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Volume 14
Number 2

UTILITY ARBORIST NEWSLINE

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Turn to **page 36** to learn more about ecological productivity and biological controls in a ROW manager's toolbox.

Turn to **page 42** to learn more about the in-depth decision on environmentally safe and durable building materials.

This is a list of common industry terms and acronyms frequently used in this magazine.

Artificial Intelligence (AI)
Best Management Practices (BMPs)
Diversity, Equity, and Inclusion (DEI)
Environmental Protection Agency (EPA)
Environmental, Social, and Governance (ESG)
Federal Energy Regulatory Commission (FERC)
Integrated Vegetation Management (IVM)
Light Detection and Ranging (LiDAR)
North American Electric Reliability Corporation (NERC)
Return-on-Investment (ROI)
Rights-of-Way (ROW)
Subject Matter Expert (SME)
Unmanned Aerial Vehicle (UAV)
Utility Vegetation Management (UVM)
Vegetation Management (VM)

President's Message

Tim Walsh

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As I wrote this message for this edition of the *Utility Arborist Newsline*, I was looking out of my office window at the, once again, rapidly changing landscape. The landscape impacting my view was changing more than usual for two reasons: (1) In the last 30 days, we had had almost four weather seasons, and (2) we had just moved into a new wing of our main campus.

That last month, we had seen the temperature shift 70 degrees Fahrenheit (21° C), dropping 48 degrees Fahrenheit (8.9° C) in less than 12 hours on one day, near the end of the year. Other regions saw more significant shifts in that time. It reminded me of the theme of this edition—environmental stewardship. At that same time, I had watched as we did some final grading, seeding, and planting of trees along the edge of the new construction.

I watched as the crews, in torrential rain, first marked and cleared the smaller brush and undesirable trees, in the area where the new trees would be planted. When crews came back to plant several days later, the ground had frozen—or to be more accurate (I can still hear Dr. Alex Shigo challenging us to be clear in our definitions), the water in the soil had frozen. The shifting environmental conditions made the process more difficult and time-consuming.

When the crews weren't out, I had watched white-tailed deer (*Odocoileus virginianus*) grazing their way along the edge of the cornfield that abuts the property; I saw more than a dozen cardinals (*Cardinalis cardinalis*) flitting amongst the new plantings; and even our resident red-tailed hawk (*Buteo jamaicensis*) soared above, looking for the next meal.

> "The important message here is that education and communication must support our environmental stewardship efforts."

While I realized that this small view from my office window didn't even begin to scratch the surface of what we do to address all the components of environmental stewardship, it does reflect that the results of our collective efforts are often viewed in the same way. That is to say, our work along hundreds or thousands of miles of ROW is frequently viewed and judged based on what one person perceives from their vantage point.

The important message here is that education and communication must support our environmental stewardship efforts. When the new wing was being constructed, I was aware of when the crews would be working outside of my office, what they would be doing, why they were doing it, and the overall costs, as well as many of the benefits. Most of the landowners, neighbors, recreational users, and all others impacted by UVM don't have all of that information. Even though we are doing good work, doing it well, and for the right reasons (a modified quote from Todd Conklin), without properly communicating this to those impacted, we may be missing the mark.

Shifting gears as I wrap up my message for this edition, let's think about the future. It is time to nominate the future leaders of the UAA. There will be a link to the nomination process, available starting in early May. Every year, we seek nominations for two new directors and a vice president. There is more information available on the UAA website (*www.gotouaa.org*), but I want to encourage you all to nominate someone who you feel will help to continue to shape the course of the organization.

Tim Walsh

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Executive Director Message

Dennis Fallon

sustainability pollination
plant communities
nature limited resources
environmental stewardship
biodiversity
ecosystem relationships
responsible operations

This edition of the UAN is focused on environmental stewardship. Recently, many of the conversations about environmental stewardship that I have been a part of include the topic of biodiversity and our responsibility to ensure our operations are at a minimum, not reducing biodiversity. When thinking about biodiversity in a UVM program, my mind immediately pulls to the plant communities found in the areas where we work, then drifts to all the communities these plant communities are dependent on to be sustained themselves. Without pollination, angiosperms (flowering plants) cannot create seed. Without dispersal, seeds are limited in their performance, and so on. There is an interdependence in nature that everything, including us, relies on for success and sustainability.

Sustaining communities requires understanding the members of the community, their contributions, as well as their needs from the community—and their influences on the community. The UAA Board of Directors met face-to-face on September 19, 2022, to revisit the organization's strategic objectives and update them, in respect to what is currently known. The outcome of that meeting clarified objective statements for all the committees, refined the language for the organization's vision, mission, and core values statement, and outlined four organizational priorities for 2023: stability, growth, external awareness, and DEI.

From an organizational success perspective, it will be necessary to know the organization's place in the natural resource management community, our contributions to the community, and our needs from the greater community to address the board priorities for 2023. To get there, we need to be there. If we had unlimited resources and time, that would mean we have representation and participation everywhere, a potential influencer on our community (or participant in our community), and we would have a strong relationship with them. The reality of every ecosystem is that resources and time are not unlimited. Because of limiting factors, we create competition for resources and strategies for efficient acquisition, as well as allocation of resources. This is where your participation and opinion is important.

The UAA Board of Directors manages the strategic direction, policies, and budget of the association. The board is made up of diverse opinion leaders, passionate about improving the UVM industry. Annually, two new director candidates and a vice-president candidate are sought to represent their peers and guide the strategic vision of the organization. Nominations for these roles will be opening soon and it is important to the sustainability of our organization, as well as our organization's contribution to the environmental stewardship of the ecosystems in which we operate, for folks to seek out quality candidates for these open roles.

We need your help identifying and recruiting folks that can help guide the organization's efforts in stability, growth, external awareness, and DEI. Please take some time to think about your needs from the organization and how growth of the organization supports your career growth. How does having a UVM influence persistently present on the natural resources management landscape impact your program's influence within the ecosystems you frequent? Nominate someone who you feel can positively impact the industry through intentional participation via the UAA Board of Directors. Environmental stewardship includes managing our professional environment in a way that enhances our ability to steward the natural environment.

Dennis Fallon

Nelsen Money

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SCHOLARSHIP APPLICATIONS

February 15 to April 15, 2023

The Nelsen Money Scholarships support college students looking to pursue careers in utility line clearance, UVM, arboriculture, forestry, urban forestry, or related fields to help boost our ever-changing industry!

For more information, visit *www.gotouaa.org/project/scholarship-program*

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EVENT COMMITTEE UPDATE

Lucas Beane

2022 has been a big year for the Events Committee with a changing of the guard, new members, new events, and big plans for 2023 and beyond.

By Lucas Beane, Events Committee Chair and Chief Operating Officer, Lucas Tree Experts

Changing of the Guard

First, I'd like to thank Michael Sultan for his years of service as the Events Committee Chair and guidance as he transitioned out of the chair responsibilities. He continues to be a strong contributor to the committee and helps guide us in the right direction with his experience. Thank you, Michael, for all you have—and continue—to contribute to our committee and to the UAA!

Next, I'd like to introduce myself. My name is Lucas Beane. I live in Hooksett, New Hampshire, and currently serve as the Chief Operating Officer at Lucas Tree Experts. I have been a member of the UAA more than a decade and have been a member of the Events Committee for approximately two years. Most recently I transitioned from the co-chair responsibilities to Chair of the Events Committee, where Michael Sultan, Kevin Puls, and Diona Neeser have been keeping me on rails, for the most part.

Additionally, with vacating the co-chair responsibilities, a new opportunity arose for Orville McLean to take on this new role. McLean is the Director of Operations at Arbormetrics and has been highly engaged with supporting the Events Committee and the UAA.

New Members

We have a lot of new members, new energy, and new momentum as we march through 2023. I'd like to thank all of our current members and welcome Eric George, Michelle Legins, Jordan Olerud, Duane Dickinson, Kieran Hunt, and Katie Madden as some of our newest members to the Events Committee in 2022. Thank you all for joining!

2022 Recap

This past year, the UAA was able to host and partner with many events throughout the country. It has been exciting to reconnect and network with UAA Members in person again after we adjusted to a world with COVID.

Some of the highlights of 2022:

- Trees & Utilities
- ROW 13 Symposium
- Texas Regional
- Southern Chapter ISA
- New England Regional
- Ohio Regional
- Washington Safety Summit
- New York Regional
- Western Regional
- Indiana Safety Summit

2023 Planning

Planning for events in 2023 is well underway. We are currently planning regional events for Ohio, New York, Western, and Texas as well as looking at some new regions of the country to host a regional event where we may not have reached UAA Members recently. We are currently exploring locations in the Mid-Atlantic and the Upper Midwest, but if you have any requests or recommendations, we would love to hear your input!

Once our 2023 schedule is established, we plan to set out to start planning our 2024 events calendar, with the overall goal of planning 18 months in advance to allow us to develop strong events with full programs and sponsorship.

Get Involved

One other update for the Events Committee to share this year is we are looking for volunteers to help us organize our regional events. Each of these events takes a lot of work and coordination, but when the tasks are split up on an energetic team, the results are impressive. For all regional events in 2023 and 2024, we are looking for volunteers to assist with finding speakers, sponsors, coordinating CEU's, and helping with outreach. We can coach you through the expectations, but it is important for us to find volunteers local to the regional event. If you would be willing to volunteer some of your time to assist us with one of our regional events, please reach out to us!

I wish everyone a safe and successful 2023 and look forward to seeing you at the next event!

Lucas

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BOARD NOMINATIONS 2023

We will be seeking qualified nominees for positions on the UAA Board.

The Board of Directors is responsible for the sustainable operation of the UAA, including the strategic direction, policies, and budget of the Association. The Board includes annual progressive roles of Vice President, President-Elect, President, and ending as Past President. In addition to these four board roles, there is a Treasurer and six Directors. The Treasurer and Directors are elected to serve for three years. The immediate Past President participates on the Board during his/her fourth year.

We will be soliciting nominees for board positions to be filled effective September 1, 2023. Elected positions sought for 2023 include Vice President and two Directors.

To nominate a candidate for the UAA Board of Directors, scan the QR code or visit *tinyurl.com/UAABoardNominations2023* by May 31st, 2023. Prior to filling out the form, the nominee must be made aware by the nominator and be prepared to fulfill the position commitments.

Board nominees who will be considered must meet the following criteria:

1. Be a current UAA Member in good standing
2. An individual who displays commitment to the UAA mission and goal, who thinks strategically and communicates effectively
3. Committed to serving the designated term in various capacities, ranging from committee champion, attendance at meetings, financial insights, as well as attend the UAA Annual Meeting, Trees & Utilities conference, and the UAA Utility System Managers Summit

The UAA Nominating Committee will review all nominations submitted and discuss the job responsibilities and commitments with the potential candidate, prior to developing a final slate of nominations for voting by UAA Members.

Nominees will be accepted from May 2 to May 31, 2023. The final slate of nominations for voting by our UAA Members will be from July 14 to August 1, 2023. Official election results will be announced during the UAA Annual Meeting, August 31 (or a different date, if deemed necessary).

COMING SOON!

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BOARD ELECTIONS

The UAA Executive Board will be opening nominations for new board members soon.

UAA Members are encouraged to update their online profiles with current information (email, address, etc.) in the member portal *(gotouaa.org/member-portal)* and prepare to submit nominations for the following UAA Executive Board open positions:

Vice President

Directors (2 positions)

For more information, contact Diona Neeser at *dneeser@gotouaa.org.*

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Safety Tools

Preparation in Our Embrace of the Natural Reality of Fire

By Dawnne Hirt, System Arborist, Liberty California and Nikki Hill, Compatible Species Specialist, Grow With Trees Company

The Lake Tahoe Basin in the High Sierra Nevada is a fire-adapted landscape. The ecology of the forests has been shaped by periodic wildfire events that have created a mosaic of mixed intensity burn scars and stages of vegetative regrowth. This, in turn, leads to a diversity of habitats that helps to foster overall ecosystem health.[1] Fire ecology research is helping to rekindle a cultural understanding of the benefits fire may have on a landscape, as well as the inevitability of large wildfire events after more than a century of suppression-focused goals.[2] Wildfires help support biodiversity in forests, but in order to safely embrace them, utility companies will need to develop and implement adaptive management strategies.

While there are several wildfire risk metrics, fuels are often thought of as the key to understanding and predicting fire behavior. But many of the large forest fires of today are understood to be driven more by climate than fuels.[3] Wind-driven spread in an increasingly dry landscape is often the catalyst for high severity fires. Many utilities have implemented vegetation management and fuel reduction programs to help mitigate fire risks to the communities they serve. These programs also help support utilities' environmental stewardship goals.

Wildland fuels are defined as living and dead vegetation that may ignite and carry fire. Electric utilities generate downed woody debris during VM activities, while compatible live vegetation is typically left in place. Wildfire risk is often described in terms of fuel depth and continuity of these two types of fuels. However, downed woody debris and vegetative cover are necessary components of wildlife habitat, as they are essential for nutrient recycling and help influence site microclimate by providing shade and moisture retention. Shrubs and large trees also act as windbreaks, which may help to slow wildfire movement. Localized potential fire behavior may be moderated by retaining key benefits of the vegetation profile when adjusting fuel continuity.

Liberty is an electric utility that provides electric services to approximately 49,000 customers in seven counties within and outside of the Lake Tahoe Basin. Liberty consists of distribution, sub-transmission and transmission lines. These lines traverse a densely forested landscape along narrow easements granted by a variety of landowners. Identifying high-risk zones is necessary because fire is a natural reality here. An effective approach to reduce wildfire risk is to adopt Firewise protocols in collaboration with landowners, along the Wildland-Urban Interface (WUI) zones where ROW exist. A "tale of two towns"[4] illustrates how Firewise protocols helped save the town of Secesh Meadows, Idaho. Where reliability of service is the objective, the sensitivity of electric grid reliability is prioritized from generation (most sensitive) to end user (least sensitive). For Liberty, this means prioritizing substations, as well as main distribution lines that run along the WUI.

