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VWVIEWS



Sustainability is essential for vegetation managers

Casey Onstot, IVM and Range & Pasture product marketing leader, Dow AgroSciences

Sustainability is a common and overused business term these days. But for those who work in vegetation management, sustainability has long been an expected way of doing business.

Vegetation management tools — mowing, herbicides, biologicals or a combination of these — all control unwanted vegetation to maintain the reliability of infrastructure. All also have an effect on surrounding ecosystems, which need to be preserved as healthy and biodiverse areas. Meeting both needs also must be accomplished with safety of the public and workers in mind. It is a big job. And it is about sustainability.

Building on a long-standing commitment

The intersection of human, wildlife and environmental needs is one reason that the potential environmental impact of vegetation management herbicides has been studied essentially as long as they have been used. Dow AgroSciences understands the crucial role science plays in preserving our resources for future generations. So, for nearly 60 years, we have been discovering, developing and bringing sustainable solutions and better land management tools to the Vegetation Management industry. Our goal is to develop tools that leverage the power of science to control problem vegetation, while at the same time benefiting the land and its wildlife.

This long-standing commitment to sustainability has been formalized in The Dow Chemical Company's 2025 Sustainability Goals, which serve as a corporate sustainability road map. Only a win-win approach to business can produce new opportunities and drive innovation. Our commitment to sustainability will help advance human progress by:

- Discovering and developing solutions that help preserve the quality of our land, water and air
- Mitigating our environmental impact in manufacturing, packaging and shipping
- Contributing to community success through meaningful collaboration

Dow AgroSciences will continue to support vegetation management professionals through research and development of new products and innovative uses.

Blending traditional with nontraditional

Recently, you've likely noticed stories in this newsletter about projects beyond the traditional commercial uses of vegetation management. We've written about herbicide use to restore crucial endangered bird nesting habitat on the Midway Islands. We've reported on university researchers using targeted applications of herbicide-infused paintballs on Maui to control invasive plants and save strategic watersheds. And, in this issue, we write about the mission of a conservation group in the Bahamas.

We have made an effort to share these stories of unique, yet important, vegetation management collaborations to raise awareness of our industry's innovative contributions to protecting and preserving our environment. We are not just in the vegetation management business. We are all in the sustainability business. It's about more than words. It's about actions.

We will continue to share more about how the Dow AgroSciences Industrial Vegetation Management business is continually working to improve sustainability in our environment, while supporting you in your organization's efforts around it as well.

InvasiveWatch

WINTER CREEPER (*EUONYMUS FORTUNEI*)

WHAT TO LOOK FOR.

Winter creeper is a winter evergreen that can be a small shrub – growing in mats along the forest floor to 3 feet in height – or a vine climbing trees to heights of 40 to 70 feet. Its opposite leaves are dark green, oval, slightly toothed, glossy and thick and often have a silvery-white venation. Flowers are inconspicuous, yellow-green and five-petaled and develop in midsummer. Plants typically flower only when climbing and almost never when trailing along the ground.

Winter creeper is a perennial and is able to tolerate and spread quite rapidly in a wide variety of growing conditions. The invasive plant colonizes both vegetatively through its vine growth and through distribution of its pink-capsulated seeds, which are spread by birds, small animals and water. If allowed to establish and grow unchecked, the vine will spread



James H. Miller, USDA Forest Service, Bugwood.org

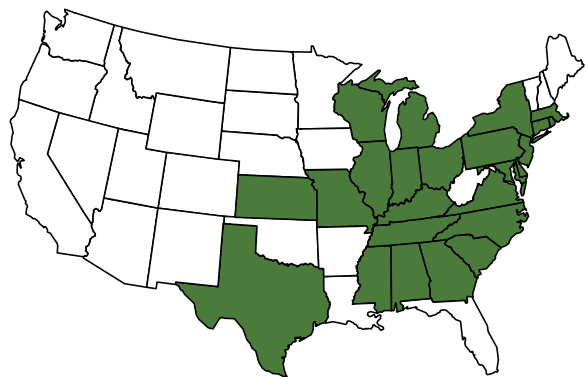


James H. Miller, USDA Forest Service, Bugwood.org

over anything in its way, even overtopping trees and prohibiting foraging by wildlife and livestock.

WHERE IT'S FOUND.

This vigorous vine aggressively invades forest openings, edges and rights-of-way, growing across the ground and climbing high into the tree canopy by clinging to the bark. On the ground, the plant forms dense mats that can displace native species and deter seedling establishment by blocking sunlight. The vines will smother and kill shrubs and small trees, as well as deplete soil nutrients and moisture from other nearby plants, making growth and regeneration more difficult for native species.



