

Utility Arborist Newsline

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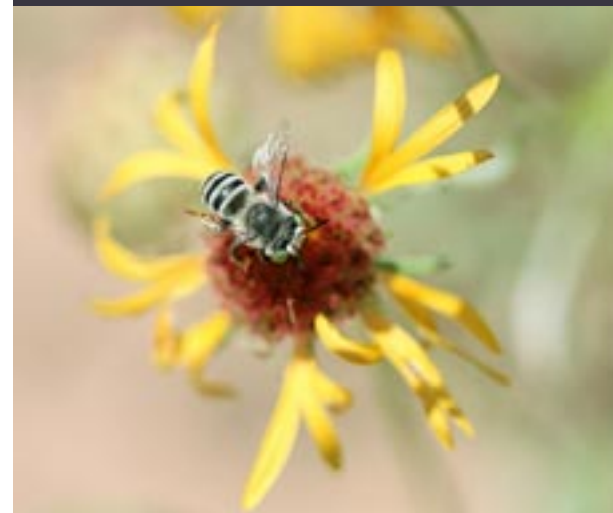
Research to Evaluate Plant and Pollinator Abundance and Composition on Southwest U.S. ROW

*By Seth Munson^{1,2}, Ashley Bennett³, Lori Jones⁴, Ruth Valencia⁴, Clare Aslan^{2,5};
 Photographs by Ashley Bennett³*

Pollinators perform essential ecosystem services across both natural and agricultural settings and are noticeably diverse in the southwestern U.S. Native bees are abundant in this region because many require dry soil conditions for nesting and utilize dryland native plants. Despite their important role, pollinator populations in the Southwest and throughout the U.S. have been declining in recent decades. One factor contributing to pollinator decline is loss of habitat, which provides food and nesting resources to adult and larval pollinators. As human development continues across the landscape, habitats that support native plants and pollinators are degraded or lost. Strategies to increase native plant and pollinator abundance and diversity can reverse degradation and promote ecosystem health.

Powerline rights-of-way (ROWs) can serve a critical role in the preservation of native plant and pollinator populations. ROWs are managed using integrated

FOCUS ON UVM RESEARCH



vegetation management (IVM), which includes mechanical and chemical treatments to reduce tall-growing trees and invasive species and promotes a stable low-growing plant community. ROWs are capable of supporting pollinator populations because they reduce overstory plants and highly competitive invasive

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² Northern Arizona University, Center for Adaptive Western Landscapes
³ Electric Power Research Institute
⁴ Salt River Project
⁵ Northern Arizona University, School of Earth and Sustainability



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plants, thereby opening up space and resources for the growth of a diverse native plant community in the understory. ROWs may further benefit pollinator populations by serving as corridors connecting patches of natural habitat and facilitating pollinator dispersal across the landscape. The reduction of trees and invasive plants and enhancement of native plant abundance can vary by the treatments implemented, time since treatment, plant community treated, and other environmental factors.



The Salt River Project in Arizona implements IVM on more than 2,300 circuit miles of transmission line from over 7,000 feet elevation in ponderosa pine forests down to 1,000 feet in desert shrubland. There is limited understanding of how ROW and associated IVM treatments affect pollinators across the multiple southwest plant communities that span this elevational gradient. The Salt River Project and Electric Power Research Institute (EPRI) have partnered with Northern Arizona University and the U.S. Geological Survey on a new research project to evaluate plant and pollinator abundance and composition on ROWs across ponderosa pine forests, pinyon-juniper woodlands, and desert shrubland that are well-represented across the southwestern U.S. The four-year project will compare native plant and pollinator abundance and diversity on and off ROWs and track how pollinators throughout the growing season respond to IVM treatments. The project will provide the Salt River Project with information to benefit their operation and maintenance costs while improving the conservation value of ROW habitat for native plants and pollinators. Project results are expected to provide new insight on how the management of ROWs influence southwest plant and pollinator communities and will be shared with interested groups.



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President's Message By Paul Hurysz

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Let me begin my note to by recognizing and thanking those who have served the UAA admirably over the last several years. Thank you, Bob Richens! Bob, your last four years of leadership (from

vice president to past president) have enriched our organization. It has been a pleasure getting to know you on a more personal level. You have a natural leadership style of bringing people together, and I can't thank you enough for all you have done for the UAA. We will miss you on the leadership team!

The next to thank, both personally and professionally, is Becky Spach. Becky, you will be sorely missed on the executive board. You always had insightful and meaningful things to contribute to almost every meeting. And you have *certainly* made a difference during the last three years of your board service.

Lastly, a special thank you to Eric Brown for his stellar leadership throughout the last year. If you know *anything* about me, you know that I am an LA Tech graduate, so I know a Bull Dog when I see one! Eric is one of the hardest working people I have ever met in this business. He is as organized and professional as they come. I look forward to your continued council and feedback throughout the next year.

There have been many times that I have been asked what the UAA is all about. We should all be able to answer that question, right? The UAA can certainly mean different things to different people. To me, the UAA is simply all about *people* who are coincidentally interested in the welfare and betterment of the utility arboriculture industry. Your personal interests may lie in safety, training, education, outreach, research, best management practices (BMP) summits, events (such as the Trees & Utilities meeting), environmental stewardship, Z133, and the list goes on. But my point remains that this professional organization we are part of—which we freely give our time, talent, and treasure to—is about *people* wanting to make a difference for the betterment of the utility arboriculture industry.

Our organization's vision is "to be the leading organization for the enhancement of the utility vegetation management (UVM) industry." That vision is a good aspiration for us, and I believe it captures the character and spirit of the UAA. The reason we can use our collective minds to achieve that vision is because of the thought leaders who are driving the change that makes a difference in this industry. Your collaborative efforts are a significant strength within this organization and is what drives continuous improvement within our industry for the foreseeable future.

Regardless of the challenges this world throws at us (e.g., a pandemic, the declining economy), the UAA leadership team and our industry should be prepared to achieve our aforementioned vision. We are currently making some fundamental changes for how we structure the organization so we can be good stewards of the time, talent, and treasure that you send our way. And we began this restructuring long before the word "pandemic" became commonplace in our vocabulary.

After all, one of our strengths, which I believe is currently being underused, is that we have mutually supporting elements within the UAA. You may be wondering, "What are mutually supporting elements?" They are focus groups or teams that complement each other without realizing it.

This *Newsline* issue's theme is UVM research. How many of you have ever seen the connection between research and safety, research and training, or education/training and employee retention? Those connections, among many others, exist but perhaps haven't been recognized as collaborative opportunities in the past. We do not have to work harder, but we can work smarter by allowing people and teams to do what they do best: collaborate and produce results.

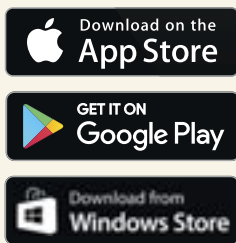
Education and outreach are other examples. You have heard the phrase, "Knowledge is power." But, in my opinion, it's about *how* you use that knowledge that generates the power, not just that the knowledge exists. The same holds true with the UAA in a structural sense. It's not about having education, outreach, or safety teams but *how* you use that thought leadership to make the UAA the leading organization for the enhancement of the UVM industry.

There is a lot of support for the UAA from many volunteers who want to make a difference in this industry. And I want to personally thank each of you for your past, present, and future efforts. Collaboration is the key to our future success, along with defining measurable goals so thought leaders, like you, can achieve results and make a difference.

Finally, if this last year has taught us anything, it's that our industry is essential. In the coming months and years, we will no doubt share many opportunities in the name of progress for our industry, and a lot of those opportunities start with research. Good things in life don't come easy. With that said, I certainly believe that it's going to be fun seeing progress and success moving forward, maybe even at a level that we are not used to seeing! Thirty to forty years from now, most of our names will not be recognizable to this industry. However, the legacy of strength through collaboration that we leave behind for the next generation of thought leaders will allow the UAA's vision to continue as its guiding focus. Take care, stay well, and be safe!

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Executive Director Comments

By Phil Charlton



I always look forward to the annual *Newsline* that focuses on research. Research in the Adirondack and Catskill Mountains of New York is where I got my start in the industry. As an organization, UAA has long recognized that research is

critical to the success of its members. In fact, the UAA mission statement articulates a commitment to driving excellence, innovation, and change through *research*. The strategy is to provide direction for scientific research on utility rights-of-way (ROW), distribute the findings to our members, and work to ensure that the latest information guides the way our industry does its work. The success of our members and the credibility of our industry depend on practices being rooted in science.

This edition of the *Newsline* focuses on research, and now is a good time to thank a couple of committees that work hard on this topic. The UAA Research Committee has more than a dozen participants and is chaired by Dr. Anand Persad. The team is responsible for understanding the research priorities of the UAA membership and using those priorities to guide the grants offered by the Utility Arborist Research Fund (UARF). Every other year, they survey the membership to set the priorities. They share those priorities with the UARF to guide them in creating the grant application. Members of the research team also participate

on the UARF Grant Committee to guide the process so that the funds go for the projects that will have the greatest impact. The committee is also working to put the latest research into the hands of practitioners. They have worked with the *Newsline* team to produce the “Research Corner” and are working on building a series of technical reviews to highlight findings of importance to the industry.

The UAA’s ROW 13 Steering Committee is also working on research. The next Environmental Concerns in ROW Management Symposia series (ROW 13) which was to be held in October 2021 in Charlotte, North Carolina, has been rescheduled in October of 2022 (see page 9). This series emphasizes scientific research on ROWs. Travis Rogers chairs the ROW 13 Steering Committee and Diona Neeser is the conference manager. They have teams working on the local field tours, plenary sessions, academic panels, programs, and more. This series, held every three to four years since the early '70s has consistently been one of the great conferences to attend. I am always surprised to see how much research is actually taking place on ROWs. In fact, there will be more than 100 papers presented in Charlotte, so update your calendars and plan to attend in 2022.

I hope you enjoy this edition of *Newsline* and ask that you join me in thanking the members of the Research, ROW 13, and Editorial Committees for working to drive innovation in our industry through research.

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Industry News



CNUC Jay Manganaro Promoted to Regional Manager

CNUC promoted Jay Manganaro to regional manager this past August. Manganaro started with CNUC in 2018, bringing years of experience in field operations management and business development to the company.

In his time at CNUC, Manganaro held various positions, most recently regional coordinator, where he focused on employee development and internal training. He is also an ISA Certified Arborist®. As regional manager, Manganaro will oversee business development and operations in Canada, while continuing his same involvement in the U.S.

“Jay Manganaro has played a key role in the growth and success of our eastern operations,” said Vice President Josh Beaver. “I look forward to many more great achievements from Jay as we grow into a new market.”

Manganaro’s promotion is representative of CNUC’s current and future growth in North America.



Jay Manganaro

in California, Amber positions us to grow those services to other clients and markets. She brings not only technical knowledge and expertise to our team, but also outstanding communication and leadership skills,” said Karen Wise, vice president, DRG Environmental Consulting. “I look forward to seeing the growth and expansion of services Davey offers across the West Coast.”

Krebbers first joined DRG in 2006 as a utility consulting forester performing pre-inspections of electric distribution facilities in California. She went on to assist with electric transmission projects in Texas and California and a large street tree inventory in Hawaii. In 2009, she was promoted to project coordinator, and in 2013 she started a new DRG initiative providing vegetation management (VM) solutions to natural gas utility providers.

Krebbers most recently served as the area manager for the DRG natural resource management team, where she provided business and technical leadership for natural resource projects, biological services, and traditional forestry.

Krebbers received a bachelor’s degree in horticulture from California Polytechnic State University. She is an International Society of Arboriculture (ISA) Certified Arborist®, ISA Certified Utility Specialist®, and a Certified Landscape Technician by the National Association of Landscape Professionals.



