

Quality Vegetation Management™ for Utility Right-of-Ways

Leveraging The Value Of A Strategic, Quality Approach to Vegetation Management

With transmission and distribution lines that traverse hundreds, sometimes thousands of miles across rural, suburban and urban landscapes, vegetation management on right-of-ways (ROWs) has long represented one of the greatest challenges to electric utilities. In fact, it is often the single largest utility operations and maintenance budget line item. But it's not just the cost and magnitude of the task that underscores its importance: service reliability and customer satisfaction are also at stake.

According to the Electric Power Research Institute (EPRI), power outages and other power quality disturbances cost the U.S. economy nearly \$120 billion a year. Much of this cost is attributable to vegetation-caused outages, often accounting for 20 to 40 percent of all customer interruptions.

While safety and reliable delivery of energy are paramount, utility land managers also have other considerations. Trees and vegetation along ROWs comprise a highly visible dynamic living system. This vegetation is not only aesthetically important, but it can also house wildlife and plant species important for the local habitat. Frequently deferred or inconsistent management practices can result in exponential cost increases over the maintenance lifetime of the ROW, but can also increase the risk of substandard habitat quality for wildlife. The challenge is to balance long-term control and maintenance that can deliver results within a reasonable cost.

Faced with new competitive pressures and economic uncertainties, utilities are re-examining costs and priorities, and many are opting for an integrated, long-term approach to vegetation management — a strategy that, until recently, was not standard practice. The result: utilities that adopt a program based on **Quality Vegetation Management™ (QVM)** practices can save 25 to 40 percent on maintenance costs, while providing more effective, targeted vegetation control, restoring and improving plant, animal and human habitat, and strengthening relationships with customers and communities.

Benefits of Using a QVM Program

QVM is a continuous process that involves multiple vegetation control strategies. This includes applying herbicide responsibly, using the appropriate amount to achieve the desired results. This strategy seeks to match the management method to the vegetation and topography for each situation, while improving habitat for native plants and animals.

Another important benefit of a **QVM** program is its potential cost savings. A common misconception is that the use of herbicides will cost more than other methods of control. However, by practicing **QVM**, not only can the cost of the initial program be less than the cost of mechanical treatments such as mowing, but follow-up treatments can lower the cost even more, reducing overall costs by up to 50 percent. The use of herbicides has been shown to be safer than mechanical clearing, because even when crews use care with mowers and chainsaws, occasional accidents occur. Lastly, the long-term impact of a **QVM** program has benefits that are difficult to achieve with any other method, such as the

positive impact on habitat and wildlife restoration, which increase the program value without increasing costs.

A Closer Look Inside the Utility ROW

While ROWs are primarily dedicated thoroughfares for transferring energy throughout the country, they are also one of the few examples of a diverse and highly productive habitat component known as early successional habitat. This is the early stage of the ecosystem where vines, forbs and shrubs thrive and trees and brush don't compete with desirable low-growing vegetation. These open areas provide food sources, nesting sites and protection from predators for countless species of wildlife, including butterflies, songbirds, turkeys, mice, rabbits and white-tailed deer. Unfortunately, early successional habitat is rapidly disappearing from wildlife ecosystems due to excessive development and poor vegetation management. Some estimates suggest that ROWs account for 80 percent of the early successional habitat remaining in New England.

Well-managed ROWs also provide millions of miles of edge. Edge is where different plant communities, or habitats, meet. If a hardwood forest meets a ROW, an edge results. The combination of a forest and well-managed ROW provides an abundance of resources that attract wildlife of all kinds. The lower vegetation canopies allow for cover, yet are open enough for wildlife to watch for predators. ROWs also create travel corridors so wildlife can move to and from other habitats and water sources.

Habitat quality on ROWs varies depending on plant community structure, soil conditions, climate, location, etc. Plant species composition and diversity are important habitat attributes. For example, although a ROW habitat dominated by dense grass prevents erosion, is accessible to line crews and is not a danger to power lines, it is considered a low-quality habitat. Instead, habitat quality would be greater if there were a variety of grasses, forbs, vines, mosses, ferns, mushrooms and woody shrubs. It is this diversity of vegetation that provides niches for an array of species not found in a mature forest.

