ignition. The town of Paradise and its inhabitants were lost because they moved into a fuel-rich environment.

As foresters, we do not need to

COMMENTARY ■ Page 17

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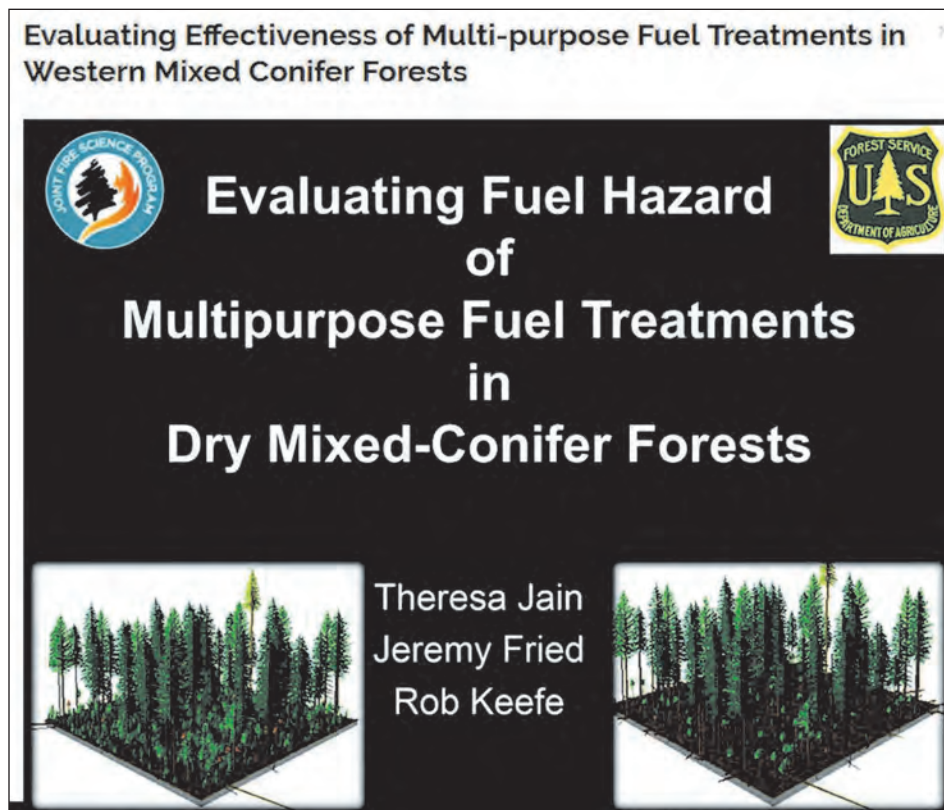
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ForestEd: Continuing Education at Your Convenience



This video from the 2017 SAF National Convention, Albuquerque, New Mexico, is one of numerous videos available at ForestEd.org.

With ForestEd, SAF's new online learning system, convenience is a key feature. The website (ForestEd.org) supports forestry and natural-resources professionals in achieving professional development goals anywhere, anytime, and on any device—smartphone, tablet, laptop, or desktop computer.

There's much more to ForestEd than convenience, of course—the site offers a wealth of valuable educational resources. These days, however, the demands on busy professionals' time are greater than ever, even as the requirements for continuing education for a variety of credentials and licenses remain unchanged or are increasing. ForestEd is a vehicle for personal growth driven by individual motivation or by employer expectations and performance development plans. Whatever the reason to pursue continuing education, time and budget limitations increase the need to expand the accessibility to learning opportunities.

Online-learning platforms create a space that mitigates the challenges imposed by such limitations and offer access regardless of where you work or live.

After testing and refining the website over the past few months, ForestEd made its debut in January 2019.

"It's now open for business—and is available and accessible to anyone, not just SAF members," said Naomi Marcus, SAF's director of professional development. "SAF members have access to free content and reduced prices on some products, [but] you don't have to be an SAF member to use ForestEd. SAF recognizes the greater importance of simply connecting professionals to each other, subject-matter experts, and the most current science to help enhance the practice of forestry."

Marcus said that ForestEd attracted

more than 4,600 professionals during its first six weeks in operation.

ForestEd visitors, she said, have been accessing the collection of recorded presentations from SAF National Conventions in a free video library. Among the 40-plus videos available are presentations on such topics as forest entomology and pathology, urban and community forestry, and private landowner communications. Look for additional convention presentations to be added in the future.

For anyone working to obtain continuing forestry education (CFE) credits to maintain an individual credential, ForestEd offers *Journal of Forestry* quizzes. (Taking *JoF* quizzes costs \$30 for members and \$45 for nonmembers.)

According to Tim Phelps, an SAF Board of Directors member representing District 9, "It was a breeze to register for the quiz."

When a quiz is completed, the score is provided instantly. When a passing score is achieved, CFEs are automatically uploaded to the individual's CFE record within 24 hours of completion. Automatic CFE uploads also apply to other CFE-eligible products on ForestEd.

Marcus said that ForestEd will host a variety of other learning experiences with CFE credits, ranging from virtual workshops, short courses, webinars, and other sources.

"I anticipate that much of the curated content will be made available through partnerships with academic institutions, other continuing education providers, and SAF working groups," she said. "ForestEd is a space to expand the reach of content to a large, diverse audience to further help prompt personal growth and scientific innovations on the ground and in the lab."

"I believe [ForestEd] will be very beneficial to those needing CFEs, but

who are unable to attend SAF meetings and other events in person," said Board of Directors member Dick Brinker, District 10.

"I welcome SAF members and colleagues from their extended professional networks to explore and utilize ForestEd as a tool for meeting professional development goals," Marcus said, "and for fostering success throughout the varying twists and turns a forestry and natural-resource professional's career takes." **ES**

Seeking Sci-Tech Articles

The Forestry Source welcomes contributions for the Science & Technology section, which focuses on recent research, technologies, and techniques for forestry and natural-resources management. These articles are not peer reviewed; they may include references and links to resources. Length: 700 to 1,500 words; photos, charts, and graphics welcome. Information: Steve Wilent, Editor, 503-622-3033, wilents@safnet.org.

New Online Course: Physical Science of Forests, Climate Regulation, and Carbon Storage

Michigan State University (MSU) Forestry and SAF recently announced an online ForestEd short course, Physical Science of Forests, Climate Regulation, and Carbon Storage. The course will be released in April 2019 and can be completed at the participant's own pace over four to six weeks. Course content is designed with natural-resources professionals, extension agents, and landowners in mind, but all interested individuals are invited to apply.

