

ARBORESCENCE

THE OFFICIAL PUBLICATION FOR MEMBERS OF THE MINNESOTA SOCIETY OF ABOICULTURE

WINTER 2020-2021



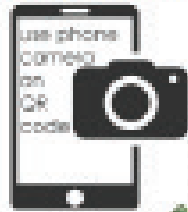
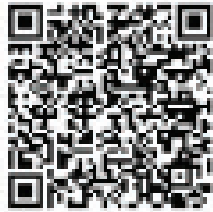


arbsession.com
arborist supplies • custom splicing

(small businesses included)

Corporate Pricing

on arborist supplies



YouTube

ARBORESCENCE

WINTER 2020-2021

//////////

ARBORESCENCE EDITORIAL TEAM

Chris Anderson
Ryan Gustafson
Kameron Kytonen
Valerie McClannahan
Lauren Stufft
Jim Vaughan

Design
Danielle Tessmer

ON THE COVER

Backyard Spruce Removal
Photo by: Jacob Busiahn

ADDRESS CHANGE?

Notify us at msa@msa-live.org

MSA 2020 EXECUTIVE COMMITTEE

President
Kameron Kytonen
President@msa-live.org

Vice President
Lauren Stufft
VicePresident@msa-live.org

Information Officer
Chris Anderson
InfoOfficer@msa-live.org

Treasurer
Ryan Gustafson
Treasurer@msa-live.org

ISA Council Representative (COR)
Jim Vaughan
COR@msa-live.org

STAFF

Executive Administrator
Danielle Tessmer
dtessmer@msa-live.org

Finance Manager
Heidi Van Schooten
heidi@msa-live.org

Please contact us regarding any ideas, questions, or concerns.



Contents

INDUSTRY UPDATES / **4**

MINNESOTA APPRENTICESHIP PROGRAM / **9**

GEAR CHECK / **11**

ITREE: GLOBAL TOOLS FOR IMPROVING COMMUNITY FOREST MANAGEMENT / **12**

CERTIFIED ARBORIST SCHOLARSHIP FOR UNDERSERVED ARBORISTS / **14**

SOME OAKS ON THE DECLINE FROM VARIABILITY IN GROWING SEASON PRECIPITATION / **15**

GARY JOHNSON: MAKE(ING) LIKE A TREE, AND LEAF(ING). A SEND-OFF / **16**

WELCOME BACK, ERIC: INTERVIEW WITH THE UNIVERSITY OF MINNESOTA'S INCOMING PROFESSOR OF URBAN AND COMMUNITY FORESTRY / **20**

COVID IMPACTS: TWO COMPANIES' EXPERIENCE OF OUR NEW NORMAL / **22**



**2021 MSA
ROCHESTER
ARBORIST
WORKSHOP:
VIRTUAL 'TREE'AGE**

**FEBRUARY
25, 2021**

**FEATURING:
DR. ALISON SHEETS
MARK CHISHOLM**

**FIND OUT MORE AT:
MSA-LIVE.ORG/
EVENTS/RAW**

Dear MSA

Kameron Kytonen, MSA President



I've always had a deep passion for our environment. Since I was young, I recognized that we have one earth that we live on, and I felt it was our responsibility to protect it. I remember when I was in high school and out driving or riding in a vehicle, I used to see all the trees out there, but didn't know what they were. That bothered me. Then in college, I took a dendrology class and learned about the different species of trees. After that, I was hooked. I suddenly had a new passion for trees. But little did I know that sparked an appreciation for more than that: the resource as a whole. I'm fortunate to be working in a profession that I truly care about. The latest interest I have is promoting alternatives

to conventional turfgrass. For example, low-mow/no-mow fescues have shown to be a viable option that once established, may need limited maintenance. This could help improve storm water quality, preserve groundwater and even help the health of urban trees!

A phrase that has been said many times since March is that we live in unprecedented times. It's certainly been an interesting year. On behalf of the MSA Executive Committee and staff, we certainly appreciate the great work being done by members and other folks in the tree care and green industry. We applaud you for your efforts, so keep up the good work! We know you have a unique passion for trees; and the resource as a whole.

The future of this organization looks bright. I'm excited about the volunteers that are stepping up to fill much needed roles. These are roles that are critical to serving you, the membership. We have an obligation to

provide you with up to date educational opportunities. We also want you to feel "a part" of MSA. That's why we want to offer networking opportunities, so you can develop more relationships with others in the industry, help with personal and professional development and help advance your careers.

We're excited for upcoming events in 2021. The ever popular Rochester Arborist Workshop (RAW) in February is one of them. We'll be working with long time coordinator Jay Maier and other key players to bring you a virtual event. The Fall Conference is also on the docket for October 2021. And of course the Tree Climbing Championship is always a hit. Along with long-time coordinators Lynn and George Welles, we are keeping our fingers crossed for a 2021 event in St. Louis Park.

Kameron Kytonen is the Natural Resources Technician for the City of Andover, MN. He got his BS degree in Natural Resources Conservation (Biology minor) at the University of Wisconsin-River Falls in 2000.

ISA Update

Jim Vaughan, MSA Representative, ISA Council of Representatives (CoR)

ISA has been growing and changing quite rapidly these past three years with the hiring of Caitlyn Pollihan. Caitlyn was recently named CEO on top of her original title of Executive Director. She has served in the role of executive director for three years, during which time she has shown exemplary leadership and continuously pushed the organization towards its goals. The change will provide a clear distinction between the Board of Directors' responsibility for strategic direction of the organization, and the CEO's authority over all operations and staff.

ISA growth has also come through expanded membership and new chapters, associate organizations and professional affiliates. As of June 2020, ISA has grown to 36 countries and 66 components (this is the phrase used for all chapters, associate organizations (not quite a chapter) and professional affiliates (i.e. Tree Fund)), with the Thai Arboriculture Association, Costa Rican Association of Arboriculture, Peruvian Association of Arboriculture and Urban Forestry and the Lithuanian Arborist

Association, the most recent additions.

Also, this winter, ISA members will be voting to fill 4 Board member positions, which will expire August 2021. Our own, Gail Nozal will be running for a second term, for one of those 4 open slots. If you are an ISA member, please vote when given the opportunity.

The pandemic really threw a wrench (or should I say saw) into events this year. The ITCC and Annual Conference had to be cancelled and converted to virtual content, respectively. ISA has postponed renewals for all certifications that were to expire this year. Hopefully, those of you that were in that group got notified by ISA, with explanation on future renewal efforts. ISA did step up, however, for education and CEU's via webinars with "Tree-sources", a bi-monthly email highlighting relevant resources, including online continuing education units (CEUs), community educational materials, and the latest information affecting our industry.

For the past 4 years, I have been on the Executive Committee for CoR, with 4 other CoR members. This committee oversees, defines and implements CoR business. My time on that committee ended as of September 1st, 2020 (I will be staying on as your CoR member, at least, through 2021). This experience was extremely rewarding, meeting and becoming friends with ISA members from across the world. In fact, to show you how we, arboriculture professionals, align with one another, no matter where you are from, my entire family stayed at my new CoR friend from New Zealand's house on a trip there a few years ago – through ISA and MSA, the connections (and dividends) are endless! Please consider giving some of your time to MSA.

Jim Vaughan has worked for the City of St. Louis Park for more than 30 years, currently serving as Natural Resources Coordinator overseeing and managing St. Louis Parks' natural resources. In addition his role as ISA CoR, Jim is the Past-President of MnSTAC.

TREE Fund Update

Ryan Gustafson, TREE Fund Liaison

The Tree Research and Education Endowment Fund (TREE Fund) is a 501(c)3 nonprofit dedicated to supporting scientific discovery and dissemination of new knowledge in the fields of arboriculture (the science of cultivating and managing trees in a landscape) and urban forestry. Since our inception in 2002, the TREE Fund has awarded more than \$4.5 million in funding to support:

- » Scientific research on urban tree care issues
- » Education programs related to trees
- » Scholarships for students aspiring to be tree care professionals

The TREE Fund is a charitable grant-

making organization established to support urban and community forests, the utility rights of way that connect them, and the skilled professionals who plan, plant, manage and maintain them. Knowledge gained from the TREE Fund research directly impacts tree care practices, arborists' techniques and people's lives every day.

The TREE Fund has earned the 2020 Platinum Seal of Transparency, the highest level of recognition offered by GuideStar, a service of Candid. By sharing metrics that highlight progress the TREE Fund is making toward its mission, the organization is helping donors move



beyond simplistic ways of nonprofit evaluation such as overhead ratios.

Our work is made possible by the generous support of corporate, small

business and community organization partners, as well as individual donors. Go to the TREE Fund website (www.treefund.org) to make a donation today!

Tour de Trees

The Tour des Trees is an annual long-distance cycling adventure which serves as the primary public outreach and community engagement event for Tree Research and Education Endowment Fund (TREE Fund). Since 1992, Tour des Trees riders have cycled through communities in the U.S., Canada and the U.K., planting trees, educating children and shining a light on the work done by arboriculture professionals and the importance of science-based tree care.

The 2020 Tour was scheduled to be held in Colorado, but due to the pandemic the TREE Fund Board of Trustees decided to postpone the Colorado Tour until 2021.

With the postponement of the Tour in 2020 it was decided to hold a Virtual Tour “Rollin’ in Place” Participants were challenged to walk, bike, swim, or any activity of choice 321 miles to reflect the 321 miles that were to be biked through the Rockies on the original Tour. As of October 1 participants had raised over \$120,000 and logged over 25,000 miles!

The Minnesota Society of Arboriculture has been an active supporter of the TREE Fund and Tour de Trees. MSA has annually donated \$2,500 to support the TREE Fund and \$1,000 to support chapter members riding in the Tour de Trees for several years.

Ryan Gustafson is currently the Shade Tree Short Course Liaison and Treasurer for MSA in addition to his role as TREE Fund Liaison. Ryan is a Project Developer for the Davey Resource Group.

MnSTAC Update

Ian Vaughan, MnSTAC Liaison

A yearly update? Well things were somewhat normal at the beginning of the year, then at one point, things changed. And then they changed some more. And then even more. You know what comes next? Yup, you guessed it, everything changed. Protocols, mandates, you name it, it probably changed in some way shape or form this year.

Over this strange and unordinary year MNSTAC has created new committees within itself which are education and forums, outreach and networking, legislative and advocacy, and finance. With the retirement of Gary Johnson, MNSTAC has taken on some of the technical support and training of Minnesota GreenCorps program, with funding coming from the MPCA. MNSTAC has also continued forums, but as with most things, the forums this year were virtual.