Source: USDA PLANTS Database Profile

Introduced ■

The plant is native to Asia and was introduced to the United States in the early 1900s as an ornamental plant. It's now considered a major noxious weed, having been reported to be invasive in natural areas in most of the states in the eastern half of the United States.

HOW TO TREAT IT.

Apply 7 fluid ounces of Milestone® specialty herbicide per acre in a foliar application. Ideal timing is late fall, when plants are dormant. Be careful to treat only the vine when it is growing on trees that may be susceptible to control from Milestone. Follow-up treatments may be needed to achieve complete control as winter creeper is difficult to eradicate.

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When treating areas in and around roadside or utility rights-of-way that are or will be grazed, hayed or planted to forage, important label precautions apply regarding harvesting hay from treated sites, using manure from animals grazing on treated areas or rotating the treated area to sensitive crops. See the product label for details. State restrictions on the sale and use of Milestone apply. Consult the label before purchase or use for full details. Always read and follow label directions.

DONATION FROM DOW AGROSCIENCES HELPS RESTORE SHOREBIRD HABITAT IN THE BAHAMAS



Margo Zdravkovic, Conservian/Coastal Bird Conservation

The Bahamas include more than 700 islands, with thousands of miles of sandy shorelines, mangroves and other natural areas that are prime habitat for numerous species of migratory and breeding coastal birds. Australian pine, an invasive species originally planted by people in the late 1800s, has spread throughout the Bahamas archipelago — eroding beaches by displacing native vegetation and damaging shorebird nesting habitat.



Conservian, a nonprofit conservation group created to protect coastal birds and their habitats, initiated the 2016 Bahamas Shorebird Conservation Expedition in an effort to reverse the damage. The five-week expedition aboard a 75-foot schooner began early this summer as the first program in the Bahamas to implement protective measures for beach-nesting birds and habitat. A significant part of those protective measures included working with

local partners and community members to implement a pilot treatment program to control Australian pine by using herbicides with the goal of restoring the habitat to its original state.

Donation from Dow AgroSciences plays key role

Long before the expedition set sail, Conservian director Margo Zdravkovic contacted Danny Leckie, IVM specialist with Dow AgroSciences, for guidance on treating Australian pine and assistance regarding herbicide and application recommendations. Based on the expedition's goals and the invasive species targeted, Leckie worked with Pat Burch, field scientist, Dow AgroSciences, to develop a treatment plan using Pathfinder® II specialty herbicide. Pathfinder II not only effectively controls Australian pine but also is a premixed and ready-to-use herbicide solution for basal bark and cut-stump applications — especially important as Conservian didn't want to have to mix herbicides in the field.

“We were able to advise the Conservian team not only about an herbicide recommendation but also about proper

training and techniques, as well as the equipment needed to perform those techniques,” Leckie says. “Pathfinder II was perfect for what they wanted to do, and we were able to take it a step further by securing a donation of 50 gallons of product to assist Conservian, as it relies on donations to complete its important work.”

Initial success spurs future plans

The completed pilot program consisted of cut-stump basal bark applications of Pathfinder II at Lucayan National Park's Gold Rock Beach on Grand Bahama Island. Inspection of the areas treated earlier this summer has shown excellent control of shoreline infestation. Conservian's long-term goal, with the help of partners, is to eventually treat all the coastal habitat of the Bahamas affected by Australian pine.

Plans are already in place for a second expedition in 2017, targeting new sites in the northern Bahamas. For more information about Conservian and its worthy projects or joining the 2017 Bahamas Conservation Expedition, follow its Facebook page at facebook.com/CoastalBirdConservation.

*Pathfinder is a trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow. Always read and follow label directions.

KEEP BRUSH AT BAY AND EXTEND YOUR SEASON WITH BASAL BARK TREATMENTS



Low-volume basal bark treatments are an effective tool in vegetation managers' toolboxes for controlling woody plants, especially when working in and around sensitive sites. These treatments also can be applied anytime, including during winter months, except when snow or water prevents spraying to the groundline or when stem surfaces are saturated with water. This flexibility extends the application season and allows for a potential reallocation of work crews early in the season when they are not as busy and have more time available.

With these treatments, herbicide is applied to the base of individual woody plants or stems, where it penetrates the bark to reach the cambium, and then translocates to the roots and stems for complete control. Translocation is what makes the treatment highly effective and eliminates resprouting or regrowth.