Fire progression (from surface to crown) and behavior depend on the fuel profile or pattern in the landscape. Understanding these aspects can be used to adjust VM[5] to inform how residual fuels should be arranged at a site.

For Liberty, collaborating with Forest Service and Conservation landowners is essential for creating shaded fuel breaks. Also known as defensible fuel profile zones (DFPZs), the intention is to provide key fuel breaks for fire control efforts while retaining beneficial canopy cover. These zones are purposefully created in high-risk areas, such as the WUI and along remote ROWs that offer easy access near forest roads for suppression efforts. Retaining adequate canopy cover by retaining larger, healthy, fire-resilient trees and mature shrub clumps, help to prevent these zones from drying out during extreme fire weather.

Liberty is committed to developing an IVM program to help protect, enhance, and sustain low-growing compatible plants within their ROWs. A stable community of low-growing compatible plants may serve as an early successional habitat. To augment the fragmenting effect that narrow, linear corridors can have in the landscape, Liberty is considering widening some ROW sections. Potential benefits from selective ROW widening include enhancement of early successional habitat zones, discouragement of tree recruitment, and creation of crown fire fuel breaks. Regional species that may benefit from a mix of shrubland and old growth forests include the American Marten (*Martes americana*), Northern Goshawk (*Accipiter gentilis*), and California Spotted Owl (*Strix occidentalis*).

The California Tahoe Conservancy (CTC) are landholders who work with Liberty and other local land agencies. Their forestry program guidelines highlight habitat considerations for a variety of common high-risk priority situations. These protocols provide methods to mitigate the effects of fuel treatments on sensitive wildlife.[6] Examples include leaving pockets of snags and downed wood throughout the site and limiting periods of activity to avoid sensitive seasonal timing, such as nesting. Landowner goals, objectives, and participation are considered when performing UVM. Aligning objectives for habitat and fuels mitigation can provide the structure of site-based prescriptions.

Vegetation management activities within the robust Sierra forests often result in an abundance of surface fuels post-treatment. A common dilemma is whether to dispose of this material or to let it decay, and what is sensible logistically. Presently, Liberty employs a few disposal end-uses, including firewood for locals, wood chips for compost, and hauling debris

to the landfill. Biomass facilities[7] are commonly offered as a solution, but hauling debris long distances and burning it contributes to atmospheric carbon while removing the benefits of carbon absorption that occurs when debris is left to decay. Forest functionality also depends on recycling woody debris. Considering larger ecosystem cycles when seeking to strike a fuels balance will ultimately offer the landscape level resilience needed in a changing climate.

Liberty is committed to developing an IVM program that not only proactively reduces risks associated with wildfire, but also promotes low-growing compatible vegetation for habitat value. By considering objectives that complement both needs at the site level and at the landscape level, we can prepare to embrace the natural reality of fire.

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The Importance of Identifying Special-Status Species and Subsequent Steps for Their Protection

By Mike Rochford, Assistant Project Manager, Transcon Environmental

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As environmental consultants, we have the privilege of working closely with a diverse group of stakeholders to protect sensitive species and support the sustainable management of utility corridors.

Our clients include both large and small utilities with the responsibility to ensure trees and other vegetation along utility corridors are cleared or pruned to prevent potential outages and/or wildfires and ensure customers have a reliable source of electricity. Environmental consultants help their clients minimize and avoid impacts to sensitive species. This results in a symbiotic private sector conservation partnership that upholds our value of environmental stewardship while supporting VM activities.

An outside observer may perceive the removal of trees and brush as an activity that is always high risk to sensitive biological resources. However, the risk created by utility arborists is minimal when performed responsibly. When pruning and removing trees and brush along electric distribution and transmission lines or other utility corridors, there is a higher potential to impact endangered, threatened, or otherwise imperiled plants and animals if those activities occur without an environmental review of the project area. This review may be as simple as a desktop evaluation or as intensive as a protocol-level field survey following guidelines from a government agency. In addition to minimizing risk to individual biological resources, environmental reviews and resulting protective measures often generate a greater good—reducing wildfire risk that jeopardizes ecosystems on a much broader scale, including the same plants and animals our clients might encounter during work.

The avoidance of special-status species, including taxa protected by the federal Endangered Species Act (ESA), the Migratory Bird Treaty Act, and those covered by various state listings, creates great cost savings. In addition to avoiding high penalties and mitigation costs (each incidence of violation of the ESA can be as high as $50,000, and $370 million is spent on mitigation annually for net loss of habitat for ESA species), a professional environmental assessment can result in long-term, efficient approaches.

For example, following the wildfires in 2018, Transcon worked with one client to develop and implement environmental constraints layers that their crews and contractors could reference in the field while aggressively working to meet end of year work targets along primary and secondary distribution lines in Tier 2 and 3 high fire-threat district areas. The project enabled their many work crews to be deployed throughout the service territory, and the environmental constraints datasets were updated continuously. They included pole, span, trigger, best management, and auto-release to construction color coding. In addition to enabling crews to work accurately and efficiently in the moment, it also helped management plan effectively for the near future.

Including environmental consultants in the design phase of a project can lead to extensive project cost savings. Early strategic planning is the key to protecting species and minimizing impacts to utilities. Long before crews head into the field, environmental consultants conduct a careful review of species distribution data, compiled by agencies, private organizations, and citizen scientists, to identify areas of concern. When reviewed during the design phase of a project, consultants can make recommendations to entirely avoid sensitive habitat for listed species. This potentially saves large sums in mitigation costs and eliminates much of the associated risk of future operations and maintenance work, including VM, along those facilities.

Raptor nest. Photo courtesy of Matt Fischer.

Rapture nest. Photo courtesy of Matt. Fischer.

While planning for avoidance and minimization during the design phase is optimal, environmental consultants are often included at a stage when infrastructure already exists and vegetation must be managed in a discrete, predefined area. In these cases, reviewing species distribution data and knowing which protected species are likely to inhabit the area is still the first step in properly planning for the avoidance and minimization of impacts to sensitive species. It is important to rule out many species' likelihood of occurring on a project site through analysis of multiple features, including seasonal activity period and microhabitat. The easiest and most cost-effective method of preventing costly penalties for ESA violations is simply to stay away from those species.

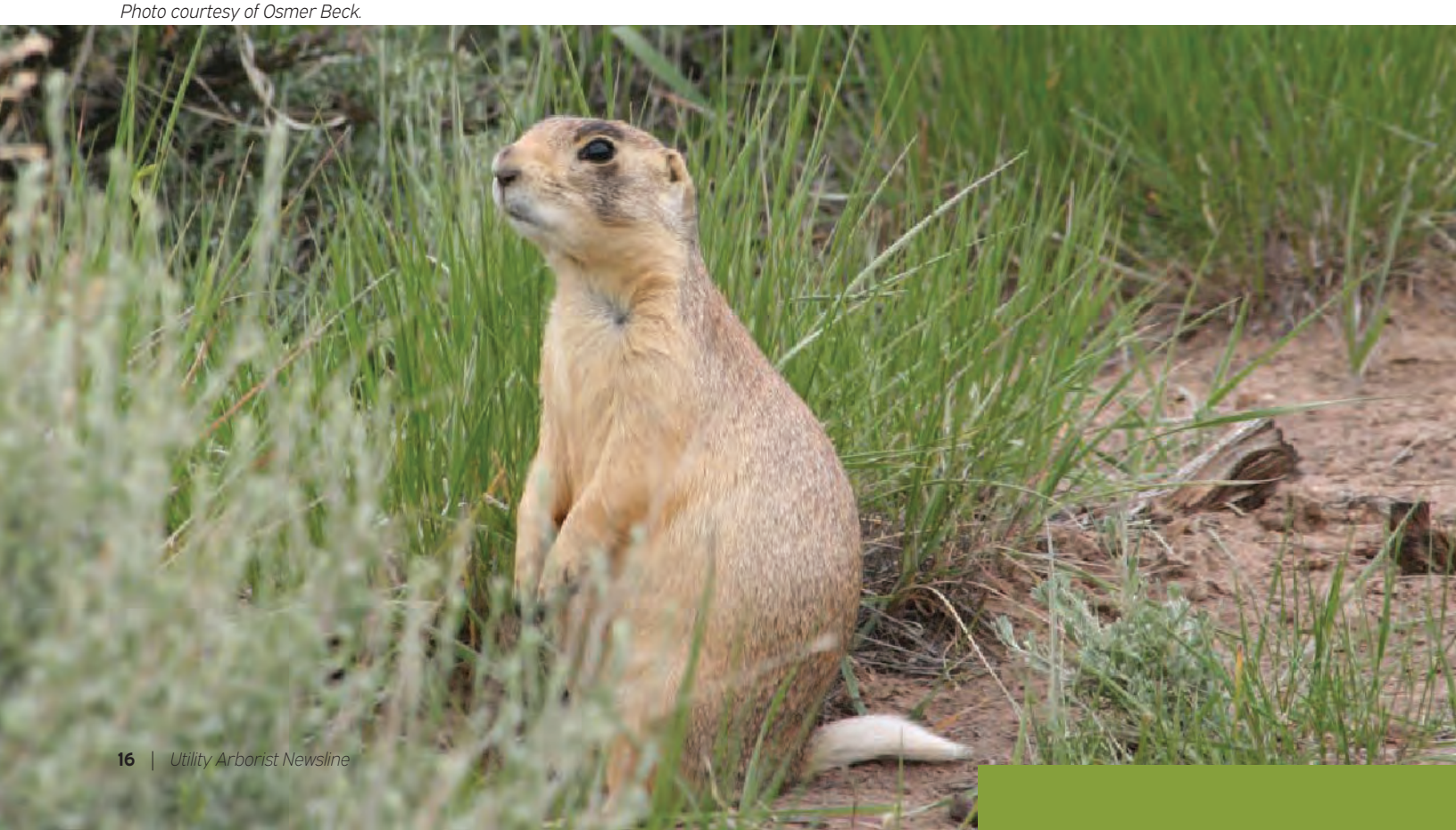
Some circumstances may require work in the ideal place and time to encounter threatened or endangered species. It may be that a fire devastated the area and the need for rebuilding infrastructure is urgent, or that the listed species in the area are habitat generalists with a broad range and are active year-round, making them difficult to avoid. In cases like these, pre-activity surveys may be prescribed so consulting biologists search for special-status species in advance of work.

In these circumstances, consultants tailor protection measures for the sensitive biological resources so that if encountered, impacts are avoided or minimized. For example, once detected, plants can be easily flagged for avoidance by crews and protective buffer zones around bird nests can be established. Some species (e.g., frogs) can be relocated by a qualified biologist to a nearby area with suitable habitat that is not slated for VM activities. Collaboration with agency biologists is critical in determining the best approach to both protect the species and ensure the project can be completed. For example, in Utah, we worked with the state and federal agencies to relocate Utah prairie dogs off the ROW to more suitable habitat, as part of an established prairie dog relocation program. This type of collaboration benefits both the prairie dog and the utility.

Many species are cryptic and might not be found until VM is underway. Under some circumstances, a biological monitor may need to remain present during work to actively search for organisms that may be uncovered as trees are pruned or removed or species that might stray into the work area after work commences. If the animal can't be relocated, the biological monitor may need to stop work in the immediate area until the animal leaves the work site under its own volition, while still allowing tree crews to work in other areas that won't cause harm.

As environmental consultants, we work with utilities to ensure biological resources are protected and lines are maintained so that electricity will continue flowing to customers. With our expertise and passion for biological resources, we are poised to deliver the perfect formula for success in protecting special-status species and their habitats while guiding our clients as they manage vegetation surrounding critical infrastructure through the open spaces we all love to explore.

Photo courtesy of Osmer Beck.



IVM An Amazing Story Going Back Over 70 Years

By Tom Sullivan, Utility Consultant, National Grid and Dr. Phil Charlton, Principal Advisor, Iapetus Infrastructure Services

The UAA hosted another great Environmental Concerns in Rights-of-Way Management Symposium. It was the 13th in a series dating back to 1976. Every symposium is a reminder that professional utility vegetation management is rooted in science. Research has informed improved practices for more than seven decades and led to the establishment of integrated vegetation management as an industry best practice.

The Utility Arborist Newsline shows practitioners are doing great work in the field and are passionate about their work and environmental stewardship. However, ten years of doing ROWSC audits and other consulting shows practitioners talk IVM, but many cannot articulate a definition or the core elements of IVM. Too many practitioners are unaware of the body of research that forms the basis for their career. Either they don't read the journals where research is generally published or it has been simply lost with time.

What Is IVM?

- It is a process, a framework, a system. Its foundation is IPM (integrated pest management). It has a long history in agriculture. IVM provides a means of decision-making, problem-solving, planning, achieving economic efficiency, accounting, etc.
- It is a strategy based on the idea of managing an outcome instead of simply controlling a problem.
- It is a philosophy of "less is more."
- It is **not** mowing over and over.

More formally, the American National Standards Institute (ANSI A300, Part 7) and companion *Integrated Vegetation Management Best Practices* by Randall Miller, published by ISA, define IVM and provide a framework for implementation. All utility vegetation managers should be familiar with these publications.

Why IVM?

The reason for IVM is to **create, promote, and conserve sustainable plant communities that are compatible** with the intended use of the site and discourage incompatible plants that may pose concerns, including safety, security, access, fire hazard, utility service reliability, emergency restoration, visibility, line-of-sight requirements, regulatory compliance, and environmental or other specific concerns.

A true professional utility vegetation manager understands IVM and acknowledges it is not about what you remove or kill, it's about what you leave behind and promote.

The Historic Record

The body of work supporting IVM practitioners is an amazing story that goes back more than 70 years. Integrated vegetation management's relationship to environmental stewardship is overwhelming, and the economic research is just as compelling. The authors have prepared an annotated bibliography to serve as a resource for IVM practitioners. More than 150 articles were reviewed and about 100 are included in the bibliography. This work was presented by Tom Sullivan at ROW 13 and will be available as a resource to UAA Members via their website.