The course is organized into five modules: Carbon Cycle and Forest Carbon Storage; Humans, the Global Carbon Cycle, and Terrestrial Sinks; Forest Ecosystems and Carbon Pools; Global Forest Ecosystems and Carbon Fluxes; and Disturbances and Carbon Impact. The course will include presentations, quizzes, links to external resources, and suggested further reading.

Cost: \$199 for SAF members, \$249 for non-members. Course topics are interdisciplinary and learning outcomes are intended to be impactful across a variety of fields. See ForestEd.org.

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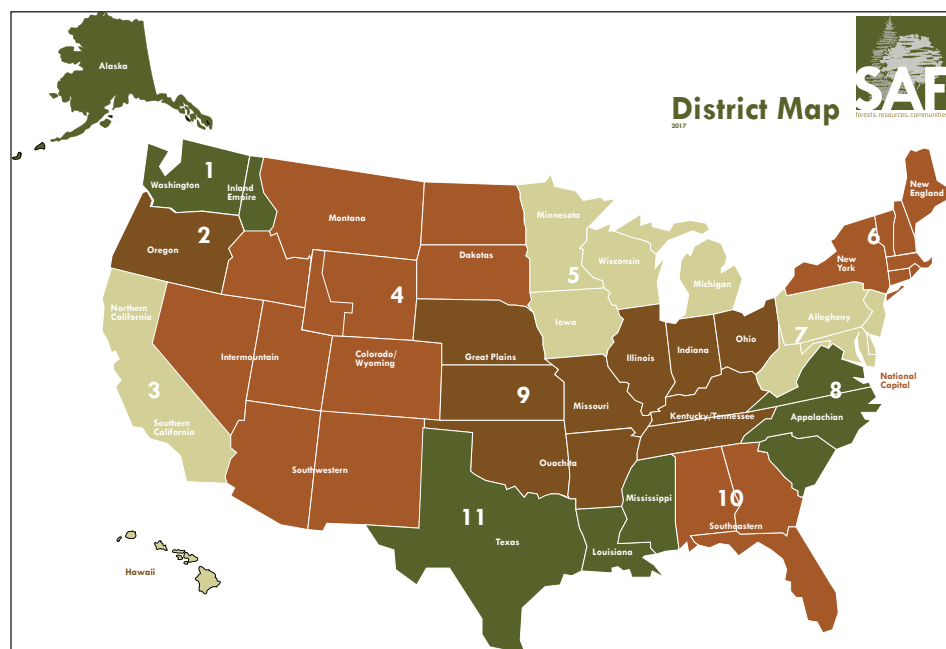
The 2019 SAF Convention will highlight mega trends such as **advanced wood materials** and **tall wooden buildings**, while acknowledging the legacy of American wood use in **music, food, shelter, and culture**, and explore new knowledge about forest connections with human health and safety.

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SAF Seeks Leaders Like You to Join Board of Directors



SAF's Board of Directors, which provides leadership and direction to SAF to achieve its mission, is seeking leaders to serve as new members. Board members include SAF's president, vice-president, immediate past-president, and 11 elected members (one from each of 11 voting districts). Board members are elected by the membership through elections each October; terms begin January 1. Five positions are open:

Vice-President: Serves for three years in succession: one year as vice-president, one year as president, and one year as immediate past-president.

District Board Members: Candidates are sought for SAF Districts 2, 5, 8, and 11. Members are elected to three-year terms.

Deadline: If you are interested in serving SAF in any of these capacities, submit your candidate packet to Lori Rasor (rasorl@safnet.org) by June 1, 2019. Forms and additional information are available at tinyurl.com/y9bv4osc.

For more information on these positions, contact Rachel Allison, National Nominations Committee chair (rachel.allison@unl.edu).

IN MEMORIAM

Marvin W. Blumenstock, 86, died on March 8, 2019, in Bangor, Maine. Blumenstock earned a bachelor's degree in forestry from Rutgers University, a master's degree in forestry from Yale University, and an MBA from the University of Maine. He spent his career in forestry-related jobs, culminating in his becoming an associate professor of forestry at the University of Maine and a forester for the university's Cooperative Extension Service. He was remembered as the face of the 1980s television series on the Maine Public Broadcasting Network, *Yankee Woodlot* and *Great American Woodlots*, which were designed to educate private woodlot owners in forest management. For more information, see tinyurl.com/y5ny4ywf.



land management, and special projects throughout the Southeast. He helped organize the West Virginia Forestry Association and received the Order of the Palmetto, the highest civilian award given by South Carolina, for helping to establish the forestry exhibit in the state museum. Funderburke joined SAF 1951 and was a Fellow. He served on the SAF Council (now known as the Board of Directors) and several committees, and chaired both the Allegheny SAF and the Appalachian SAF. For more information, see tinyurl.com/y3d7344f.

Leslie Wayne Johnson, 76, of Mifflinburg, Pennsylvania, died on March 9, 2019. He was a retired assistant forest manager for the Pennsylvania Bureau of Forestry; he helped manage the Bald Eagle State Forest for 31 years. Johnson was a member of the Pennsylvania Forestry Association, Pennsylvania Forest Fire Museum, and Keystone Elk County Association. For more information, see tinyurl.com/y9q36d3t.



Kenney P. Funderburke died on March 9, 2019, in Summerville, South Carolina, at the age of 92. Funderburke served in the US Navy during World War II. A University of Georgia forestry graduate, he started his forestry career with the South Carolina Forestry Commission and later worked for 43 years for the West Virginia Pulp & Paper Company (now known as Westvaco), in wood procurement,



Link to SAF Journals

Digital editions and archives of the *Journal of Forestry* are available at academic.oup.com/jof and *Forest Science* at academic.oup.com/forestscience.

SAF NEWS

Update: SAF's Forest Science and Technology Board

By Nan Pond

As the new chair of the Forest Science and Technology Board (FS&TB), I'm pleased to have a chance to introduce myself and remind my fellow SAF members of the role of the board.

FS&TB serves as a conduit for the exchange of information related to forest science and technology between SAF working groups (and therefore, members at large) and SAF leadership. It's a volunteer board made up of both regional and subject-area representatives; I joined the board as the resource-measurements subject-area representative in 2016 and served in that capacity before assuming the role of chair this year.

FS&TB roles and responsibilities are centered around helping the Society use forest science and technology to achieve its larger goals. This is done through disseminating information, providing guidance and subject-area expertise to national leadership and other boards, and otherwise reviewing and advising on relevant forest-science issues. The board also administers the Kurt Gottschalk Science Fund; provides grants for research, outreach, and collaboration; and recommends nominees for the annual National Science Award.