In general, low-volume basal bark treatments work best in areas with medium to low stem density (fewer than 2,000 stems per acre), and with stems up to 6 inches in diameter and any height. Low-volume basal bark treatments are most effective in the following situations:

- As selective treatments where other species are to be left untreated
- As a follow-up to mechanical clearings or reclamation projects
- For treating areas of high public visibility or areas that are inaccessible to heavy equipment
- On sites that require routine — but not intensive — maintenance
- Where a low profile is required to maintain desired vegetation

Milestone® provides flexibility and broader control

Milestone® specialty herbicide is labeled for use as a low-volume basal bark treatment, as well as for basal cut-stump and cut-surface treatments alone, for sensitive woody species in the Fabaceae family (legumes), or in combination with Garlon® 4 Ultra specialty herbicide on other woody species. The addition of Milestone to a basal mix provides a broader spectrum of control than with

Garlon alone, but an additive may be necessary to mix Milestone into a basal mix with Garlon 4 Ultra.

Mix Milestone at 0.5 percent to 5 percent v/v alone or with Garlon 4 Ultra in a commercially available basal diluent. The basal oil should be compatible with a water-soluble herbicide, such as Milestone. Herbicide concentration will vary with tree diameter, bark thickness, volume used per acre and the susceptibility of the species being treated. These combination treatments are especially effective on root-sprouting species, such as cherry, locust or tree-of-heaven.

Using a backpack sprayer, apply spray solution with the appropriate nozzle (flat fan or solid cone) to the lower 12 to 15 inches of bark to the ground level. Spray until the bark is wet but not to the point of runoff. Old or rough bark will require more spray than young, smooth bark. When applying to trees with exposed roots, continue treatment down the root collar to the soil line for maximum effectiveness. Again, these treatments can be done anytime, unless snow or water prevents spraying to the groundline or when stem surfaces are saturated with water."





HOW WATER QUALITY CAN IMPACT HERBICIDE PERFORMANCE

Herbicide applicators are trained to know the influence that certain factors can have on the effectiveness of the application — things such as application timing, equipment calibration and selection of the proper herbicide for the vegetation being treated. One factor often overlooked is water quality.

Water is often 95 percent or more of the total herbicide spray solution. So it makes sense that water quality could impact the effectiveness of the herbicide application.

Poor water quality can have adverse effects

What kinds of problems can poor water quality cause in a herbicide solution? For one, if water contains high levels of acidity and/or dissolved minerals, these may interact with the active and/or additive ingredients in the herbicide formulation. Poor-quality water also can adversely influence the herbicide by reducing the solubility and decreasing absorption by the target plant, resulting in poor performance.

These problems might not always drastically reduce performance, but even a slight drop may be enough to cause significant control issues when treating particularly difficult species or species that are tolerant to certain herbicides. And if this happens, water quality often is overlooked as the culprit. The immediate suspects are factors such as improper tank-mixing, poor weather conditions at the time of application or perhaps the herbicide used.

Testing water is important

It's important to test your water before making a tank mix. Things to measure include iron levels, pH and water hardness. There are

essentially two options for testing your water: Hire a professional vendor or purchase a do-it-yourself water-testing kit. The route selected probably will be influenced by the water source.

If an operation is getting the majority of the water used in applications from the same main source, it's fairly simple to bring in a professional to determine the water quality before the season starts.

Selecting the do-it-yourself testing route makes more sense for those who are using multiple water sources from various areas and locations. These kits are readily available and usually involve using color-changing paper to document the pH, water hardness and iron levels.

Water quality problems can be solved

There are several ways to help solve water quality issues. It starts with reviewing the recommendations on the herbicide label. The label may specify pH levels needed, or it may warn about reduced effectiveness if mixed with water that is considered to have high hardness levels.

If the water doesn't meet requirements, it may be necessary to add an adjuvant or condition the water. A water conditioner can be added to the herbicide solution to eliminate problems with water hardness. Or a pH buffer can be used to raise or lower the water's pH. Taking these steps will help ensure that the water you're using won't negatively affect your herbicide performance.

UNDERSTANDING GRAZING TOLERANCES WHEN USING HERBICIDES

When applying herbicides on a utility right-of-way, roadside or other approved use site, it's important to read and understand product labels. If not, the application can lead to unintended consequences, such as off-target crop damage. Furthermore, if a herbicide without established grazing tolerances is mistakenly applied to land used for grazing, or even land that is potentially susceptible to grazing, it can lead to the contamination of livestock or other animals.