Amber Krebbers Named Western Operations Manager, Davey Resource Group

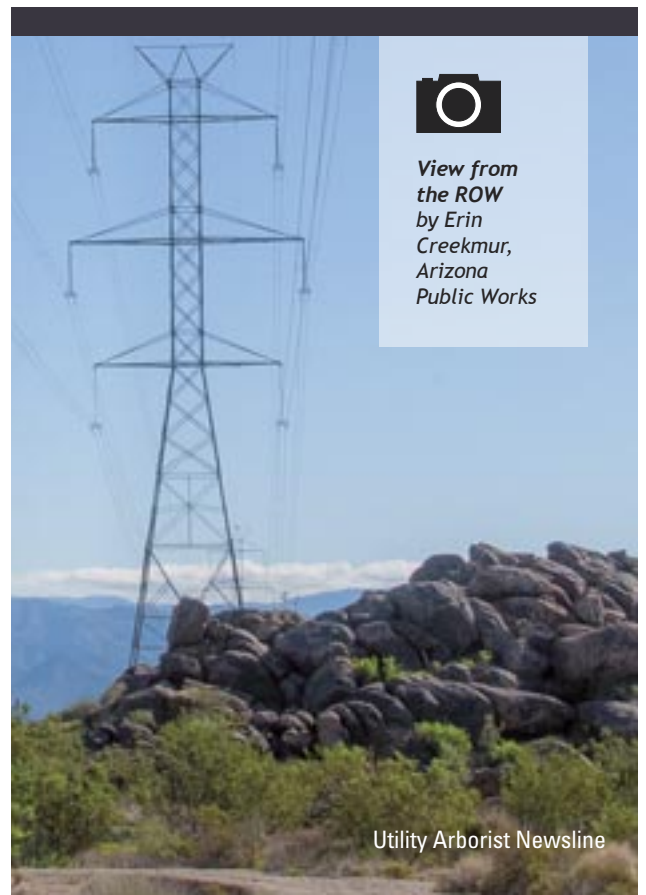
The Davey Tree Expert Company is proud to announce Amber Krebbers as operations manager, western region, for Davey Resource Group (DRG) Environmental Consulting Services.

Krebbers will work closely with area managers from across Davey’s service lines in the western region, including DRG, residential/commercial services, western utilities, as well as Davey’s National Business Development Team, to support the sustainable growth and diversification of Davey’s services throughout California and parts of Washington State.

“It’s a pleasure bringing Amber back to Davey. With her recent experience managing environmental consulting and landscape restoration projects for utilities



Amber Krebbers



View from
the ROW
by Erin
Creekmur,
Arizona
Public Works



13TH INTERNATIONAL SYMPOSIUM ON

Environmental Concerns in Rights-of-Way Management

RESCHEDULED
October 2022

Charlotte, North Carolina

MORE
INFO TO
COME

The Environmental Concerns in ROW Management Symposia Series (ROW 13) planned for October 2021 in Charlotte, North Carolina, has been rescheduled for October 2022.

Because of uncertainty around travel and large in-person events, it has been decided that a one-year postponement of the symposia would best serve the industry.

The UAA aims to make ROW 13 another spectacular international event. Travis Rogers chairs the ROW 13 steering committee and Diona Neeser serves as the conference manager. Their teams are working on the local field tours, plenary sessions, academic panels, programs, and more.

This series, held every three to four years since the early '70s, has consistently been one of the great conferences to attend. Please update your calendars, watch for more details, and plan to attend ROW 13 in 2022.

Your ROW 13 Steering Committee Chairs,

Phil Charlton, *UAA Executive Director*
Travis Rogers, *Corteva/Symposium Co-host*
Tom Johnson, *Duke Energy/Local Chair*



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Research Committee Update: A Year of Strategy and Actionable Initiatives

This past year, the UAA Research Committee focused on outreach, technology transfer, and development of new funding initiatives. Two subcommittees were formed. An outreach committee worked on a template for presenting peer-reviewed rights-of-way (ROW) research in a standardized format. This group also focused on reviewing and condensing research articles for easy assimilation of pertinent findings, and articles were presented in a “Research Corner” of the UAA *Newsline*. The second committee focused on the funding of new research and worked on a process to align funding with research priorities.

These subcommittees informed the wider committee, and in 2019-2020, our overall focus was expanding on the 2018 ROW Systems Managers Survey Poll. The poll had identified several priority areas, including operating costs, training, reliability, technology, and regulations and compliance. Renewed efforts on targeting funding sources, as well as alignment with research priority areas and researchers, resulted in the development of a vetted funding mechanism flow and actionable roadmap.

In addition to the Utility Arborists Research Fund (UARF)—our flagship funding initiative—it is the hope of the UAA Research Committee that this recent focus and roadmap enhances our outreach and engagement of our utility membership to deliver funded, pragmatic, and relevant research. We continuously seek industry feedback, and through collaboration, we plan to engage all stakeholders moving forward. By featuring our roadmap at conferences and other external opportunities, we can incorporate feedback and contributions as we continue to build on this initiative.

Our aspiration moving forward is to continue to present ROW research effectively and to encourage collaborations that help drive the funding of research and to capitalize on emerging issues. We believe that a connected and engaged effort will better serve all of our membership.

SPONSOR SPOTLIGHT

Honoring the Heroes Among Us

At ACRT Pacific, we understand that we are only able to do what we do thanks to the service and sacrifices of our brave veterans. Only through their sacrifice and effort are we all able to enjoy living and working in a free nation.

With Veterans Day arriving this month, we want to take the opportunity to acknowledge and honor some of our employees who have served in the United States Armed Forces:

James Adams, U.S. Army
Jeremiah Bersola, U.S. Marine Corps
Dennis Bogle, U.S. Army
Rene Brehm, U.S. Air Force
Josh Carsner, U.S. Army
Camran Etherton, U.S. Army
William Litel, U.S. Coast Guard
Greg Lott, U.S. Army
Tyler Lott, U.S. Army
Dean Matheson, U.S. Air Force
Isaac Nothwang, U.S. Army
Lonnie Mauck, U.S. Navy
Gregory Pieper, U.S. Army
Gregory Sherrow, U.S. Navy



Thank you to our employees for your commitment to the cause of freedom. And thank you to every veteran who has served and continues to serve. Please join us in celebrating veterans across the country this November.

Learn more about our commitment to service at pacific.act.com.

UAA 2020 Award Recipients

By Eric Brown and Paul Hurysz

The UAA's vision is simply stated "to be the leading organization for the enhancement of the utility vegetation management (UVM) industry." Part of the responsibility of working towards achieving this vision is annually recognizing who we feel are some of the best, brightest, and hardest working individuals that are making a difference in this great and challenging industry of ours. During our virtual annual meeting this year, there were many well-deserving recipients we were able to recognize. What follows is a brief summary of those awards and their deserving recipients.

Beginning with safety, the UAA seeks to find at least one deserving recipient of the **Silver Shield Award** each year. It is awarded to a person who is on the front line of safety, regardless of an official role within the organization, and influences and promotes a safety culture at every turn. This year's recipient is **Johnny Wilson** from the Davey Tree Co. Wilson has

been a leader at Davey for 48 years! He is recognized and respected at all levels of the company and across the industry. He has created, supported, mentored, and coached hundreds—perhaps thousands—of tree care workers in his career. Anyone who knows Wilson has witnessed his passion for safety and knows that he always "walks the walk!"

Next, the UAA would like to recognize our **Partners in Excellence Award (PinE)** recipients. The UAA's success truly relies on the support we receive from our members, sponsors, and volunteers. Companies that go above and beyond to support our mission will be recognized with our PinE Award. UAA membership, sponsorship, advertising, active committee volunteerism, and many other efforts have been quantified and assigned a value, all adding up to

equal each PinE Award recipient's score. This is reviewed by a committee of industry peers based on the aforementioned criteria from the previous fiscal year (September through the following August).

The following companies are the PinE Award recipients for this last fiscal year:

- The Davey Tree Expert Company and Davey Resource Group
- ACRT and ACRT Pacific
- Asplundh Tree Expert Co.
- CN Utility Consulting
- Environmental Consultants Inc.
- ArborMetrics
- Duke Energy
- Corteva Agriscience
- Wright Tree Service
- IBM
- Lewis Tree Service
- First Energy
- Nelson Tree Service

Congratulations to these fine companies for all their support, dedication, and making a difference in our industry by supporting the UAA in a multitude of ways!

(Continued on page 14)



Scott Asplundh, Asplundh - PinE Award



Ron Adams, Duke Energy - PinE Award



Kara Roth, Lewis Tree - PinE Award



Chuck Anderson, ECI - PinE Award



Jeff Jones, Nelson Tree Service - PinE Award

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The **Rising Star Award** is exactly what it sounds like. It is awarded to individuals who are relatively early in their career, yet have already shown significant leadership skills and traits within the UAA, their company, and the industry. In a few short years, our recipient, **Maegan Mullinax** from ACRT, has already made a name for herself across the industry. As a certified arborist, her resumé is filled with experience in utilities nationwide, serving in roles ranging from system arborist to her current role as business development manager. Mullinax, no stranger to volunteering, is a member of the UAA Women in Vegetation Management Committee, UAA Professional Development Committee, Saluting Branches, and several other community organizations serving as a subject matter expert, instructor, and arborist.

The **Education Award** is certainly one of the UAA's most coveted awards. This award recognizes an individual who has added to the knowledge and practices of the utility arborist. This year's recipient is **Steve Kerr**. Kerr has been the UVM Professional Development Program facilitator for three terms. On average, he invests 120-150 hours for each 10-week period helping train and improve the next generation of UVM professionals, in addition to being a vegetation supervisor at a utility and spending time with his wife and kids.



Maegan Mullinax, ACRT - Rising Star Award

Our next award, the **Utility Arborist Award**, is recognized by many as a peer recognition of industry accomplishment and achievement. It is presented to an individual who has made a significant contribution to the field of utility arboriculture. This year's recipient is **Stan Vera-Art**. He has been leading UAA's Managing Thriving Ecosystems on ROWs (rights-of-way) taskforce. Through his leadership, devotion to this effort, and his passion for truly improving the environment, there is a movement in the industry to use practices, tools, and techniques prescribing the best possible approaches for managing thriving herbaceous ecosystems on utilities' ROWs.

Every year, the UAA presents someone in our industry with the Lifetime Achievement Award. This award is presented to the person who has reached many milestones and made contributions of time and talent to the industry he/she has served during his/her career as a utility arborist.



Stan Vera-Art, Grow With Trees - Utility Arborist Award



Johnny Wilson, Davey Tree Co. - Silver Shield Award

The **2020 Lifetime Achievement Award** was presented to **Tom Wolf**! Widely known in the industry, he is the vice president for Sales and Client Relations for Utility Services at the Davey Tree Expert Company. Wolf's commitment is to deliver affordable, executable, result-oriented ideas for the care and management of customers' assets. He serves on the board of directors for the International Society of Arboriculture (ISA) and Trustee Tree Fund, and is past chair of the Knoxville Tree Board, past president of the ISA Southern Chapter, and past chair of the Tree Climbing Championship for the ISA Southern Chapter.

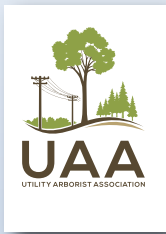
The winner of the **President's Award** for 2020 was chosen by outgoing UAA President, Eric Brown who selected **Larry Abernathy** for his dedication and relentless efforts to put together the Utility Line Clearance Training Program on the West Coast. Primarily because of Abernathy's efforts, Butte College and the UAA have completed initial development of the five-week Utility Line Clearance Arborist Pre-Apprentice Training Program. The intent is to increase awareness of UVM as a career and provide more consistent entry-level training for new, inexperienced workers.

What a year! During this past year's uncertainty, our industry is full of



Tom Wolf, Davey Tree Expert Co. - Lifetime Achievement Award

dedicated and talented performers at every level. Our award recipients are certainly deserving of our recognition and praise, whether we can shake their hands in person or not. Congratulations to all and thank you for your continuous efforts to make a difference for so many in our industry. As a final note, reach out on our website, www.gotouaa.org, and tell us if you know of someone who is deserving of recognition. There, you can review the recognition opportunities that we have mentioned and contact both of us. We look forward to seeing you in person in Minneapolis, Minnesota next year! Take care and stay well.



The UAA awards those who have made significant contributions to the field of Utility Arboriculture. It's one small way that the organization can show appreciation to those individuals who have contributed to the advancement of the profession.

These at-large awards and recognitions include:

Utility Arborist - Presented to an individual who has made a significant contribution to the field of Utility Arboriculture.

Education Award - Recognizes an individual who has added to the knowledge and practices of the utility arborist.