After the Minnesota State Agency Report about Emerald Ash Borer in Minnesota that was released in 2019, MNSTAC has reported updates from stakeholder

meetings regarding the document. Although the meetings commenced, the members were, like most of us, pretty focused on COVID-19.

A bonding bill for the green industry was not approved at the end of the regular legislative session or the special session. As expected, focus in legislative sessions revolves around Federal Aid, Policing Policy, and Statute Reform. Because of this, it is highly unlikely that a bonding bill will be discussed in the near future.

As always, MNSTAC will continue to be the leading advocate for Minnesota’s community forests and to empower and educate Minnesota’s citizens to maximize the coverage, health, quality, function, and future of our community forests.

Ian Vaughan recently joined the urban forestry industry, as a CFANS graduate of 2018, but has been able to work for both a municipality and a private tree company in the Twin Cities. Even though he’s a new-ish addition to the field, he looks forward to contributing to our urban forest!

2020 Minnesota Community Forestry Awards



Treescaping Award

Hennepin County, MSR Design, and Ten x Ten Landscape Architecture and Urbanism

Practitioners Award of Excellence

The University of Minnesota, Department of Forest Resources Youth Engagement in Arboriculture (YEA)

Outstanding Project Award

Hennepin County, The City of Medicine Lake, and Chris Klar

Outstanding Volunteer Service Award

Susan Lindoo

Dr. Gary R. Johnson Leadership Award

Gina Hugo

Canopy of Influence Award

Dr. Gary R. Johnson

Mark Stennes Award

Gordie Bailey

MSA President’s Award

Alissa Cotton

Youth Engagement in Arboriculture

Jack Faje, University of Minnesota
Monica Randazzo, University of Minnesota
Chad Giblin, University of Minnesota

The Youth Engagement in Arboriculture (YEA) program works to promote youth engagement in urban forestry, arboriculture, and urban green spaces. This not only exposes young Minnesotans to academic paths and career options in these fields, but also fosters a culture of stewardship for trees and the environment in future stakeholders. In addition to promoting a viable career field to the youth engaged in the program, YEA offers a recreational experience that few are able to otherwise experience. Tree climbing offers a challenge that allows one to feel a sense of accomplishment and increased self-esteem after ascent into the canopy of a mighty tree. Each year YEA offers a variety of programming including school presentations, learning experiences in the Urban Forestry Outreach Research & Extension (UFore) Lab and Nursery, and climbing camps at local schools and at the University of Minnesota. In 2019 and 2020, over 1400 youth participated in YEA programs, with more than 100 hours of programming delivered by UMN staff, students, and volunteers.

SCHOOL PRESENTATIONS

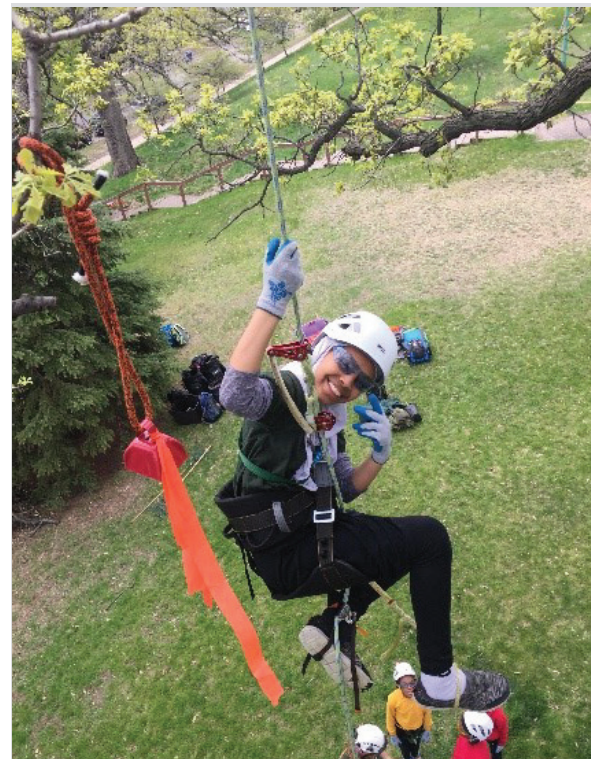
To celebrate Arbor Month in Saint Paul, a tree-themed poster contest for 3rd grade classrooms is conducted annually citywide. As part of the poster contest, YEA partners with City of Saint Paul Urban Foresters to visit classrooms, teaching kids about the importance of the trees around them and about the work that is being done to manage and protect their urban forest. Basic tree biology and tree benefits are shared along with fun facts about trees commonly found in Minnesota. To recognize the 2019 winner of the poster competition, a tree planting ceremony was held at Martin Luther King Recreation

Center in partnership with Capitol Hill Gifted & Talented Magnet along with representatives from the Mayor's office and other local dignitaries.

More advanced classroom curriculum engaged 5th graders at Four Seasons A+ Elementary and 7th graders at Creative Arts Secondary School and Humboldt Secondary School in Saint Paul. During these events YEA and City of Saint Paul staff hosted stations that helped students learn about tree phenology, tree inventories, climate change, and methods of conducting tree research.

YEA CLIMBING CAMPS

A major part of YEA programming – and the part students are most excited for – are the tree climbing camps! Young people are able to gain the experience of climbing trees in a safe environment and gain confidence when they accomplish their climb using modern climbing systems. YEA tree climbing camps maintain full compliance with the American National Standard for Arboricultural Operations Safety Requirements (ANSI Z133) and incorporate the expertise of on-staff arborist technicians during planning and implementation of the events. In addition to safety, YEA focuses on treating participants on an individual level so that everyone can participate at a level they feel comfortable while still being challenged to overcome an objective that they help define. At each climbing event, staff present on the ground interact with youth to share knowledge about plants or to cheer on those actively engaged in a climb. Other ground activities include a slackline for practicing limb walking skills as well as a rigging games challenge where students can practice teamwork





while moving a load with blocks, pulleys, and porta wraps.

2019 climbing camps launched in March with high school sophomores from Hmong College Prep Academy visiting the University of Minnesota. During the visit, students enjoyed a campus tour of the UFore Nursery and Lab, a drone demonstration, and an indoor climbing session at the UMN Saint Paul Gym.

School-age engagement continued in May as Arbor Month in Minnesota begins. YEA contributes to the celebration by bringing an appreciation of trees and urban natural resources to young people throughout the month. In early May, YEA hosted a public climbing event at the Eden Prairie Arbor Day celebration at Round Lake Park. This event ran alongside the Minnesota Society of Arboriculture's Tree Climbing Competition and offered a climbing experience to the youth of the community.

Throughout the rest of Arbor Month in Minnesota YEA brought climbing camps to three 5th grade classrooms at Four Seasons A+ Elementary and three 7th grade classrooms at Creative Arts Secondary School. These camps are conducted in partnership with the City of Saint Paul and truly give students a new perspective on the public parks that are right outside their classrooms. The 5th grade students at Four Seasons A+ Elementary experienced climbing in beautiful, mature bur oaks at Merriam

Park, and 7th grade students at Creative Arts Secondary School climbed at Kellogg Park, giving students a great view of the Mississippi River and Downtown Saint Paul from the treetops. Students who elect not to climb work with staff on the ground to learn about urban green spaces, knot tying, career paths, or to cheer on their peers as they ascend surrounding trees.

Summer for YEA brought the Youth Engagement Program from Como Park Zoo & Conservatory to the University of Minnesota Campus. This program gives high school students a chance to experience opportunities in conservation and natural resources through field trips and service learning in their community. These unique experiences offer hands-on opportunities to young adults as they dig deep into what they are excited about as they approach adulthood. In July and August 2019, YEA hosted Recreation & Wellness' Youth Program Summer Camps at the University of Minnesota for two five-day climbing camps for youth 10 to 15 years old. During this event, young tree climbers have the opportunity to participate in environmental science scavenger hunts and record their own observations and data in YEA Field Books. Each day, campers level-up in their tree knowledge and climbing experiences culminating in a Challenge Day at the conclusion of each camp. Campers can choose their own adventure as they participate in timed climbing events, create works of art in their field books,

and support each other in team building exercises. Challenge Day closes with Prize Time to acknowledge everyone's accomplishments throughout the week.

In October of 2019, YEA offered on-site instruction and tree climbing experiences to the Tree Trust YouthBuild team who attended two days of climbing workshops at the University of Minnesota. YouthBuild members come to this program to gain exposure to skilled trades and typically come from low-income families and have faced challenges in their educational experiences. As the season was ending, the Conservation Corps of Minnesota and Iowa (CCMI) visited the University of Minnesota in early November to participate in the College & Career Day. At this event, YEA staff offered CCMI a chance to climb trees on campus using professional rope access systems and get a taste for future career and academic paths in arboriculture and urban forestry.

In 2020, most YEA events were cancelled in response to the COVID-19 pandemic. Online content quickly became the core focus of programming, with videos and photos shared on Instagram, TikTok, Facebook, and Youtube. Informational videos on tree identification, carbon sequestration, arboricultural techniques, and tree phenology were shared on all platforms, as well as guided meditation and tree yoga videos. YEA hosted two events with Tree Trust YouthBuild team in August of 2020, replicating the same climbing workshops as in October of 2019.

YEA works year round to spread awareness of trees and their benefits as well as offering hands on experiences through school visits and climbing camps. Students and young adults that participate in YEA climbing camps and classroom visits have gained new experiences that inform their interactions with trees as well as a new perspective on trees and the important role they play. In 2020, while the program has faced major challenges reaching students, YEA still functions as a connection between youth and the urban forest through new avenues, and will continue to evolve and offer as many opportunities to young people interested in trees and the value they add to urban life.