What are grazing tolerances?

Grazing tolerances are established for a pesticide by the U.S. Environmental Protection Agency (EPA). They are only established for products that have undergone stringent testing for use of the pesticide on grass, hay or other feedstock for livestock animals such as cattle, horses, sheep and goats. Only herbicides with grazing tolerances should be used to treat unwanted vegetation in grazed areas. Products with grazing tolerances may have certain grazing restrictions, which are listed on the product label. The restrictions include any special instructions (such as maximum allowable use rates, how to handle hay or manure, or use for lactating dairy animals) pertaining to applying the herbicide within grazed areas.

Why are grazing tolerances important?

When treating an area such as a right-of-way that crosses a pasture, even though the herbicide may be registered for use on rights-of-way, the EPA still requires a tolerance or exemption from tolerance for any food or feed commodity, including meat, milk, grass or hay. This means that unless it can be assured that no animals graze the treated area, a herbicide product without a grazing tolerance cannot be used in that area. It also means that responsible vegetation managers should not use products without grazing tolerances if the land they are treating may be grazed, as they could be cited for misapplication of a herbicide.

What is the difference between a herbicide with grazing tolerances and one with grazing restrictions on its label?

In short, a herbicide with grazing tolerances means it has undergone extensive testing and received EPA approval for use to treat vegetation in areas grazed by livestock. If tolerances exist, then the label will have instructions for how to use the herbicide and comply with the established grazing tolerance.

A herbicide that contains grazing restrictions on its label means that the product can be used to treat vegetation in grazed areas, but there are certain restrictions that should be followed. These restrictions could apply to use rates, application methods or how to handle hay, manure or the movement of livestock in and out of the treated areas. If the listed restrictions are not followed, it could be a violation of the

label and cause any animal that grazes the treated vegetation to be unacceptable for slaughter and human consumption.

Does using herbicides without grazing tolerances increase your liability when applying near grazed areas?

When using herbicides with no grazing tolerances on a right-of-way, treatment cannot continue when pastures or other land susceptible to grazing animals is encountered. If treating grazed areas with a herbicide that does not have grazing tolerances, it is a violation of the label and subject to state and federal regulatory action. When a pasture in a right-of-way has been treated, the area is subject to the grazing restrictions, if any, on the product label.

Having grazing tolerances is similar to using herbicides registered for both aquatic and terrestrial use when making an application. When a herbicide has both aquatic and terrestrial labeling, vegetation managers and applicators are able to treat entire rights-of-way, even when encountering creeks, streams and wetlands, instead of having to switch from a terrestrial herbicide to an aquatic herbicide. It is similar for vegetation managers and applicators using a herbicide with grazing tolerances. They are able to treat the entire right-of-way without having to switch herbicides or herbicide mixtures, even when the right-of-way contains both nongrazing and grazing areas.

What happens if cattle eat grass treated with herbicides without established grazing tolerances?

The short answer is that these animals cannot be sold or slaughtered for human consumption. This means cows, horses, goats, sheep or any animal that may graze and ingest treated grass. So, even if an animal escapes from a fenced-in pasture and grazes an area treated with a herbicide without a grazing tolerance, that animal is considered adulterated and cannot be sold for food. This is potentially devastating to ranchers and farmers who make a living selling livestock.

What products does Dow AgroSciences offer with established grazing tolerances?

Dow AgroSciences offers a full portfolio of products with grazing tolerances, all developed with the end user in mind. Dow AgroSciences' latest commitment to vegetation managers are Milestone®, Vastlan™, Capstone® and Opensight® specialty herbicides. These products provide vegetation managers with the ultimate flexibility and convenience when making treatments. Some other popular Dow AgroSciences herbicides with established grazing tolerances include Rodeo®, Spike® 80DF, Garlon® 3A, Garlon 4 Ultra and Transline®. Even with these established tolerances, some restrictions or precautions exist on certain products. Read each product label carefully for more information.

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When treating areas in and around roadside or utility rights-of-way that are or will be grazed, hayed or planted to forage, important label precautions apply regarding harvesting hay from treated sites, using manure from animals grazing on treated areas or rotating the treated area to sensitive crops. See the product label for details. State restrictions on the sale and use of Capstone, Garlon 4 Ultra, Milestone, Opensight, Spike 80DF and Transline apply. Consult the label before purchase or use for full details. Vastlan is not registered for sale or use in all states. Contact your state pesticide regulatory agency to determine if a product is registered for sale or use in your state. Always read and follow label directions.