I'll take this opportunity to remind you of the opportunity to participate in SAF working groups. The role of the working groups is to represent communities of interest within the profession. This includes representing the community of interest within the larger gatherings and context of the profession, as well as working with FS&TB to advise the SAF Committee on Forest Policy on position statements. The working groups also serve as a clear channel—established by and supported by SAF—for the dissemination, discussion, and application of forest science.

Our most successful working groups are those that have a strong community within them and—as we have seen in the revitalization of several groups in recent years—it doesn't take long to build such a community when engaged SAF members come together around a topic of mutual interest. Currently, we have a wide range of active working groups, focused on subject areas ranging from forest technology to agroforestry to diversity and inclusion. You can join a working group by visiting eforester.org, then selecting "Join a Working Group" under the Communities tab at the top of the page. You can also contact me directly at nan@silviaterra.com, if you'd like to learn more about a working group or to find out who is currently leading a specific community. Also, at the SAF National Convention each year, there is a scheduled time for Working Group Meetups, an opportunity to meet in person with people focused on your area of interest and to participate in setting goals

for the group for the year.

I believe that SAF's working groups are one of the strongest potential communities and opportunities for network-building within the Society. Rather than connecting you to others geographically, they provide a way to connect to those who are passionate about the same aspects of forestry as you, regardless of their location—an excellent avenue for learning and sharing practical knowledge that will help us advance the profession. **FS**

Nan C. Pond is the lead biometrician at SilvياTerra (silviaterra.com).

UPDATE

■ From Page 2

with our partners, and engagement with SAF members to express support for increases or concerns about loss of funding, together we can demonstrate that forests and forestry are important to constituents across the country. SAF's main priorities are highlighted in Baker's submitted written testimony, which is available on the SAF website. You can also watch his first congressional testimony before the subcommittee at the 8:14 mark in this video, at tinyurl.com/y9xbdpvw.

SAF's Government Affairs team is excited about working with Congress and the administration on promoting healthy, productive forests on public and private lands across the US. We will provide periodic updates on these priorities, as well as other Government Affairs activities designed to increase awareness and understanding of the benefits and importance of forest management and how forests improve quality of life.

SAF is not and cannot be successful in attracting attention to these forest-policy priorities without working in close coordination with its partners. The need for partnership and coordination extends to the national office working alongside SAF state societies and local units on these national-office policy priorities and other important policies that impact forest management closer to home. Forest professionals have a responsibility and a vested interest in educating the public and decisionmakers about the practice of forestry. When possible, I encourage you to share your knowledge and experiences to educate and help influence policy. Don't be shy—advocacy is for everyone. As a constituent, you are the ideal grassroots advocate to convey to legislators how essential forests and forestry are to your community. Resources are available at tinyurl.com/ybff2r4d, and you can always contact me, barnwellj@safnet.org, with questions or concerns. **FS**

John Barnwell is SAF's director of government affairs and external relations.

New Books by SAF Members

Stormy Outside



Mark Stormzand, author of *Stormy Outside: The Adventures and Misadventures of a Forester and His Dog*, with constant companion Dusty. Photo courtesy of Mark Stormzand.

Stormy Outside: The Adventures and Misadventures of a Forester and His Dog, by Mark “Stormy” Stormzand, is a collection of stories about “life in the brush” that will be familiar to many other foresters.

“Not everyone is fortunate enough to stumble into the perfect career path as I did,” he writes in the introduction. “I did not realize it growing up in a metropolitan area, but not only did I like the outside, I like my outside big with lots of space, lots of trees, and not a lot of people. Short of being a wilderness guide, which was highly unlikely for a kid growing up in the ‘burbs’ in the fifties and sixties, a career in forestry was perfect. I worked alone in spectacular landscapes and with one very wonderful perk: Every day was bring your dog to work day.”

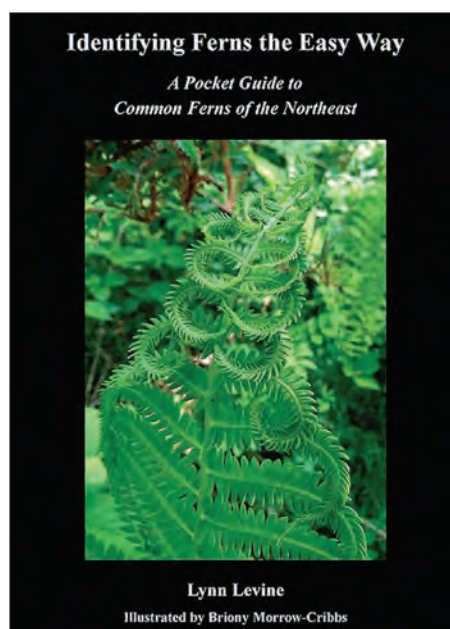
Stormzand also loves to write, and this book is devoted to 38 stories of his experiences in the woods, “all the way from a logging camp in Idaho to the wilds of Maine.” In “Disney and Fire,” he describes fighting fires as a summer forestry intern in northern Idaho, where he learned the nature of extremely hard work, often on a diet of Spam sandwiches. In “Not a Clear-Cut Issue,” Stormzand recalls explaining to a dubious Michigan landowner that a clear-cut really was the best option for his stand of aspen.

Throughout his adventures, Stormzand usually is accompanied by one of four golden retrievers, one of which, Dusty, appears in a photo with Stormzand on the back cover of the book.

Stormy Outside, published in September 2018 by Mission Point Press, is available in numerous bookstores in Michigan, as well as via Barnes and Noble and other online retailers.

Pocket Guide to NE Ferns

Lynn Levine’s *Identifying Ferns the Easy Way: A Pocket Guide to Common Ferns of the Northeast*, published in January, is billed as “an easy-to-use guide for fern lovers.”



The 74-page book includes information about and exquisite illustrations of 28 common ferns of the region, from bracken and bulbet to spinose wood ferns.

The first few pages are devoted to ferns as ancient plants, their reproductive systems, lifecycles, parts, and terminology. A silhouettes section offers illustrations of ferns in five categories: once-cut, twice-cut, thrice-cut, three parts, and unique, followed by a section with two pages devoted to descriptions and detailed illustrations of each of the 28 species.

Levine earned a master’s degree in forestry from the University of Massachusetts and now works as a consulting forester from her home in East Dummerston, Vermont. She is coauthor, with Martha Mitchell, of *Mammal Tracks and Scat: Life-Size Tracking Guide*, as well as an author of books for children, such as *Snow Secrets*.