2019 SCHOOL PARTNERS

- » Barack & Michelle Obama Elementary School
- » Capitol Hill Elementary School
- » Cherokee Heights Elementary
- » Creative Arts Secondary School
- » Four Seasons A+ Elementary School
- » Groveland Park Elementary School
- » Highland Park Elementary School
- » Highwood Hills Elementary School
- » Hmong College Prep Academy
- » Humboldt Secondary School
- » L'Etoile du Nord Elementary School
- » Linwood Monroe Arts Plus Elementary
- » Mississippi Creative Arts Elementary School

2019 VOLUNTEERS

- » Alissa Cotton – UMN Forest Resources Alumnus
- » Leland Hatcher – City of Saint Paul
- » Leah Keeler – Minneapolis Park & Recreation Board
- » Cy Kosel – City of Saint Paul (ret.)
- » Mike Kosowski – Harmony Tree Works
- » Victor Lazarz – DS Contract Climbing LLC
- » Karl Mueller – City of Saint Paul
- » Mary Pederson – City of Lakeville
- » Alex Plattes – Minneapolis Park & Recreation Board
- » Kerrick Sarbacker – Branch & Bough Tree Service
- » Nels Spence – Bartlett Tree Experts
- » Taylor Stockert – City of Saint Paul
- » Kelly Taylor – Minneapolis Park & Recreation Board

2019 PROGRAM SPONSORS

- » City of Saint Paul
- » Minneapolis Park & Recreation Board
- » Minnesota Department of Natural Resources
- » Minnesota Turf & Grounds Foundation
- » United States Forest Service

EQUIPMENT SUPPORT & DONATIONS

- » DMM
- » Sherrill Tree
- » TreeStuff
- » Wesspur

PROGRAM DIRECTORS

Chad Giblin and Monica Randazzo

ARBORIST TECHNICIANS

Brian Luedtke, Kiley Mackereth, Kerrick Sarbacker, and Brian Volz

STUDENT TECHNICIANS

Noah Buraglio, Katie Connolly, Ben Converse, Jack Faje, Leland Hatcher, Dan Petters, Luke Plunkett, Taylor Stockert, Jesy Stortenbecker, Josiah Velner, and Graham Wessberg

Chad Giblin is Director of Operations at City Forester LLC in Cupertino, CA. He's also an Instructor at the University of Minnesota in the Department of Forest Resources. Chad's work is focused on increasing awareness and access to urban natural resources through memorable, hands-on outdoor experiences, affordable tree care, and systems of tree preservation.

Monica Randazzo is the Youth Engagement in Arboriculture Program Director and a Urban and Community Forestry Researcher at the University of Minnesota. Her research interests include community planting initiatives, young tree establishment, and environmental education in carceral systems.

Minnesota's Arborist Apprenticeship

Valerie McClannahan, Minnesota Department of Natural Resources
 Copyediting by Emma Schultz, Minnesota Department of Natural Resources

Our industry is in great need of skilled workers, and we're not alone in this. Areas like construction and manufacturing have seen strong gaps in employment needs and available skilled workers for decades now. Our industry has an opportunity to recruit and retain new workers into good paying jobs in our industry as an alternative to incurring heavy student loan debt. One of the ways to do this is through apprenticeship.

Apprenticeship is a method for training in a new generation of arborists. The Minnesota Arborist Apprenticeship program includes on-the-job training as

well as in-classroom study supported by Mid-State Technical College.

"I think if somebody wants to learn to be an arborist, and they are willing to be a good arborist, and do it the right way without going to college, it's a great opportunity," said Wes Nichols, Owner of Pro-Tree Outdoor Services, discussing Minnesota's Arborist Apprenticeship.

Minnesota started its Arborist Apprenticeship program in 2018 with nine apprentices and five employer host sites. The program began thanks to a number of local tree care companies interested

in pursuing apprenticeship. The creation of this program makes the arborist profession an official trade with the State of Minnesota, which then provides new opportunities for recruitment.

Advantages to hiring an apprentice:

- » Receive external support for training in staff
- » Train workers as they produce for you
- » Increase workplace safety
- » Enhance your recruitment capabilities
- » Reward current staff, such as groundworkers, with advanced arborist training and skills

Training in a new employee can be an

arduous process. Hiring an apprentice still requires on-the-job training, but apprenticeship provides an additional layer of support. Wes Nichols, owner of Pro-Tree Outdoor Services says, "It definitely is a good clear outline, and it provides a good structure and format. Like what an arborist should be learning in the first six months, in the first year, the second year...what skills and competencies do they really need to work on?"

Apprenticeship also builds upon your trainer pool. "These apprentices are the future trainers (once they become journeyworkers), so I'm setting up opportunities for them not to just learn things, but to take this information and train somebody else," explains Joe Hoffman, Instructor at Mid-State Technical College, of the classroom instruction arborist apprentices receive. "I often approach a topic by stating, 'You're taking on the role of the expert now. Coach me or coach somebody else.'"

On top of apprenticeship being a good means of recruitment and training, it also provides a new opportunity of public relations for the industry. The more companies take on apprentices, and the more apprentices we have, the more opportunities we have to showcase arborists as skilled tradespeople. Ben Cooper, of Rainbow Treecare, was part of the original group that got the arborist apprenticeship started. He states, "One of the reasons [that pushed me to assist in starting arborist apprenticeship] is creating more awareness around arboriculture and technical arborist tree climbers as a career path. I think across a lot of the green industry, it's a struggle to create that with high school students, with people that are at the age where they're trying to make decisions as to what they're going to do. I don't even think we would register as a potential career pathway. The experience I have heard from a number of arborists is that they stumbled into this field but had no awareness of our industry's opportunities."

On a somber note, I regularly hear about tree related accidents from homeowners trying to remove their own trees, often ending with tragic results; I am convinced these unfortunate occurrences could be avoided with a better understanding of, and healthy respect for, the risks involved.

I believe that showcasing the industry as a skilled trade has the opportunity to greatly reduce these terrible incidents in the future. I relate this idea often to electricians; I may install my own light switch, but I know electrical work holds risks, and I'm significantly less likely to try to do my own major electrical repairs.

What on-the-job training does an arborist apprentice need/require?

- » ANSI and employer safety standards for all work (500 hours)
- » Plant health care diagnostics (300 hours)
- » Rigging on the ground and aloft (500 hours)
- » Access trees: i.e. perform pre-work inspection, maneuver safely through canopy, etc. (900 hours)
- » Operate chainsaw on the ground and aloft (750 hours)
- » Operate chipper (300 hours)
- » Prune trees and shrubs from the ground and aloft according to current ANSI A300 standards (1,000 hours)
- » Remove trees and shrubs (750 hours)
- » Local optional work processes: i.e. operate vehicles with or without trailer, operate stump grinder, perform plant health care activities, etc. (1,000 hours)
- » Paid related instruction (440 hours)

An arborist apprentice needs to receive a total of 6,440 hours of on-the-job training, 50 hours safety training (first aid, Electrical Hazards Awareness Program, etc.), and 440 hours of instruction from Mid-State Technical College. Instruction from Mid-State Technical College is typically held at their lab facility in Wisconsin Rapids, WI and has been developed into four week-long classes spaced throughout the year to minimize travel costs to employers.

What do you need to develop an arborist apprenticeship program at your organization?

- » Register with the Minnesota Department of Labor and Industry (you can do this anytime, but optimally by end of July to coincide with Mid-State Technical College training). You can obtain the form by e-mailing Leslie Philmon from the Minnesota Department of Labor and Industry at leslie.philmon@state.mn.us to get the process started.
- » Select at least one current highly skilled employee to serve as a journeyworker. This person, or people, will work with the apprentice and provide hands-on job training and mentorship. There must

always be one journeyworker for each apprentice on a worksite, so it can be helpful to select more than one of your skilled workers.

Once approved, the Minnesota Department of Labor and Industry will provide technical assistance for your program with regularly scheduled check-ins to ensure you, as the employer, are getting what you need out of the program and that the apprentice is getting what they need to succeed.

Good to know:

- » Hiring an apprentice is just like hiring a regular employee. You as a business go through your existing process to decide if you want to take on an applicant or current employee as an apprentice.
- » Apprentices are paid a wage, pre-determined by you as the employer, during all on-the-job and in-classroom training.
- » The entire program for an apprentice takes approximately three years to complete. Once finished, the apprentice becomes an Arborist Journeyworker.

There are advantages seen in the arborist apprenticeship program that aren't entirely tangible. As Joe Hoffman offers, "There's clearly a collective pool of experiences brought to the table from the diversity of companies and working experiences of each apprentice. The apprentices are learning more than simply what I'm teaching them. They are sharing their personal knowledge and experiences as well. I think this is how the industry as a whole has the opportunity to elevate itself. The idea is, 'Let's share and improve our industry' rather than 'Let's make one person smarter', can truly make a lasting impact on the future of arboriculture."

Valerie McClannahan works as the state's Urban and Community Forestry Coordinator at the Department of Natural Resources. Valerie's mission for Minnesota is to increase environmental services by creating and maintaining healthy urban and community forests.

In what feels like a lifetime ago, Emma Schultz worked as a field forester in remote northern Maine. She now assists with urban forest management across Minnesota in her role as Community Forest Project Specialist with the Minnesota Department of Natural Resources.

Gear Check

Nick Grebe, Minneapolis Park & Recreation Board

Recently, I have had my MPRB colleague top of mind, as he had all his gear stolen from his truck. In just this past year, I have had three friends have gear stolen from their vehicles. In a discussion about the value of gear, my friend Juan asked how much money I thought I had in stored gear. I guessed maybe \$8,000? He bet my gear totaled a lot more than that. This got me thinking: I have over \$500 in gear bags alone; \$400 in throwline! It occurred to me that I should probably figure this out.

I interviewed three friends; each of them a victim of gear theft. I needed to know not only how much was stolen but how was it stored? Was it insured? What did they get back or get paid for? And most importantly, what did they learn from that experience and how did they alter their activities afterwards? As climbing arborists, with large investments in gear, we should heed their advice.

Anthony had his gear stolen through the sliding window in the back of his truck. A police report was made. Through his home insurance he was able to claim \$8,600 which did not cover all that was stolen. His home clause covered business and personal up to \$10,000 with a \$2,000 deductible and \$2,000 of depreciation. His auto insurance only covered \$250 above the deductible. To be eligible for compensation, Anthony had to search extensively for any photo evidence and proof of purchase. As a result, Anthony is now saving digital receipts, photographing each item and logging the date of purchase and price into a google spreadsheet. He is preventing further theft by using a heavy duty lockable Job Box in the bed of his truck.

Scott had \$6,000 worth of climbing and small rigging gear stolen out of his truck bed in the short amount of time he was completing a walk-through with a client. Scott is one of the lucky ones in this scenario as he had it all successfully returned to him. A neighbor happened to notice and call the police on the perpetrators and they were caught in a stolen vehicle before getting on the

freeway. Scott is insured as a business owner, but his coverage at the time would not have covered the full loss. Since then, Scott has increased his coverage amount and documents his equipment with photos and a spreadsheet.