Charged with balancing a multitude of diverse, and sometimes conflicting, objectives, utilities are increasingly recognizing the need to take a more deliberate approach to vegetation management as a way to maximize long-term cost and performance benefits.

Mechanical Methods: The Cost Of Cutting

To manage ROW vegetation, utilities have two primary options: mechanical and herbicides. While mowing and cutting at first may appear to be the least expensive way to control vegetation, when all the expenses are added — equipment, fuel, labor, and the continuous cycle — it can actually be cost prohibitive. In addition, workers' compensation insurance is much higher when mowing is used — not to mention the potential liability costs when accidents happen.

Perhaps one of the biggest drawbacks of mowing is that it destroys wildlife habitat by shredding nesting sites and tearing up wildlife food sources. Mowing often removes beneficial, low-growing vegetation, which doesn't threaten power lines, but does offer significant benefit for wildlife. In some cases, ROWs are the only early successional communities available. Mowing reduces, and even eliminates, their potential habitat value. Mowing can also be tough on topsoil — increasing the risk of erosion and leaving behind leaking hydraulic fluid, oil and diesel fuel.

Another disadvantage of mowing is that objects like branches, rocks and barbed wire hurled by mower blades can damage nearby property and cause serious injuries to workers and bystanders. Even after mowing, the sharp pointed stubble that mowers leave behind remains a potential hazard. Moreover, mowing has the undesired effect of causing vegetation to grow back thicker and fuller, requiring repeated and more frequent cutting and mowing. This further hinders accessibility, shortens vegetation management cycle times, and increases equipment wear and tear. Eventually, it becomes a vicious cycle, with costs that continue to add up.

For these reasons, mowing should be used as a way to reclaim an overgrown ROW, but not as the only brush control method. Ultimately, vegetation management based solely on mechanical methods may offer a visible, short-term outcome, but it provides ineffective long-term control, and at the same time, introduces a great deal of risk and environmental harm.

Low-Volume Herbicide Techniques as Part of QVM

With low-volume applications, utilities can reduce the amount of active ingredient applied per acre, while increasing the number of acres of ROW treated annually with herbicides. Additional benefits include 30 to 40 percent cost reduction improvements over traditional mechanical and high-volume control techniques. Some of the more common low-volume application methods include:

- **Aerial Broadcast:** Rapidly treats a target area, is suitable for any height/density brush and works on any difficult terrain. This method has low impact on terrain and can be selective (depending on herbicide) for increased vegetative species richness.
- **Low-Volume Foliar (ground broadcast):** Best choice for medium to high-density brush up to 10 feet in height. Provides selective brush control with species-specific herbicide and allows minimal potential for understory runoff and off-target damage.
- **Low-Volume Foliar (backpack):** This method works on most terrains and is highly selective to target brush while preserving vegetative species richness. Treat individual tree foliage on brush with low to medium density and

heights to 10 feet. Highly efficient, with minimal chemical load on the environment.

- **Cut Surface:** Ideal for sensitive areas where mechanical equipment can't access. This technique prevents resprouting from untreated stumps. Individual stumps can be treated immediately after cutting (cutting is required only once) or in several weeks.
- **Basal Bark:** Offering low profile and low impact on terrain, basal bark is highly selective. This method treats individual stems, and is best for low stem-density sites and can be performed in the dormant season.
- **Hack and Squirt:** This method applies the herbicide directly into the target tree using a hatchet and squirt bottle. This method is best for sensitive sites where desirable trees can be left standing without competition.

Regardless of method, because a low-volume application is designed to remove only targeted, undesirable vegetation, it helps enhance wildlife habitat, not destroy it.

Vegetation managers should determine treatment options based on terrain, vegetation height, existing wildlife and habitat and density. For example, in cases where ROWs have been mowed for decades and hardwood brush is very tall and dense, an effective approach would be to mow first, then apply a herbicide after a small amount of re-growth the following year. This will allow the herbicide to move through the leaves into the root systems, preventing new shoots and promoting grasses and other desirable vegetation. Thereafter, a low-volume broadcast application with a selective herbicide or individual stem treatments can be used to maintain control of plant species. This will selectively control the undesirable vegetation while creating a ROW that will be conducive to habitat enhancement.