Vegetation management has been practiced by ROW managers (primarily electric transmission ROW) since the early twentieth century. Mechanical means of VM gradually gave way to herbicide-based programs, beginning in the early 1950s. Research on the impacts of herbicide use on ROW began in earnest in the 1950s and continues to the present. Impacts on flora, fauna, and human health grew out of concerns related to all herbicides and pesticides in the early days of the modern environmental movement. Rachel Carson's *Silent Spring* helped give rise to this movement. **Rachel Carson** and **Dr. Frank Egler**

TREE ILLUSTRATIONS: ©ADOBESTOCK/ANNA FRAJTOVA

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were among the first to introduce the concept that selective use of herbicides and establishment of a compatible natural plant community can resist invasion by trees. This biological control of incompatible vegetation has been demonstrated through decades of practice and research.

A QUICK SURVEY
Early Publications

Dr. Egler's 1953 publication "Vegetation Management for Roadside and Rights-of-Way" is one of the earliest using and defining the term "vegetation management." In his paper, he discussed the impacts to wildlife and aesthetics and described the concepts of "relay floristics" and "initial floristic composition." He stated, "Basal herbicide application results in a shrubland composed of shrubs, forbs, and grass. Such vegetation resists tree seedling invasion."

In 1958, **William Neiring et al.** wrote, "The application of sound management would not only benefit the utility with reduced costs on a long-range basis but also results in high conservation values to the nation."

In 1962 **Rachel Carson** wrote her book *Silent Spring*. She wrote, "The object of brush control along roads and rights-of-way is not to sweep the land clear of everything but grass; it is, rather, to eliminate plants ultimately tall enough to present an obstruction to drivers' vision or interference with wires on rights-of-way. This means, in general, trees."

In 1975, Egler published *The Plight of the Right-of-Way Domain, Victim of Vandalism*. He wrote, "Right-of-way vegetation management is the practical art of managing the vegetation on rights-of-way and roadsides at the lowest long-term cost, with the highest conservation, resource, social, and scenic values within the engineering needs. Ecologically, it aims for the quickest development of the most stable permissible shrub vegetation using any methods whatever that do not contaminate the total environment or have undue hidden deferred or social cost."

Environmental Impacts

In the 90s, **Drs. Norris** and **Charlton** (1991) published "Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality on New York State Powerline Rights-of-Way." The paper assessed the effectiveness of buffer zones to prevent deposition of herbicides into water bodies (lakes, ponds, rivers, streams). This paper became the technical basis for buffer regulations in New York.

Related to water quality and wetlands, **Dr. Norton Nickerson** (1992) published "Impacts of Vegetation Management Techniques on Wetlands in Utility Rights-of-Way in Massachusetts." The conclusion: no significant impact to wetland value or function. Mechanical treatments resulted in higher impacts to cover value for wildlife than those involving herbicides. Residue from petroleum products (bar oil and hydraulic fluid) were recovered on the leaf litter from mechanically treated sites. No herbicides residues were recovered from herbicide-treated sites. A follow-up study by **Dr. Nickerson et al.** (1994) was conducted to quantify soil deposition of herbicides immediately following application and their environmental fate in the soil up to 12 months after application. Results showed low-foliar applications resulted in the lowest deposition of herbicide to the soil compared to cut stump or basal applications.

Of course, the 70s and 80s saw the **Bramble and Byrnes** research take front and center in the industry, and it remained there for decades. Their work at Pennsylvania Gamelands 33 began to look at the impact of management on a variety of wildlife species including deer, reptiles, amphibians, songbirds, butterflies and more. Integrated vegetation management consistently promoted diverse and productive habitats. **Duncan et al.** (2012) studied vernal pools and found ROW creation and maintenance should not be considered incompatible with vernal pool habitat preservation.

In a continuation of the Gamelands 33 research, **Mahan, Ross, Stout, and Roberts** (2019) explored the benefits of IVM, writing "Results suggest selective, low-volume herbicide applications may promote high pollinator abundance and species richness." **Haggie, Allen, and Johnstone** published the Pollinator Site Value Index (2019) in the proceedings from the 12th International Symposium on Environmental Concerns in Rights-of-Way Management.

What About Costs?

Utility executives and shareholders are increasingly aware of each company's responsibility for stewarding our environmental resources. Even so, they will always want to know about the costs. So, what about the cost of IVM?

Finch and Shupe (1997): "IVM methodology has provided reduced regulatory conflicts, greater public acceptance, enhanced wildlife habitat, improved aesthetics, reduced worker and public exposure to herbicides, and significant cost savings."

EPRI (2000): "EPRI data from many utilities shows that program costs for mechanical treatments are 2–5 times more costly than for programs using an integrated approach."

Johnstone and Haggie (2004): "The authors report monitored plant community changes and cost of treatment from three cycles of IVM work on Delmarva Power ROWs. Cost of second and third cycle treatments were reduced by approximately 50% in comparison to costs of repeated mowing."

Goodfellow, Mahan, and Charlton (2018): "The report concluded the present value of cost over a 20-year evaluation period are approximately half as much as controlling incompatible plant species without the use of herbicides. Report references three other studies showing 20- to 30-year cost savings from use of herbicides in the range of 45% to 48%. The cost advantage of the IVM-based strategy was shown to provide additional significant benefits—less site disturbance, water quality, reduced incompatible tree density and height, wildlife habitat, bird species diversity and abundance, amphibian and reptile diversity and abundance, and butterfly species diversity and abundance. These benefits come at no extra cost. Lastly, the IVM strategy demonstrated lower risk (lower maximum height) between treatments."

Looking Forward

Ours is a profession grounded in science. Integrated vegetation management is the industry standard that has emerged from 70 years of research. Take time to learn about the rich history that has gotten us here.

What about the future? **Dr. Logan Norris** published a paper in the proceedings of the 6th ROW Symposium that answered that question. He asserted that "Many environmental concerns about rights-of-way siting, construction, and management can be addressed most effectively with scientific data from field- and laboratory-based research and monitoring programs. Both the public and entities managing ROW will best be served by increased research and monitoring."

To view the complete annotated bibliography, visit the "Research & Publications" section under the "Public Resources" page at *www.gotouaa.org*.

ABOUT THE AUTHORS

Thomas E. Sullivan

Tom Sullivan has more than 40 years of electric utility experience as an employee and consultant to National Grid and its predecessor companies and as a project management consultant to other Northeast U.S. utilities. For most of his career, he managed the Transmission Forestry Department at National Grid. Sullivan holds a Master of Science degree in biology from Boston University and a Bachelor of Science degree from the College of Environmental Science and Forestry at Syracuse. He is a Certified Arborist and Massachusetts Licensed Forester. Sullivan is active in professional organizations and has served as a director of the UAA, from which he received the Utility Arborist Award in 2004. He is currently President of the Princeton Land Trust and Tree Warden for his hometown.

Philip M. Charlton

Phil Charlton has more than 40 years of experience in the UVM industry. He holds degrees (B.S.F., M.S.F. and Ph.D.) in forestry and forest science from West Virginia University. Charlton spent nearly 30 years at a leading consulting company, including serving as its president until 2006. During that time, he helped assess the VM program of over 150 utilities worldwide and developed the industry's first widely used work management system. Charlton served as Executive Director of the UAA for 10 years. He provides expert witness and consulting services through Charlton & Associates, LLC, and serves as Principal Advisor to Iapetus Infrastructure Services. Charlton is also a lead auditor for the Right-of-Way Stewardship Council.

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Photo courtesy of Matt Hebert & Tara Laughlin.

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AT ACRT PACIFIC: MATT HEBERT AND TARA LAUGHLIN

At ACRT Pacific, we're built around our people. Our team is one big family—including ACRT Pacific Pre-Inspection Managers Matt Hebert and Tara Laughlin.

The duo met during a new-hire orientation class in July 2019, and the rest is history. In October 2022, he proposed to Laughlin on top of a fire-watch lookout tower in the Sierra Buttes in Sierra City, California. "Since then, we have enjoyed our lives together and look forward to what our future holds," shared Hebert. "What we love about our jobs is the ability to make our communities safer by identifying vegetation that could pose a risk to utility infrastructure in our division," said Laughlin. "Another awesome perk is being able to see things that the average person wouldn't (i.e., scenery and nature), that beautiful California has to offer."

The duo raves about their teammates and commented, "We are so lucky to have amazing, hardworking, and dedicated people that we work with every day."

Hebert and Laughlin describe their working relationship as being "fortunate to have each other." Laughlin noted, "When we have a particularly difficult task that needs solving, we can always bounce ideas off each other—on or off the clock. We also understand each other's jobs on a different level than most couples who don't work together. We understand each other's struggles, which makes us stronger together. As they always say, *two is better than one*."

Outside of ACRT Pacific, the two enjoy spending their time together at home with their wonderful animals and exploring the wilderness. Laughlin reflected, "We look forward to what the future holds for us at ACRT Pacific and vegetation management as a whole. We are proud to work for our wonderful community."

Browse our careers to become a member of the ACRT Pacific family at *careers.acrt.com*.

It doesn't matter whether a crew member has been on the job for a decade or a day – according to Brandon Sullivan, everyone's voice deserves to be heard and taken seriously. Brandon has been a General Foreperson at Lewis for over 5 years, empowering his crews to voice their opinions and trust their instincts.

Brandon is one of the many General Forepersons here at Lewis who lead our front line every day. We celebrate their contributions to innovation, safety, and operational excellence. Follow us on LinkedIn to hear more of their stories.

https://www.linkedin.com/company/lewis-tree-service-inc.

Environmental Stewardship and Traditional Ecological Knowledge

By M.K. Youngblood, Safety Manager, ACRT Pacific. All photos courtesy of M.K. Youngblood.

The National Oceanic and Atmospheric Administration (NOAA) defines environmental stewardship as the responsible use and protection of the natural environment through conservation and sustainable practices to enhance ecosystem resilience and human well-being (Chapin et al. 2010). The key word is **sustainable**. Most recently, this has included traditional ecological knowledge (TEK) from local tribes due to their longstanding history with the land, *their* land—current and ancestral. Within the Biden–Harris Administration, several Indigenous people have been appointed to key environmental posts, most notably:

- **Deb Haaland** (Laguna Pueblo tribe), United States Secretary of the Interior
- **Danna Jackson** (Kootenai descendant), Senior Counselor to the Director of the Bureau of Land Management
- **Heidi Todacheene** (Navajo), Senior Advisor in the Office of the Secretary
- **Charles F. "Chuck" Sams III** (Confederated Tribes of the Umatilla Indian Reservation), Director of the National Park Service
- **Arlando Teller** (Navajo), Deputy Assistant Secretary of Tribal Affairs in the Department of Transportation

The list goes on from there. This increased inclusion led to a surge of TEK being integrated into previous models of environmental stewardship.

Sacred indigenous sites, such as the Bears Ears National Monument located in Southeast Utah, are now being co-managed with several local tribes (Hopi, Zuni, Navajo, and Ute), as listed in the Presidential Proclamation 10285, designating the monument. There are currently four parks within the United States National Park System that have co-management authority with tribes including Canyon de Chelly National Monument, located within the boundaries of the Navajo Nation in Arizona; Glacier Bay National Park and Preserve in Southeast Alaska; Grand Portage National Monument, located within the boundaries of the Grand Portage Indian Reservation in northern Minnesota; and Big Cypress National Preserve in Florida.

This co-management allows for their TEK to be intertwined with the new land-use planning process. Why is co-management so important? The answer is simple. Tribes have been managing and sustaining their environment for thousands of years, utilizing a wide variety of techniques, such as using good fire, invasive species eradication, and harvesting of cultural plants (Stevens 2020).

In the Central Valley of California, the San Joaquin River Conservancy, led by its executive officer John Shelton, has collaborated with several native nonprofits to gain a better understanding of TEK and indigenous environmental stewardship to better serve the public in its newest project, Circle V (Vinnard) public access plan. This collaboration started with the planning phase for a new building, designed with Indigenous elements to enhance the environmental stewardship of the land. In addition, the collaboration continues past design elements into space usage and grounds development. This total community approach will serve this property well and allow for a better understanding of the Indigenous peoples who tended the land throughout the centuries into current day status. If more entities—public and private—had this mindset of environmental stewardship with TEK input, the land could reach its best version for all to use. The San Joaquin River Conservancy is at the forefront of this movement and its prosperity will show as a beacon of success for the rest of the country.

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M.K. Youngblood

ABOUT THE AUTHOR

M.K. Youngblood serves as the safety manager at ACRT Pacific. He has more than 30 years of public service and first responder experience, with core proficiency in American Indian law, American Indian culture, and disaster cleanup. Youngblood also serves as a certified instructor for the U.S. Department of Energy (National Nuclear Security Administration and Center for Radiological Nuclear Training), U.S. Emergency Management Institute, and Center for Domestic Preparedness. He was awarded a Bachelor of Science degree in Emergency Management and a master's degree in public administration, both from Concordia College.

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OUR DUTY TO PROTECT Cultural & Historic Sites

By Lawrence J. Kahn, Esq., Executive Director, Tulane University Law School Utility Vegetation Management Initiative

There's an old Native American saying: We don't inherit the earth from our ancestors, we borrow it from our grandchildren.

While many laws are focused on protecting property rights of existing landholders, the thrust of environmental protection laws and regulations is centered on protecting and preserving the environment for future generations. I believe, as utility arborists, the vast majority of us are in fact dedicated to a role as a caretaker and the concept of preserving the world around us, and looking for ways to wisely manage the relationship between the built environment and the natural environment is incorporated into our worldview.

Even if this concept does not come naturally to us, we recognize it is required, nonetheless. The job of a utility arborist requires that we stand on the front line to ensure that the work performed by utilities—to safely and reliably deliver power—is, in fact, in compliance with legal requirements that mandate the protection of the environment. In this respect, we're used to ensuring compliance with laws and regulations relating to the Migratory Bird Treaty Act (MBTA), for example.

Compliance with the MBTA is something we learn early in our utility arborist training. We generally receive good training on how to look for bird nests and determine whether they are active. With practice, we can become adept at finding and protecting birds, and, by extension, our utility clients from violation of the laws and regulations that protect birds. Once this happens, we feel confident that we can do this work quite well.