Identifying Ferns was edited by Cliff Adler, Levine’s husband, and illustrated by Briony Morrow-Cribbs. It is available at Heartwood Press (heartwoodpress.com), as well as on Amazon and other retail outlets. **FS**

Seeking GIS, Sci-Tech Articles

The Forestry Source welcomes contributions for the GIS for Foresters and Science & Technology sections. GIS for Foresters articles cover geographic information systems, lidar and remote sensing, tips and techniques for being more productive with ArcGIS and other software, and related topics. Science & Technology focuses on recent research, technologies, and techniques for forestry and natural resources management. These articles are not peer reviewed; they may include references and links to resources. Length: 700 to 1,200 words. High-resolution photos and graphics welcome. Information: Steve Wilent, Editor, 503-622-3033, wilents@safnet.org.

Flathead “Shutdown” Dinner



Brownies enticed some of the federal employees and their families at a potluck dinner organized by SAF’s Flathead Chapter in Montana during the 35-day partial federal government shutdown. Photo courtesy of Zachary Miller.

Zachary Miller, chair of the SAF Flathead Chapter in northwest Montana, held a potluck dinner for federal employees and their families in January, during the 35-day partial federal government shutdown. The chapter invited federal employees and their families from the two local national forests, the Flathead and Kootenai, in a message sent via e-mail to district rangers, contracting officers, and foresters. It was an open invitation for any federal employee.

Three families affected by the shutdown turned out for the dinner, held at the Montana Logging Association. Serving them were eight SAF members, four Weyerhaeuser employees, and one generous citizen.

“It was great to see the community come together to support each other,” said Miller. “The night was filled with good food and conversation, oversized Jenga games, cornhole games, sledding, and an outside campfire. There were multiple benefits beyond the obvious of helping out the federal employees. Hosting the event brought local awareness to what and who SAF is, and it united community members and local professionals. It also motivated our chapter—we did something new; it brought us closer.”

Zipse: Allegheny Forester of the Year

Bill Zipse, a forester with the New Jersey Forest Service, recently received the Allegheny SAF Forester of the Year Award. Zipse, who began working for the agency in 2000, is the supervising forester for several programs, including the state lands planning program, which plans for, manages, and provides technical forestry expertise for approximately 775,000 acres of state-owned forests.

“My DEP colleagues and I congratulate Bill Zipse for achieving this prestigious honor in recognition of his outstanding stewardship to protect New Jersey’s forests and wildlife management areas,” said Department of Environmen-



tal Protection commissioner Catherine R. McCabe. “Bill’s expertise helps ensure that the public will be able to appreciate and enjoy our natural lands for many years.”

For more information, visit tinyurl.com/yyjf3at4.

Andrews: 50 Years in SAF

Lynn Andrews received an award for 50 years of service to SAF on February 21, 2019, at Indiana SAF’s winter meeting. Among several jobs during his career, Andrews spent the most time—more than 30 years—as a forester at the Naval Surface Warfare Center (NSWC) in Crane, Indiana. According to the center, NSWC is the third-largest navy installation in the world, at about 100 square miles, or 64,000 acres. When Andrews started at NSWC, the center was harvesting about 100 MBF/year. By the time he retired, its annual harvests had increased to a sustainable one MBF/year. The forest-management plan Andrews and his team wrote is still in place today. When he retired, he received the Navy Superior Civilian Award, the highest award given to a civilian working for the navy.

As a retiree, Andrews stays busy as a lead disaster volunteer with the American Red Cross in southern Indiana. He has served as treasurer for Indiana Woodland Steward for the last 10 years. **FS**



COMMENTARY

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come to an agreement on whether climate change is or is not occurring to address the apparent increase in wildfire occurrence and acreage. We can all agree that if there is more fuel on the ground, fires will burn hotter and be more difficult to control. We can deal with that through forest-management activities such as prescribed burning and mastication. We can reduce the potential for crown fires through thinning. We can inform and encourage communities to implement the Firewise program. And we can do these things much more rapidly and effectively than humankind can change the climate.

In my opinion, what we cannot do as foresters is state that climate change is causing larger and more-intense wildfires, because the data supporting climate change are too far removed from the data foresters use in predicting fire behavior. The SAF Code of Ethics states in part: “We pledge ... to perform only those services for which we are qualified...” I submit that we are not qualified to determine if climate change is real or not, or human-caused or not. We are qualified to address the fuel buildup that has occurred in much of our forestland to reduce the potential for catastrophic wildfires. Now let’s get to work. **FS**

Conrad J. Franz lives in Trenton, New Jersey. He is a registered forester in Mississippi.

CONTINUING EDUCATION CALENDAR | April through June 2019

More Events at tinyurl.com/gnd78jh (www.eforester.org)

Continuing education events for **April through June 2019**. SAF Continuing Forestry Education (CFE) credits are available at all events. Visit SAF's Continuing Education Calendar at tinyurl.com/gnd78jh for more information on these events and others that may have been recently added to the list. Note the webinars at the top of the listings.

CFE Providers: To obtain pre-approval of Continuing Forestry Education credits for an event, complete and submit the CFE Provider Application Form on the Certification & Education/Continuing Education page at eforester.org (or tinyurl.com/gnd78jh)

WEBINARS

- 4/2/2019, Dead Ash Dangers and Considerations for Risk and Removal
- 4/9/2019, Prescribed Fire in Natural Resources Management
- 4/11/2019, Fire Ecology Flashtalks
- 4/18/2019, Climate Change Effects on Grassland Productivity and Drought Resilience
- 4/25/2019, Role of Science and Scientists in Natural Resources Decision Making & Advocacy
- 5/2/2019, Diverse Grasshopper Community Effects to Rangeland Ecosystem Health and Function
- 5/14/2019, Crop Tree Management at Perkey Tree Farm
- 6/11/2019, Wildland Fire and Plant Communities
- 6/18/2019, Treaty Rights and the Chippewa National Forest

ALABAMA

- 4/8–9/2019, ArborGen Alabama Higher Genetics Tour, Prattville

ALASKA

- 4/17/2019, Tree Disorder Diagnosis, Anchorage
- 4/17/2019, Why Trees Fail, Anchorage

ARKANSAS

- 4/8/2019, Seminar: A New Support Tool for Forest Herbicide Decisions in Arkansas, Monticello

CALIFORNIA

- 4/25–26/2019, GIS for Forestry, Lake Tahoe
- 5/10–11/2019, GIS for Forestry, Redding