Lifetime Achievement - Awards the person who has reached many milestones during his/her career as a utility arborist.

Rising Star - Awarded to individuals who are relatively early in their career, yet have already shown leadership of the organization and the industry

President's Award - Awarded by the outgoing president to recognize individuals they felt assisted them or the industry in extraordinary ways before, during, and after their term of office.

PinE Award - UAA membership, sponsorship, advertising, active committee volunteerism, and many other means are quantified and assigned a value, all adding up to equal a PinE Score, which is reviewed by a committee of industry peers and scored for the previous fiscal year.

Silver Shield Award - Awarded to a person who is on the front line of safety and may have official or unofficial roles within an organization. They influence and promote a safety culture at every turn.

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Adaptive Capacity

When studying struck-by close calls, we discovered several recurring patterns. Commonalities in some of these close calls were crews working in remote areas—rarely asking for help—and an overreliance on break cuts when other types of cuts would have been more effective. Why? Because crews were more comfortable with break cuts, which were their default.



While we have inroads to make, the Lewis Tree Service approach to human performance is a combination of operational discipline and adaptive capacity. We train our craftworkers to follow established policies and procedures (operational discipline), but we also support them by building knowledge and practices that will enable them to create safety in highly variable situations (adaptive capacity). Here are some examples of each:

Operational discipline

- Follow the protocols to establish a drop zone.
- Employ situational awareness (e.g., size of canopy, slope of land, speed of wind, lean of tree) to ensure the drop zone is adequate.
- Establish communication protocols to ensure no one enters the drop zone without expressed acknowledgement and permission from the trimmer.

Adaptive capacity

Building adaptive capacity when felling or trimming could include ensuring all craftworkers have a greater competence level with multiple types of cuts and different tools (e.g., rope jacks, wedges).

Crews facing a difficult tree might pause to think about it overnight and come back in the morning when reenergized and have better lighting.

Last, but certainly not least, crews might pause to get input from others. Capacity = having options ready (e.g., knowledge, variety of tools, different methods, more time).

As Tony Robbins famously said, "Stay committed to your decisions but flexible in your approach." Building adaptive capacity is an active learning process that we can all use to promote safety.

In Memoriam: Arboriculture Pioneer Hyland Johns (1925-2020)

By Geoff Kempter

I owe my career to Hyland Johns. In 1993, he recommended me for a position at the corporate office in Willow Grove, Pennsylvania. He had been retired for three years, and the company was looking for someone to fill his shoes; I was doomed to fail. It took an entire department to fill the niche that Johns left behind. Many of my colleagues—both in the Asplundh Technical Services Department and in the greater world of tree care—were originally hired by Johns. We all looked to him for guidance, right up until his passing. I can only wonder how many across his vast sphere of influence can say the same thing. Through his years of involvement in arboriculture and beyond, Johns touched the lives of thousands, from crew members to executives at the highest levels.

When he passed on August 11, his legacy in arboriculture spanned nearly 75 years. He was a giant in our field and was instrumental in driving innovation and best practices

before these terms were ever popular. When Johns started in arboriculture, climbing saddles were loops of rope, chain required two people to operate, and aerial lifts and chippers were mere ideas. He was an eager and influential participant in the development of the profession we know today. But his influence extended far beyond utility arboriculture. His knowledge of business—of systems, science, and human nature—made him a natural leader in whatever endeavor he chose. None of us should be surprised that Johns was admired and respected far beyond the bounds of Asplundh, arboriculture, and the utility industry. He was a researcher, mayor, public speaker, author, hospital executive, non-profit administrator, church leader, philanthropist, loving husband and family man, and more.

Through his years of involvement in arboriculture and beyond, Johns touched the lives of thousands, from crew members to executives at the highest levels.

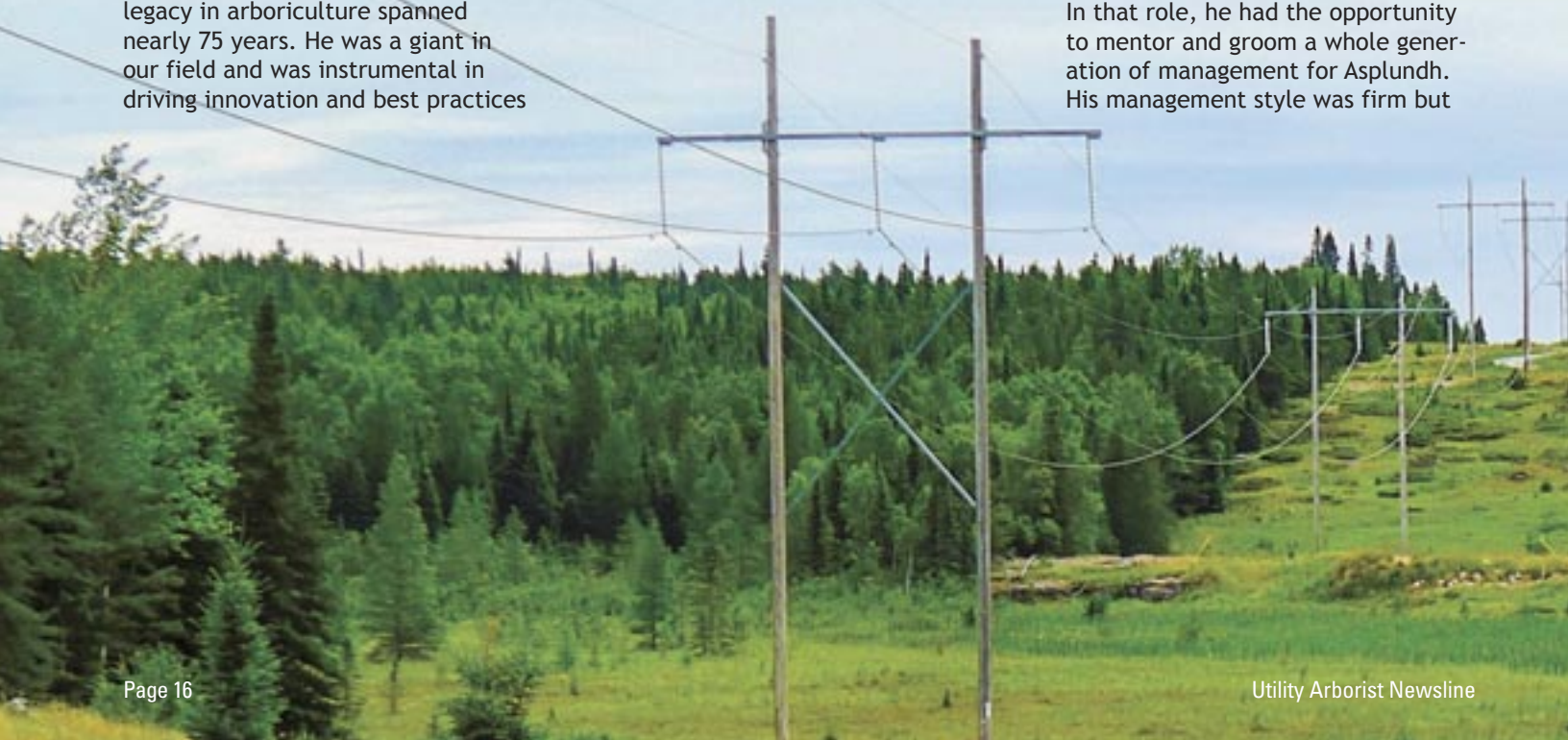
Johns was part of the “Greatest Generation,” living through the Great Depression and enlisting in the Navy during World War II. He was a Seabee (short for Construction Battalion), building support facilities for the American war effort in the Pacific. After the war, Johns attended Purdue University, earning a BS in forest management, then an MS from



Hyland Johns (1925-2020)

Michigan State in arboriculture and urban forestry. During his summer breaks, he worked as an arborist, a profession that would eventually lead him to a 40-year career with Asplundh.

Johns worked *in* the field, at first, but was soon brought into the Asplundh home office to develop the Personnel and Training Department. In that role, he had the opportunity to mentor and groom a whole generation of management for Asplundh. His management style was firm but



fair, and his employees flourished under his leadership. By 1962, he was a vice president, and by 1969, he was elected to the board of directors. Johns was not a member of the Asplundh family. But the Asplundhs recognized his talents and gave him the freedom to make things happen. And happen they did.

Here are just a few of the enterprises created by Johns at Asplundh:

- Seeing the need for more professional oversight of utility vegetation management (UVM) programs, Johns founded Environmental Consultants Inc. (ECI) to assist utilities in planning and managing their UVM programs. In the decades since, a whole generation of professionals have worked at ECI and have gone on to take key positions across the industry.
- Johns realized that highway departments, city foresters, and other government agencies were spending money managing their trees when Asplundh crews were well suited to perform this kind of work. Johns hired Dr. Robert Tate to establish the Asplundh Municipal Division. Tate, in turn, hired a team—including me—to penetrate this market. Tate went on to lead the International Society of Arboriculture (ISA) Western Chapter and serve as president of the ISA.
- Recognizing the potential benefits of incorporating herbicides into

rights-of-way (ROW) vegetation management (VM), Johns started the Asplundh Chemical Department, which coordinated research and demonstration projects and developed application equipment and techniques that are still in use today.

None of us should be surprised that Johns was admired and respected far beyond the bounds of Asplundh, arboriculture, and the utility industry. He was a researcher, mayor, public speaker, author, hospital executive, non-profit administrator, church leader, philanthropist, loving husband and family man, and more.

In 1960, Johns was a charter member of the Penn-Del Chapter of the ISA and served as the chapter's first president. A few years later, in 1966, he chaired the committee that brought the ISA's annual conference to Philadelphia. Johns served as president of the ISA when the conference was held in Philadelphia again in 1977.

Over the course of his career, Johns served on countless committees, often as chair, but always as a constructive participant. In fact, he

strongly believed that organized collaboration with a team brought out the best in people and was the secret to the success of any organization. When Johns was faced with a problem, he would form a committee to solve it.

In 1974, recognizing the importance of unbiased scientific research, Johns, along with John Duling, formed the ISA Research Trust to fund research projects in the field of arboriculture. Johns, always meticulously organized, insisted that the trust have a sound committee structure and a fair process for awarding grants. Under Johns' leadership, the trust grew and merged with the National Arborist Foundation in 2003. I was serving as a trustee at the time, and we were struggling with finding a name for the new organization. It was Johns who came up with the TREE Fund (Tree Research and Education Endowment Fund), which remains our industry's premier research organization.

Since 1975, millions of dollars have been granted for research and scholarships around the world. The Johns and Duling grant programs of the TREE Fund honor their names as founders.

Johns was full of stories—enough to fill a book—but one story certainly stands out. In 1952, Johns was supervising some of the burgeoning Asplundh spray operations on utility transmission corridors. Even then, herbicides were controversial. ►



Over the course of his career, Johns served on countless committees, often as chair, but always as a constructive participant. In fact, he strongly believed that organized collaboration with a team brought out the best in people and was the secret to the success of any organization. When Johns was faced with a problem, he would form a committee to solve it.

Metropolitan Edison (now part of FirstEnergy) was getting pushback from hunters and officials at the Pennsylvania Game Commission (PGC) about the potential negative effects of herbicide spraying on game. Johns proposed a small demonstration study project where rabbits would be placed in pens on the utility ROW, the ROW would be sprayed, and the effects on the rabbits would be evaluated. Unfortunately, the team did not consider the effects of predators on penned rabbits. No one is sure whether it was foxes, coyotes, or local dogs, but the rabbits perished before any meaningful data could be gathered.

That debacle did not stop Johns. Instead, he contacted Dr. William Bramble at Penn State. Bramble and his graduate student, W. R. Byrnes, agreed to conduct a comprehensive, peer-reviewed study of the effects of various ROW treatments on game species where the Met-Ed ROW crossed Pennsylvania Game Lands 33. The project was run by Bramble and Byrnes and funded by Asplundh, AmChem, and Met-Ed, with cooperation from the PGC. Over the years, other chemical companies and utilities became involved. Nearly 70 years later, the Game Lands 33 study continues to yield valuable data. Thousands of people have toured the site, and ROW management and integrated vegetation management (IVM) practices around the world have been influenced by this study Johns started.