Damian's car was stolen out of his driveway, with \$9,000 worth of gear inside. He suffered such a huge financial loss and his car insurance did not provide any coverage for his gear. His insurer told him that because the gear was used for work purposes, it was not covered. He was able to fundraise and his friends were able to soften the blow. Damian stores all his gear in his home now, and documents all his inventory on gearlog.org.

I, personally, am a total gear nut. At my peak of purchasing tree climbing equipment, I was spending around \$1,500 per year. Most of this was in experimenting either with new ropes or devices, but a large portion (\$500-\$700) was in maintaining a high production climber's annual requirements. Most of this yearly expense was purchased with my own money. About \$500 per year was paid for by my employers. I could always justify the remainder as I desired it for competitions and needed it for the tough, complex jobs.

It never occurred to me to count how much money I had in gear. In my mind, I am not including the retired textiles or even the shelves of good used gear I no longer utilize in my basement. In total, that would all account for a small fortune! All of my gear, used and merely stored is worthy of documentation. For the purpose of this article, I am only referring to the gear I store in my truck for use on side jobs or for complex work at MPRB. If I am to protect myself from the loss I would incur with gear theft, I must start the process of documenting my valuables and being more aware about securing them.

Lessons learned:

- » Take extra precaution in preventing theft, by being vigilant about locking doors and keeping gear out of sight.
- » Bring gear indoors whenever possible as vehicles are often less secure.

- » Contact your insurance and become knowledgeable about your coverage.
 - How much coverage do you have under home or auto insurance for your gear? Is that enough coverage or do you need to increase it?
 - What requirements do your insurers have for documentation?
- » Save, scan or photograph receipts or proof of purchase.
- » Photograph gear.
- » Use an organization system for tracking.

I am now setting aside blocks of time to chip away at the massive undertaking of recording my gear. To assist, I have asked Minneapolis Saw to print a list of all the gear I've purchased from them over the years. Through logging, I will know how much all my gear is worth and I will have the added bonus of setting an inspection schedule. Damian's use of the app GearLog has given me motivation to use technology. After trialing it, I intend to continue using it. It's free and it has preset categories and subsets to upload every item (such as chainsaw protection, lowering devices, rigging gear, and harnesses). I began my logging with the backbone of my climbing gear: my harness. I was able to select manufacturer, product, condition, inspection/service dates, serial number, etc. I took a picture, per Anthony's recommendation, and completed the logging task. It only took a few minutes and now my harness specs are saved in one place. Someday soon, I will have all my gear documented in preparation for the worst case scenario.

I highly recommend beginning the process of documenting your gear so that you're protected from what could be a huge financial loss. I hope that this article, and the experience of these fellow arborists, will help minimize future gear theft and the impacts of gear loss within our tight community of tree climbers.

Nick Grebe has been climbing trees for 16 years. He currently works for the forestry division of the Minneapolis Park & Recreation Board. Nick is a passionate climbing arborist and has a strong desire to help others safely enjoy rope and harness arboriculture.

iTree: Global Tools for Improving Community Forest Management

David J. Nowak, USDA Forest Service
 Scott Maco, The Davey Institute
 Mike Binkley, The Davey Institute



i-Tree (www.itreetools.org) is a suite of freely-available software tools designed to assess the benefits and values derived from trees and forests. Originally released in 2006 and designed to work in the United States, these tools have expanded globally among professional and non-professional users (e.g., universities, citizens, schools, land managers, foresters) in nearly 150 countries. i-Tree is developed through a collaborative public-private partnership and is designed to engage people in assessing and valuing their forest resources, understanding forest risk, and developing sustainable forest management plans to improve environmental quality and human health. These tools can be scaled to assess individual trees or entire forests in both urban and rural areas.

i-Tree's vision is to improve forest and human health through easy-to-use technology that engages people globally in enhancing forest management and resiliency. To attain this vision, i-Tree continues to develop tools with the ultimate goals of allowing anyone to easily assess:

- » Local forest conditions
- » Ecosystem services and values derived from forests
- » Local risks to forest and human health
- » How changes in forest structure will

lead to changes and tradeoffs among ecosystem services and values

- » Best locations, tree species and planting rates to optimize ecosystem services and values through time and across space to enhance human health and well-being

By achieving these goals, i-Tree users can create healthy, sustainable, and resilient forest landscapes across the urban to rural continuum.

I-TREE USAGE

Since its release in 2006, i-Tree usage has grown exponentially to meet global demand (Figure 1). By the end of 2019, there have been over 410,000 unique users of i-Tree products in 148 countries (Figure 2).

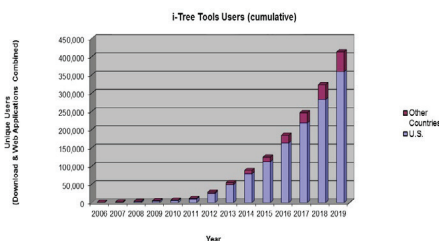


Figure 1. Cumulative number of unique i-Tree users: 2006-2019.



Figure 2. Global distribution map of i-Tree users (2006-2019).

I-TREE TOOLS

The i-Tree modeling suite is comprised of many tools that can be utilized by different user profiles depending on their needs

and goals:

i-Tree Eco: this tool uses sample or inventory-based field data to assess forest structure, ecosystem services and values for any tree population (including number of trees, diameter distribution, species diversity, air pollution removal and health effects, carbon storage and sequestration, runoff reduction, VOC emissions, UV radiation reduction, building energy effects). i-Tree Eco is the core i-Tree tool and is designed to easily guide users from start to finish through project set-up, data collection and analyses. It has many functions to facilitate use, including plot selection programs, mobile data entry programs, table / graphic reporting and exporting, and automatic report generation. i-Tree Eco also can forecast future tree population totals, canopy cover, and ecosystem services and values. Due to the field data collection requirements, i-Tree Eco provides the best estimates of tree benefits.

The program is designed to readily work in the United States, Canada, Australia, Mexico, Colombia, Korea, the United Kingdom, and European Union Countries. For areas without national versions of i-Tree Eco, the i-Tree Database program (see below) can be used to enable i-Tree Eco for use in their area.

i-Tree Database is a web-based tool that allows international users to submit local geographic (e.g., latitude, longitude), pollution and precipitation data for importation into i-Tree. Once the data are processed, users can run i-Tree Eco for that international city or area. Users can also view and submit new tree species information to help build a global tree database.

i-Tree Canopy: This web-based tool allows users to quickly and easily photo-interpret Google aerial images of their area to produce statistical estimates of tree cover and other cover types (e.g., grass, buildings, water) along with calculations of the uncertainty of those estimates. This tool provides a simple, quick and inexpensive means for cities and forest managers to accurately estimate their tree and other cover types. i-Tree Canopy can be used anywhere in the world where high-resolution, cloud-free Google images exist. Use of historical imagery can also be used to aid in canopy change analyses over time. Ecosystem services and values of trees are estimated based on U.S. environmental conditions.

i-Tree Design: This web-based tool also relies on Google maps and allows users to sketch their home to see how the trees around the home affect energy use and savings, as well as other environmental services and values. This program currently works, nationally, in the United States and Canada, but is being developed for international area where i-Tree Eco functions.

MyTree: This tool is a simple, web-based application geared towards mobile devices that allows users to easily quantify the benefits and values of individual trees. This program uses environmental conditions of the United States and Canada to estimate local tree benefits. Similar to i-Tree Design, it is also being developed for international locations where the i-Tree Eco and Design programs function.

i-Tree Hydro: This tool is designed to simulate the effects of changes in tree and impervious cover on hourly stream flow and water quality within a watershed. It contains auto-calibration routines to help match model estimates with measured hourly stream flow. It ultimately produces tables and graphs of changes in flow and water quality due to changes in tree and impervious cover within the watershed. While readily available in the U.S., this tool can work globally where sufficient weather and stream flow data exist.

i-Tree Species: This tool is a web-based utility designed to help users select the most appropriate tree species based on desired environmental functions and geographic area. It relies on the assessments of functions performed by many tree species at maturity.

Other i-Tree tools that are specific to the United States are:

i-Tree Landscape: This web-based tool allows users to explore tree canopy, land cover, forest data and basic demographic information anywhere in the conterminous US. With the information provided by i-Tree Landscape, users can quickly:

- » learn about the benefits and values of trees (carbon storage, air pollution removal, reduced runoff) in their area
- » understand local risks to people and forests
 - insects and diseases
 - wildfire potential
 - ultraviolet radiation exposure
 - land surface temperatures
 - urban-wildland interfaces
 - air pollution exposure
 - projected climate change
- » map areas in which to prioritize tree planting or protection efforts to improve both forest and human health and sustainability.

i-Tree Planting: This web tool estimates the long-term environmental benefits from a tree planting project. Users select their location, enter groups of different species they wish to plant, and set mortality rates and project lifespan. The program estimates the cumulative values of the trees over the project lifespan.

INTERNATIONAL PROJECTS

The development of i-Tree Eco has expedited urban and rural forest data collection and analysis across the world, with approximately 9,000 known i-Tree Eco projects (Figure 8). Examples of international analyses based on i-Tree include reports from London (Rogers et al. 2015) and Torbay (Rogers et al. 2011), England; Edmonton (City of Edmonton 2012), Oakville (McNeil and Vava 2006), and Toronto (Nowak et al. 2013), Canada; Perth,

Australia (Saunders et al. 2012); Merida, Mexico (de la Concha et al. 2018); Zurich, Switzerland (Wälchli 2012); Strasbourg, France (Selmi et al. 2016); Porto, Portugal (Graça et al. 2017, 2018); Barcelona, Spain (Chaparro and Terradas 2009); Belfast and Dublin, Ireland (Mills et al. 2016).

This international data collection is providing valuable new data to aid in understanding the benefits and values of forests, promoting improved forest management, and understanding the patterns and variations in urban forest ecosystem services and values. By using a standard data collection process, i-Tree Eco can help serve as a global standard on data collection and analyses of urban forests.

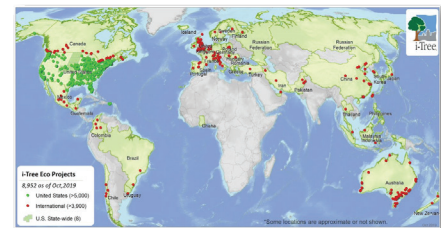


Figure 3. Known i-Tree Eco projects.