COLORADO

- 4/4/2019, Intentional Grazing of Poisonous Plants, Fort Collins

CONNECTICUT

- 6/29/2019, Habitat Diversity, New Canaan

FLORIDA

- 4/16–17/2019, Longleaf Academy: Herbicides & Longleaf, Lake City
- 4/30–5/1/2019, 46th SAF/SFRC Spring Symposium, Gainesville

GEORGIA

- 4/9/2019, Forest Health & Invasive Species Update, Adel
- 4/29–5/1/2019, Georgia Vegetation Management Association 2019 Annual Conference, Savannah
- 6/6/2019, North Georgia Prescribed Fire Council Meeting, Jasper

IDAHO

- 5/21–23/2019, Forest Insect & Disease Identification and Management, Coeur d'Alene
- 6/21/2019, Pruning to Restore White Pine, Coolin

IOWA

- 4/12–14/2019, 11th Annual Meeting, SER, Midwest Great Lakes Chapter, Pella

LOUISIANA

- 4/5/2019, Florida Parishes Forestry Forum, Hammond

MAINE

- 4/3/2019, Maine Invasive Species Network Annual Meeting, Rockland
- 4/4/2019, Emerald Ash Borer Night, Littleton
- 4/11/2019, 2019 CFRU Spring Advisory Committee Meeting, Orono
- 4/12/2019, Native Plant Conservation in the 21st Century, Falmouth

[.com/z2zqc3o](http://tinyurl.com/z2zqc3o)). Submittal instructions are included on the form.

CFE Post Approval for Individuals: If an event was not preapproved for CFE credit, SAF will evaluate the meeting on an individual basis. This service is available to members and SAF-certified professionals at no cost; non-members are assessed an annual fee of \$30. To apply, complete and submit the CFE Post Approval Form on the Certification & Education/Continuing Education page at eforester.org (or tinyurl.com/z2zqc3o). Submittal instructions are included on the form.

MASSACHUSETTS

- 4/3/2019, Plant-Insect Co-Evolution, Whately
- 4/28/2019, Ecological Pollinator Conservation, Framingham
- 5/8–11/2019, Botanical Inventory Methods, Framingham
- 5/18/2019, Ecology Of Mount Tom, Easthampton
- 6/8–9/2019, Dendrology 101, Whately

MICHIGAN

- 4/2/2019, Grand Traverse Bay Watershed Forestry Network Meeting, Traverse City
- 4/3/2019, Log Scaling and Grading Workshop, South Range
- 4/3/2019, FCWG 2018-19 Learning Exchange Series Session: Forest Carbon Markets, East Lansing
- 4/8/2019, Forest Invasive Species Prevention Workshop: Oak Wilt, Lansing
- 4/10/2019, Forestry for Michigan Birds: Stakeholder Workshop, Sault Ste Marie
- 4/18–19/2019, Michigan Society of American Foresters, Grayling
- 5/1/2019, FCWG 18-19 Learning Exchange Session: The Family Forest Carbon Initiative, East Lansing
- 5/9/2019, Heterobasidion Root Disease Harvest Criteria, Cadillac
- 6/5/2019, FCWG 2019-19 Learning Exchange Series: Natural Climate Solutions, East Lansing

MINNESOTA

- 4/3/2019, Small UAS in Forestry and Land Management, Cloquet
- 4/16/2019, Webinar, An Update on Invasive Plants in Minnesota's Forests
- 5/2/2019, Tribal Cultural Landscapes and Forest Management, Onamia
- 5/21/2019, Understanding Treaty Rights and Obligations,
- 6/18/2019, Webinar: Treaty Rights and the Chippewa National Forest

MISSISSIPPI

- 4/13/2019, 2019 Spring Field Day, Baxterville

MISSOURI

- 6/28/2019, The Tree Course, St. Louis

MONTANA

- 4/11/2019, Noxious Weed Management Technical Workshop, Butte
- 4/12/2019, 10th Annual MT Forest Landowner Conference & Society of American Forest Meeting, Butte
- 4/13/2019, 2019 State Meeting Field Trip, Butte

NEW HAMPSHIRE

- 4/1/2019, Start Making Maps with Lidar, Manchester
- 4/2/2019, New Hampshire's Loons, Hillsborough
- 4/2/2019, Start Making Maps with Lidar, Albany
- 4/9/2019, More than Granite: An Introduction to New Hampshire's Geology, Hillsborough
- 4/9/2019, Soils Matter: 2019 Soils Conference, Concord
- 4/11/2019, NH Timber Harvesting Law, Wentworth
- 4/12/2019, Start Making Maps with Lidar, Plymouth
- 4/13/2019, Dirt-to-Trees-to-Wildlife, Randolph
- 4/15/2019, Basic Logger First Aid, North Conway
- 4/16/2019, Basic Logger First Aid, Hillsborough
- 4/17/2019, Basic Logger First Aid, Lancaster
- 4/18/2019, NH Timber Harvesting Law, Conway
- 4/19/2019, Advanced Safe and Productive Felling, Bennington
- 4/22/2019, Basic Logger First Aid, North Haverhill
- 4/24/2019, The Emerald Ash Borer & What It Means for You, Rochester
- 4/25/2019, Hydric Soils of New England, Goffstown
- 4/29/2019, Safe and Efficient Trucking, Lancaster
- 5/2/2019, Mechanized Timber Harvesting, Pembroke
- 5/3/2019, Understanding the Basis and Use of Wetland Evaluation, Manchester
- 5/3/2019, Mud Season Breakfast, Berlin
- 5/4/2019, Plainfield Sanctuary, Plainfield
- 5/6/2019, Fundamentals of Forestry, Colebrook
- 5/8/2019, Advanced Logger First Aid, Berlin
- 5/9/2019, Blackfly Breakfast, Henniker
- 5/9/2019, NH Tree Farm Inspector's Training, Henniker
- 5/10/2019, Basic Safe and Productive Felling, Wentworth
- 5/18/2019, Wetlands and Forestry: Optimizing the Benefits, Jefferson
- 5/22/2019, US Army Corps Wetland Delineator Methods, Portsmouth
- 5/29/2019, US Army Corps Wetland Delineator Methods, Portsmouth

- 6/5/2019, US Army Corps Wetland Delineator Methods, Portsmouth
- 6/6/2019, Soil Genesis, Goffstown
- 6/7/2019, Grasses for Beginners, Portsmouth
- 6/8/2019, Logging with Tractors, Bridgewater
- 6/8/2019, Stone Fence Farm Guild Gathering, Unity