A primary goal of low-volume herbicide applications is reducing the amount of chemical placed into the environment. Utility companies that have not adopted low-volume techniques typically apply 100 to 200 gallons of herbicide mix on an acre. Using low-volume application techniques and **Arsenal® herbicide**, the amount is typically less than 50 gallons of mix per acre, with backpack applications as low as 5 gallons of mix per acre, depending on brush height and density.

Moreover, instead of an increased number of undesirable stems, which occurs with mowing and cutting, low-volume herbicide applications result in fewer stems with each successive application. Consequently, herbicide treatments are required less frequently and are more selective in terms of the species controlled, allowing desirable species to flourish.

As an example: Gainesville Regional Utilities (GRU) in Gainesville, Florida saw its per-acre ROW clearing costs drop by nearly 70 percent, thanks to the longer maintenance cycles brought about by low-volume, selective herbicide use and the reduction in ROW acreage requiring maintenance. Tracy Maxwell,

GRU vegetation manager, reports that in the 1994-1995 spraying season, the utility spent about \$90,000 on herbicide application and \$150,000 on reclearing, adding up to a total vegetation management cost of \$52 per acre of line.

After implementing a low-volume, selective herbicide program — which eliminates the need to mow ROWs on a regular basis — GRU’s costs dropped to \$52,000 in herbicide application and \$7,500 for reclearing by the 1999-2000 spraying season. This equates to an annual cost of \$16 per acre, or a cost-savings of 70 percent, compared to five years previous. (See Figure 1.)*

GRU VEGETATION MANAGEMENT COSTS

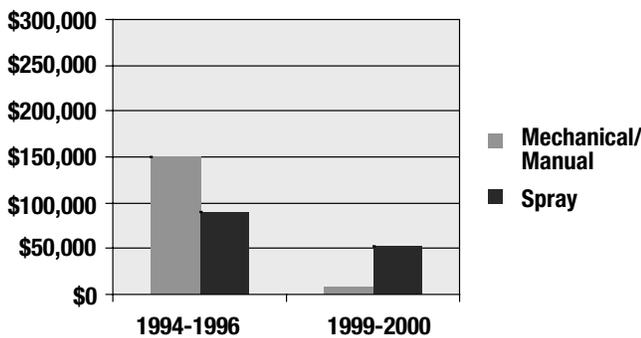


Figure 1. GRU slashed its mechanical and manual reclearing budget and reduced spraying costs after incorporating low-volume, selective herbicides.

* GRU’s cost per acre reductions are best case; these results may not be as good in all cases.

The total acreage requiring maintenance also decreased for GRU. “We have 100 fewer acres to treat because the problem species are gone,” Maxwell explains. “As we get more open areas that don’t need work, the cost differential [between mowing and herbicides] widens. I hadn’t expected such a large savings, but I saw it myself.”

Maxwell proved his experience wasn’t an isolated occurrence when he reviewed the results of a recent study which compared low-volume herbicide use to mowing on test plots at three Florida utilities: Florida Power and Light (FPL)/Clay Electric Cooperative Inc. (CEC); Florida Power and Light (FPL); and Jacksonville Electric Authority (JEA). All three utility companies saved money in the first year with the use of low-volume, selective herbicides. (See Figure 2.)

In a similar example, Georgia Power predicts that by 2006, its total vegetation management costs for the ROW floor will be 35 percent lower by relying on a low-volume herbicide application program in combination with a lengthened mowing cycle. (See Figure 3.) That’s because as naturally low-growing plants become more dominant in the ROW, thanks to herbicide management, the maintenance costs decline over time.

LOW-VOLUME, SELECTIVE HERBICIDE USE

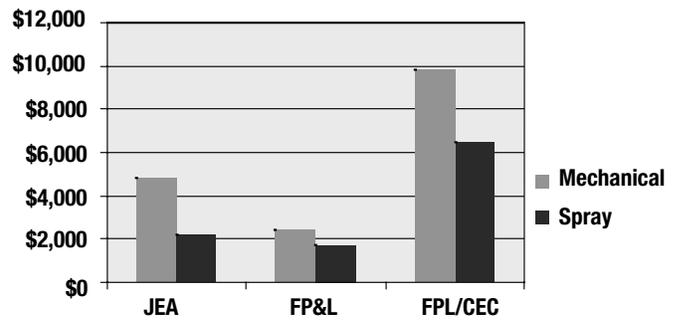


Figure 2. Low-volume, selective herbicide use yielded significant savings for these Florida utilities.