However, what may be somewhat less well-known are federal and state laws and regulations that protect historic and cultural sites. The National Historic Preservation Act of 1966, for example, declared that:

"The spirit and direction of the Nation are founded upon and reflected in its historic heritage"

and

"The preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans."

A variety of state laws and regulations likewise provide protections for historic and cultural sites. In this article, let's focus on a complex matter that requires careful consideration: Native American sites of cultural importance.

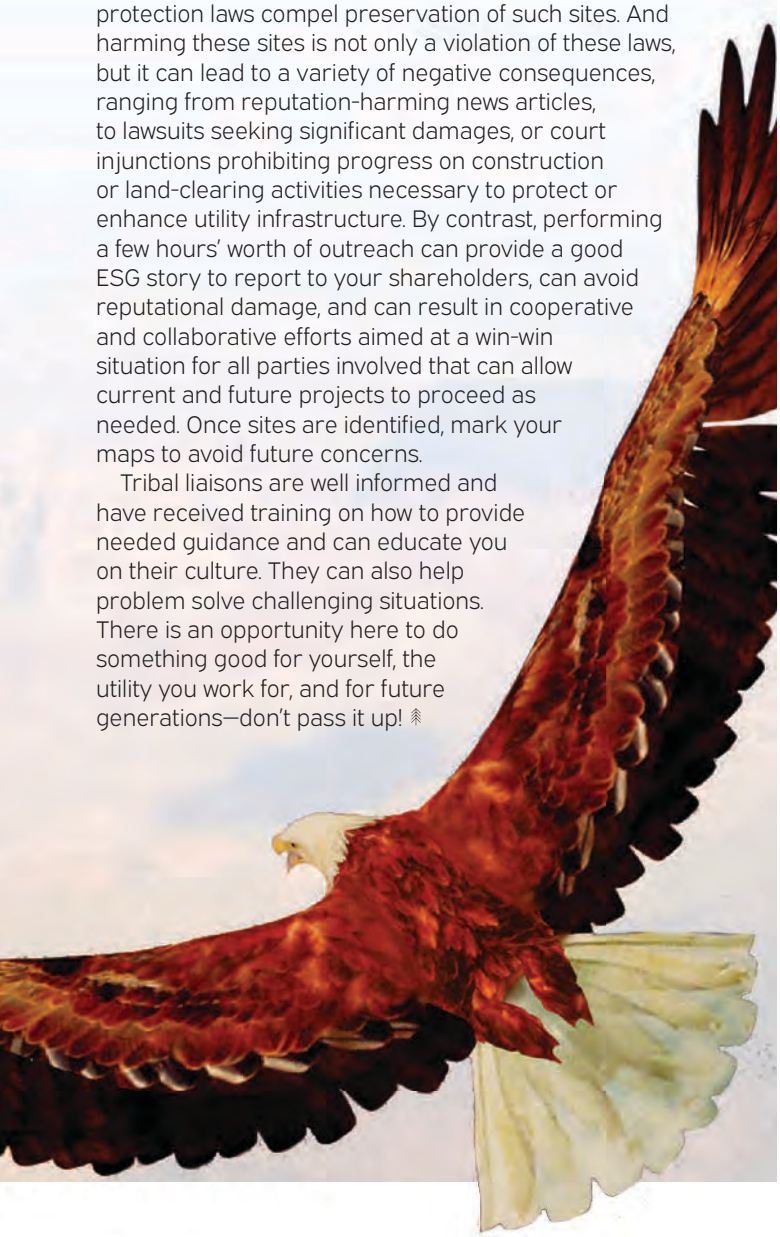
It is known that prior to European conquest of North America and the establishment of the nations that now govern this continent, Indigenous peoples occupied this land, which was divided among a number of different tribes. Over a relatively short period of time, their territory was purchased, conquered, or otherwise taken, and their historic territories were limited, reshaped, or moved (or removed) entirely. In many instances, as tribes were moved from one place to another, these original inhabitants left behind items of great importance. Some of these sites are clearly marked with signs installed through various federal or state programs. Most sites, though, are not marked with any such signs. Additionally, while some sites may show clear signs of human efforts at construction, other sites may show no such signs at all. A particular tree, for example, may be a sacred or an otherwise culturally significant or impactful site, but to someone without knowledge of this fact, it appears to be an ordinary tree. Whether marked or not, all such sites are entitled to protection, and it is the duty of utility arborists to take appropriate steps to respect the importance of such sites and ensure that they are not harmed.

Harm can come in a variety of forms related to utility arboriculture. It is clearly important to avoid dropping trees or limbs on such sites and causing physical damage to burial mounds or other physical structures, in much the same way that dropping trees or limbs on homes should be avoided. But when it is the tree itself that is the important cultural site, a decision to perform any cutting of that tree should not be made without first discussing the matter with the tribe that sees the tree as important to their culture.

Complicating matters somewhat is the fact that some tribes are now geographically far removed from their historic territory. Accordingly, it shouldn't be assumed that avoiding harm to historic and cultural sites of significance to Native Americans can be resolved with a quick phone call a few days ahead of when the work is scheduled. Instead, strong consideration should be given by both utilities and their green industry partners to forming relationships with the tribes that inhabited the territory in which work needs to be performed, so as to avoid or minimize negative impacts. If such relationships have not been formed yet, then there is no better time than now to get started.

There are numerous reasons to do so. Historic and cultural protection laws compel preservation of such sites. And harming these sites is not only a violation of these laws, but it can lead to a variety of negative consequences, ranging from reputation-harming news articles, to lawsuits seeking significant damages, or court injunctions prohibiting progress on construction or land-clearing activities necessary to protect or enhance utility infrastructure. By contrast, performing a few hours' worth of outreach can provide a good ESG story to report to your shareholders, can avoid reputational damage, and can result in cooperative and collaborative efforts aimed at a win-win situation for all parties involved that can allow current and future projects to proceed as needed. Once sites are identified, mark your maps to avoid future concerns.

Tribal liaisons are well informed and have received training on how to provide needed guidance and can educate you on their culture. They can also help problem solve challenging situations. There is an opportunity here to do something good for yourself, the utility you work for, and for future generations—don't pass it up!



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SPOTLIGHT ON THE ENVIRONMENT

The Vegetation Management Maturity Model

By Stan Vera-Art, Creative Catalyst, Grow With Trees and Phil Chen, Manager of R&D, CNUC

A few years ago, the environmental stewardship committee developed a vegetation management maturity model (VM3) of BMPs on electric transmission ROW. The maturity model is a self-guided assessment intended to help utility vegetation managers highlight program accomplishments and identify areas for improvement along a path towards UVM excellence. The VM3 is a tool designed to help utility vegetation managers benchmark the level of operational maturity achieved by their utility's VM departments. The VM3 is not a scoring exercise; instead, it is designed to help utility vegetation managers reflect on current programming and to identify next steps to enhance operational excellence. The goal of the VM3 is to drive industry-wide change in UVM programming towards more sustainable and environmentally conscious management practices.

The VM3 is divided into four levels:

- **Level 1: Compliance.** In level one, program evaluation deals with compliance requirements.
- **Level 2: Industry Standards.** In level two, program evaluation focuses on adherence to industry standard practices, such as BMPs described in the ANSI A300 Part 7 and the ISA Integrated Vegetation Management BMP, industry standard employee and contractor trainings, certifications, and landowner notifications.
- **Level 3: Beyond Compliance.** In level three, program evaluation moves beyond compliance requirements and standards. Examples of activities beyond compliance include collection and evaluation of biodiversity or habitat metrics, an organizational biodiversity commitment, and annually updated corporate sustainability reports.
- **Level 4: Corporate Sustainability.** In level four, program evaluation focuses on adaptive management and environmental stewardship. Examples of activities found in level four include incorporation of cross-sector BMPs,

The Vegetation Management Maturity Model (VM3) Overview

	Common Language	Record Keeping	Stakeholder Engagement	Sustainability Reporting
Compliance-Based VM →	**Compliance:** ☐ FERC/state/municipal regulatory compliance ☐ Vegetation Management Plans (TVMP, etc.) **Contract Structure:** ☐ Compliance-oriented RFPs **IVM BMP Standards:** ☐ ANSI A300 Section 7: Integrated Vegetation Management on Rights-of-Way ☐ IVM BMPs	**Metric Goals:** ☐ Reliability ☐ Herbicide use ☐ Acres managed ☐ VM costs/mile ☐ Safety goals ☐ Fire avoidance	**Internal:** ☐ Board of Directors supports compliance-based IVM ☐ VM employee's education and training **External:** ☐ Exchange knowledge of compliance-oriented BMPs across ROW industries (cost-effective technologies) ☐ Land owner notification	**Metric Trends:** ☐ Reliability ☐ Herbicide use ☐ Acres managed ☐ VM costs/mile ☐ Safety goals ☐ Fire avoidance
Habitat-Based VM →	**Beyond Compliance:** ☐ Strategic VM Plan ☐ Tactical VM Plan ☐ Natural Resource Management Plan ☐ Annual Plan review ☐ Research/Development Plan **Additional IVM BMP Guides:** ☐ External/cross-industry BMP guides **Contract Structure:** ☐ Habitat-oriented RFPs ☐ Quality Control/Quality Assurance in RFPs	**HABITAT METRICS** (quantify percentage of system managed) **T&E Species Management:** ☐ HCPs, ITPs, CCAAs, etc. **Biodiversity—avian:** ☐ Protection & Enhancements **Biodiversity—insect pollinators:** ☐ Protection & Enhancements **Biodiversity—plant composition:** ☐ Tracking of % Compatible/ incompatible cover ☐ Reduction in noxious weed cover ☐ Technology/Innovation	**Internal:** ☐ Align company's sustainability strategy with VM department's plans ☐ Board of Directors supports habitat-driven VM **External:** ☐ VM Crew education and training ☐ Exchange knowledge of habitat-oriented BMPs across ROW industries ☐ Partner with for-profit stakeholders (state/regional)	**T&E Species Management:** ☐ HCPs, ITPs, CCAAs, etc. **Corporate Sustainability Report:** ☐ ROW Biodiversity Commitment ☐ ROW Habitat Reporting **Accreditation/Third Party Review:** ☐ Wildlife Habitat Council ☐ National Wildlife Turkey Federation ☐ Other regional/state/federal ☐ ROW Stewardship Council **Corporate Sustainability Indices:** ☐ DJSI, GRI, EEI's, ESG, etc.

TREE ILLUSTRATIONS: ©ADOBESTOCK/KATE

inclusion of habitat-oriented requests for proposals (RFPs), a commitment and plan to reduce invasive/noxious weeds, partnerships with external stakeholders, participation in corporate sustainability indices, and accreditation from third-party reviewers like the ROW Stewardship Council.

The VM3 can be downloaded from the UAA's environmental stewardship tab website under the self-assessment tools option and comes with instructions on how to best use it, definitions, and an acronym list. The tool is designed to be a collaborative exercise.

Begin by familiarizing the group with the VM3's introduction and model components. Review the acronyms and definitions, and make sure the team is ready to begin. Assign a notetaker, preferably someone with good handwriting or typing skills. The notes taken during the exercise are a valuable resource for review and planning. Start at Level 1 and proceed through each section, evaluating each item. Select the response that most closely matches group consensus and document important discussions. This process is not a simple checklist, so take time to ask questions, discuss, and document the group consensus. (Note: for many utilities, there will be differences between the NERC regulated sections of the transmission system and the remainder of the system. That's okay. Document it.) Move through each category until you have completed level one. Have all requirements been satisfied? Have most? Did any interesting discussions result from level one?

Move on to level two and repeat the process. This process should continue until completion of level four. Many UVM programs will begin to find areas for enhancement in levels two or three. This is also okay. Continue to move through the four levels and discuss any areas of potential enhancement. Are these areas important to the evaluation team? To the board of directors? To company sustainability? Why or why not? Can important enhancements be incorporated into a roadmap of strategic and tactical elements?

An accurate self-assessment is best achieved by an inclusive team of UVM personnel. Completing the VM3 can take a few hours to complete, depending on level of UVM program maturity and openness of discussion. If the evaluation team is open to an honest discussion of current activities, then the VM3 should guide discussion of potential program enhancements.

As a group, try to answer the following questions and record consensus:

- What are areas of potential enhancement?
- Are there areas where the utility is currently excelling, but not documenting or reporting?
- Are there key performance metrics that could enhance target development and reporting?
- Are there third-party accreditation standards or sustainability indices that the utility is interested in researching further?
- What are the next steps that the evaluation team should take in order to mature to the next level?
- Is there a plan for the team to meet again?
- Should results of the VM3 be discussed with other departments to better align internal UVM or the board of directors to communicate the potential to enhance corporate sustainability reporting?

Ideally the UVM department reviews the VM3 annually. This can be an excellent activity to incorporate into your teams annual strategic planning activities. This activity creates a forum for discussion on what is going well with the program as it stands today and suggests some possible places to look for program enhancement. Likely you will find some surprising wins and open dialogue about some places where only your documentation is holding you back from taking credit for the great work happening on your ROW. It is encouraged to look to incorporate other departments in this activity. This is a simple way to break down potential silos between the VM department, environmental department, marketing department, and others.

Finally, the VM3, as it stands, is version 1. The UAA Environmental Stewardship Committee is interested in continuing to refine and improve this tool but can only do so with your input. After utilizing the tool with your team, please provide us feedback on how it went. What was helpful about the VM3? Where were your team left with questions? What is missing? Just like all VM programs have room to grow in program maturity, our maturity model does too—help us enhance into VM3 version 2.