NEW JERSEY

- 4/18/2019, Pond Design, Management, and Maintenance, Hillsborough
- 5/21–22/2019, Vegetation Identification for Wetland Delineation: North, Basking Ridge
- 6/11–14/2019, Methodology for Delineating Wetlands, Basking Ridge
- 6/12/2019, Introduction to Wetland Identification, Basking Ridge

NEW YORK

- 4/24/2019, Forest Pest Awareness Training, Kingston

NORTH CAROLINA

- 4/4–7/2019, S-290 Intermediate Wildland Fire Behavior, Browns Summit
- 4/9/2019, NC ProLogger Mod 19, Plymouth
- 4/11/2019, ACF Spring Meeting, Dunn
- 4/12/2019, NC ProLogger Mod 19, Marion
- 4/17/2019, Carolina Canopy Workshop: Weathering the Storm, Wilmington
- 6/26/2019, Duff Fire Science and Management Workshop, Southern Pines

OHIO

- 4/2–3/2019, 2019 Forest Health Meeting, Jackson

OREGON

- 4/10/2019, The 2019 Starker Lecture Series, Corvallis
- 4/11–12/2019, Slope Stability and Landslide Management in the Pacific Northwest, Springfield
- 4/17–19/2019, 2019 OSAF Annual Meeting, Lebanon
- 4/30/2019, Scaling for Non-Scalers: Understanding the Scaling Process, Log Rules, etc., Wilsonville

SOUTH CAROLINA

- 4/16/2019, Keowee Chapter: Drones in Forestry, Easley
- 4/18/2019, Forest Health and Invasive Species Workshop, Greenville
- 4/23/2019, Winyah Chapter of SAF Forestry Workshop, Georgetown
- 5/8/2019, Annual Forestry Meeting, Leesville
- 5/19/2019–6/1/2019, Forestry and Recreation in Germany and Switzerland, Countries in Europe
- 6/12–13/2019, Logging Cost Analysis, Columbia, South Carolina
- 6/21–23/2019, Deer Steward: Habitat Enhancement, Beaufort, South Carolina

TENNESSEE

- 4/17/2019, The Tree Course, Memphis

TEXAS

- 4/25/2019, Lufkin-Nacogdoches TSAF Q2 2019 Meeting
- 4/25–26/2019, 29th Annual Outlook for Texas Land Markets, San Antonio

UTAH

- 4/2/2019, Canker Diseases on Landscape Hardwood Trees in the Western US, Logan

VERMONT

- 4/4/2019, Woods, Wildlife, and Warblers Program, Leicester
- 4/9/2019, Fundamentals of Forestry, Brattleboro
- 4/27/2019, Intensive Forest Management Workshop: A Demonstration and Discussion, Chester
- 5/23/2019, Hazard Tree Assessment Training, Barre
- 6/27/2019, ESHQUA BOG, Hartland

VIRGINIA

- 4/30–5/3/2019, Va. Forestry Summit: From Seedling to Stump: Forestry for Profit and Pleasure, Norfolk

WISCONSIN

- 4/4/2019, Sustainable Forestry Conference, Florence
- 4/12/2019, Spring Celebration, Green Bay
- 6/9–11/2019, 2019 Great Lakes SAF Leadership Conference, Appleton
- 6/7/2020, Timber Marking for Wildlife Habitat: White-tailed Deer, Amherst Junction

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From the SAF Career Center

For the complete listing of these and other ads, visit <http://careercenter.eforester.org>

Associate Director

Employer: UGA Center for Forest Business
Location: Athens, Georgia
Job ID: 47357012
Posted: March 18, 2019
Industry: Forestry/Natural Resources
Academia
Min Education: Master's Degree
Min Experience: Over 10 Years
Required Travel: 10-25%

Postdoctoral Fellow

Employer: Colorado State University
Location: Fort Collins, Colorado
Job ID: 47302648
Posted: March 15, 2019
Entry Level: No

Wood Procurement Coordinator

Employer: Verso Corporation
Location: Fredericksburg/Culpepper/Orange, Virginia
Job ID: 47255182
Posted: March 13, 2019
Entry Level: No

Utility Arborist

Employer: ECI Consulting
Location: Atlanta, Georgia
Job ID: 47254773
Posted: March 13, 2019
Entry Level: No

Utility Forester

Employer: ECI Consulting
Location: Hutchinson/Manhattan/Salina, Kansas
Job ID: 47254768
Posted: March 13, 2019
Entry Level: No

GIS Analyst

Employer: Steigerwaldt Land Services
Location: Tomahawk/Hayward, Wisconsin; Negaunee, Michigan; Chillicothe, Ohio
Job ID: 47254733
Posted: March 13, 2019
Entry Level: No

Tax Law Policy Specialist

Employer: Wisconsin Department of Natural Resources
Location: Madison or Rhinelander, Wisconsin
Job ID: 47240653
Posted: March 12, 2019
Entry Level: No

Forest Tax Law Administration Specialist

Employer: Wisconsin Department of Natural Resources
Location: South Tax Law Team Area, Wisconsin
Job ID: 47240645
Posted: March 12, 2019
Entry Level: No

Tax Law Forestry Specialist

Employer: Wisconsin Department of Natural Resources
Several locations in Wisconsin
Job ID: 47240641
Posted: March 12, 2019
Entry Level: No

Log Buyer

Employer: Besse Forest Products Group

Location: Northern Lower Michigan
Job ID: 47240279
Posted: March 12, 2019
Entry Level: No

Log Buyer

Employer: Besse Forest Products Group
Location: Eastern Upper Peninsula, Michigan
Job ID: 47240217
Posted: March 12, 2019
Entry Level: No

Reforestation Unit Leader

Employer: Tennessee Division of Forestry
Location: Delano, Tennessee
Job ID: 47239796
Posted: March 12, 2019
Entry Level: No

Forest Management Scientist

Employer: The Jones Center at Ichauway
Location: Newton, Georgia
Job ID: 46646058
Posted: March 9, 2019
Job Function: Faculty in Forestry/Natural Resources
Min Education: Ph.D.
Min Experience: 1-2 Years

Regional Sustainability Forester

Employer: Enviva
Location: Franklin, Virginia/Ahoskie, North Carolina
Job ID: 47177638
Posted: March 8, 2019
Min Experience: 3-5 Years
Required Travel: 10-25%

Aspen Procurement Forester

Employer: Besse Forest Products Group
Location: Northern Wisconsin/Upper Peninsula, Michigan
Job ID: 47134942
Posted: March 6, 2019
Job Function: Procurement Forester
Entry Level: No