Johns retired from Asplundh 30 years ago, but he remained involved, both professionally and in his community as Mayor of Bryn Athyn for 24 years. In addition to serving as mayor, Johns served on the board of the Academy of the New Church and the Pennypack Ecological Restoration Trust. Johns served on the board of Holy Redeemer Health Systems and was its interim CEO for nearly a year. Furthermore, he donated countless gallons of blood to the Red Cross.

Johns married Beth, his high school sweetheart, in 1950 and was with her for 67 years. They raised five children and enjoyed their time with grandchildren on the Jersey Shore. As Beth became infirm in her later years, Johns was her dedicated primary caregiver. He was revered by his family, his local community, and the many people he mentored and assisted throughout his long life.

There was a parking space with his name on it at the Asplundh home office up until this summer, as he was driving right up to the last months of his life. Throughout the years after his retirement, Johns would frequently stop by to offer counsel to the current executives and to visit his friends at the office. He stood tall until the end, always carrying himself with dignity, with his shock of white hair neatly combed and a wry twinkle in his eye. A group of us gathered periodically with Johns for lunch to hear his stories and maintain that connection with the history of the company and the industry. We will all miss him.

EXTEND YOUR VEGETATION MANAGEMENT SEASON

Once the leaves have fallen and the heart of the vegetation management season comes to an end, it doesn't mean there aren't other opportunities to continue line clearance efforts. Many great options still remain, such as **basal applications** and the use of **tree growth regulators**.



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- Reduce trimming bio-mass reduction
- Lower overall line mile cost



Question:

What additional environmental factors would you like to monitor?

SPOTLIGHT on the Environment



Profitability in Ecological Sustainability

By Kimberly Laing, Market Innovation Manager, Transmission & Distribution Solutions, Manitoba Hydro International Ltd.

The role of technology to support vegetation management (VM) activities has come a long way since 2003 when the Federal Energy Regulatory Commission (FERC) implemented FAC-003 requiring utilities for the first time to have programs in place to prevent vegetation-related outages to protect the bulk transmission system. Although we have made great strides in the last two decades and our interests have moved far beyond protection of our energy grid, we seem to be stuck in this state

Utility vegetation managers are in a tough, yet unique, position to make a positive difference in helping deliver power in a sustainable way, both economically and environmentally.

of just “getting by” with compliance instead of exceeding it. The traditional approach to utility vegetation management (UVM) is based on maintaining required clearance levels to enhance safety and reliability and to reduce incidents and outages.

But there is more to UVM than simply safety and reliability. The challenge is

how do we move beyond compliance to manage for enhanced ecological value? In other words, how do we convince decision-makers of the value of caring for the ecosystems under our management? The answer is not simple and often requires a multitude of technological and non-technical solutions from across the energy sector and beyond, some yet to be realized or invented. Despite

major industry disruptions from rapidly emerging technologies, utilities are now simultaneously overwhelmed with choices while trying to catch up.

Further complicating the issue, future UVM technologies will need to account for climate change, wildfire management, restoration of habitats and species diversity, reduction of wildlife fatality, improvement of watershed integrity, and more. Developing technologies that focus on managing these changes will trend and profit, but these will only complement boardrooms, managers, planners, and crews that want to make the shift.

Utility vegetation managers are in a tough, yet unique, position to make a positive difference in helping deliver power in a sustainable way, both economically and environmentally. To determine the best investment in technology development for utilities, there is no better place to start than asking the experts in the industry who spend their days on the front lines.

Fifty-five people from utilities and consulting companies in Canada and the U.S. were interviewed as part of an in-depth market research project conducted by Manitoba Hydro International. Utility vegetation managers, foresters, senior advisors, consultants, and utility experts participated in phone interviews, surveys, and discussions. Given the diversity of technology solutions available, geographical ecosystems they were working with, and resource and budget constraints, there was no one-size-fits-all answer to the methods required to tackle current and future challenges. In fact, the situation gets more complex and multi-layered with the more people added. However, there were two common themes among everyone interviewed: 1.) Most time and money are spent meeting regulatory compliance and short-term risk mitigation, and 2.) There is a wish to do more in terms of integrated

vegetation management (IVM), but investment and support are required.

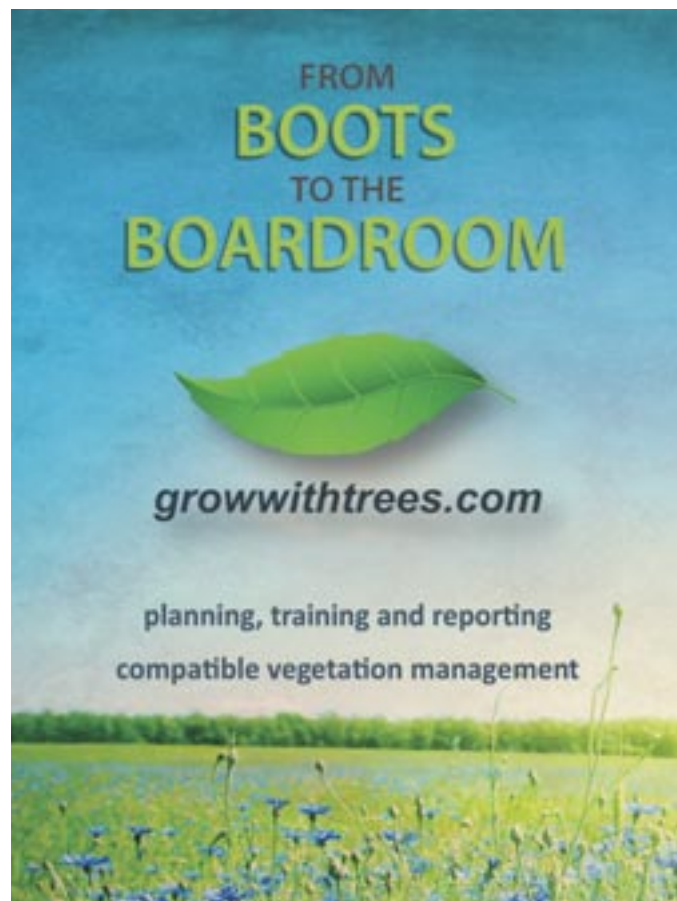
In terms of investment and support, the top three challenges faced by the companies were:

1. Limited resources (lack of skilled labor and expensive labor)
2. Technology not meeting needs of field workers (price, data inventory, reliability, safety, and ease of use)
3. Tools needed to help justify budget spending on future risk mitigation

Understanding the top challenges of utilities and consultants provides us with important hints for future technological developments and requirements. The key is to invest in technology that helps free up time and money so utility companies can focus on improving IVM practices and environmental stewardship.

As such, indicators for future technology development include tools that:

- Help field workers access areas that are unsafe or out of line of sight
- Attract a new workforce, invest in training programs and worker retention, as well as training workers in biodiversity
- Monitor, support, and/or predict bird migration, tree mortality, growth rates and health (enhanced change detection), weather impacts, such as ice storms, fire risk, endangered species habitats, right-of-way (ROW) stewardship targets, invasive species, reduced time to receive permits, and environment/climate change (tree migration, drought, weather patterns)
- Improve the data collection process and manage inventories for future software solutions
- Forecast cost-benefit economic analysis of UVM and the cost of *not* taking action to help prevent future outages
- Increase in collaboration and information sharing that goes beyond sales and marketing, to focus on cooperative



knowledge-sharing to disseminate information instead of reinventing the wheel. Consultants can provide more holistic solution for customers by collaborating to meet objective instead of competing

Many technology providers are leading the way with these types of solutions. Therefore, not only are we moving into an era defined by managing beyond compliance, but also proving that there is profitability in ecological sustainability, and that money does, in fact, grow on trees.

Manitoba Hydro International's research hopes to improve IVM practices with new technology.



Research Corner

RESEARCH STUDIES: TECHNICAL REVIEW



Determination of Strain Patterns Across the Root-Stem Transition Zone in Trees

This is a technical summary based on a master's thesis for the Research Repository at West Virginia University (WVU), written by Kenneth E. Beezley.

The recent increase of catastrophic global weather events and liability concerns arising from the management of urban trees are receiving more attention. These weather events are an especially significant concern along electrical utilities right-of-ways (ROWs), as tree failures can cause disruption in power that impacts private citizens and businesses alike. Predisposing factors can increase the likelihood of tree failure during wind events, even under mild wind and weather conditions. Trees along utility corridors are often subjected to pruning and associated maintenance that potentially alter the loading of the tree. This can leave the tree unbalanced and potentially at increased risk of failure, possibly due to undetected internal decay or compromised structural roots.

● Methods

The distribution of strain (deformation) was investigated in order to conclude how an applied load moves from the stem into the roots. Static load testing was conducted on 15 mature pin oak (*Quercus palustris*) trees in Morgantown, West Virginia, to evaluate the distribution of strain across the root-stem transition zone (RSTZ). The maximum uprooting resistance for an individual tree can be estimated using the tree biomass, diameter at breast height (dbh), and tree height, along with parameters associated with soil properties and root-plate characteristics. Bending moment increases as the upper canopy produces more biomass, increases in height, and the crown is exposed to greater wind velocities. To measure the amount of force required for stem deflection to 0.1 degree from natural lean, three subsurface roots per tree were examined. Soil excavation exposed the roots in order to provide the desired visual range for the Digital Image Correlation (DIC) hardware. A digital video recorder was positioned to record the measurement of the digital level and to capture audio during each pulling trial.

● Results and Discussion

The maximum pulling force for sampled trees ranged from 7,729 to 30,488 N, bending moment for all pulls averaged $101,575 \pm 38,100$ nm. A weak, linear relationship was found between the pulling force and dbh, and a stronger linear relationship was found between bending moments and height. These correlations are initial and indicate the influence of canopy in RSTZ effects from loading. Further analysis and research of the root-soil plate interaction with the structural root zone and RSTZ will provide valuable information in the area of tree stability, structural soil, and root interactions.

● What It Means to Utilities

Weather events can cause failure in both above-ground and below-ground portions of a tree. Whole tree failures have been reported to be as high as 25 percent of the outages and many of these are due to the uprooting of trees. The loading is carried along the stem and transferred into the root system across the RSTZ. Vegetation managers can utilize the fact that tree tip-overs can, to some extent, be managed by prudent canopy practices in ROW.

Technical review by Dr. Anand Persad, Director of Research, Science, and Innovation at ACRT Services

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The Utility Arborist Association is the leading North American organization for the enhancement of quality utility arboriculture and right-of-way (ROW) management. Our success relies on the support we receive from all of our members, sponsors, and volunteers.

Companies that go above and beyond to support our mission will be recognized annually through our Partners in Excellence (PinE) Program.

Membership, sponsorship, advertising, active committee volunteerism, and many other means have been quantified and assigned a value, all adding up to equal a PinE Score.

All applications and supporting material of qualifying companies are reviewed and selected by the PinE Committee.

We want to take this time to congratulate and thank our 2020 PinE Award Recipients.

Your continued support of the Utility Arborist Association is greatly appreciated on many levels.



2020 PinE Award Recipients

GOLD AWARD



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PHOTO COURTESY OF CHRISTINA CUNNINGHAM

ROW Habitat Reclamation Update

By Russ Maxwell, Lead Consulting Utility Forester, CNUC; Christina Cunningham, System Arborist, CNUC; Anna Martz, Consulting Utility Forester, CNUC

According to the Nature Conservancy, there is only one percent of native grass species left in the American Southeast. This loss of habitat has caused many pollinator species to be threatened or have an endangered status. Practicing integrated vegetation management (IVM) on rights-of-way (ROW) allow for the opportunity to reintroduce native grasses and fauna to the ecosystem, helping pollinators without compromising electrical facilities. As native species are reintroduced to ROW, it is important to suppress incompatible and undesirable vegetation below and near overhead electrical facilities. Doing so provides access to the ROW for vegetation management (VM) and emergency service crews and ensures the safety and reliability of power lines. This suppression cannot be managed solely through physical and mechanical mechanisms. It requires an integrated approach involving resources such as selective herbicide application and non-human interaction.