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Detection Dogs in Wildlife Conservation:

Applications for Utilities

By Allison Locatell, Assistant Project Manager/Fatality Search Dog Handler; Christin M. McDonough, M.S., Certified Wildlife Biologist/Professional Wetland Scientist; and P. Chase Bernier Natural Resources Team Lead/Certified Wildlife Biologist, SWCA Environmental Consultants

INTRODUCTION

With an olfactory system that exceeds humans, domestic dogs (*Canis familiaris*) have long been deployed in a variety of fields (Kokocinska-Kusiak et al. 2021). Their macrosmatism affords them not only extraordinary olfactory smell, but also memory (Barrios et al. 2014; Pirrone and Albertini 2017). In wildlife management and conservation applications, detection dogs have been deployed for disease detection, poached game species, deceased wildlife remains, and locating cryptic or rare wildlife (Stevenson et al. 2010). Additionally, detection dogs have been found to be more efficient at identifying wildlife in the field than humans, by locating more wildlife in less time than human counterparts. Human-led field surveys for particular species can be tedious and costly, sometimes with poor results.

The surveys we implement require noninvasive, repeatable methods for locating wildlife fatalities and target wildlife species in their natural habitats. In this case study, we demonstrated how we have utilized detection dogs in two conservation applications: (1) detecting avian and bat remains from collisions with wind turbines in Texas and (2) surveying for rare turtles as part of preconstruction turtle surveys in New England. We show how we successfully utilized human-canine teams to increase our efficacy and efficiency in completing surveys for both of these applications compared to human-only surveyors.

Photo courtesy of Allison Locatell.

Background

Since 2017, SWCA Environmental Consultants (SWCA) has been implementing the use of canine searchers for post-construction fatality monitoring on windfarms. The canines are trained to find birds and bats killed due to collisions with the turbine blades to improve our surveys and decrease overall costs to our clients. From 2007 to 2012, SWCA also used canines for turtle surveys, where canines were trained to detect specific turtle species for various ROW projects.

Windfarm Fatality Monitoring

Bat and avian fatalities resultant from turbine collisions number in the hundreds of thousands per year (Aishwarya et al. 2016; Smallwood and Bell 2020). Regulatory agencies frequently require generation utility companies to monitor and report avian and bat fatalities at their facilities and mitigate for these losses. Added concerns and mitigation costs occur when threatened or endangered species fatalities are likely to occur, making accurate fatality estimates a crucial concern for wind generation companies and regulatory agencies. However, as part of the fatality monitoring, scientists are routinely challenged with finding bird and bat remains across large areas with dense vegetation, difficult terrain, and other unique challenges, such as crop rotation and harvest, domestic livestock disturbance, or scavenging predators—which create bias factors in fatality estimates, sometimes resulting in higher mitigation costs.

Generation utility companies and regulatory agencies are considering ways to reduce these fatality bias factors. One way is to increase the searcher efficiency (SEEF) rates. Human searchers could achieve this by increasing survey transects, increasing survey frequency, or increasing the size of a search plot, for example. These changes increase survey time while not always increasing the SEEF rates significantly enough, resulting in increased costs for little improvement. Our scientists have been examining the use of canine searcher teams as an alternative to decrease the bias factors in fatality estimates.

Rare Turtles

In addition to utilizing canines to survey for wildlife remains, we have also deployed detection dogs to survey for a variety of rare wildlife, including reptiles (Vice and Engeman 2000; Braun 2003; Nuessear et al. 2008; Stevenson et al. 2010; Kapfer et al. 2012). In Massachusetts, our scientists previously deployed detection dogs to survey for eastern box turtles (*Terrapene carolina*), a cryptic species that is particularly difficult to visually locate.

For projects that may adversely impact habitats of rare turtles, regulatory authorities frequently require multiple mitigative measures to reduce adverse impacts to the population. In addition to other measures, project proponents will often be required to install turtle exclusion fencing and complete preconstruction turtle surveys within the limit of work to relocate any turtles from within the work area to adjacent suitable habitat. For projects that impact eastern box turtles in Massachusetts, these preconstruction surveys require a minimum of four survey-person hours per acre of forested habitats and two survey-person hours per acre for field habitats. This level of survey effort is costly, sometimes with few or no observations of the target species.

The canine-handler team found carcasses that were half-buried bird, desiccated, decayed, or partially consumed, which were unidentifiable or missed by human searchers. Photos courtesy of Allison Locatell.

Methods

In order to evaluate the efficacy of utilizing detection dogs to complete fatality monitoring surveys at windfarms, we selected two windfarms in Texas and compared human and canine SEEF rates. Field trials were conducted in spring 2021 within three vegetation cover classes: bare ground, low vegetation (ankle height), and medium vegetation (knee height).

Trial surveys compared SEEF rates of a canine-handler team and a human surveyor in finding bat and small quail (*Cotumix cotumix*) carcasses. Our team evaluated only small carcasses because these typically have a lower SEEF rate than medium and large sized carcasses. We tagged each sample carcass with unique identifiers, prior to placement on a survey plot to identify placed carcasses versus real fatalities.

We selected twelve turbines for the trial surveys at each windfarm test site. The survey plots on both test sites consisted of 100-meter square plots centered on each turbine, with the human searcher's transects spaced 6 meters apart. The survey plots at Test Site 1 (TS-1) consisted of only one vegetation class, tilled (bare) ground agriculture fields. A total of 40 sample carcasses (20 bats and 20 quail) were used at TS-1. The survey plots of Test Site 2 (TS-2) were in livestock grazeland consisting of either low vegetation or medium vegetation cover. A total of 80 sample carcasses (40 bats and 40 quail) were used for TS-2 for these remaining two vegetation classes. A proctor scientist placed a random number and type of sample carcasses within each survey plot at points randomly generated using ArcGIS. The canine wore a Dogtra Pathfinder Global Positioning System (GPS) collar which recorded the canine's survey path.

RESULTS

Windfarm Fatality Monitoring Trial Study

The results of the trials demonstrate that the canine searcher method was more successful than the human searcher method in both their SEEF rates and survey speed. On TS-1, one of the 40 placed bat carcasses had been scavenged by a predator prior to the canine-handler team's search. Out of the 19 remaining bat carcasses and 20 quail carcasses, the canine found 17 bats (89.5%) and 16 quail (80%), while the human searcher found 9 bats (47.3%) and 10 quail (50%). The canine outperformed the human searcher by an average of 73% on TS-1. Additionally, the canine's survey speed averaged 20 minutes per turbine, while the human searcher's survey speed averaged 30 minutes per turbine.

Photos courtesy of Allison Locatell.

Results for TS-2 showed similar trends. Again, one of the 80 carcasses was scavenged at TS-2. Remarkably, the canine was able to detect the tag of the scavenged carcass. Of the remaining 39 bat carcasses and 40 quail carcasses placed at TS-2, the canine found 18 bats (46%) and 24 quail (60%), while the human searcher found 6 bats (16.6%) and 11 quail (27.5%). The canine outperformed the human searcher by 147% on TS-2. Again, the canine's survey speed averaged better than the human's, with 26 minutes per turbine versus the human searcher's averaged 42 minutes per turbine.

Since the trials were held on active windfarms, detection of incidental fatalities was a possibility for both search teams. Both teams found incidental fatalities; however, the most impressive of these incidental finds were made by the canine, who discovered three incidental fatalities on TS-1 and four incidental fatalities at TS-2 that were missed by the human searcher. Of these canine-found incidental fatalities, two were half-buried bird and bat carcasses which were desiccated and decayed beyond identification and two were partially consumed bat carcasses, also unidentifiable to species. One of these partially consumed carcasses consisted of a portion of bat wing and tuft of fur less than 6 centimeters.

DOG ILLUSTRATIONS: ©ADOBESTOCK/GOLLLI

Rare Turtle Survey Trials

Between 2007 and 2012, we deployed one canine-handler team to survey for eastern box turtles at sites throughout Massachusetts. The utilization of a detection dog resulted in an increase of turtles found when compared to human surveys, as well as a reduction in the amount of time required to effectively cover the work area. To comply with permit requirements, the typical survey-person hours were adhered to. However, it was our experience that the canine-handler team was able to survey a much larger area in less time and with a greater efficiency rate than the human surveyors alone. Using the estimates of Kapfer, Muñoz, and Tomasek (Kapfer et al. 2012), human surveyors were able to find 22 eastern box turtles per 316.5 survey hours, whereas canine-human teams are able to find 25 turtles in only three survey hours. This time savings, combined with the increase in rare turtle observations, resulted in a higher success of relocating turtles out of the limit of work to adjacent suitable habitats.

Conclusion

The comparative results of the 2021 windfarm canine trials clearly show distinct advantages of using a canine-handler team over traditional human surveyors. Beyond the SEEF improvements identifying more fatalities and completing surveys more quickly, a canine handler team could also provide a cost-effective solution for clients, lowering mitigation costs, and decreasing survey frequency at a windfarm site.

Utilizing canine-handlers to find eastern box turtles for preconstruction surveys has been shown to be a successful survey method in Massachusetts. The increased rate of success in locating eastern box turtles has allowed us to relocate a larger number of individuals successfully and safely from within the limits of work, a critical task to ensure the long-term survival of local populations of this species.

The utilization of detection dogs for conservation applications is an emerging practice that is expanding across multiple sectors. Many utilities, consultants, nonprofits, and other organizations understand the benefits of utilizing detection dogs to further their conservation goals. We are confident that future work with detection dogs may result in increased survey success, reduced survey-hour requirements, and cost savings for project proponents.

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ABOUT THE AUTHORS

Allison Locatell has more than 10 years of experience performing rare species surveys, animal handling, and monitoring. At SWCA, Locatell developed the SWCA detection canine program, where she is developing canine/handler teams capable of conducting avian and bat fatality monitoring surveys and providing individualized detection dog training. Her background in service dog training provides her with a solid foundation of fundamental knowledge and hands-on experience for training detection canines. She can be reached at *allison.locatell@swca.com*.

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Allison Locatell

Christin M. McDonough

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Don't Wing Your Environmental Stewardship: Helping the Northern Long-Eared Bat Hang in There

What federally endangered bat species can be found in 37 states and eight provinces in North America? If you guessed the northern long-eared bat, you're correct.

In November 2022, the species was reclassified as endangered under the Endangered Species Act (ESA). According to the U.S. Fish and Wildlife Service (USFWS), "The bat, listed as threatened in 2015, now faces extinction due to the range-wide impacts of white-nose syndrome, a deadly disease affecting hibernating bats across North America." The updated classification took effect on January 30, 2023.

The USFWS also noted, "Bats are critical to healthy, functioning natural areas and contribute at least $3 billion annually to the U.S. agriculture economy through pest control and pollination." During the warmer months, these species tend to live alone or in small colonies "underneath bark or in cavities or crevices of both live and dead trees," and will emerge at dusk to fly along forested areas.

As utilities and associated organizations are increasingly being called upon by stakeholders and the public alike to explain their environmental stewardship efforts throughout their territories, it's important to know and understand what species inhabit those spaces.

Environmental stewardship is more than a trend—it's here to stay. Our Research, Science, & Innovation (RSI) team is dedicated to strengthening environmental stewardship across the industry through education, collaboration, technology, and business development—including BIOaudit™ assessments. These assessments can promote conservation and engagement in sustainable practices that support rare, threatened, and endangered species, such as bees and bats.

As you inspect utilities and organizations' surrounding vegetation, what are you doing to protect endangered species like the northern long-eared bat?

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PHOTO COURTESY OF AL HICKS, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION.

Streamlining VM Work Using Programmatic Permits

By Laura Weyant; Principal Land Consultant, Environmental Resources and Mitigation; Pacific Gas & Electric Company

Consecutive years of drought conditions in many regions of the country have fueled significant wildfire activity. PG&E understands the increased wildfire danger to its facilities, customers, and communities. PG&E long believed the Federal Government should consider taking additional steps to maintain safe and reliable electric service; promote public health and safety, protect our natural resources, and reduce federal regulatory and administrative burdens on our public lands, including undertaking efforts to develop operations and maintenance plans to expedite routine operations and maintenance activities on federal lands.

In 2018, the U.S. Department of Agriculture amended its existing special use regulations to implement section 512 of the Federal Land Policy and Management Act (FLPMA). This section governs the development and approval of operating plans and agreements for maintenance and VM of electric transmission and distribution line facilities on National Forest System lands inside the linear boundary of special use authorizations for powerline facilities and on abutting National Forest Service (NFS) lands to remove or prune hazard trees.

Prior to the enactment of FLPMA 512, PG&E found itself facing more than 420 expired land authorizations across U.S. Forest Service (USFS) land management territory. PG&E attempted to negotiate renewals and separate O&M Plans with eleven national forests—that effort was challenging. Only one forest O&M Plan with one of the eleven forests was executed after ten years of negotiations. This caused the U.S. Forest Service and PG&E to pivot their strategy to developing one O&M Plan negotiated at the Region 5 office. This effort took three years, and the plan has become a model across the United States.

For many years, utility ROW were added, authorized, and renewed on a piecemeal basis. Through this partnership, PG&E and Region 5 of the USFS were able to successfully complete the reissuance and consolidation of hundreds of utility permits on NFS lands. Now the forests are able to monitor and renew utility permits by providing one permit and one easement per forest. The backlog of permits caused delays in approval of critical wildfire prevention work. The reauthorization effort helped further the national goals of addressing the backlog of expired and expiring permits and will make it easier for both the USFS and PG&E to monitor further expirations.

The updated permits are accompanied by a Programmatic O&M Plan that describes the facilities and activities, establishes the activity review process, defines environmental review and protection process, and establishes communication and monitoring protocols. The O&M Plan has successfully reduced the amount of time staff spends reviewing and processing routine operation and maintenance activities. Where before it could take 6–12 months to obtain approval to address a potential wildfire hazard, it now takes 5–15 days to obtain approval to move forward with the activity.

The O&M Plan aids with maintaining PG&E's facilities in a safe and reliable manner. The plan achieves greater consistency and certainty across the region for reviewing and approving O&M activities. It lays out when, where, and how PG&E can conduct vital work. The streamlined process helps assure electric facilities are regularly maintained, thereby reducing fire hazards. The plan ensures maintenance work is done quickly and efficiently to protect the National Forest System lands.

The O&M Plan is necessary to ensure that facilities are maintained in compliance with applicable federal, state, and local laws, including the California Public Utilities Commission requirements and regulations. The O&M Plan also outlines procedures to avoid effects on plants, animals, aquatic features, endangered and sensitive species habitats, areas of resource concern, and other areas of potential affect.