Forestry Inventory Manager

Employer: Weyerhaeuser
Location: Brunswick, Georgia
Job ID: 47134927
Posted: March 6, 2019
Min Experience: 3-5 Years

Supervisory Forester of Communications and Communities

Employer: Colorado State Forest Service
Location: Woodland Park, Colorado
Job ID: 47134921
Posted: March 6, 2019
Min Experience: 3-5 Years
Required Travel: 10-25%

Conservation Forester

Employer: The Nature Conservancy
Location: Sparta/Cookeville, Tennessee
Job ID: 47121711
Posted: March 5, 2019
Entry Level: No

Forester

Employer: Campbell Global
Location: Cross City, Florida
Job ID: 46989955
Posted: March 5, 2019
Entry Level: No

Regional Wood Fiber Procurement Manager

Employer: WestRock
Location: Fernandina Beach, Florida
Job ID: 47121302
Posted: March 5, 2019
Entry Level: No

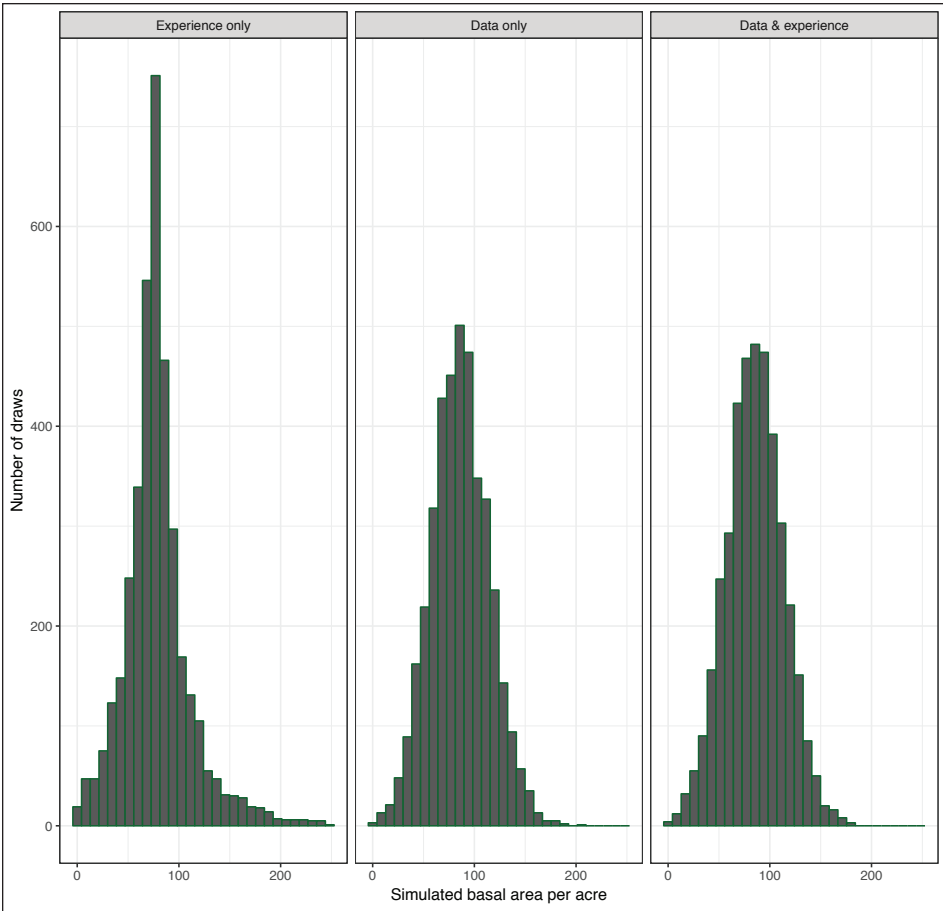


Figure 2: Histograms of three basal area per acre simulations

	Mean	Std. Dev.
Experience only	79.2	32.5
Data only	85.7	28.5
Data & experience	84.8	27.8

Table 1: Mean and standard deviation for the three simulations

BIOMETRIC BITS

■ From Page 11

cases the peak in this value isn't nearly as strong. Incorporating cruise data provides much more weight for values that are close, but not exactly equal, to our mean estimate. Note also that including prior experience shifted the mean in the direction of the "experience only" mean (Table 1), though the change is not particularly large. This is probably owing to the fact that this cruise is a robust sample of 50 plots within a single stand. A smaller, more variable dataset would have resulted in more weight being given to our prior expectation.

In addition to the difference in the mean, the combined distribution has a smaller standard deviation, and therefore, lower uncertainty, than the other two estimates. Recall that the experience-only distribution (Figure 2) had a lot of weight at our expected mean of 80 ft²/acre. Since applying Bayes' Theorem integrates the distribution of the data with our prior expectations, the high precision we expected results in higher precision in our final estimate.

So, what should we do with these results? In this case, the fact that the cruise mean was higher than our expected value, even after integrating our expertise, would

lead us suspect that there's something different about this stand compared to those we've inventoried in the past. We may decide we are convinced by the evidence, or we may elect to collect additional information before deciding whether these results lead us to update our prior belief. It's up to you to decide. The beauty of Bayes' Theorem is that it gives us a rigorous framework to ask critical questions about our data, and to weigh the evidence it presents against our expert knowledge.

You may be thinking, "That's how my intuition works already." That's great! The framework outlined here may help you codify this approach and make it part of your regular workflow. The intuitive insights encoded in Bayes' Theorem may seem simple, but they have far-reaching consequences for modern forest statistics. This article has just scratched the surface of Bayesian biometrics—I'd be happy to continue the conversation if you have questions or comments. If you are interested in learning more about Bayes' Theorem and Bayesian statistics, I recommend checking out *Statistical Rethinking* by Richard McElreath. [FS](#)

Brian Clough is a forest biometrician with SilviaTerra. He has a PhD in ecology and evolution from Rutgers University.

Forest Products Industry News

MPP Maker on Innovation List



Freres Lumber Co., an Oregon-based maker of mass plywood panels (MPPs), was recently named to the *Fast Company* list of the World's Most Innovative Companies for 2019. Photo: Steve Wilent.

Fast Company, a monthly business magazine, recently named Freres Lumber Co., a maker of mass plywood panels (MPPs), to its annual list of the World's Most Innovative Companies for 2019; Freres was listed fifth in the Urban Development/Real Estate category.