We began implementing IVM at North Georgia EMC (NGEMC) earlier this year. Allowing the natural succession of native grasses and pollinator habitats to thrive will reduce environmental impacts from tractors and mechanical equipment and create a friendly environment for flora, native grasses, and fauna. By using IVM techniques on ROW, we will not only see a decrease in budgetary spending but will turn an eyesore into a beautiful, managed ROW with flowers and native grasses where bees and butterflies can thrive.

Project Status: Fall 2020

We are establishing the baseline data points and control areas for system species inventory of our current ROW flora and fauna. In September, our herbicide contractor, who was also involved in the control area application in 2019, applied herbicide selected from our research.

We have been fortunate to collaborate with many researchers, professors, schools, and companies who have been instrumental in developing and establishing methods of VM that are more environmentally conscious. We partnered with Jacksonville State University to collaborate



NGEMC works to reduce the environmental impacts from mechanical equipment so the vegetation and wildlife can thrive.

with graduate student interns for resources in the collection, analysis, manipulation, and dissemination of data.

We also collaborated with Phil Chen, manager of research and development for CNUC and co-chair of the UAA Environmental Stewardship Committee, to use the UAA's habitat scorecard to ensure our ROW will be attractive for monarch butterflies. We have also spoken with Dr. Carolyn Mahan from Penn State University, who has been instrumental in the State Game Lands 33 ROW project. She informed us of the many bee species her team has been able to find and identify, and we hope to be able to do the same.

IVM Methods and Phases

Our process, developed in consultation with Enable Midstream Partners, starts with our VM contractor, W. A. Kendall, mowing the ROW. Mowing provides a more aesthetically pleasing initial step as opposed to selectively treating woody growth by a hack-and-squirt methodology, according to Enable Midstream. This will level the playing field for native grasses and pollinator species within the ROW to better compete against the woody undesirable and incompatible species and is consistent with Connell and Slatyer's models of succession: inhibition, tolerance, and facilitation (1997).

The second phase of the project involves selective herbicide treatment of incompatible and undesirable vegetation after the first growing season post-mow, in our case performed by Southeastern Woodlands. Selective herbicide treatment after the first growing season serves two purposes: first, it allows vegetation regrowth, including the stems of woody vegetation, resulting in better identification and treatment of incompatible and undesirable species. The second purpose is consistent with the inhibition model of succession proposed by Connell and Slatyer: the disturbance in the plant community should provide a

significant enough opening to allow for the proliferation of grass species.

The third phase of the project occurs one year to date from the phase two treatment. This step consists of treating incompatible and undesirable vegetation with a lower herbicide concentration. At this phase, the community structure of the ROW should shift to favor the establishment of native grasses. This is consistent with results seen by Shatford, where grass species restricted the ability of woody species to invade a given area (2003). Upon completion of phase three, the project enters its maintenance phase in which selective herbicide spraying occurs at regular one-year intervals to address any incompatible and undesirable vegetation still present within the ROW.

If our results are consistent with those seen by Enable Midstream, by the third or fourth year, selective herbicide treatment will only need to be performed every other year, as a result of the succession of the ROW. Control sites will be maintained via the current VM process at ROW within the same substation and circuit as the treatment sites. These sites will be maintained by both mechanical and hand-cutting methods on a five-year cycle, with mid-cycle management, if needed. Consistent with current practices at NGEMC, no herbicide will be used on any control sites.

Through our use of IVM methods, we will be able to successfully reclaim space for native grasses to thrive in the southeast. However, IVM adoption must be more widespread to have lasting environmental change. Ideally, the NGEMC reclamation project will inspire others to transform their ROW, resulting in better habitats for pollinators across North America.

PHOTO COURTESY OF CHRISTINA CUNNINGHAM





Improving Reliability Through Combined Vegetation Management and Outage Prediction

By Robbie Berglund, Weather Solutions Global Business Executive, IBM; Robert Boucher, Senior Offering Manager, Energy & Utilities, IBM

Traditionally, vegetation management (VM) and outage response teams have been siloed departments within an organization. However, vegetation has a direct impact on outages and is a leading cause of lost power in communities. Fluctuations in weather patterns, due to climate change, will affect how utilities plan for storms and will require a more proactive approach to both VM and emergency response.

Properly managing vegetation can help utilities stay ahead, as evidenced by Hurricane Isaias. Most outages in New York, New Jersey, and Connecticut were due to trees falling on powerlines, resulting in 2.5 million customers¹ losing power—in some cases for an entire week. Additionally, given the surge in heat, dry vegetation, and lightning storms across the West Coast in the last few weeks, over 500,000 people will be experiencing power cuts in an attempt to mitigate wildfires. The lawsuits caused by these fires cost Pacific Gas and Electric (PG&E) over \$25.5 billion. Even with the attempts to shut down the grid, 78,000 acres have already been overtaken by flames in the Sierra Nevada Mountains.²

When these intense, and sometimes dangerous, weather conditions arise, organizations need to be equipped with the right tools to prepare for these challenges and to get the lights back on as soon as possible. Utilities must bridge the gap between departments for better communication, ultimately leading to more desirable operational outcomes.

Managing Vegetation Risk Areas

When it comes to shifting to a more proactive business model for outage preparation, it's important that teams have a strong understanding of vegetation-related risk areas. VM has traditionally been a laborious process with utilities hiring contractors or utilizing staff to manually assess vegetation conditions in their service territory with boots on the ground. When it comes to weather's impact on trees, teams have historically relied on local forecasts to make predictions or have used forecasting models that may not have the required industry expertise.

Utilities need to look beyond these data sets for a more accurate depiction their vegetation state and how these



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high-risk areas can impact reliability across the grid. These organizations need to account for the current state of vegetation, historical outage data, asset types, and weather insights to better prepare for incoming storms. Utilities must move beyond local weather forecasts to get hyper-specific data on how wind, soil moisture, winter icing, or other severe weather types can affect designated areas. They require a solution that can combine different data sets and types to make comprehensive recommendations in one easy platform.

Making Vegetation Management More Data-Driven

With the changes in weather, utilities are being called to take a more proactive, data-driven approach. Traditionally, teams have relied on closely watching weather forecasts to plan for severe weather. While this can be beneficial, this does not provide enough insight into the areas affected most, which can lead to lower reliability scores and wasted dollars. Therefore, utility companies should not only be relying on their local forecasts to plan for outages, but need to implement a solution that combines asset information, satellite data, and geospatial data with soil moisture, tree heights, and historical outage trends. The right solution will not only provide this information but deliver specific insights that your team can proactively act upon.

With the combined power of analytics and machine learning, utilities can take advantage of this granular

information to better predict where outages will occur and how severe weather will impact the grid. Additionally, by incorporating all of this data into their models, utility companies will be able to leverage more accurate prediction models for better emergency response and VM. This leads to greater reliability across the network and increased trust among customers. Utilities also benefit by saving money on sending the right crews to the right locations after a storm.

Bridging the Gap Between Vegetation Management and Outage Prediction

Of all weather-related power outages in the U.S., vegetation was responsible for 92 percent¹ of them. In addition, weather-related outages cost the U.S. economy between \$18-33 billion per year. Given the damaging correlations between vegetation and outages, bridging this gap is a necessity for utility companies.

However, since VM and outage prediction departments have traditionally been siloed, innovation is often stalled. By integrating vegetation insights into outage prediction models, utilities can take a more proactive approach to severe weather, leading to improved reliability and safety across the grid. This combination will also strengthen the bottom line of organizations due to its application of strong technology to crucial business needs. Users need a solution that can take both disciplines and combine the information for more actionable insights. Since vegetation is a leading cause of outages, improving reliability on the grid requires the combined resources of these departments.

Final Thoughts

When you combine VM with outage prediction, you are strengthening your strategy and boosting your reliability. By better managing your risk areas, making your VM more data-driven, and by working to bridge the gap, you will experience a complete transformation of your VM and outage prediction strategy. These two disciplines can combine to create a better course of action to help keep the lights on. And with IBM's years of knowledge and expertise, we know what it takes to create a plan that lasts.

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Georgia Power Interview on Crew Software

Chris Kelly from Clearion met with Dan Burer from Georgia Power to discuss their three-year journey with mobile-enabled vegetation work management software, focusing on the benefits, challenges, and lessons learned during their effort to deploy software to their contractor crews.

KELLY. What's your background in utility vegetation management (UVM), and what is your role today?

BURER. I started my career at Georgia Power in the early '90s as a utility arborist and then spent 20 years in various roles in power delivery. Four years ago, I came back to lead T&D vegetation management (VM), where we have a responsibility for the rights-of-way (ROW) along 50,000 line miles.

KELLY. How does your program work? What is Georgia Power's approach to UVM?

BURER. A few years ago, we moved from work to spec to a planning approach seeking to reduce costs. We decided to have an arborist identify which trees and spans to treat, and specifically what could wait another cycle. It's a condition-based approach, and it's also a risk-based approach because we consider the criticality of the asset.

“Thinking back to the time when we had three different sets of paper maps that we struggled to sync up, now it's closer to real time. Everybody has the same information, and that's been a major benefit.”

KELLY. How did you communicate with your crews prior to implementing a software solution that put technology in the hands of the crews?

BURER. We worked from printed maps. The crew had one map, the general foreman had another map, and the arborist had another map that we tried to sync up with highlighters and pens. There was a lot of lag and a lot of risk for information to be lost or missed.

KELLY. So, your software deployment coincided with your move to a work-planning approach. What were the main challenges during and after implementing the software?

BURER. Our biggest challenges continue to be around security and hardware. We have a separate software system for transmission VM that we use across all three operating companies in Southern Company. This system is inside our firewall and is one hundred percent Windows PC based. Establishing trust between a contractor-owned device and our internal servers is a big challenge that we still haven't solved because of the way we house our transmission data. On the distribution side, our servers and data are hosted by the software vendor and our field software is a hybrid of PC and smartphone apps. The PC software is challenging because our various contractor companies have their own security protocols with unique requirements and hurdles. It takes a lot of back and

forth, and sometimes they had to physically bring the machines to Atlanta to get them imaged. The smartphone apps where the crews access their work simply don't have these issues. That aspect turned out really well.

KELLY. Moving on from the challenges to talk about the benefits; were there any surprises or any benefits you didn't anticipate with having your crews connected with this technology?

BURER. Well, there are a lot of benefits. The one big surprise is that the crew foremen really loved it. They like having the digital map on their phone with their GPS signal showing where they were, where the work was, and the discreet work tasks. They love it. Going into this, I thought that group of users would be the most resistant. So that was a surprise, but a good one.

The planning software also worked really well, and it was pretty easy to drop points and lines and specify detailed work directives. The intelligence you get knowing where you did work or where you had planned work provides benefits as different issues pop up. We are able to move work between crews and contractors very rapidly if we need to, and we're able to leverage that technology for storm and trouble events. Thinking back to the time when we had three different sets of paper maps that we struggled to sync up, now it's closer to real time. Everybody has the same information, and that's been a major benefit.

The other big benefit, that we probably didn't fully appreciate previously, is the ability to build and share a restriction layer. It's a specific commitment we made to a customer or a concern that we know will be there and needs to be handled every time we visit a property. It may be a no-spray zone, a refusal, or an environmental or



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regulatory requirement that we must abide by. Now everybody's got that: the crew foreman, the general foreman, the arborist. Everybody has that information, and that has been really valuable in terms of managing customer relations. We are not repeatedly stepping into the same problems we learned from, or attempted to learn from, and tried to communicate because we didn't have good tools in the past to bring that information forward. So, that's been a big benefit, too.

KELLY. Is there anything you would change at this point in terms of the software, the hardware, or the communication frequency? Is there a wish list at Georgia Power for this technology moving forward?

BURER. On the transmission side, we're still working with our IT security team to find a way to get contractors easier access to our system inside of our firewall. That's something that continues to be a barrier for us—unlocking the benefits of a fully connected workforce—that we're trying to solve.

With our distribution system, we'd like to see more two-way communication and for the data sharing to be more real time. Right now, the crews can update existing information in the system but can't add items or work tasks created in the field. That's one item on the wish list. There is also a one-day delay in getting some of

the data out to our crews. Eliminating this would open up a lot in terms of storm, reactive work, and immediate communications with the part of our work that is emergent and would benefit from real time communication.

KELLY. You've been testing LiDAR for your distribution vegetation management (DVM) program. Can you share anything about that experience?