As part of the permitting assessment and evaluation process, the USFS requested that PG&E prepare and submit an inventory of the roads required by PG&E to safely operate and maintain its authorized facilities. In addition, PG&E committed to complete a condition assessment to determine the actions and time needed to bring all utility roads to Forest Service Maintenance Level 2 standards. PG&E has committed to completing the inventory, assessment, and required maintenance within five years of execution of the master permits and easements.

PG&E meets with USFS leadership and staff on an annual basis to explore opportunities where we can continue to collaborate and reduce wildfire risk within California. Topics that will be explored in the coming years are clarifying the process for prescriptions for the disposition/treatment of felled trees (e.g., timber sale, lop and scatter, chipping) and the IVM approach that would allow the use of Forest-approved herbicides to control utility incompatible vegetation while seeking to encourage a low-growing, stable plant community around powerlines.

PG&E is currently undergoing similar efforts with the National Park Service and Bureau of Land Management.

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Beyond the Butterfly

When managing ROWs for ecological productivity, biological controls are an underused tool in a ROW manager's toolbox.

A monarch butterfly (Danaus plexippus) feeds on a milkweed plant on a ROW on State Game Lands 33 property in Pennsylvania. Photograph by Stephen Hilbert, Asplundh Tree Expert, LLC.

By Kieran Hunt, Asplundh Tree Expert, LLC

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The world of transmission UVM since the 2003 blackout is largely focused on the removal of incompatible vegetation on the ROWs. While that is a legitimate strategy for preventing transmission outages and ensuring compliance, it fails to acknowledge the omnipresent allies that already exist on, adjacent to, or nearby ROWs: those native ecosystems that naturally resist tall-growing plants.

Establishing a robust ecosystem on the ROW is about more than protecting against the listing of a single endangered species; it creates ecological momentum for compatible ecosystems, reducing physical, chemical, and financial inputs while improving the health of the ecosystems that utilities control.

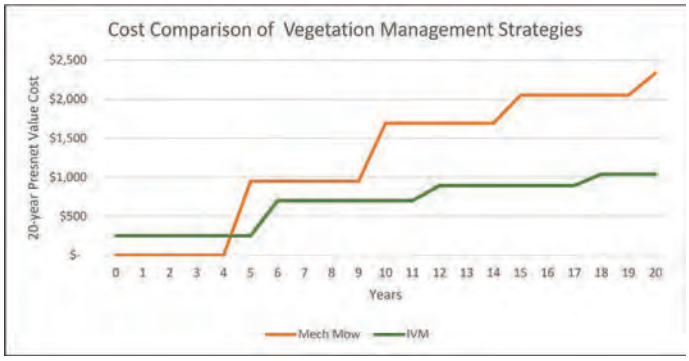
The Business Case for IVM

On-the-ground UVM is typically focused on suppressing incompatible species to satisfy stakeholders and achieve compliance. Many utility vegetation managers believe that all they must do to be successful is suppress incompatible species. While perhaps sufficient for compliance and safety, this falls far short of the mark for a comprehensive IVM program.

Most utility vegetation managers are at least aware of IVM, and many will claim to practice IVM in their day-to-day management. When discussing the establishment of healthy ecosystems on ROWs, however, it's important to note that a spray program is not the same thing as an IVM program. Vegetation managers across North America have been highly successful in using herbicides to suppress undesirable vegetation, but these are usually cyclic spray projects and not equivalent to a comprehensive IVM program. Importantly, a cyclic mowing program will typically cost significantly more than an IVM program on the same ROW. This is true even if the program incorporates some chemical controls if they are not part of a comprehensive IVM program.

The process of encouraging compatible vegetation while reducing incompatibles eventually leads to fewer management inputs and greater cost savings over the long term. A recent paper by John Goodfellow on "The Cost-Efficiency of IVM" showed how, after just five years, a comprehensive IVM program will be less costly than a typical mow and hand-cut program.

In addition to the cost-efficiency and cost savings, IVM creates ecological function, resiliency, and momentum, which will greatly improve stakeholder relations. A comprehensive IVM program will actively incorporate adaptive management, action thresholds, and cyclic adjustments to continuously improve the program and reduce its costs over time. This approach differs from the method of implementing a series of repeated mow and spray projects that generally cost the same each year and treat large swaths of ROW the same, removing compatible and incompatible vegetation in the same broad strokes.



Comparison of present-value costs of mechanical mowing versus IVM. Cost of IVM is higher to start because mowing often must be done in addition to other IVM treatments at the outset. Image from "The Cost-Efficiency of IVM" by John Goodfellow, BioCompliance Consulting, Inc.

Using Nature as an Ally on the ROW

Biological controls can include small animals that consume tree seeds, deer that browse woody vegetation, and compatible plants outcompeting incompatible seedlings. It can also encompass low-growing native plants releasing chemicals into the soil to inhibit the growth of other plants and even native soil fungal and bacterial communities predisposing the soil to favor compatible native plant growth. To achieve these sorts of controls, the ROW needs to be managed to encourage and promote compatible plant growth while selectively removing incompatible species. Specifically, the floor (area directly beneath the powerlines) is usually converted into low-growing native plant communities such as those found in early successional habitats.

Early successional plant communities tend to be the first to repopulate a site after a disturbance. For example, early succession often occurs immediately following a large blow-down of trees in a forest, exposing the previously shaded forest floor to sunlight. This added light prompts dormant seeds in the soil to germinate and begin to grow. What results is a community predominantly composed of shrubs, forbs, and grasses. In a forested setting, this is how meadows form. Many animal species are adapted to these environments, including deer and mice.

Native plants and animals that naturally occur in early successional environments have developed adaptations to prevent the invasion of trees. In the case of animals, this might be consumption of young trees and tree seeds. In the case of plants, this might include soil changes and shading to inhibit tree growth. It is these natural adaptations that utilities use to their advantage in ROW management. Any adaptation that compatible plants and native animals use to inhibit incompatible plant growth can be considered a biological control. No one pays for these controls; rather, the IVM system of management seeks to establish healthy, robust, stable, and resilient low-growing plant communities, which use biological controls to sustain themselves.

Using IVM to establish low-growing native plant communities on the ROW is an ongoing process that typically requires the most work upfront and progressively fewer management inputs as time goes on. The process often starts with the initial establishment of the ROW, or reclamation of an overgrown ROW, where all plants in the management area are removed through mechanical and/or chemical means. Then, selective physical and chemical treatments are used on a regular basis to remove incompatibles while favoring compatibles—especially those that would naturally comprise an early successional native habitat.

After each treatment cycle, managers review how well they are doing by taking stock of what plants are present in the treatment areas and adjusting future treatments accordingly. Treatments become more selective in their chemistry and application over time as fewer incompatibles are present on the ROW. The time it takes to establish a resistant ecosystem varies, though results can be dramatic after just one treatment. No ecosystem will ever become completely resistant to invasion from incompatibles. Still, as native compatible ecosystems are established and managed, less money will be required to remove incompatible plants.

Compatible native vegetation growing on a ROW. Photograph by Todd Hagenbuch, ARBORCHEM Products.

A comprehensive IVM program incorporates cultural and biological controls to maintain compatible plant communities. Cultural controls can include maintaining lawns or parks for recreational use beneath the wires. When compatible plant communities are established on the ROW, they bring biological controls with them: for instance, competing with and helping exclude incompatible plants. Photograph by Lewis Payne, New York Power Authority.

Workers performing low volume foliar applications of herbicide to remove incompatible vegetation on the ROW while leaving compatible plants intact. This is what ROW maintenance often looks like IVM, after the ROW has been converted to compatible vegetation cover. Photograph by Todd Hagenbuch, ARBORCHEM Products.

To be clear, establishing a native, low-growing plant community is not appropriate everywhere on the ROW. Constraints such as ownership, stakeholder requirements, cultural uses, environmental regulations, and access can affect what "compatible vegetation" means and what the goals are. IVM is about using adaptive management to continuously improve management strategies to favor compatible vegetation, whether that is lawn or milkweed.

Building Ecological Momentum

Shifting focus from removing incompatible vegetation to the establishment and maintenance of compatibles will maintain regulatory compliance and move the program toward ecological function including biological controls. To achieve both the cost and ecological benefits, ROWs need to be surveyed for present plant communities, and strategies must be developed to convert those communities into desirable ecosystems. Current utility vegetation managers do not need experience with this type of program to get started in IVM. Instead, they can use industry guidelines and best practices to begin incorporating adaptive management into their program, and when necessary, contract local ecologists for guidance. The key is creating good specifications and requiring skilled labor.

Managing ecologically means working with nature to create an ecosystem that is largely self-sustaining. This is a sort of "ecological momentum," as healthy and well-established ecosystems tend to have robust mechanisms for maintaining dominance over the lands they occupy. If no significant disturbances occur, it takes many years for an established ecosystem to convert into something different. Cost savings usually occur relatively soon after converting to compatibles-based management, but they continue to grow because this ecological momentum increases steadily over time. Increasingly, only minimal treatments are required to remove sparse occurrences of trees, invasive plants, and other incompatibles that arise.

Modern research suggests that soil health may have a lot to do with this ecological momentum, and that above-ground plant communities directly impact the composition of below-ground microflora and microfauna. In other words, as ROWs are converted from a hodgepodge of native and invasive plants into established, native, compatible ecosystems, utilities are likely also reaping the secondary benefit of remediating the soil health on these lands. This benefits local native plants and animals and may make it harder for invasive and incompatible plants to establish over time. This is also a good reason to

follow the BMP of excluding invasive vegetation from the ROW, even if its mature height is compatible with the wire zone. Invasive plants are detrimental to local ecosystems and may interfere with native plant communities' biological controls. Allowing invasive plants on the ROW is not compatible with environmental stewardship.

A growing body of knowledge shows that plant communities dominated by native vegetation provide the greatest foundation for functional food webs. Researchers like Dr. Doug Tallamy with the University of Delaware are gaining particular attention as they link native plant abundance to the abundance of charismatic animals, such as birds. Plants absorb energy from the sun and convert it to food. Native plants are generally the most suitable hosts and food for many native animals, such as pollinators, mammals, and caterpillars. An abundance of these primary plant consumers will, in turn, benefit animals in higher trophic levels such as birds. Without healthy native plant communities to feed primary consumers and support local pollinators, the natural systems that drive local and regional ecosystems can collapse, which can have serious repercussions for natural and human well-being.

A 2006 paper on the "Importance of pollinators in changing landscapes for world crops" (Klein et al. 2006) estimates that roughly 35% of the world's crop production requires animal pollinators. Even aside from the business case for IVM, the health of the planet's ecosystems is an important reason to practice sound ecological land management. Utilities can help steer the ship of ecological momentum in the communities they serve, using the millions of acres they manage as reservoirs for functional native ecosystems in a world where land is increasingly fragmented and converted away from natural land cover.

Caterpillars feed on a perennial plant on a ROW on State Game Lands 33 property in Pennsylvania. Photograph by Stephen Hilbert, Asplundh Tree Expert, LLC.

A bee on a native compatible plant on the ROW at the State Game Lands 33 property in Pennsylvania. Photograph by Stephen Hilbert, Asplundh Tree Expert, LLC.

Start Somewhere

The UAA Environmental Stewardship Committee's 2021 guide to "Managing Compatible Vegetation for Targeted Species and Biodiversity," available for free on the UAA website, can help utility vegetation managers interested in taking advantage of biological controls. The guide lists three primary approaches to managing compatible vegetation for healthy ecology: protection, enhancement, and integrity.

Protection-based approaches focus on preserving compatible vegetation that already exists on the ROW, both through avoiding direct impacts and ensuring that damaging agents such as invasive plants do not harm existing compatibles. Enhancement-based approaches focus on increasing the amount of compatible vegetation present, either through direct planting or through creating conditions where current and potential populations of compatibles are likely to grow. An integrity-based approach stewards natural systems in ways that promote communities of compatible vegetation to thrive, proliferate, and stabilize. Integrity-based approaches are more complex and tend to come with IVM program maturity; in a way, they are approaches that seek to generate and increase the "ecological momentum" discussed earlier.

The Environmental Stewardship section of the UAA website has resources for utility vegetation managers looking to get started on an IVM program. These include a slide deck for a business case presentation, a net present value cost calculator, and a multitude of examples, videos, guides, and case studies of successful program management. Making the business case is generally the first step in creating buy-in by senior leadership and those who make the final call on whether a UVM program can transition to IVM.

BUTTERFLY ILLUSTRATIONS: ©ADOBESTOCK/ANATOLIR.

As with most institutional change, there will be a short period of increased cost as the IVM program is initiated on top of the existing VM program. It is important for vegetation managers to be upfront with stakeholders about these expenses while also stressing that costs will decrease significantly as the program matures. Utilities already including mechanical clearing (e.g., mowing) followed by broadcast chemical controls (e.g., cut stubble) in their maintenance cycle have a head start on IVM, as most of the upfront cost is associated with this type of combined treatment.

Sound ecological ROW management through IVM will provide many other benefits, such as improvements to utility ESG KPIs, improved stakeholder relations, reduced risk of adverse environmental impacts, reduced risk of mid-cycle vegetation encroachment on conductors, and numerous benefits to local plants and wildlife. Additionally, utilities can assume that sound ecological practices will benefit them if environmental regulations change or strengthen in the future, or if a protected species is discovered on a management site.

Establishing a comprehensive IVM program is a sound investment in the future of the lands a utility manages. As healthy ecosystems are established, the frequency and amount of VM inputs will decrease, reducing program costs. The financial sustainability of the ROW management program will align directly with environmental sustainability and stewardship on the utility's lands. As native plant cover leads to ecosystem health, native pollinators and other animals will use the ROW as habitat, further increasing positive environmental impact. Public and stakeholder relations will improve as lands are managed ethically and with the future of the environment in focus. As management costs go down, ratepayers' costs can also be reduced. When the utility is engaged in a comprehensive IVM program, their customers can thank native plants and animals on the ROW for helping to lower their electric bill.