Freres, which was founded in Lyons, Oregon, in 1922, produced lumber for decades and began producing veneer in 1959; the company now produces only veneer, except for small amounts of lumber it mills from peeler cores. It broke ground on a 168,000-square-foot MPP manufacturing facility in March 2017 and produced the first panels in December of the same year. Some of its MPPs have been

used in a new forest science building at Oregon State University (See "First CLTs, Now MPPs: Mass Plywood Panels" in the September 2018 edition of *The Forestry Source*.)

Fast Company noted that "In 2018, Freres received certification as well as patents for the first mass plywood panel made entirely out of structural composite lumber. These panels are made from 8-inch diameter, suppressed trees that when removed reduce wildfire risk from overstocked landscapes. The new panels are designed to replace concrete and steel in tall buildings, and hundreds of buildings have been built or are under construction since the product came to market."

US Hardwoods: \$348 Billion

A recent study found that the US hardwood forest-products industry contributes \$348 billion to the nation's economy and employs more than 1.83 million people (see tinyurl.com/y3rbwc9j). The study cited these figures for 2016:

- Direct Effect: \$135.6 million
- Indirect Effect: \$108.9 million
- Induced Effect: \$103.6 million

For every \$1 million in output of hardwood products, 5.3 jobs and \$0.45 million of gross domestic product are supported within the US.

The study was conducted by Agribusiness Consulting, on behalf of a handful of hardwood forest-products associations, including the American Hardwood

Export Council and the Hardwood Manufacturers Association.

Georgia Forestry Rocks!

The Georgia Forestry Commission recently reported that the state's forest-products industry generated \$21.3 billion in total revenue in 2017, up 2.7 percent from 2016. Georgia's pulp and paper industry continued to dominate all sectors within the state's forest sector. The state's 12 pulp mills represented 62 percent of total revenue output, 36 percent of employment, and 49 percent of compensation. In 2017, its pulp and paper companies increased their collective output and employment by 0.3 percent and 1.4 percent, respectively, while compensation decreased by 7.5 percent.

In 2017, Georgia's forest industry provided 53,933 jobs, up 3.9 percent from 2016 (2,033 jobs gained). This was the seventh consecutive year of positive forest-industry job growth. Across all manufacturing industries, forestry ranks second (to food processing) in total employment.

Dartmouth to Heat with Biomass

Dartmouth College recently announced that it is seeking proposals to build a biomass-energy heating facility and transmission system to replace its existing central heating system, which has been in use in various forms since 1898 and serves 110 buildings. A Dartmouth press release stated that the biomass plant "will allow the College to stop burning the millions of gallons of No. 6 fuel oil used in the exist-

ing heating plant, which is located in the center of campus. Instead, biomass—in this case sustainably sourced waste-wood material from forestry and timber industries—will be burned in the new plant. The materials will be purchased as locally as possible. A review of the availability of wood biomass shows that a sufficient quantity of the material is available in the region and across New England." The Hanover, New Hampshire, college hopes to begin using the new facility by late 2025.

Russian Lumber on the Rise

The trends are clear, according to FEA/Wood Markets (woodmarkets.com): Russia's softwood-lumber production and exports have risen dramatically:

- The country's softwood-lumber production, estimated at 39 million cubic meters (m³) in 2018, has increased by 55 percent over the past 10 years.
- Its softwood-lumber exports, at 29.3 million m³ in 2018, have nearly doubled over the same period.
- Russia exported 15.65 million m³ of softwood lumber to China last year, more than double the amount shipped during 2014.
- Russian lumber represents 63 percent of China's total softwood-lumber imports.

FEA/Wood Markets also reports that Russian lumber is displacing lumber exported from other countries, including Finland, Sweden, and Canada. **FS**

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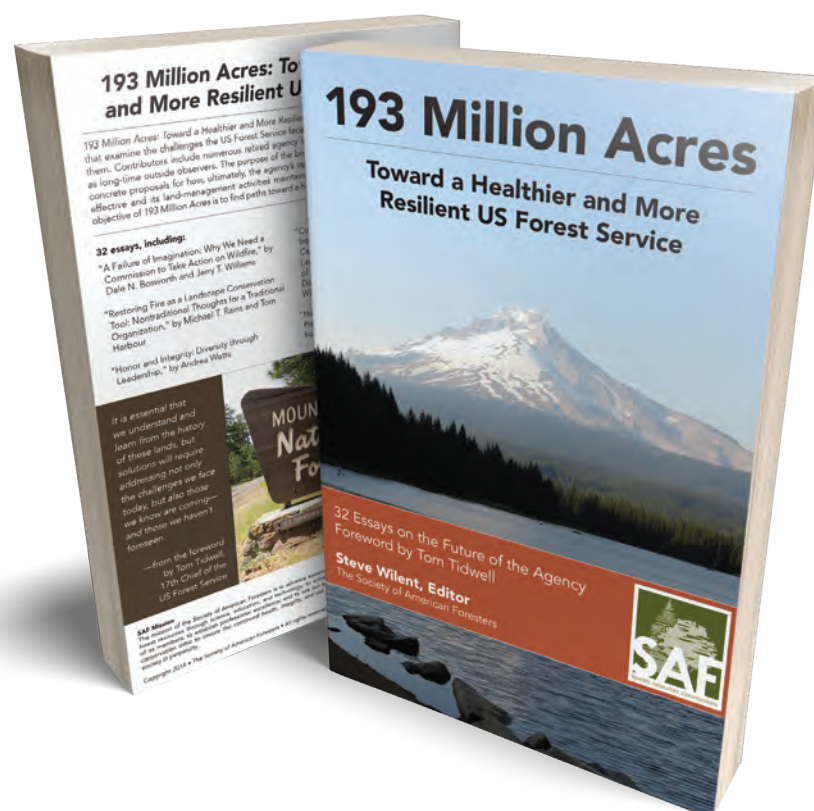
Now Available from SAF

A collection of essays that examine the challenges the US Forest Service faces and propose solutions that would address them. Contributors include numerous retired agency leaders, including two former chiefs, as well as longtime outside observers. The purpose of the book is not to criticize the agency, but to offer concrete proposals for how, ultimately, the agency's operations might be made more efficient and effective and its land-management activities maintained, expanded, and improved. In short, the objective of 193 Million Acres is to find paths toward a healthier and more resilient US Forest Service.

"A Failure of Imagination: Why We Need a Commission to Take Action on Wildfire," by Dale N. Bosworth and Jerry T. Williams

"Anatomy of an Enduring yet Evolving Mission," by Al Sample

"How Collaboration Can Help Resolve Process Predicament on National Forests: Examples from Idaho," by Rick Tholen



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