MANAGEMENT COSTS DECLINE WITH HERBICIDE USE

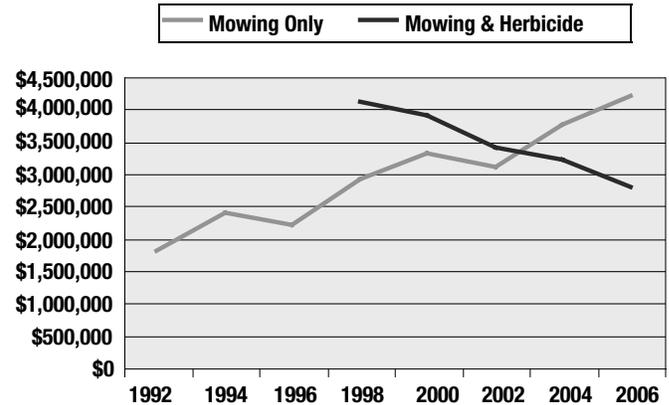


Figure 3. Georgia Power projects big savings by incorporating low-volume, selective herbicides, compared to mowing alone.

“Initially, there was a cost increase when we mowed and then sprayed the following year, because of the added maintenance cost of the spray program during the transition period,” recalls David Thomas, transmission supervisor of forestry and right-of-ways, Georgia Power. “Subsequently, the amount of herbicide we use and the related cost have decreased as woody stems decreased, and the time between mowing cycles could be lengthened. Productivity has increased, because we have fewer stems to spray. Equipment costs have been lowered, too, since we use backpacks to spray the herbicides.”

In instances where a utility ROW traverses a roadside ROW, low-volume techniques make the application process safer and more convenient for operators and the public. Using compact, vehicle-mounted or backpack sprayers, maintenance crews no longer block roadways with high-volume spray trucks. Motorist visibility is not decreased, and the less visible backpack operators don’t distract motorists. In addition, because low-volume herbicides control vegetation better and longer than

mowing, road signs and shoulders remain easier for motorists to see. Combined, these factors greatly increase public safety.

Choosing The Right Herbicide

Not all herbicides are created equal. Some have an extremely wide control spectrum — from controlling grass to shrubs to seedling trees. Others may have a narrower spectrum of control, but are more effective when used in high-volume applications. Still others are most effective when used in low volumes. The most valued herbicide tools are those that control the most troublesome species, prevent spring re-sprouting and allow flexibility of application timing.

Low-volume herbicide applications (100 gallons per acre or less) are more conducive to wildlife habitat enhancement than mechanical control strategies or high-volume applications, and provide effective vegetation control with less cost per acre. When used properly, they are not toxic to people or wildlife. And because they are more targeted and require less solution for effective control, they pose less risk and cause fewer injuries to workers, the community and the environment. Low-volume applications can be done with a backpack using selective stem applications or broadcast with a radiarc or a handgun.

“We save a lot of money using herbicides,” says Dennie Chilton, right-of-way maintenance supervisor with the Upper Cumberland Electric Membership Corporation, which serves seven counties in Tennessee. “The cost of mowing to us, which includes equipment breakdowns and maintenance, labor and fuel, is over \$700 per acre. Our mowing cycle was every two to three years. With herbicides, we last about four to six years. Plus, an area that takes a day to mow, would take an hour to treat with a herbicide.”

Aesthetics also play an important role in herbicide choice, because some products achieve a rapid brownout of vegetation, resulting in unsightly withered leaves. The slow-acting effects of low-volume herbicide application techniques are particularly desirable, because they result in a gradual transition from a ROW dominated by tall-growing brush to one occupied by more compatible lower-growing forbs, grasses, flowers and brush species. A slow brownout can be achieved using a slow-acting herbicide such as fosamine, or glyphosate, which is more fast-acting. When a slower brownout is desired, such as to mimic that of a fall dormancy or coloration, apply late in the growing season using a tank mix of **Arsenal**® herbicide and fosamine. For a faster brownout, choose a tank mix of **Arsenal** and glyphosate.