FUTURE INTERNATIONAL DEVELOPMENT

Through international partnerships and additional funding, the i-Tree team plans to continue to improve the science behind the models, add new ecosystem services and values, and expand development and applications globally (e.g., adding new national versions). New ecosystem services and values in development include tree effects on stream temperatures, air temperatures (e.g., Yang et al. 2013) and air temperature impacts on human health. Currently, the international focus is on developing national models of i-Tree Eco and translating the program and manuals. Once i-Tree Eco is developed for a nation, i-Tree Design, Canopy and MyTree can also be developed to help raise awareness of tree values among citizens and improve forest management. More information on international development of i-Tree can be found at: https://www.itreetools.org/resources/intl_overview.php.

The ultimate objective of i-Tree is to develop best management practice prescriptions based on local environmental and forest data. These prescriptions will aid managers in sustaining healthy and functional forests to improve human health and well-being by detailing the best tree species, locations, and planting rates to attain desired outcomes.

REFERENCES

- » Chaparro, L., J. Terradas. 2009. Ecological Services of Urban Forest in Barcelona. Centre de Recerca Ecològica i Aplicacions Forestals, Universitat Autònoma de Barcelona, Bellaterra Spain. 103 p.
- » City of Edmonton. 2012. Urban Forest Management Plan: Edmonton's Urban Forest – Taking Root Today for a Sustainable Tomorrow. City of Edmonton. 38 p.
- » de la Concha, H., Cano, M.L.R., Burgos, A.G. 2018. Inventario del Arbolado Urbano de la Ciudad de Merida. Media Ciudad Blanca. 75 p.
- » Graça, M.S., J.F. Goncalves, P.J. Alves, D.J. Nowak, R. Hoehn, A. Ellis, P. Farinha-Marques, M. Cunha. 2017. Assessing mismatches in ecosystem services proficiency across the urban fabric of Porto (Portugal): the influence of structural and socioeconomic variables. *Ecosystem Services*. 23: 82-93
- » Graça, M., P. Alves, J. Gonçalves, D.J. Nowak, R. Hoehn, P. Farinha-Marques, M. Cunha. 2018. Assessing how green space types affect ecosystem services delivery in Porto, Portugal. *Landscape and Urban Planning*. 170: 195-208.
- » Mills, G., M. Anjos, M. Brennan, J. Williams, C. McAleavey, T. Ningal. 2016. The green 'signature' of Irish cities: An examination of the ecosystem services provided by trees using i-Tree Canopy software. *Irish Geography*, 48(2), 62-77.
- » Nowak, D.J., R.E. Hoehn, A.R. Bodine, E.J. Greenfield, A. Ellis, T.E. Endreny, Y. Yang, T. Zhou, R. Henry. 2013. Assessing Forest Effects and Values: Toronto's Urban Forest USDA Forest Service, Northern Research Station Resource Bulletin NRS-79. Newtown Square, PA. 59 p.
- » Rogers, K., T. Jarratt, D. Hansford. 2011. Torbay's Urban Forest Assessing Urban Forest Effects and Values: A report on the findings from the UK i-Tree Eco pilot project. *Treeconomics*. 46 p.
- » Rogers, K., K. Sacre, J. Goodenough, K. Doick. 2015. Valuing London's Urban Forest: Results of the London i-Tree Eco Project. *Treeconomics London* 84 p.
- » Saunders, S.M., E. Dade, K. Van Niel. 2012. An Urban Forest Effects (UFORE) model study of the integrated effects of vegetation on local air pollution in the Western Suburbs of Perth, WA. 19th International Congress on Modelling and Simulation, Perth, Australia, 12-16 December 2011.
- » Selmi, W., C. Weber, E. Rivière, N. Blond, L. Mehdi, D. Nowak. 2016. Air pollution removal by trees in public greenspace in Strasbourg city, France. *Urban Forestry and Urban Greening* 17: 192-201.
- » Wälchli, G. 2012. Ökosystemdienstleistungen als ökonomische Strategie? i-Tree: ein Instrument für die Wertermittlung von Stadtbäumen, Zürcher hochschule für angewandte wissenschaften, Departement life sciences und facility management, Institut für umwelt und natürliche ressourcen. 123 p.
- » Yang Y., T.A. Endreny, D.J. Nowak. 2013. A physically-based local air temperature model. *Journal of Geophysics Research-Atmospheres*. 118: 1-15

Certified Arborist Scholarship for Underserved Arborists



The Minnesota Society of Arboriculture, working with the Minnesota Department of Natural Resources, will offer scholarships, on a reimbursement basis, to underserved populations that pass the International Society of Arboriculture Certified Arborist exam. Applications for the scholarship will be released in January 2021.

Minnesota's underserved arborist population includes:

- » Racial and ethnic communities, including Native communities
- » LGBTQI communities
- » Disability status
- » Veterans
- » Women
- » Those living outside of the 7-county metro

The scholarship can cover:

- » Exam fee,
- » Computer-based testing administrative fee,
- » and the Arborists' Certification Study Guide.

This scholarship is being made possible through a grant from the USDA Forest Service.

Some Oaks on the Decline from Variability in Growing Season Precipitation

Brian Schwingle, Minnesota Department of Natural Resources

Reviewed by Val Cervenka, Minnesota Department of Natural Resources

DNR foresters and the forest health team fielded many calls this summer, as I am sure arborists did, from concerned landowners in northwestern, central, and southern Minnesota, reporting dieback and mortality of their oaks. This is nothing new. We have been investigating areas experiencing abundant mortality or dieback of bur and red oak for several years. For simplicity's sake, we refer to this multiyear, landscape-level dieback and death as "decline."

Decline is seen as progressive dieback and eventual death of oak trees over several years. On oaks, epicormic sprouts are often the first symptoms of decline. On bur oak, these epicormics die back annually and new sprouts arise in their place. Stunted leaves in the outer canopy sometimes precede dieback. Twolined chestnut borer and Armillaria root disease typically deal the final blow to these stressed oaks. Often, tree owners observe a problem for the first time with their oak once advanced dieback symptoms arise from these pests. Less noticeable symptoms of decline often are present for years before though.

We know tree decline is caused by multiple factors, some of which predispose trees to attack by pests. Extremes in precipitation commonly kick-start decline, but initial symptoms may not appear until one-to-three years after a flood or drought.

As an example, the DNR forest health team documented thousands of acres of dying red and bur oaks from central to northwestern Minnesota from 2014 through 2018. Doves of oaks, approximately 50-years-old or older, started dying two years after the dry, late growing season of 2012; July through October 2012 was the fourth driest period on record (dating from 1895) in the southern two-thirds of Minnesota (i.e. the southern 6 climate divisions). The same time period in 2011 was also extremely dry in south-central Minnesota.

Unfortunately, 2012 was not the last time areas of Minnesota experienced extremes in precipitation. May through August of 2017 and 2018 were very dry in northwestern Minnesota. The four-month timeframe in 2017 was the ninth driest on record for northwestern Minnesota (specifically the northwestern and north-central climate divisions combined). It is not surprising, then, that this year we received many reports of oak dieback in north-central Minnesota. Many of the oak forests we inspected this year had decline symptoms landowners hadn't noticed in the years before.

Lastly, let's not forget the extreme precipitation experienced in 2019. Trees in low-lying areas were flooded across much of southern and central Minnesota. The southern 60 percent of the state (from the Iowa border to Detroit Lakes and Brainerd) experienced its fourth wettest April through September on record. Oaks on poorly drained soils and in low-lying areas continued to die in 2020 from the 2019 floods.

Before anyone feels too depressed about oaks, let's step back and look at the big picture. U.S. Forest Service Forest Inventory and Analysis (FIA) data shows that the most abundant tree species with a trunk diameter of 18 inches or larger in Minnesota is bur oak, followed by northern red oak. Combined, northern red and bur oak make up 25 percent of Minnesota's trees 18 inches in diameter or larger, and they make up 35 percent of Minnesota's big trees from the Iowa border to Mille Lacs Lake.

The good news is that those bigger oaks that have been dying are being replaced. The number of bur and northern red oaks 18 inches in diameter or larger has increased from the 2014 FIA survey period to the most recent survey in 2019. The number of large dead bur oaks statewide also increased from 2014 to 2019. The number of large dead northern red oaks

increased substantially, but only in the southern half of Minnesota. The mortality rate of both these oak species is higher in the southern half of Minnesota relative to the entire state.

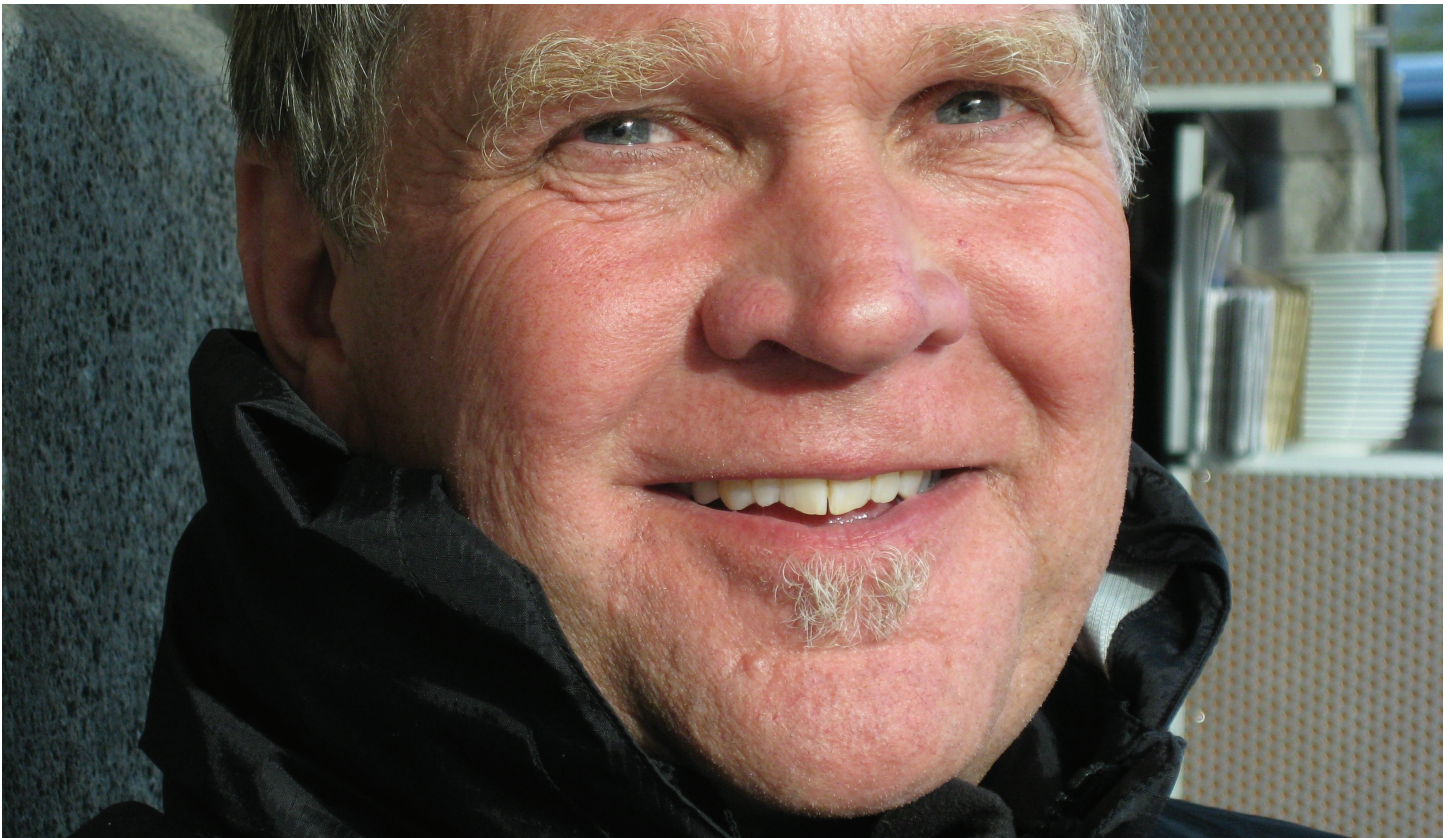
Large, older oaks will continue to be negatively affected by drastic swings in precipitation. If drastic swings keep happening, we will continue to see subsequent declines in older oaks.