BURER. Yes, we've been testing LiDAR on distribution for a few years. We've done multiple surveys over about 5,000 miles of line, and we're using that data to drive a condition-based program. The LiDAR work really began in parallel with the development of our software system. And the beauty is that the LiDAR results can be immediately ported into our work management system. I don't think it would have been possible to act on that LiDAR information without a software system for work management and crews. It just would have been too much to try to translate by pen and paper or spreadsheet. It's been powerful to take the condition-based survey from LiDAR and then turn it into action through our software system.

KELLY. Before we wrap up, I have a couple of questions about the community engagement work that's going on within Georgia Power's UVM program. Can you

tell us about the work you're doing with Zoo Atlanta and also about the wood chip donation program?

BURER. Sure. Working with external stakeholders, like nonprofits or other community organizations, is a great way to make a positive impact locally. We've been working with Zoo Atlanta for a couple of years. They came to us with an idea to provide a wider variety of food for their browser species at the zoo, like the giraffes. We coordinate with the zoo to send their specialists out ahead of our line clearing crews to identify vegetation species that would enhance the animal diet for browsers. Our crews leave those target species behind, and those trimming end up on the table, so to speak, of the animals at the zoo.

The wood chip program is much newer, but it seems to be filling a

need. It started with a group of community farms in the Metro Atlanta area that use a large volume of wood chips for mulching perennial beds to enhance soil conditions. These farms support educational programs at several schools in the area, as well as a women's transitional center. These farms are also providing food to over a hundred families in need. Since launching the wood chip program with the farms, this has expanded to parks and other organizations that struggle to find affordable mulch for erosion control and ground maintenance. It's a win-win for us because we've got an abundance of chips, and it doesn't cost us anything to drop these where they're needed in the community.

KELLY. That's really fantastic. Has your crew software been useful in these community engagement programs?

BURER. We recently added these two community programs to our software system. We were running the zoo project for a couple of years using text messages and e-mails. Once we added this layer into our software, the coordination with the team at Zoo Atlanta has been much easier. Two-way communication between the zoo and our crews has been a big improvement over the old way we were working. With the chip sites, the organizations can request chips at predefined sites that show up in our crew app. A green icon means the site is looking for wood chips, and our crews can compare these locations with their current locations on the map. They can click on the map to get contact information and detailed instructions for each site. Frankly, we've been surprised by how much demand is out there for wood chips and are happy to be able to support the community this way.



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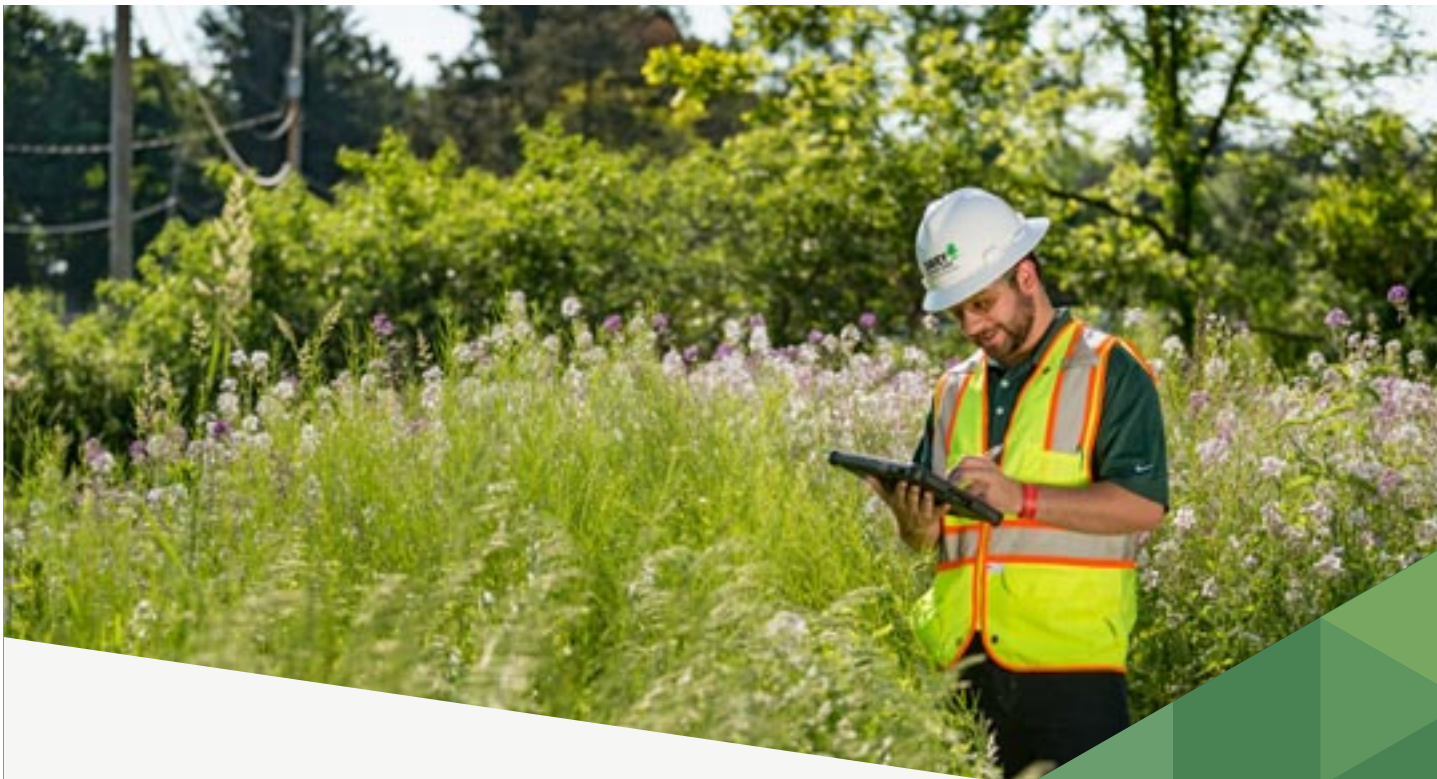
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Mixed-Reality Visualization of Work Volumes for Advanced Vegetation Management Along Power Lines

By Tiyasa Ray, PhD Candidate, School of Sustainable Engineering and the Built Environment, Arizona State University; David Grau, PhD, PE, Associate Professor, School of Sustainable Engineering and the Built Environment, Arizona State University; Lori Jones, Manager, Vegetation Management, Salt River Project; Colleen Spakowski, Business Analyst, Vegetation Management, Salt River Project; Todd E. Rakstad, Manager, Land/Survey Division, Salt River Project

What is the problem?

This project aims at enhancing the prevention of vegetation contact with and surrounding electrical conductors through Salt River Project’s (SRP) 7,620 miles of overhead power transmission and distribution infrastructure within and around the Phoenix metropolitan area and north into the U.S. Forest Service Tonto and Apache-Sitgreaves National Forests. Currently, vegetation around distribution

and subtransmission lines is managed every other year, and vegetation around high-voltage transmission lines is managed annually. At SRP, integrated vegetation management (IVM) includes assessment, pruning, removal, and/or chemical treatment of vegetation.

While the mixed-reality approach in this study can be leveraged to support these vegetation management (VM) functions, it specifically aims at enhancing field pruning operations. During cycle operations, utility foresters need to manually infer or estimate a clearance buffer around the power lines to account for vertical sag, horizontal wind sway, and vegetation growth. Vegetation is pruned around this manually-estimated clearance buffer.

Worker assessments can be challenging without the appropriate tools. Inaccuracies in estimating clearances can lead to power line contacts and failure to maintain adequate clearance between the overhead lines and vegetation during the clearance cycle. For example, actual vegetation growth rates are difficult to predict even for the same tree species due to differences in ground moisture, orientation, or sun exposure. As a result, vegetation contacts may still occur resulting in power outages, fires, and negative impacts to customer service and, eventually, to the health and safety of the public.

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What are we doing about it?

In response, SRP is currently exploring the incorporation of advanced sensing technologies and computing methods in support of VM, and notably for the automated identification of vegetation pruning heights and densities through mixed-reality visualization techniques. The ultimate goal is to empower field workers with the real-time visualization of the required work. This article focuses on the two initial steps of the project: field data collection with advanced sensing devices and extraction of work volume information with novel computing methods.

How is field data collected?

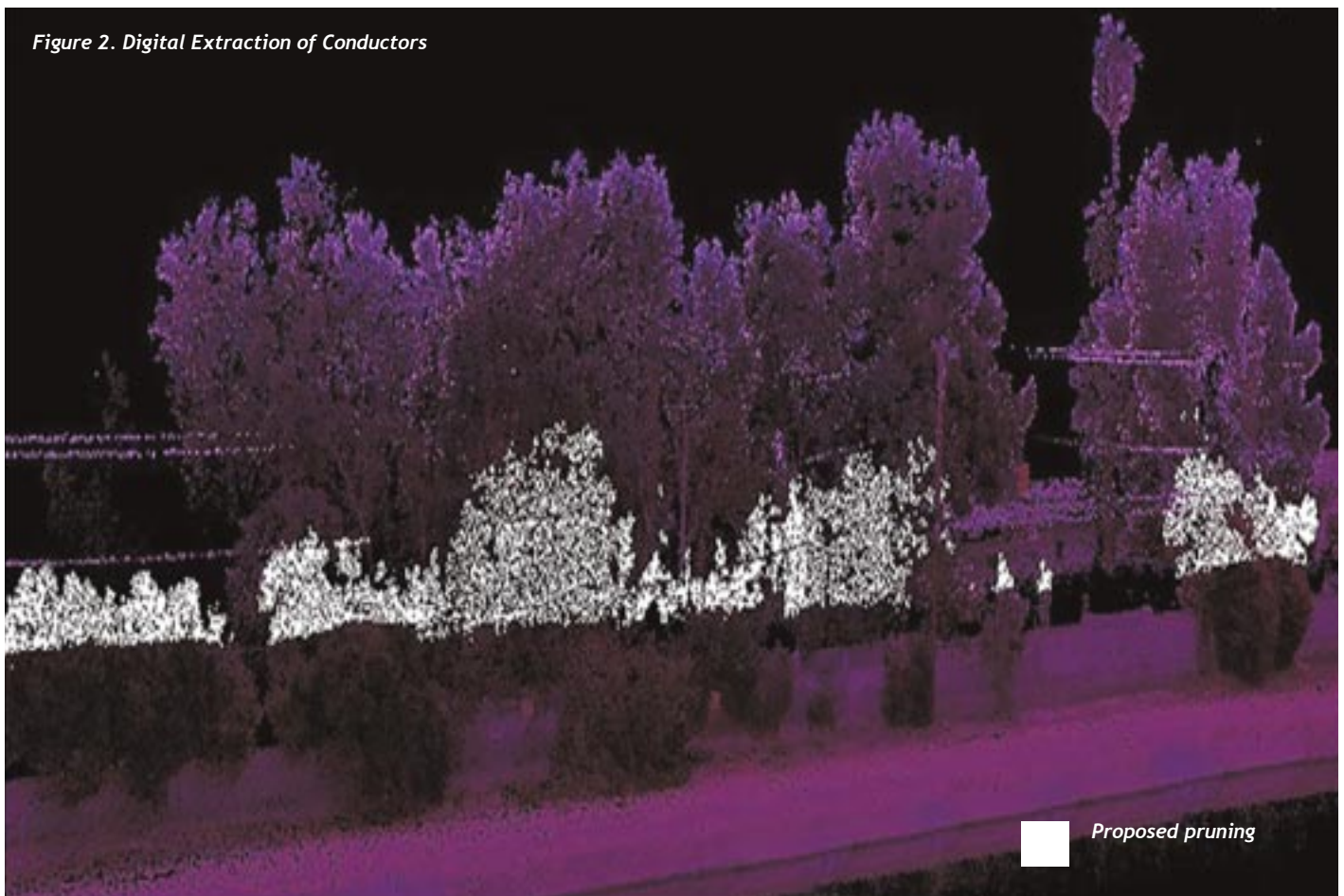
Initially, truck-mounted Laser Imaging Detection and Ranging (LiDAR) and photogrammetric sensing units were employed to collect high-density point cloud data of the geometry of one of SRP’s power corridors and its surrounding vegetation. The LiDAR device emitted laser pulses that bounced back against the surrounding surfaces and were captured by the laser sensor. The resulting cloud of points (or point cloud) replicates the geometry of the surfaces of power infrastructure and vegetation by means of individual points containing X, Y, Z coordinates with surveying



Figure 1. Point Cloud Power Infrastructure Scene

accuracy (Figure 1). The scene displayed illustrates neighboring points in the cloud arranged such that their unique geometric properties could be leveraged with computing methods to automatically extract clearance distances observed in support of UVM.