About the Author

Kieran Hunt is municipal manager with Asplundh Technical Services and works with Asplundh's field operations to improve and expand municipal and roadside VM programs. His background is in municipal and UVM, inventory, and work planning. He is an ISA Certified Arborist Utility Specialist and a New Jersey Licensed Tree Expert and has a bachelor's degree in ecology from Rutgers University.

PLANT ILLUSTRATIONS: ©ADOBESTOCK/SPICY TRUFFEL

PROFESSIONAL PROFILE

TROY ROSS

I graduated from Hocking College in Southeast Ohio with a Ranger Services and Fish and Wildlife degree in 1998. I went to school thinking I wanted to work as a forest ranger. After I went through ranger police officer training, I decided that path was not for me. I was at a crossroads, unsure of what I was going to do with my life. A classmate of mine told me about a job they had gotten with ACRT—they said they loved it. They were able to use skills they had learned at school and worked outside every day. A week later, I packed up everything I owned and moved to Tennessee to work with ACRT on Southwest Tennessee Electric Membership Corporation, and worked for a year as a utility forester. I really fell in love with the work and the industry. From there, I dedicated my life's work to ACRT and the UVM industry.

Upon entering the UVM industry, I did not expect much of it at first. I really did not think of it as an "industry" when I first started. It seemed like I was working a niche job for a small utility. As my career expanded, I started seeing more and more utilities, changing my viewpoint. Working across the country with the UAA and other organizations, I have seen a group of like-minded, hardworking, intelligent, and passionate people. These people are leading the way in safety, environmental stewardship, efficient operations, and reliability across the world.

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I steadily worked my way into leadership positions and worked with more and more utilities. I was the operations manager of Tennessee and Virginia, director of all operations outside of California, and vice president of all operations. In 2016, I was asked to move to Ohio to work out of our organization's home office. I left Tennessee after 18 years and became president of ACRT. In 2018, I moved into ACRT Services, our parent company, and became the executive vice president of operations. In this role, I started overseeing all operating companies. This gave me a chance to work in several different industries. In October of 2022, I was promoted to COO of ACRT Services and now oversee all operating functions of the organization.

I was drawn to UVM for a job, but I found a career. In the beginning, it was my innate love of the outdoors and variety in the job. It grew into a passion for helping utilities aid their communities. Tongue-in-cheek, I like to say, "We are saving the world one tree at a time." When you think about how interconnected we are, the heartbeat of our society is electricity, and UVM is all about safe and reliable electricity at the lowest possible cost. The quote rings true. Our industry's workers are those hometown heroes who help society function and thrive.

Of all the aspects of UVM, I enjoy helping people the most. I truly believe that working in UVM is an act of service to our communities. I also enjoy the teamwork that must happen to meet our industry's goals. Utilities, their vendors, and consultants must work together to accomplish a large task, year after year, while managing a dynamic system that throws more and more variables at you.

I wouldn't be able to help communities if I didn't have mentors who helped me first. It's difficult to narrow down who guided me to where I am today because there have been so many—I am scared to leave someone out. I believe who we are is a tapestry of the people we have met and learned from. Early in my career, it was Mark Falcon. He was my first manager and I learned about this industry from him. I also adopted his passion for ACRT and UVM. As my career progressed, it had been Mike Weidner. He helped

guide me from being a utility forester to a businessman. He also supported me in continuing my education with a Bachelor of Science in organizational leadership and a Master of Business Administration. Outside of our organization, I have taken inspiration from the UAA as well as many of my customers. Glenn Springer, John Laselva, and Ken Kinsey are a few customers who have helped hone my management skills. Mike Neal and Randy Miller were both on our Board of Directors, where I got to see their leadership qualities on display. At the UAA, when I was a director, Phil Charlton, Paul Hurysz, Will Nutter, and Craig Kelly's passion for the industry was contagious. While at the UAA, I championed the Editorial Committee. My chair on the committee at the time was Nelsen Money. I loved watching Nelsen's passion for the *Newsline*, UAA, and industry education on display.

Currently, I am working on an integration of a new company that ACRT Services has acquired. It is an environmental company called EnviroScience. Utility vegetation management is an environmental industry. Over the years, I have seen the march to environmental sustainability, IVM, pollinator habitat, and now corporate ESG. The merging of this new company's services and our organization will help us better prepare to lead and support all of the changes. Personally, it will help me have a better understanding of the shift, allowing me to be a better consultant.

There are three big things that I have seen change in the industry throughout my career: technology, safety, and environmental stewardship. When I started, I was given electrical maps that were blue carbon copies. I had a pager and carried quarters to use pay phones to contact my tree crews. All work was planned and completed on paper. This was in 1999. Today, we have electronic everything—instantaneous communication, planes with laser beams, satellites, and robust integrated data platforms. Technology is going to be the biggest driver of our industry in the future. The UVM of today will not be the UVM of tomorrow.

Safety and environmental sustainability followed a similar path. When I first started consulting with utilities, they would tell me that they left safety to their contractors and expected them to follow the law. I always felt like environmental concerns were seen as a burden to be avoided. Today, utilities are driving safety and environmental sustainability. They are core values of the industry. I see more passion around these topics than any others. I think this is only going to continue, and our industry and workers are going to be better off because of it.

> **Today, utilities are driving safety and environmental sustainability. They are core values of the industry... This industry is only as good as the people who are in it. We must drive for more education, more outreach, and more training for our future leaders.**

My final thought on how I see our industry succeeding, besides embracing technology, safety, and environmental stewardship, is through people. This industry is only as good as the people who are in it. We must drive for more education, more outreach, and more training for our future leaders. We need to look at the people who work in the industry, such as trimmers, climbers, foresters, arborists, as professionals. They need to be paid like they are professionals. We need to create strong partnerships that drive longevity, not a race to the bottom dollar. Our industry sees a massive brain drain every year as people leave to find their fortunes somewhere else. We must also embrace change. The dynamics of the world have to speed up. The pace of change is faster now than ever before. We must embrace this, lean into it, and do what we do best: save the world, one tree at a time.

PG&E Modernizes Utility Access with Innovative Plastic Lumber Solution

By Anna Gresham, Land Consultant–Property Management, Pacific Gas and Electric; Ode Bernstein, Senior Terrestrial Biologist, Pacific Gas and Electric; and the Boardwalk Construction Team.

In California, Pacific Gas & Electric Company (PG&E) generates and delivers electricity and natural gas to nearly 16 million customers daily. Given the scale and complexity it takes to supply energy to two-thirds of the state, it makes sense that there is also a certain degree of maintenance required to provide customers with uninterrupted service. One of the most essential mechanisms PG&E must provide to its workforce is safe, reliable access to facilities. PG&E's Natural Resource Management (NRM) team works to monitor and maintain access in a wide variety of California's landscapes—everything from electric transmission towers located in the tidal wetlands of San Francisco Bay to hydropower facilities deep in the mountains. Because access is critical to timely maintenance and inspections, the NRM team is engaged on many fronts to help provide this for all coworkers. NRM offers operational and programmatic support to multiple internal workstreams, primarily though property, vegetation, and access management.

Each aspect of the core model facilitates the operation and maintenance of assets and the infrastructure vital to delivering electricity to customers. For example, for decades PG&E has used wooden boardwalks to provide workers with access to the hundreds of transmission towers in the tidal marsh and wetland areas in and around San Francisco Bay. With a growing need for the replacement of miles of degraded—and in some cases, rotted—boardwalks, PG&E sought to find an alternative boardwalk material. Projected sea-level rise in San Francisco Bay has also increased the threat of boardwalk inundation during high tides. PG&E needed a boardwalk material that would offer not only a long-term solution to maintenance frequency and construction challenges but also upholds their commitment to environmental stewardship.

In 2007, construction personnel worked with a materials manufacturer to explore possible improvements to substructural boardwalk components. The goal was to eliminate a fracturing issue commonly experienced during pile installation. During fabrication, the material composition was carefully researched for viability, longevity, and potential for any adverse environmental impacts on the natural open space, wetland, and wildlife habitats, where the boardwalks commonly exist. After extensive factory and field testing, the first of many resin-based, high-density polyethylene, fiberglass-reinforced, 4" x 4" (i.e. plastic lumber) boardwalk piles were produced. Not only was this state-of-the-art plastic lumber material the structural solution PG&E was looking for but came with the added benefits of being an eco-friendly, non-leaching, toxin-free material that holds up remarkably well in extreme salt, sun, and other corrosive environments due to its thermodynamic properties.

Completed Boardwalk. All photos courtesy of the Boardwalk Team.

After several years of using the redesigned posts, PG&E began incorporating other custom-engineered components to replace the dilapidated wooden planks and missing handrails found in the field. As it turned out, the newly designed planks were lighter and easier to manage than their wooden equivalent and provided a safer non-skid walking surface with improved traction. During construction, boardwalk planks were evenly spaced and assembled in a manner that allowed sunlight to reach underlying vegetation to promote growth. And while the evolution of PG&E's system of boardwalks will greatly benefit utility workers, they are not the only benefactors considered during the project development. Our bays and marshlands are teeming with wildlife and it is PG&E's goal to respect and conserve the natural habitat, in concert with optimizing the safe and operational function of utility access.

With more than 20 years of support from qualified vendors, PG&E has built and repaired boardwalks that provide linemen access to maintain electrical towers around the bay in marshland and open water locations. As the boardwalk program has evolved, the team has grown to include not only the construction crews but a team of biologists who work alongside the construction crews to ensure all permit measures (AMMs/BMPs) are met and are compliant with all local, state, and federal wildlife regulations. Site-specific environmental tailboards and wildlife trainings are conducted with all personnel prior to the start of work to review endangered species, required buffer zones, and any necessary stop-work procedures. Once the entire team has a clear understanding of the delicate environment they are working in, they can start construction with confidence that they will leave the work area in better condition than they found it.

During the construction of these boardwalks, plastic posts are driven into the ground using "hickey bars" with 800 lbs. of human force, essentially minimizing the extent of ground disturbance to the size of a 4" x 4" post. The fact that this work is conducted manually eliminates the need for loud, impactful heavy machinery in tidal marsh habitats of the San Francisco Bay, where the state and federally endangered California Clapper rail (*Rallus obsoletus*), a secretive marsh bird, and salt marsh harvest mice (*Reithrodontomys raviventris*) occur. Fun fact: these two rare and elusive species are not found anywhere else in the world.

During the removal of the existing wooden boardwalk, it was quite a task to ensure no debris is left behind. Waste removal was accomplished using battery-operated tools with vacuum attachments. In addition, all chainsaw sawdust and metal debris were collected in bins before reaching the marsh below. For projects with durations longer than a day, good housekeeping practices ensured that the local wildlife was safe and clear from any equipment or materials that might be left onsite overnight. All utility buckets must include little mouse ramps for an easy escape and silt fences are put in place to keep larger critters away from partially constructed boardwalks. Once the boardwalks are complete, security gates fitted with side wings are installed to keep terrestrial animals as well as trespassers off the boardwalks and away from open water sections. Signs are also posted on gates and other boardwalk areas to notify authorized utility workers when they work in environmentally sensitive areas.

One instance demonstrating the level of importance PG&E places on the restoration and preservation of marshlands was in the Laumeister Marsh. A few years back, a King Tide storm event devastated a deteriorating boardwalk running parallel to marshlands in the peninsula. The boardwalk debris had washed up along a two-mile section of the Laumeister Marsh, home to many seabirds and the endangered salt marsh harvest mouse. The goal of this project was to safely remove all the displaced boardwalk components to mitigate any adverse effects on the ecosystem. The cleanup crew was transported to the site via airboats. Crew members were given instructions on how to identify nests, other signs of wildlife habitat, and areas to avoid. The washed-up materials were gathered into secured bundles, and safely lifted by helicopter from the site. At the end of the project, the marsh, having been restored to its original condition, became a local wildlife habitat.

Old degraded boardwalk.

Old degraded boardwalk.

It is PG&E's mission to work diligently to safely conduct all operations or maintenance activities in an environmentally conscientious manner. Whether these actions take the form of a singular event or a series of ongoing training for all internal and contract personnel, the objective is to preserve the natural beauty of the San Francisco Bay. The boardwalk program is no exception. And while we strive to keep our access to utilities safe with a relatively small ecological impact, the impact of our processes, progress, and sustainability efforts are beyond measure.

Wildfires and UVM: Prevention, Mitigation, and Innovation

Part 3: 2022 UAA System Utility Vegetation Managers Summit

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The third and final iteration of focus from the 2022 Utility Vegetation Managers Summit will engage previously discussed topics of workforce recruitment and retention as well as remote sensing and artificial intelligence for vegetation managers to address a well-known concern across the UVM industry. A successful management program employs a multifaceted approach, including implementation of these two areas of emphasis, to mitigate risk associated with wildland fire.

By Adam Johnson, Transmission Vegetation Strategy and Execution Contracts Manager, Duke Energy

In today's world of UVM, few aspects receive as much attention, both in the industry and in the public, as the risk of wildfire. Seasonal characteristics that favor wildfire initiation and sustainability have been extended from traditional intervals. Although the number of wildfire "starts" have maintained somewhat of a baseline, or even decreased in certain geographic areas, the size of fires and the intensity in which they burn has increased exponentially in recent years. Major causes of wildfires associated with electric utilities include downed lines due to equipment failures, blowout, and contact with vegetation.

Electric utility maintenance program initiatives—focusing on wildfire initiation prevention and mitigation techniques—have become a common practice among utilities across the globe, increasing efforts to deliver safe and reliable energy to their customer base. These initiatives concentrate on how to increase efficiency, safety, and performance in areas of high-risk potential, while establishing processes that not only reduce or eliminate the potential for causing a wildfire but also prevent damage to company assets during a wildfire event. Although catastrophic wildfires have predominantly been a common experience for the Western U.S. and Canada, the threat of wildfires is a growing concern for other areas of North America and several countries worldwide. The risk of electric utilities being the source for initiating wildfires or incurring damage during a wildfire event may not be completely preventable, but mitigation activities have been proven to drastically reduce potential occurrences.