Proven, low-volume herbicides, such as **Arsenal** and **Stalker**® herbicide, can control unwanted vegetation, including many hardwood tree species, while releasing desirable forbs. Unlike previous generations of herbicides, these selective herbicides specifically target three enzymes found only in plants — not in

birds, fish, people or other mammals. While mowing is totally non-selective and indiscriminate in its destruction, **Arsenal** and **Stalker** control unwanted weeds and brush right down to the roots, without impacting the forbs and legumes wildlife use for food. In fact, these **Smart Herbicides**™ actually help increase species richness by releasing desirable vegetation from competing plants.

Because **Arsenal** translocates throughout the entire plant, killing the brush at its roots, long-term costs are reduced because there is little need for retreatment. It has minimal movement in the soil and is highly effective when using low-volume application techniques. This means less product applied and less chemical load on the land.

Stalker contains the same active ingredient as **Arsenal**, which travels throughout the plant to inhibit growth. **Stalker** plus triclopyr, used for basal bark and cut-surface treatments, can offer superior control of sassafras, black cherry, ailanthus and many other difficult woody brush species. Because of its effectiveness, **Stalker** can reduce the total active ingredient applied per acre by as much as 50 percent compared to other herbicides.

Certain areas like utility substations need to be completely free of weeds, day-in-day-out, year after year. **Journey**® herbicide is a highly effective herbicide that controls a wide range of broadleaf and grass weeds. **Journey** is readily absorbed through leaves, stems and roots and is translocated rapidly throughout the plant delivering an effective, season-long bareground and sensitive bareground control, and eliminating the need for re-treats. Treated plants stop growing soon after spray application, resulting in fewer applications, which saves time and budget dollars. **Journey** is particularly well-suited for utility substations because it stays where it is sprayed and is much less likely to runoff from the treated areas and impact adjacent vegetation.

QVM Yields Dividends

With all the pressures of today, utilities are in a state of change. The public wants — and even demands — low cost, safe and dependable energy. And, most people are concerned about wildlife and wildlife habitat. Clearly, public relations and corporate image are increasingly important considerations. By transitioning from the high cost and substandard performance of traditional techniques to a more strategic, **QVM** approach, utilities can more effectively balance these often competing objectives.

Utilities today can take several key steps toward implementing a successful **QVM** program:

- **Assess the situation** – To get started, a utility should make an assessment of current habitat, existing wildlife needs and habitat needed to attract desired species. Obviously, ROWs running through existing woodlands or

through rough, less developed areas offer the greatest potential for wildlife habitat improvement. Cropland, pasture, and residential and industrial developments neighboring on ROWs offer less habitat potential, although niche opportunities may exist even in those areas. It's also important to know if there are any endangered or threatened species on the land or surrounding areas to determine the best way to protect them.

- **Plan your control strategies** – As the biodiversity present in the ROW is determined, select control strategies that best meet the vegetative composition, topography and habitat conditions of the targeted ROW.
- **Utilize professionals** – Work with professional herbicide manufacturers, distributors and applicators, wildlife managers and consulting foresters to assess wildlife habitat conditions and establish short- and long-term vegetation management goals and plans. Applicators should be certified and trained in the specific herbicides and application methods used to ensure quality application.
- **Research low-volume and low active ingredient** – Working with your applicator, determine if a low-volume herbicide will be effective and discuss the amount and rates of chemical to ensure the lowest effective active ingredient for each site.
- **Look at the long term program** – Success doesn't happen overnight. Look at the long-term goals of the utility and re-assess every year to make sure that the program is on track.

Resources For More Information

- BASF VMAnswers: www.vmanswers.com
- U.S. Fish and Wildlife Service: www.fws.gov
- USDA, Natural Resources Conservation Service: www.nrcs.usda.gov
- Wildlife Habitat Council: www.wildlifehc.org

www.vmanswers.com

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