Figure 2. Digital Extraction of Conductors



How is work volume information generated and visualized?

Morphology reasoning and geometric inference mechanisms were investigated to classify power conductors and clearly estimate and visualize work volumes automatically. In this approach, the points belonging to overhead conductors in the point cloud were identified (Figure 2). In order to infer the occluded sections (e.g., behind vegetation) of a power conductor, the catenary function was leveraged. Parameters of the catenary function were adjusted to best fit the visible portion of the power conductor so that the hidden segments of the conductor could be inferred. A vegetation clearance buffer was mathematically modeled around the electrical conductor using a generalization of the rotational-symmetry-axis approach. The automatically generated vegetation clearance buffer follows SRP’s minimum vegetation clearance distance rule. For example, for 230 kV conductors the vegetation clearance distance has a radius of 9 ft. around the conductor, while for 500 kV the radius is 12 ft. The geometric intersection of the curved cylindrical hull along the conductor with the nearby trees enables the unequivocal estimation of the vegetation pruning volume and clearance through its mixed-reality visualization (Figure 3).

What are the impacts?

This applied research project represents an initial step to enable field workers with non-trivial decision making regarding when, where, why, and how vegetation maintenance should occur along power transmission and distribution corridors. The results proposed could reduce the cost of VM efforts by up to 20 percent, thus enabling additional positive economic impact through the effective and uninterrupted operation of power services (Figure 4).



Figure 3. Mixed-Reality Visualization of Pruning Work

Notably, this applied technology project has the potential to positively impact the health and safety of customers and society by preventing power disruption, blackouts, and fires from overhead powerlines through appropriate identification of vegetation requiring pruning, removal, and/or chemical treatment.

Acknowledgments

The authors want to acknowledge and thank the Joint Research Program between Salt River Project (SRP) & the Ira A. Fulton Schools of Engineering at Arizona State University for funding and facilitating this project.

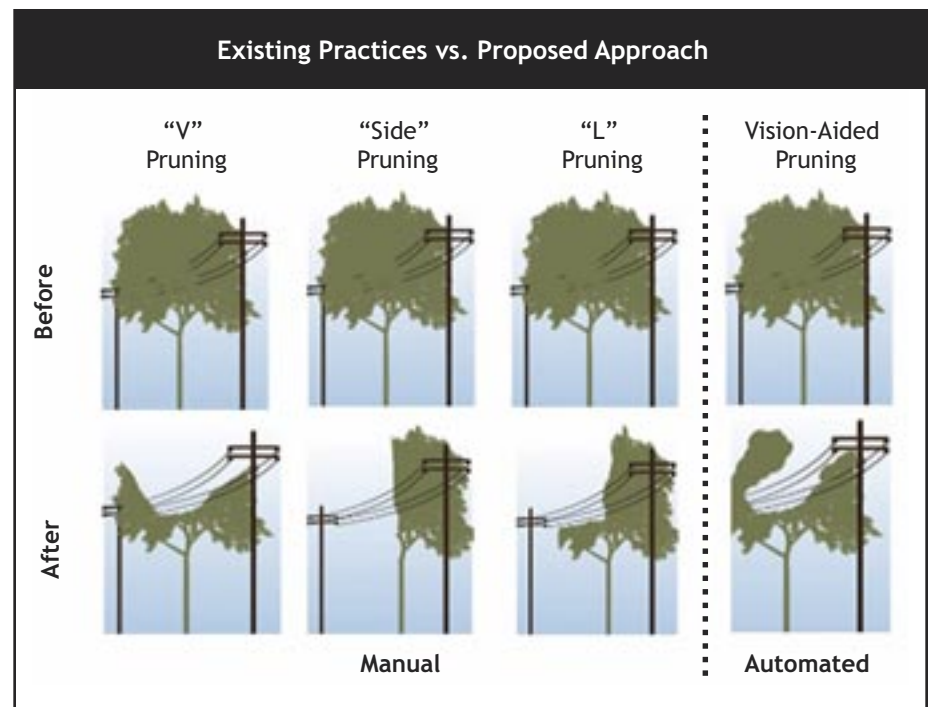
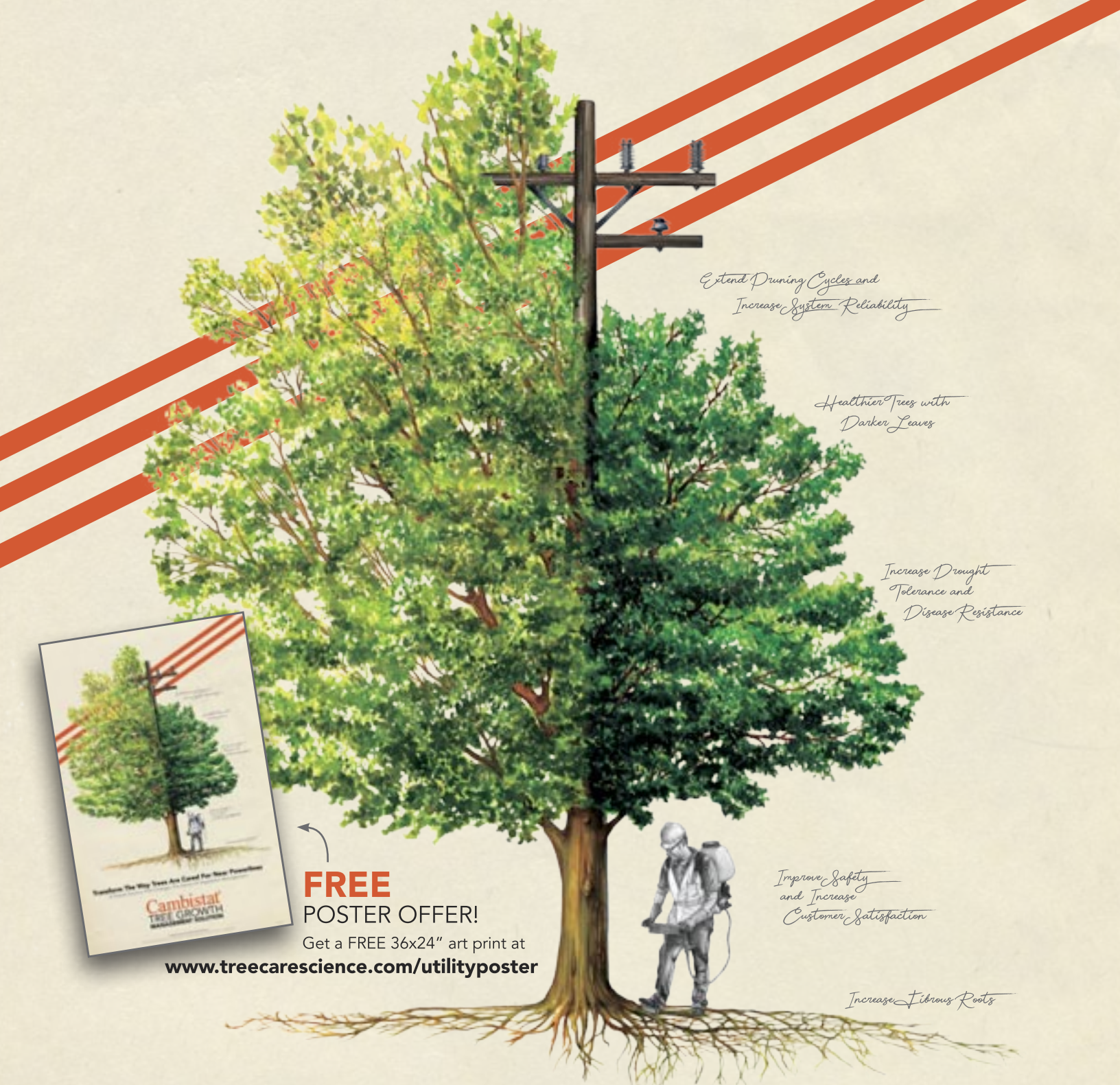


Figure 4. Existing Practices versus Mixed Reality Pruning (Source: SRP)



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The Athletics of Climbing at Davey Tree Surgery Co.

The Davey Tree Surgery Co. partnership with WorkCare helps put focus on employee health while tree climbing.

Tree climbing is a difficult job. It requires strength, coordination, focus, and dexterity to safely climb a tree and perform work in it. So, it is no surprise that climbers are industrial athletes who are at risk of injury, much like your favorite professional athletes.

While serious or fatal accidents can happen when tree climbing, data shows that most of the Occupational Safety and Health Administration (OSHA) recordables are soft tissue injuries—twisted ankles, minorly injured fingers, and other strains and sprains. The Davey Tree Surgery Co. decided to take a proactive approach to reduce injuries in this category.

Safety is a core value at Davey, and the Surgery Co. wanted to address the challenge seriously and with an innovative approach. To help, Davey reached out to WorkCare™ to create an Industrial Athlete Program.



Lindsay Klawiter-Donnelly, industrial injury prevention specialist at WorkCare, began working with Davey crews in February 2020. She instructs Davey professionals on a wide range of activities that boost safe work performance, such as nutritional advice, sleep hygiene, injury prevention and intervention, as well as ergonomic corrections. Klawiter-Donnelly



- ▲ *The Industrial Athlete Program helps tree climbers stay safe, healthy, and alert on the job.*
- ◀ *Biometric suits gather data to identify muscle groups prone to injury while tree climbing.*

developed a new Stretch and Flex Program, which she implemented throughout the Bay Area and Central Coast. She provides on-site preventative interventions, such as stretching, sports massage, and rehabilitation exercises. In addition to hands-on care, she visits crews on-site to demonstrate ergonomic corrections and provides advice based on observation.

“If a crew member gets injured on-site, I am able to complete an immediate assessment, perform an appropriate intervention, and send them at-home rehabilitation exercises. Early intervention helps avoid unnecessary visits to the doctor and missing work, as well as helping improve their rate of healing,” Klawiter-Donnelly said.

Biometric suits are also being introduced to this injury prevention program to gather quantifiable data on which muscle groups are being used while doing a job. This information will help the Davey Tree Surgery Co. team identify common problem areas and create a plan to improve worker safety and efficiency.

The feedback from crews has been positive, and Davey professionals appreciated having an expert resource on-site who cares about their health.



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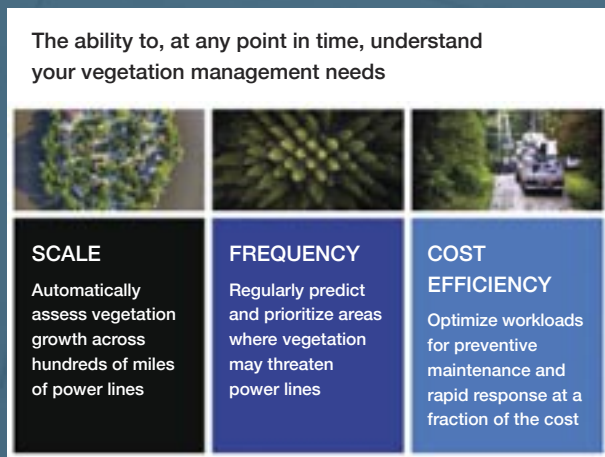


Figure 1

Reduce vegetation infringement with power lines at scale by using insights from geospatial data and analytics to more frequently assess the state of the vegetation and its proximity to your assets.

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AI Improves Resilience of Vegetation Management

New technologies can provide vegetation insight across a utility’s vast service territory, improving the performance of vegetation management programs.