Homeowners have some control over the number of stressors put on old oaks in their yards. Not driving and parking under the canopy is one. Not irrigating around periods of heavy rain is another. Cap it off by only fertilizing if your oak needs it. For those oaks losing roots in excessively saturated soils, these actions could tip the scales in favor of oak survival.

We know that extreme drought often promotes attack by Armillaria and twolined chestnut borer on oaks. Preventing both of these is not an insecticide, fungicide, or fertilizer, but rather, deeply watering the tree's roots. I recommend watering, above all treatments, as a means to sustain trees during and after severe droughts.

Bur oak is adapted to growing in a variety of soil textures and acidity levels, and it is highly tolerant of drought. Bur oaks can even tolerate occasional flooding. There are few other trees adapted for such disparate growing conditions. The U.S. Forest Service's climate change atlas predicts that bur oak will thrive in Minnesota's future climate. Despite our wild weather and the current uptick in older tree decline, oaks, and bur oak especially, remain a good tree choice for Minnesota.

Brian Schwingle has been the Minnesota DNR's forest health specialist for central and southern Minnesota since 2014. Before his time in Minnesota, he was a forest health specialist in northern Wisconsin for the Wisconsin DNR. Brian earned an M.S. in plant pathology from the University of Minnesota and a B.S. in forestry from the University of Wisconsin-Madison.



Gary Johnson: Make(ing) Like A Tree, And Leaf(ing). A Send-Off.

Valerie McClannahan, Minnesota Department of Natural Resources
Copyediting by Emma Schultz, Minnesota Department of Natural Resources

Professor Gary Johnson was hired by the Department of Forest Resources at the University of Minnesota as the Urban and Community Forestry professor in 1992. Over his career, Gary developed the University of Minnesota's Urban and Community Forestry program into one of the top-ranked programs in the world. Gary has received numerous awards for his teaching, research, and outreach contributions and even now has the distinguished honor of having an award named after him, the Gary Johnson Leadership Award.

Much of Gary's success in elevating our Urban and Community Forestry program has been his ability to develop strong teams and relationships with stakeholders such as federal, state, and municipal forestry agencies, private tree care companies, arborists, land-care

professionals, and community members. This means that if you work in the industry, or simply live in Minnesota, it's likely you've been impacted or influenced in some way by Gary and his team's work. He doesn't do it alone, but his leadership has driven everything listed below:

- » The Shade Tree Short Course, educating over 1,000 attendees each year.
- » Urban forestry volunteer programs.
 - The state-based Tree Care Advisor Program, educated nearly 300 volunteers who have submitted over 100,000 volunteer hours.
 - The community-based Citizen Pruner and Tree Steward Programs, with nearly 350 volunteers trained who have submitted nearly 4,000 volunteer hours.
- » The Tree Inspector Certification and Recertification workshops, including the Tree Inspector Newsletter (TreeIQ), with

nearly 1,000 current Tree Inspectors.

- » The weekly MnSTAC newsletter email and monthly MnSTAC forums.
 - The annual August field day at the UMN Saint Paul research and extension nursery.
- » Tree care workshops for professionals and municipalities throughout the state.
- » The weekly Tree Essential classes at the nursery.
- » A program nationally recognized as a leader in urban forestry research and education.
- » Graduating urban forestry and arboriculture students who want to live and work in Minnesota.
- » A self-supporting, not funded by UMN, arboriculture and urban forestry research nursery (11 acres) and lab on the Saint Paul campus.
 - Generates practical and research-based information that informs best

practices.

- Employed 5 researchers, 2-8 graduate research assistants, and at least 12 undergraduate research assistants throughout the year.
- » Fact sheets, publications, Green Reports, and training videos the program generates each year.
- » More than 15 community-based and funded research projects around the state annually.
- » The Youth Engagement in Arboriculture (YEA) program, reaching approximately 1,300 underserved youth each year.
- » The Tree Trek Program.
- » Technical assistance provided to nearly 200 communities statewide annually.

Lively and funny, Gary is consistently able to entertain while still educating, be it while presenting at a conference or mentoring a student. These abilities are what allowed him to strengthen Minnesota's culture around science based decision making and safety, two key elements of our industry that have increased substantially due to Gary and his work. Gary's reach goes beyond the professionals, working closely with community members and empowering them to be active in their community forest.

“

His welcoming and humorous style of teaching draws many to share his passion for being a “tree hugger”...

”

– Janet Palmer
Tree Care Advisor

Gary's enthusiasm and passion influenced so many that he inspired the creation of a video filled with over 50 professionals and students, as well as a 24-page book of notes and letters from volunteers, all who have learned from or worked with Gary over the years. Both video and book were filled with notes of gratitude and

appreciation (Gary even incited some to write poetry, how many can say that about our careers?) for the work Gary has done as well as for the man himself.

Gary is clearly a consummate professional, but his relaxed and fun attitude is what drew people in. Gary is the definition of a man who takes his work seriously, but himself lightly, which is something I believe to be the best of both worlds.

To start, how did you find urban and community forestry? It's not historically an easy thing to find. I know you began in Plant Pathology, so, how did you get there?

I think I evolved into it. I never at any point thought, “I'm going to be an Urban Forester” because I never even thought of the words. My undergrad degree was horticulture (nursery management)/ agronomy and chemistry, so that's part of urban forestry: planting, growing, cultivating trees. Then I got into plant pathology and plant ecology at the master's level, and finally recreation and urban studies at the doctoral level. Plant pathology is definitely part of urban forestry, because it's part of arboriculture and arboriculture is part of urban forestry, so I had that connection... but I had a real strong design background too.

My brother and I had a landscape design-build company in Illinois, and I taught landscape design courses at the University of New Hampshire and the University of Maryland. Then for a number of years until I came to Minnesota, at the University of New Hampshire and Maryland I had very understanding department heads so I convinced them that consulting was professional development and I was a principle in a horticultural consulting company in New England for several years. In 1984, I started a two-year urban forestry program at the University of Maryland. That's what I mean; I kind of evolved into urban forestry.

When the position came up at University of Minnesota, I was really interested because I knew Minnesota had a good reputation in urban forestry. The University

started their urban forestry program in 1984 and this was '92 when I came here. When I looked at the curriculum it was still very much an arboriculture program. But I was given permission and support to develop what I thought would be closer to a true urban forestry program: a much broader palette of classes to address a much broader profession.

What is one of your career accomplishments that you're most proud of? Just one of them. We don't have all day.

Planting trees on the St. Paul campus. I love walking by trees I planted with students as a project 5-10-15-20 years ago, and now they're canopy. They're more than two-inch caliper sticks coming out of the ground.

“

I just wanted to say thank you for all the years of guidance you provided, whether it be what to do with my life or what tree to plant.

”

– Jacob Busiahn
Tettegouche Tree Care

What drove you to want to teach?

Our landscape design company in Illinois... I made a lot of money, but got really disgusted with the profession and myself, because it was all about “turns” (how quickly can you get in, get the job done, get out, get paid). That was the focus. The customer was always right – but that's not true. However, if you're going to get a lot of turns and get it done fast, you do what the customer tells you.

So I started changing our designs and we were making good head way, one client at a time, but it wasn't enough for me. So I thought, “Alright, the only way I know I'm ever going to have an impact on this is trying to impact young people.” That's when I started thinking about teaching

and this position came up at University of New Hampshire. It was a faculty position and, I thought, "what the hell, I'll try it". That was the beginning of teaching for me.

At least for me, I've never worked a day as a teacher because if you are doing what you love, it's not work. That's honestly how I feel about it too. People started in on me 10 years ago, "Aren't you ready to retire?" I was like, "Why would I retire?" I don't really work and I get paid, and I do pretty much anything I want to.



Gary's enthusiasm for the wonderful world of trees was contagious and left a lasting impression on me... I often wonder what my life at Winona State University would have been like if I hadn't spent that enriching week in Rochester with Gary Johnson. It certainly wouldn't have been as rewarding as it turned out. Because Gary is such an inspiring, passionate teacher, he was able to reach out and give me the tools to pursue my dreams. For me it was as if a light switch went off in my brain showing me the path I wanted to follow.



– Bill Meyer

Something I particularly admire about you, and it seems like a magical thing you're able to do, is you're really good at bringing really good people together and you find people who are unusual, and weird and so lovely. I do. And you bring them together to accomplish these really great things, and I'm curious what you look for in people when deciding to add them to your team?