As populations increase and expand the wildland urban interface (zone of transition between unoccupied land and human development), it is increasingly necessary to establish more utility infrastructure within fire-prone areas. Regulatory agencies in certain territories have formed requirements for some utilities to establish wildfire mitigation plans. However, a strong VM program is just one aspect of a successful plan. Utility vegetation management is one of ten categories required by California legislation within Wildfire Mitigation Plans (WMP) for investor-owned utilities in the state. Jack Shearman, founder and CEO of the UMS Group (energy and utility industries consulting firm), presented devastating wildfire statistics from recent years and strategies among utilities to combat the trend of utility-related fires at the 2022 Utility Vegetation Managers Summit. One such strategy is a collaborative forum of industry professionals designed to facilitate the sharing of wildfire risk mitigation insights and the discovery of innovative and unique utility wildfire practices, known as the International Wildfire Risk Mitigation Consortium (IWRMC). Shearman, the consortium's Lead Convenor of the Executive Strategy Track & Vegetation

Management Working Group, outlined the working group as members sharing experiences which assist in identifying industry-leading practices for wildfire risk mitigation. This example leads to the first recommendation from discussions for best practices when developing risk mitigation plans: **when engaging in strategic planning for near and long-term risk mitigation, avoid working in silos.**

These complex issues require collaboration and cooperation of multiple utility business units, entities, and key stakeholders. Capabilities among the utility must combine asset management, engineering, VM, system operations, emergency preparedness, community engagement, and all other aspects of daily operations to promote an expansive mitigation plan as the common goal. Simple forms of mitigation to create "defensibility" may appear in threat-based tree removals or fuel modifications, replacing wooden poles or structures with noncombustible materials, or asset condition assessments. More intricate details may be shared among functional groups such as LiDAR data or satellite imagery acquisitions. Working across jurisdictional boundaries to share data acquisition costs could lead to higher quality outputs, such as current condition assessments, but also feed into predictive modeling for weather, fire behavior, infrastructure response, and vegetation threats. Data from these analytics and strategies can contribute to more risk-based grid hardening design and innovation. Ultimately, these practical partnerships result in more resilient planning and create opportunities to share successful outcomes within the industry.

Artificial intelligence, remote sensing, and data modeling have enhanced the UVM platform for more efficient and data-driven decision-making. Technological advancements continue to grow and provide cost-effective solutions for vegetation managers during maintenance planning and risk mitigation strategy development. As a second recommendation for best practices, colleagues highlighted these technology solutions for **system performance improvement, cost reduction, increased safety of the grid and employees, and support for a sustainable labor force**. As previously stated, data acquisition and analytics can be used in a variety of ways to monitor, detect, and predict defects in and along the utility system for more advanced planning and response of a wildfire event.

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Vegetation managers strive to overcome the evolution of challenges associated with conducting an effective program by wearing many different "hats." Budget and work planning, safety oversight, quality control, public relations, and contract administration are just a few examples of tasks these individuals must perform regularly to create a positive atmosphere and drive towards an efficacious plan. Recruitment and retention of a talented workforce may also be added to the manager's resume in today's culture. Previous articles stated, "High worker turnover, less experienced workforce and a host of economic factors have contributed to labor shortages."

As a third, and final recommendation for best practice, it is a necessity to **create adaptive and innovative solutions related to professional development**. While AI can fill certain gaps in the workforce, there is no substitute for the application of well-trained and highly skilled labor. Managers must look past traditional roles and explore candidates with more diverse and specialized skill sets to address greater dynamics of present-day demands. As stated in a recent report for wildfire mitigation strategies, the UVM industry must institute "longer-term thinking and take a more robust strategic approach, focused on the most impactful actions."

Electric Utility Risk Mitigation of Wildland Fire Sub-Committee

Adam Johnson
Duke Energy

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Dan Marsh
Florida Power & Light

National Grid's Biodiversity Study for Integrated Vegetation Management

By Mariclaire Rigby, Lead Vegetation Strategy Specialist, National Grid

With a system of ROWs extending throughout New England and New York, National Grid manages an expansive network of electricity and natural gas distribution to more than 20 million people. Just as it is essential to maintain those services to its customers and partners, it's essential for the utility to be a proactive leader in environmental stewardship—the caretaking of the land it manages and all that lives and relies on it.

National Grid is no stranger to this effort. With educational and professional backgrounds in environmental studies, the vegetation management team members are responsible stewards of the land on which they've worked. Every day, the team prioritizes efforts not only in maintaining land but also in making proactive decisions that will benefit future generations within the organization and the community.

Photo courtesy of Mariclaire Rigby.

National Grid lines bisect many pristine ecological areas that have been maintained with IVM that benefit habitat health. View of Quabin Reservoir.

Launching Pilot Programs

A key initiative for the vegetation management team has been implementing new, creative solutions under the Responsible Business Charter. For example, the team is striving to improve the environmental value of 10% of the land under the team's care by 2030.

To that end, the pilot programs launched focus on promoting biodiversity and pollinator habitats. One of these was the installation of two honeybee hives near National Grid's Northboro, Massachusetts, facility. The hives, which are now home to more than 20,000 honeybees, will contribute to pollinator research, while bolstering the local pollinator population.

The second pilot program focuses on off-road greenspaces found under powerlines in the ROWs. Historically, the only way to maintain these ROWs has been through a combination of mowing on periodic cycles as well as the use of IVM solutions, such as the application of herbicides that target incompatible and invasive plant species. National Grid has been using IVM on its ROWs since the late 1950s. However, a few challenges arose from this approach over the years:

- Mowing reduces the available coverage for pollinating insects and reduces seedstock for pollinating plants in soil, reducing their populations over winter. Mowing ROWs is also a significant, ongoing investment for the organization.
- Multiple IVM techniques have historically been used on ROWs, at times leading to pushback from landowners. Nationally, herbicides are also often the focus of legislation intended to ban their use, causing a negative perception.
- There was a distinct need to build greater interest in IVM, the importance of the program, and the impact it makes on the environment and to increase involvement and awareness in IVM vendors.

Addressing These Challenges with a Biodiversity Study

In early 2021, National Grid made the strategic decision to undertake a biodiversity study of several areas on its system. To bring this initiative to life, the utility turned to its industry vegetation management partner, ACRT Services, and its Research, Science & Innovation (RSI) team. Led by Dr. Anand Persad, the RSI team is committed to advancing the scientific process as it pertains to environmental analysis for the energy industry, focusing on the integration of AI and data-driven greenspace protocols and building on sustainable ideals and metrics. Its biodiversity study, called BIOaudit, is a comprehensive environmental assessment that is evaluated seasonally.

National Grid examined plots across Massachusetts, New Hampshire, Rhode Island, and Vermont that are currently managed using IVM techniques. In some instances, they have reduced mowing, which allows native pollinator populations to increase while reducing the associated costs.

The utility's VM team can align the data-backed nature of the BIOaudit study, which measures the effectiveness of the IVM program, to the utility's programs and their cycles. This is important as it pertains to preserving the compatible low-growing plant communities, which are able to thrive between treatments that typically occur every four to five years. The team members can now be more effective as their future work planning will be based on efficacy data that is current. They can also better inform and educate adjacent landowners so they understand

Dr. Anand Persad, Director of Research, Science & Innovation for ACRT Services, is no stranger to the ROW environment. Photo courtesy of ACRT Services.

Happy Lepidoptera on National Grid's Washington, D.C. Line. Photo courtesy of Mariclaire Rigby.

the effectiveness of the utility's IVM program. Over time, the data will also be used to address the third challenge mentioned above.

National Grid plans to continue the study over multiple years to accurately measure progress. In the study, the utility's industry partners at ACRT Services measured native seed banks, beneficial plants, and insect communities along 222 standardized plots—using established scientific sampling methods for understanding abundance as well as presence—at 15 different areas across the system, which includes several eco-sensitive areas.

Early on, the study has provided a comprehensive list of native plant populations, some of which the team was not aware were in local abundance, which was a good sign. The ecological progression measured across these sites has been strong as well, demonstrating—scientifically—the value of IVM, thereby validating the team's approach and enabling it to justify its efforts with landowners, communities, and the industry as a whole. The study has also opened doors to new landowners who are interested in trying herbicide as a means for addressing invasive plant species.

Knowledge Paves a Way Forward

Long-term, the results of the BIOaudit study are expected to enable a reduction in the usage of herbicide along ROWs; use more and better technology when planning and implementing herbicide applications; increase sustainable ground cover across our ROWs; increase the variety and timing of blooms that provide nectar and pollen; increase food, shelter, and protection for insects and other wildlife; and decrease the amount and frequency of input needed on ROWs, thereby reducing our overall carbon footprint from soil to sky.

As data is collected in future seasons, the team plans to continue to communicate and share information and resources about the program within the organization and to the communities it serves. Industry colleagues have also taken note of the program and have reached out.

Additional communications are planned to further these educational efforts. The team members also implemented more public-facing communications, such as a website detailing the program and relationship with the ACRT Services RSI team.

As National Grid continues to invest in this program and seeks additional ways to strengthen its environmental stewardship, the utility is encouraging colleagues and associates to ask what they can be doing to better understand and learn from their land. The ROWs the VM team manages, and the plants, insects, avian population, and wildlife they support, are critical. Land managers have an amazing opportunity to learn from what's happening—or not happening—on them.

ABOUT THE AUTHOR

Mariclaire Rigby is the lead vegetation strategy specialist for National Grid, where she previously served as the senior transmission forester. Prior to joining National Grid, Rigby worked as a utility transmission forester for Davey Resource Group. She has also held roles as an arborist and urban forester with regional forest services, including the U.S. Forest Service. She earned her bachelor's degree in natural resource management from the State University of New York College of Environmental Science and Forestry.

Blooms on ROW provide foraging for many pollinator species. This is a direct benefit of IVM and responsible land stewardship. Photo courtesy of ACRT Services.

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Combining its accumulated weather observations and high-resolution weather forecast, SDG&E has constructed and operationalized the machine-learning-based model of predicting wind gusts across its weather stations, further enhancing its forecasting capability to help serve communities in the highest fire risk areas. Photo courtesy of SDG&E.

How SDG&E Meteorology Helps Wildfire Mitigation, Risk Modeling, and PSPS Preparation

By Yumin Moon, NWP Scientist, San Diego Gas and Electric Meteorology

San Diego Gas & Electric (SDG&E) operates in a region that is projected to become more vulnerable to wildfires, and it is imperative to stay prepared to mitigate the increasing risk of wildfires in its service territory. SDG&E's predictive fire weather program is one of the most advanced in existence. Its innovative program is the result of 15+ years of technological advances and collaboration with academia, industry, and government.

SDG&E's weather station network, the world's first utility-owned network of its kind, is foundational to our ability to understand and predict the potential of extreme fire weather events and their impacts on local communities in its service territory. SDG&E owns and operates a dense network of 222 weather stations in a 4,000 square mile service territory, with each station measuring wind, temperature, and humidity every 10 minutes—totaling over 30,000 observations daily. The observations are publicly available in real time. Availability of more than 10 years of weather observations has enabled SDG&E to perform statistical analysis and determine the wind impact guidance for its service territory, which varies from place to place. This allows SDG&E to further sectionalize circuits each year, thus decreasing the potential footprint of Public Safety Power Shutoff (PSPS) events. In addition, 96% of our weather stations have the capability to report observations every 30 seconds during elevated fire risk conditions. This high-frequency monitoring of weather conditions allows us to swiftly adjust the precise timing and location of powerline de-energizations required during PSPS events, further reducing the total number of PSPS-impacted customers.

To stay informed on future weather that could lead to increased wildfire risk and other hazardous conditions, SDG&E performs daily multiple ensembles using the state-of-the-art numerical weather prediction model on its in-house supercomputers. This allows our meteorologists to monitor and predict the wildfire risk by calculating the Fire Potential Index (FPI), which is a planning and decision-supporting tool designed to reduce the wildfire risk by examining the susceptibility of the environment to fire. The FPI is formulated to detect weather and fuel conditions in the forecast that resemble those associated with previous major wildfires events, and its daily calculation is shared broadly with the community. Combining its accumulated weather observations and high-resolution weather forecast, SDG&E has constructed and operationalized the machine-learning-based model of predicting wind gusts across its weather stations, further enhancing its forecasting capability to help serve communities in the highest fire risk areas.

SDG&E fire scientists and vegetation management have analyzed hundreds of thousands of trees, historical power outages, and weather conditions to derive the Vegetation Risk Index (VRI), which helps prevent tree-related outages and ignitions—reducing the risk of wildfires. The VRI quantifies the risk by analyzing the tree characteristics near a circuit—such as their number, height, species—and historical vegetation-related outages. The VRI is used in operational decisions during fire weather events and for prioritizing VM efforts and informing potential strategic undergrounding or covered conductor solutions.

Our goal is to continue taking steps to reduce the risk of wildfires throughout our region and to help educate and protect our customers, employees, and community.

SDG&E owns and operates a dense network of 222 weather stations in a 4,000 square mile service territory, like the one pictured here. Photo courtesy of SDG&E.

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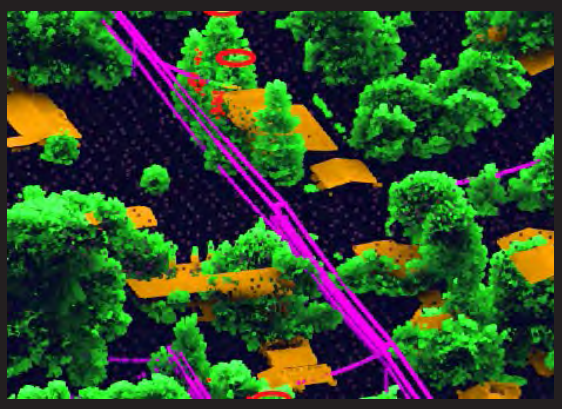

Don't be the victim of "good enough" data. NV5 Geosaptial's vegetation management solutions ensure you have the highest quality data and analytics tools to make the best decisions for your distribution network. See what NV5 Geospatial can do to improve your operations and grid resiliency. Your customers depend on it.

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