By Bryan Sacks, IBM

Customers depend on affordable, uninterrupted electrical service. Shareholders demand better financial performance. Government agencies insist upon strict adherence to regulations. How do we balance these requirements in a world that has about 6 million circuit kilometers (Ckm) of high-voltage transmission lines and 60 million Ckm of distribution¹ lines, often in close proximity to more than 300,000 vegetation species²? How do we conduct inspections, monitor real-time hazards, and proactively prioritize scarce vegetation management (VM) resources when lines are located in disparate environments like polar tundra, arid deserts, tropical forests, and temperate urban centers? It is a challenge that transmission and distribution companies face every day. And with escalating climate change, mitigating the risks associated with vegetation has become increasingly paramount.

Utilities make decisions about where to focus their VM efforts based on the best information available to them. Unfortunately, due to the size of utility service territory, variations in vegetation species, and dynamic weather patterns, a cost-effective mechanism to obtain real world vegetation conditions has been elusive. In the absence of

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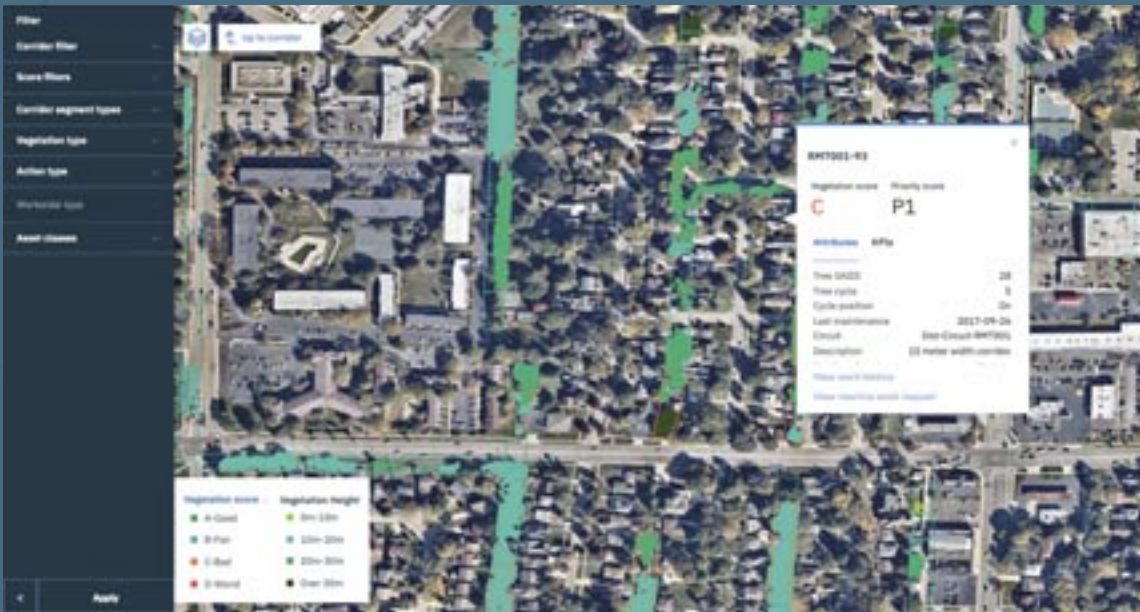


Figure 2

Using machine learning and AI techniques, the system is trained to differentiate tree cover down to the street/area level, overlay the utilities primary lines to look at the proximity of trees to the utility assets, and analyze other attributes like tree height and tree species.

this knowledge, utilities have developed approaches that rely on experience and rules of thumb, such as average growth rates, leading to techniques such as fixed-cycle management.

In the past few years, utilities have been experimenting with new technologies that hold the promise of providing rapid and accurate vegetation insight. These include image capture and light detection and ranging (LiDAR) scans collected through drones and manned aircraft. But even new technologies present their limitations. Aerial studies are prohibitively expensive and time consuming to conduct over a broad territory, leading to targeted scans on specific areas of known risk. In addition, extracting value from all this data requires supplemented analytics. While this may seem simple, the process of collecting, cleaning, and analyzing massive data sets in many different formats is tremendously complex.

Focus Scarce Resources on Areas with Most Impact

Understanding the attributes of vegetation with accuracy can drive informed decisions. However, to

have a material impact across the entire vegetation workflow, several factors need to be considered: scale, frequency, and cost efficiency. Utility vegetation managers must make decisions that impact huge territories. For this, their decision processes must incorporate multiple categories of information that have a high spatial and temporal granularity.

Utilities are continuously under pressure to achieve better outcomes at a lower cost. VM budgets are almost always insufficient to address needs across the entire service territory. To maximize the value of their VM program, utilities need to focus on areas that present the most opportunity to mitigate risk. Without knowledge of risk across the service territory, utilities are forced to rely on measures such as fixed cycles. What if we could push a circuit scheduled for cycle treatment back a year with minimal impact to risk? What if we could use that saved resource to treat an area sooner if it presents an escalated risk level? The only way to achieve this level of optimization is to have vegetation insights at scale—across the entire service territory—and the means to aggregate and handle these insights.

Vegetation grows. Seeds and spores are transported by nature-altering species composition in a given area. Weather, soil conditions, human influences, pruning, herbicide applications, and insect infestations can impact the vegetation state, growth rate, and health. It is not uncommon for gaps between manual inspections to be long enough for a sapling to grow into a formidable tree and cause an outage, or for a previously barren shoreline to become an inhabited wetland. The value of insight gathered at a single point in time diminishes quickly, limiting the ability to make informed decisions in an ongoing VM program. Obtaining insight on a frequent basis is necessary to facilitate reliable long-term decision making opens up additional use cases, including post-pruning, herbicide audits, and smart, data-driven contracting.

Scale and frequency are only relevant if they can be executed cost efficiently. LiDAR may provide tremendous accuracy; however, the associated costs restrict its broad use across the service territory. If a LiDAR scan is performed at scale, it is often done infrequently, perhaps every 3-10 years, limiting its value after the initial use and the use



Figure 3

The decision platform provides full visibility on the vegetation situation to enable users to explore, examine, and quickly take action.

cases it can serve. A feasible remote-sensing solution must combine scale, frequency, and cost efficiency to benefit an effective VM program.

Integrate and Analyze Data to Produce Insights

IBM® has developed a VM solution that enables utilities to digitally transform their VM program. Leveraging high-resolution satellite and aerial imagery, artificial intelligence (AI), and geospatial analysis, IBM can rapidly and accurately identify and assess vegetation with frequency—across a company’s entire distribution and transmission territory—in a cost-effective way that wasn’t even imaginable a few years ago.

IBM has been working with transmission and distribution utilities across the globe, subject to vastly different climates and vegetation species, to prove the capability of this approach. Its projects have been rooted in building trust of the derived insight through deep engagement with forestry departments, including field validations with arborists and planners to compare the digital results to those found in the real world.

To get started, a utility need only provide corridor or conductor

locations with corridor specifications, which typically come from a utility’s geographic information system (GIS). The IBM VM solution ingests this information and layers it with other sources of data, including high-resolution aerial and satellite multi-spectral imagery (as granular as 0.6m resolution or less). Leveraging IBM PAIRS, IBM’s flagship geospatial-temporal analytic platform, each corridor is analyzed across the *entire* service territory. This approach provides the flexibility to incorporate additional layers of geospatial data, including LiDAR data, if available.

For each corridor, the location and state of vegetation is determined, including distance to conductor, average tree height, and maximum tree height. Advanced attributes, including tree species, can now be derived with sufficient ground truth data. IBM is currently working with clients on tree health models and growth rate estimations, providing further insight into their environment.

From Vegetation Insights to Actionable Work

For insights to deliver on the promise of business value, they need to be turned into actionable work (Figure 2

on page 43). If a utility cannot make a better decision based on the derived insight, nothing has truly been accomplished. Scrolling through thousands of Ckm of conductor looking for areas at risk is simply not feasible. Tooling is required to inject this intelligence into the VM workflows.

The IBM VM solution embeds methods that have been successfully used in the field of asset performance management: aggregating and leveraging multiple disparate data sets and calculating meaningful scores and indicators. These help vegetation managers more easily identify critical corridors, understand actions to be undertaken, and rank them according to their urgency, criticality, or related risk. The proposed toolset thus may help vegetation managers in their move from purely time-based practices to hybrid-condition and risk-based VM practices (Figure 3).

Once the state of vegetation is understood, it is possible to determine a vegetation score that indicates the relative risk for a given portion of a circuit. That risk, however, does not represent the relative overall risk to operations. A circuit with significant infringement that has few service delivery points may represent less risk than a circuit with modest


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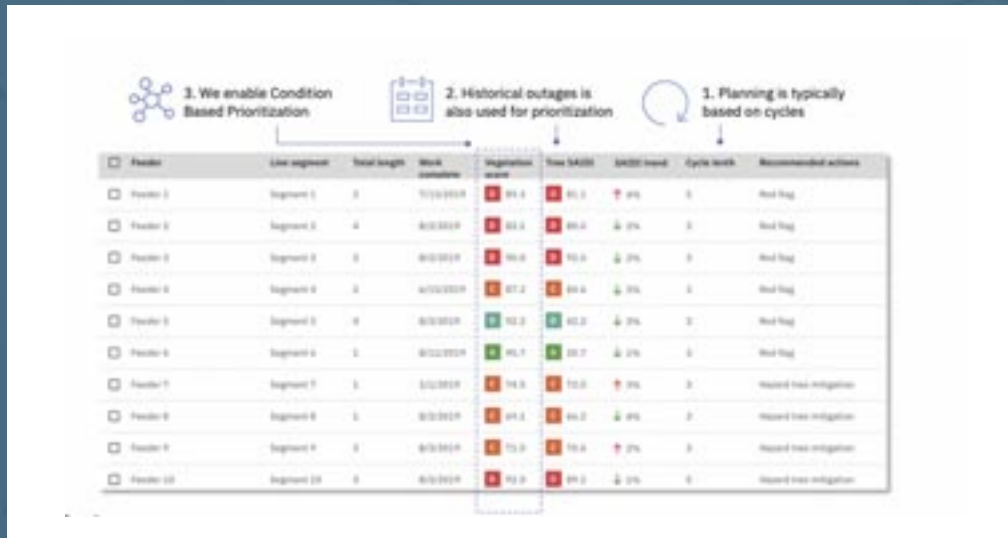


Figure 4

Enable condition-based vegetation management (VM).

infringement but thousands of service delivery points that include critical locations, such as hospitals. Incorporating additional information, such as the connectivity model, outage history, customers, and trimming history allows the solution to determine an overall risk that can be used to make actionable decisions.

Ensure that corridors and assets remain free of encroachment by pinpointing sectors for strategic maintenance, rather than deploying tree-trimming crews based on calendar schedules. Manage a smarter, competitive bidding and contracting process appropriately assigning man-hours and budget. Improve the auditing process by performing audit work remotely to validate that the vegetation actions have been effectively completed. Assign more expensive resources to concerning areas that may require more detailed, manual audits.

The IBM VM solution provides a geographical overview of the entire service territory, allowing users to drill down into smaller zones and pre-defined corridors and corridor segments. It narrows the focus into areas that require immediate handling or attention. Key performance indicators (KPIs), as well as recommended actions with priority scores, help identify risks so companies can make informed decisions that reduce the risk of line interference and improve operational performance.

Alternative list views allow sorting by priorities, enabling users to make decisions on where to focus their scarce resources (Figure 4). They can group areas to be handled more efficiently and can easily define and assign vegetation work activities at a more granular and specific level.

The solution is remarkably scalable and surprisingly affordable. It can be customized to each organization's specific requirements. IBM believes this solution signifies a

new era for transmission and distribution companies that are under such tremendous pressure to cost effectively improve performance and reliability while also respecting our delicate environment.

Consider the benefits to be achieved through the implementation of geospatial-temporal analytics and AI.

The adoption of these technologies will enable you to manage vegetation more cost-effectively through a scalable, flexible support system—a system that generates greater results by empowering your team with knowledge.

Bryan Sacks is the global head of work and asset organization solutions for IBM.

Endnotes

- 1 Source: Power Technology, Global transmission line market to exceed \$78bn by 2025, October 22, 2018 <https://www.power-technology.com/comment/global-transmission-line-market-exceed-78bn-2025/>
- 2 Source: Shreya Dasgupta, How many plant species are there in the world? Scientists now have an answer, Mongobay, May 12, 2016 <https://news.mongobay.com/2016/05/many-plants-world-scientists-may-now-answer/>



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