Honesty. I always figure, learning is so easy, but you can't teach honesty. I do like different people which I think goes back to junior high and high school. I was in sports, but I didn't hang out with jocks. They were all the same, it was boring to me. I gravitated towards outsiders. Kids other people didn't want to hang out with, because their family was poor, or they weren't good in sports, or they liked theater, or they dyed their hair. Even when I had my business with my brother, we had a very eclectic crew.

When hiring people, I look for honesty, and if you're quirky and multi-talented, I'm even more interested in having you as part of our team. When you look at the team here (UFORE) the talent is pretty cool; you're not gonna find that in many places.

I'm also a firm believer that very little is intuitive. I hate the phrase "Common Sense". There is no common sense. There's learned sense. If no one taught you as a baby to get away from the highway, you would crawl out on to it. It's not common sense if you have to be taught it. It's the same with everything else, you have to be given a training period. I think also if you create the right climate, really good people recognize that climate and want to be part of it.

I think also, you create a climate and culture that provide opportunities for honesty. You're not really hard on people when they make mistakes, you continue to cultivate that in people. I think that's really important.

Oh, that's wicked important. When people are afraid of making mistakes they're going to lie and cheat, and when you're collecting research data, you just can't have that.

What do you think is next for the industry? I'm asking you to do some future predictions so if you can pull out the crystal ball...

It's becoming much more professional at an exponential rate. More companies have safety directors, and have really become earnest about safety and training. Sending workers to conferences, paying

for certifications, licenses etcetera. The first arborist I worked for, when I asked, "Do you have a rope and saddle I can borrow?" he goes, "Real men don't use ropes." It's a wonder I didn't die falling out of a tree. That whole attitude is probably still out there, but it's not common, and rare in Minnesota. Second thing: the equipment! Holy buckets, the technology! When I look at chainsaws and equipment now compared to what I used in the late '60's/early '70's, it's the reason I don't have a right kneecap. Equipment was unforgiving back then. It's so much better now. Switching over to battery operated chainsaws... phenomenal... two-cycle engines are the most polluting thing in the world, and now we have battery-operated chainsaws, string trimmers, mowers.

With tree production, for a long time it languished. Nobody wanted to change. There were nurseries 10 years ago, I wouldn't give you a nickel for any of their trees. They had so many inherent problems, but now I buy regularly from them. They listened, they changed their operations. Tree production is getting much better, and I think a lot of it is getting young people bringing in new ideas and experienced growers willing to relearn.

Now, urban forestry: so what if you can prune a tree? You need to know how to keep our water clean, cool the environment, deal with people, avoid invasives, urban critter management. Whereas 20, 30, 40 years ago it was like, "Do you know how to climb and prune trees?" Boom, you're a municipal arborist. Now, you have to be so much more. Do you know GIS? Can you manage a website? Writing skills? People skills? That's a huge change. Urban forestry is not just trees anymore. It's about how is the canopy looking (i.e. species diversity)? How healthy is the canopy? How sustainable? How is it helping people? Who is not being helped? That's now, that's the future. With tighter and tighter budgets, you better be able to justify your profession as more than pruning trees.

What do you think you're going to miss the most?



I'm a people person. I teach at the most cohesive and supportive department of any University I've been at, the most supportive of all departments in the University of Minnesota Twin Cities campus. I'm really going to miss working with communities, I adore the students, and I love volunteers. I don't even care why you're volunteering, I just love that you're a volunteer. I'm going to miss them all a lot.

“

Thank you for opening the door into the world of urban forestry to me and so many others

”

– Emily Ball
City of Lakeville

I think about the Shade Tree Short Course, and for me, I would rank it even above the State Fair (can't believe I said that) because the Shade Tree Short Course for me was all about seeing old friends and making new friends. That's why I love Tree Inspector workshops too. Once a year going around for either new certs or recerts. I get to run into Steph or Mary again. I'm really going to miss that a lot, but haven't I been a fortunate person?

That you get to miss so many people?

Yeah, I can count these people on more than two hands. Some people only have

one, others have none. (I always have music going through my head)

Is it like the piano playing you off?

That was Eddie Vedder, Just Breathe.

What is next for you?

A lot more bicycling. Bicycling is one of my great loves. I used to be very competitive. I always made sure my average miles per hour was way up and I had all these loops in the metro. If I saw a younger cyclist ahead of me, I wasn't satisfied until I burned 'em on a hill. But what it really gets down to is being a kid again, and that's why I like it. I grew up in the country and for me to get anywhere I'd have to pedal seven miles to a town because they had a pool hall there. I love woodworking too. I used to build houses with my best friend Lyle, and I love building stuff and refinishing furniture. So I'll be doing that. I love planting and caring for trees. I love cutting down buckthorn, not because I hate buckthorn so much, but it's really good firewood.

The cliché is, "Oh, I'm going to travel a lot more." I don't know. I have more time to go on short trips with Jill. I give Jill a lot of credit. She has put up with my obsession for 17 years, of working too much. I never knew when to turn the clock off. So spending more time with Jill, when she has the time.

More reading. Kickin' around at the cabin,

feeding the birds. One thing I won't do anymore, unless absolutely necessary, is set an alarm clock. I'm planning to continue writing. I'm working on an article for the next Tree IQ on deicing salt. I'm almost done revising "Staking and Guying Trees" and am moving right into "Trees for northeast Minnesota." I'm focusing on getting it published on trees.umn.edu.

I really am built for retirement. I want to learn harmonica. I want to get better on the bongos. There's a good chance I'll pick up guitar again. I was in bands for a number of years. It helped pay for my college.

Is there any wrap up you want to provide, or generic advice you have for the poor schlubs continuing with their 9-5, or requests you have for the people who are not anywhere close to retirement... like please keep doing this...or don't do that, or ...?

I don't feel worthy of giving advice, even when it's solicited. I really don't.

Well, that's madness but... okay.

One of my favorite "words of wisdom" was from Paul Walvatne when he was honored at an MSA event at Saint John's University. "When you're out working and the sun is going down, for each finger that you can put between the bottom of the sun and the horizon, that's 15 more minutes of daylight you have." THAT, is good advice!

Welcome Back, Eric: Interview with the University of Minnesota's Incoming Professor of Urban and Community Forestry

{Insert *Welcome Back, Kotter* theme song here}

Valerie McClannahan, Minnesota Department of Natural Resources
Copyediting by Emma Schultz, Minnesota Department of Natural Resources

Dr. Eric North will be starting as the new Assistant Professor of Urban and Community Forestry at the University of Minnesota's Department of Forest Resources in late December.

Eric is currently contract co-teaching "Problem Solving for Environmental Change" at the University of Minnesota and remains Assistant Professor of Practice in the School of Natural Resources at the University of Nebraska-Lincoln until the end of the year. Eric developed the 4-year degree program in Regional & Community Forestry at University of Nebraska-Lincoln where his primary responsibility has been preparing students for successful careers in urban forestry, arboriculture, and natural resource management in the built environment.

Eric serves in numerous capacities for professional organizations and on community boards, including the International Society of Arboriculture (ISA), the Arboriculture Education and Research Academy, and the Lincoln Community Forestry Advisory Board. In 2018, he served as a Diversity and Inclusion Fellow, a position awarded by the Office of the Executive Vice Chancellor. Eric is also an ISA Certified Arborist.

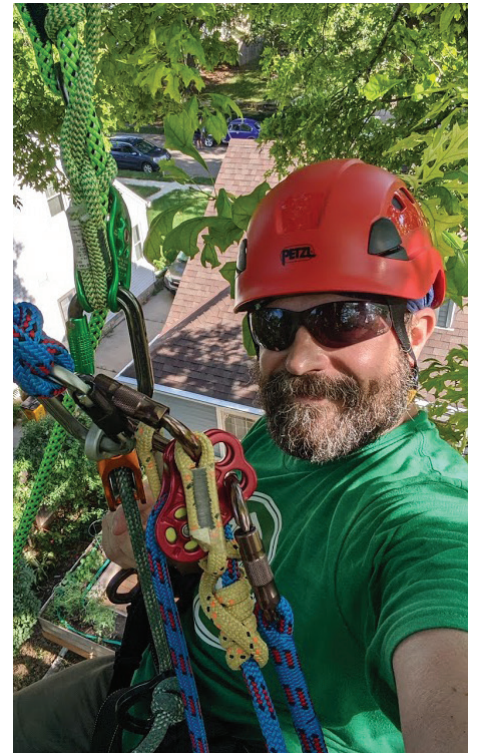
Eric has a passion for communicating science to improve natural resources in urban areas, and for working with people and trees to enhance the built landscape. His research has been published in peer-reviewed journals and Extension publications, including *Urban Forestry & Urban Greening*; *Journal of Forestry*; and *Arboriculture & Urban Forestry*.

You were a non-traditional student when it came to Urban and Community Forestry. What brought you into the industry?

I was working in my previous life and I liked hiking, climbing, and being outside, and camping, and... I was really interested in nature, but realized I didn't know anything. I mean, I didn't know anything about nature per se. I could do all the hiking, but I didn't really know what I was looking at. One year I went to Kenya, and I was talking to a guide and he was telling me about restoring the forest in his hometown. I thought that was really an interesting idea - that you would restore trees in your home city. When we got back from Kenya I started looking around at potential ways to do that for a living and then, like many people in urban forestry, stumbled on the urban and community forestry offerings at the University of Minnesota. My wife, Heather, and I were living in Minneapolis at the time and she had a job requiring us to stay in a city, and when I saw that you could study forestry in an urban context, I thought, "That's cool." And now I help others "find" urban forestry and arboriculture.

You started your urban forestry career in Minnesota. Were there any projects that you were part of, or something that you learned while you were here that you took with you to Nebraska?

Oh...ah...everything. *(Laughs)* I think there are a lot of ways to answer that. Working with communities, which was Gary Johnson's big passion, and I was fortunate enough to work with a lot of the communities. When I came here to Nebraska one of the first things I did was



try to reach out to various communities to see how I could help...if I could help, what they needed, what they were interested in.

Having an ability to teach at the University of Minnesota, and really honing that craft of teaching and then bringing that here [*the University of Nebraska-Lincoln*] to start a program where nobody was thinking about trees, at least at the University level. There was landscape architecture and horticulture, but nobody was thinking about urban forestry, including the students. One thing I learned at the University of Minnesota was how powerful a recruiting class like dendrology could be, so that was the first course I created and taught here at UNL



What ultimately drove you to teach?