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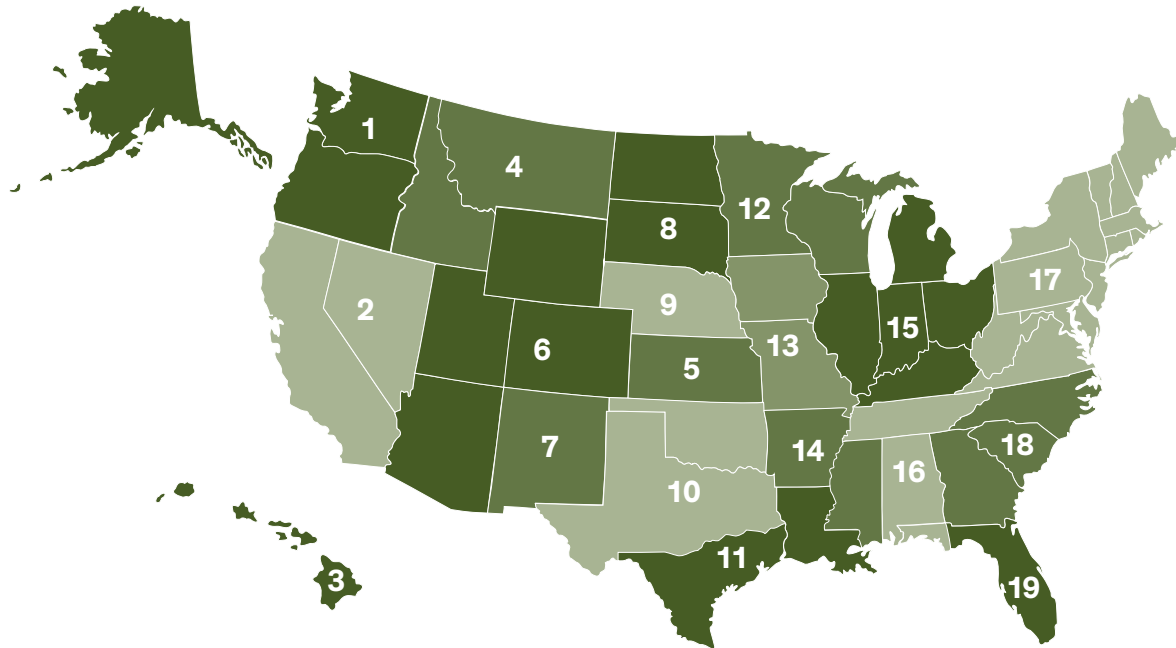
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Dow AgroSciences Vegetation Management Specialists



1. Bob Stewart, Albany, OR
541-924-0881
rastewart@dow.com

2. Beau Miller, Sacramento, CA
916-296-2811
bjmiller@dow.com

3. Roman Dycus, Honolulu, HI
808-779-7025
rddycus@dow.com

4. Trent Brusseau, Caldwell, ID
208-318-8877
tabrusseau@dow.com

5. Debbie Morton, Leawood, KS
913-948-1690
demorton@dow.com

6. Claire Volk, Loveland, CO
972-439-7666
cmvolk@dow.com

7. Greg Alpers, Roswell, NM
575-626-7438
gaalpers@dow.com

8. Karissa Floerchinger, Fargo, ND
406-788-4044
KAFloerchinger@dow.com

9. Craig Davidson, Lincoln, NE
701-260-0712
cdavidson@dow.com

10. Rhonda Roberts, Princeton, TX
317-220-0665
rkroberts@dow.com

11. Oracio Molina, Fort Worth, TX
682-308-7460
OMolina@dow.com

12. Jamie Baumgardner, Des Moines, IA
712-299-2583
jdbaumgardner@dow.com

13. Brant Mettler, Sarcoxie, MO
940-641-0274
bcmettler@dow.com

14. Blake Williams, Memphis, TN
863-393-5772
bwwilliams@dow.com

15. David Jay, Mooresville, IN
317-946-4086
dmjay@dow.com

16. Jacob Hodnett, Wadley, AL
334-349-6123
jmhodnett@dow.com

17. Brandon Dunlap, Carlisle, PA
717-448-7101
btdunlap@dow.com

18. Darrell Russell, Roswell, GA
470-545-8983
dwrussell@dow.com

19. Daniel Leckie, Cape Coral, FL
843-513-3914
deleckie@dow.com

Railroad:

Homer Deckard, Friendswood, TX
281-992-5331
hedeckard@dow.com



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For more information, visit us at VegetationMgmt.com.