I saw how terrible Gary was (*laughs*) – only kidding, I owe a lot to Gary’s mentoring. You see the impact a good instructor (good teacher, good professor) can have on what people end up doing and I think I recognized pretty quickly that it was something I enjoyed doing. Teaching, especially in a class like dendrology, where for a lot of students, it might be one of their first classes involved with trees. Watching students discover and see part of the world that they kind of noticed was there ... and discover there’s more to it, and there are lots of really amazing things to find. Being a part of a student’s discovery, that is incredible.

I’d like to talk a little about your time as the professor of urban and community forestry at University of Nebraska-Lincoln. What’s one of the accomplishments you’re most proud of over the last few years?

When I came here there was no forestry to speak of. There were a couple forestry courses with fairly low enrollment. So, developing the core forestry curriculum, and then teaching those courses. The first semester I was here, there were 19 students that I think were more or less just put into my classes, they didn’t necessarily request to be in those classes (*laughs*). Then this semester, even during a pandemic, there are over 50 students in that same class, and over 75 total students involved in forestry courses. We now have 15 students enrolled in a forestry

minor, and 5 or 6 in the recently-approved forestry degree. We have an entire 4-year curriculum approved through the University offered for the first time this fall (2020). We got all that done in just under three years. In building the core program, there’s a whole new group of people here: not just Cornhuskers, but Tree Huskers.

Building a program from the ground up and really focusing on how I interact with students has been so rewarding. I’ve worked hard to talk with preschool kids through community college students, to show them this profession. As more and more people move into urban areas we need trained and skilled individuals that know how to manage urban forests, urban greenspaces, urban natural resources. A lot of my focus has been on managing an entire natural resource for the benefit of a community.

What is an initiative or project that you’re excited to see and help grow when you get back to Minnesota? Something that’s existing or new that you want to be pushing forward.

Where Gary’s position was teaching and outreach, or teaching/Extension, the new position I’ll be filling has a research component. I want to make sure we keep the high level of teaching and outreach, but on top of that add research products that go out into broader world, both Minnesota and beyond. There are so many wonderful things that happen in Minnesota, in urban forestry and

arboriculture, within the university and within the communities of Minnesota. I want to tell those stories outside of Minnesota and highlight all the great happenings, this is a great opportunity.

For those of us who aren’t enrolling this semester as students, where can we connect with you?

While I’m still here at Nebraska my YouTube channel can be found by searching “TreeHusker” on YouTube. Since the pandemic began, we’ve been creating all sorts of online content both for students, and for the community to replace in-person trainings. I’ve created a lot of “how-tos:” how to do climbing knots, how to do basic chainsaw skills, the chainsaw versus chaps video which people seem to really like, and lots and lots of Tree ID videos. I hope to continue doing these types of things once I get to Minnesota, and continue to do as much face-to-face and in-person as I can during the pandemic. I can also be found on Twitter and Instagram (@treesotan).

I’m always happy to chat with people about research ideas or community projects, or anyone interested in pursuing master’s- or PHD-level education. I’m certainly always interested in advising students. If someone just wants to reach out and share a favorite tree photo or story, I love hearing those stories!

COVID-19 Impacts: Two Companies' Experience of Our New Normal

Lynn Welles, Northeast Tree Inc.
Ben Cooper, Rainbow Treecare

In March, the COVID-19 Pandemic impacted all of our businesses and business operations. We were faced with having to modify how we conduct our business both with our customers and 'behind the scenes'. Beginning in mid-March, we implemented numerous protocols with the intent of safeguarding our employees and our clients. The following are examples of protocols that are now in place:

- » Trucks and equipment are sanitized twice daily, at the start and finish of each day
- » Hand sanitizing 'stations' are in all trucks and at the yard
- » Only 1 employee in a truck, others now use their personal vehicle to get to the work site and can receive reimbursement per federal per diem
- » Masks are provided to all employees
- » Maintain social distancing guidelines to the extent feasible during tree work and even for lunch/breaks
- » Limit office staff to owners only; meetings and employee evaluations were initially delayed but eventually accommodated with a larger conference room or outdoors
- » Employees were allowed to take paid time off if they had concerns with infection risk at work
- » Amended how we interact with clients - eliminated the in person walk through at job site and switched to a phone call to discuss work when requested by client and limited to no in-person meetings with clients during sales calls

COVID CHALLENGES

Staff shortage: We were unable to bring in an office assistant and treatment technician due to small office size. As a

result, the owners took on these functions. These extra duties required more time, resulting in one of the business owners quitting their other job. That action eliminated the benefits both owners (husband and wife) were receiving. The company had to absorb the cost of benefits. There is a shortage of applicants and most tree services we have had contact with are all short staffed.

Increased volumes: With everyone at home, the increased volume of bid requests was overwhelming. We had to reduce our service area and change the scope of our bids. Clients were requesting that we walk through entire properties and assess all trees. We had to make it clear that free estimates were for projects with a set scope. (The plumber does not come and look at all the faucets when at the house, they look at the area of concern only, and it is not free). While some clients were very understanding, others did not seem to value our time. Just like all other industries, we were not able to plan for the increase in volume, which was potentiated by the staff shortage.

Client contact: We had to limit contact between sales arborists and clients. Initially, we did not accept or schedule any meetings or appointments. Even today, we are still limiting contact as much as possible. But, as things have opened up in the state, we have begun scheduling in-person appointments and meetings with clients while adhering to safety guidelines such as wearing masks and social distancing. Unfortunately, some clients have absolutely refused to respect the protocols requested by us for the safety of our staff.

Procurement of cleaning supplies: At the beginning of the pandemic, there was a shortage of available sanitizing products. This required yet more time of the owners to search out supplies. At one point, we even made our own sanitizer so we could continue to safely work.

Limited activity and increased workload:

We are a small company, and with the staff shortages, the owners have had to be very conservative with activities and interactions. For several months, we had interaction with no one outside of work. We could not risk getting exposed as that would shut down the company for at least two (2) weeks simply based on the amount of duties the owners took on to keep the company running.

Other industry effects: COVID also created limitations for other contractors and services we typically use to get our work done. Examples include upwards of 1 hour to simply make a bank deposit via drive-thru; 2-3 months out for scheduling line drops with Xcel Energy; and delays in shipping of required materials to complete jobs.

We are fortunate to have employees and subcontractors that are not only respectful of their teammates' well being but also have been able to adapt to the ever evolving impacts of COVID-19 while keeping themselves safe and healthy. We are thankful that tree work was considered essential and that we did not miss a day of work - we have worked straight through the pandemic! We felt a great sense of responsibility to our employees to keep the company moving forward and stable, but also to the greater



business community as so many other small businesses were not able to work. We are heart broken every time we hear of a small business that did not make it through the pandemic, as we know how much heart and soul the owners and employees put into that business.

In summary, 2020 has been tumultuous and exhausting to say the least, but yet we still consider our business year successful.

Lynn Welles is the Co-owner and Operations Manager of Northeast Tree, Inc. She is an ISA Certified Arborist and MN Dept of Ag Certified Pesticide Applicator. Lynn serves as Co-chair of the Minnesota Tree Climbing Championship.



Back in January of this year most of us were not thinking too much about the murmurs of a new strain of virus that was emerging in China. Here in Minnesota we were embracing winter, the time of year that really creates our identity as Minnesotans. Out skiing, skating, snowmobiling; to break the grip of that winter cabin fever. Some of us likely even made plane trips to exotic and warm places. It is guaranteed that most arborists were spending time outside with the trees that are our livelihood. But none of the worry and concern, that we now carry, was present such a short time ago.

Our business was confronted with the reality that life was going to be different

moving forward in the beginning of March. Our ability to connect with people was going to be different; our employees, our customers, our teams. Things that we had so recently taken for granted; riding together to job sites, talking over a plan for tree work in a customer's living room, having a morning safety meeting in the garage; would all change.

By the end of March all Minnesotans were asked to shelter in place and stay home to slow the spread of this virus. This pause gave our organization an opportunity to stop and take a breath and regroup. Out of necessity, we had created some fixes for working safely but this stop in the action gave us a chance to be thorough and complete.

We started our process by pulling all of our leadership team together to outline what would be required for all of us to work safely when we returned to work. Each leader then looked at all processes in their area to create best management practices for their teams. Here are a few examples of ways our organization has changed due to COVID.

One of every tree company's major spring events is the onboarding and training of new spring employees. Our business historically has a very hands-on training program for the first two weeks. This clearly was not going to be our solution this spring. Over the course of three weeks our team recreated this training into a virtual and distanced training.

Our company communications also changed almost overnight. Most employees with office spaces moved

to their homes. We, with the rest of the world, moved into the Zoom world. I cannot say enough about the power of this tool. It allowed our entire team to remain connected; from regular meetings, to meeting with crews on jobs sites, to training opportunities, and even customer meetings, while the full shelter in place order was in effect.

A final shift in our business was creating processes to be paperless. So many communications are required in order to serve our customer's trees, from an appointment to a proposal to an invoice. We unfortunately had a number of processes that still use paper. In a short period of time we were able to create paperless processes through tools like fillable PDF's, Docusign documents and our GIS software platform.

Through the emergency of this exceptional time our business has been required to adjust and change. Even in the face of such uncertainty our teams were resilient, innovative and focused on the wellbeing of each other. Some new and creative processes created out of necessity will without a doubt become a part of our business permanently. While the future of this pandemic is not clear, I am certain that our organization will come out stronger.

Ben Cooper is an arborist and manager at Rainbow Treecare. He currently serves as a member and volunteer on the Registered Apprenticeship Program for Arborists Committee as well as the Saluting Branches Organization; Arborists United for Veteran Remembrance.



Minnesota Society of Arboriculture
PO Box 16321
St. Paul, MN 55116

PRSR STD
US POSTAGE
PAID
TWIN CITIES, MN
PERMIT NO. 30308

PROTECTING COMMUNITY FORESTS

Since 1880, we have been committed to expert tree care. Davey Resource Group, Inc. was established to nurture and protect natural resources, including the treasured urban and community forests across North America.

We specialize in:

- GIS-based tree inventories
- Tree preservation and protection
- Urban tree canopy (UTC) assessments
- On-call urban foresters
- Operational management plans
- TreeKeeper® software
- i-Tree
- Operations and ordinance review
- Master plans
- Natural Area Management and Restoration
- Invasive Species Management and Control

CONTACT DAVEY RESOURCE GROUP TODAY TO LEARN MORE.

 **Ryan Gustafson, Project Developer** | 763-360-3335
ryan.gustafson@davey.com | www.davey.com/uf

DAVEY 
Resource Group