United States Department of Agriculture

Integrated Vegetation Management (IVM)

Maintenance Strategy for Improved Pollinator Habitat and Economic Benefits in Conservation Reserve Program Plantings

Conservation Fact Sheet ***May 2017***

THE VALUE OF POLLINATORS

Pollinators are a vital component of the production and persistence of many agricultural products. The majority of the products that we use and the food we eat daily are either dependent on, or derived from, plants that rely on pollinators.[1] There would be devastating economic costs if pollinator populations were to dramatically decrease. In the United States, domestic honey bees, native bees, and other pollinators contribute more than $24 billion to the agricultural economy by pollinating fruits, nuts, and vegetable crops.[2] Worldwide, $250 billion worth of agricultural production, or over 80 percent of all crops, require pollination.[1]

The Conservation Reserve Program (CRP) can play an important role in providing habitats that support pollinators and other wildlife. Herbaceous plantings, especially those that include a diverse mix of native grasses, forbs, and legumes, are important for providing food resources for pollinators, other insects, and wildlife in the forms of pollen, nectar, foliage, and seeds, as well as nesting and cover habitat.

The monarch butterfly provides a good example of the importance of habitat. Although the monarch is not a critical pollinator for crop production, it does play a significant role in the United States economy. The monarch migration, which occurs yearly to and from Mexico, is valued in the billions of dollars.[2] Since 1997, both the value and the number of monarchs have been reduced by 90 percent.

The monarch's population decline is often attributed to the use of conventional agricultural practices.[3] In the United States, effective weed control and expanded crop acreage has reduced the availability of milkweed, a vital food source for monarch larvae.[4,5] The population dynamics of monarchs are complex, however. Recent research suggests that although milkweed is essential for larval monarchs, it may not be the primary limiting factor for monarch populations. The lack of nectar sources during migration and habitat degradation (in North America and Mexico) are likely to be contributing factors in the monarch's decline.[6]

Figure 1. Monarch butterfly on butterfly milkweed *(Asclepias tuberosa)*. *Source: http://www.ivmpartners.org/pollinator/*

Figure 2. Common milkweed *(Asclepias syriaca)*. *Source: http://www.ivmpartners.org/pollinator/*

Thus, it is important that sufficient habitat be maintained not only during the reproductive season for insects and wildlife, but also during the fall and into the winter to provide pollen and nectar sources for domestic and native bees, butterflies, and other pollinators, and protective cover and food for migrating and non-migrating birds and other wildlife.

MAINTENANCE STRATEGIES FOR HERBACEOUS PLANTINGS

In Maryland, producers can control the growth of unwanted woody vegetation in herbaceous CRP plantings after August 15, when the primary nesting season (PNS) has ended. Depending on requirements in their contract and conservation plan, most producers mow immediately after the PNS. This late summer mowing has the undesirable consequence of destroying plants that provide food (i.e., nectar, pollen, foliage, and seeds) for insects and birds, as well as killing pollinator larvae on host plants, such as milkweed. Wojcik, et al. (2016) says it best: "Without a place to feed and nest, pollinators cannot survive."

Controlling woody vegetation in herbaceous plantings can be difficult, especially when plantings are adjacent to woody seed sources, such as forested areas. CRP restricts the timing and frequency of mowing to protect and maintain habitat for pollinators and other wildlife. In general, CRP conservation plans state that no more than 1/2 of CRP acreage can be mowed in any one year (on a two to three year rotation), except for unique circumstances, such as to manage invasive plant species. Mowing during the growing season in late summer (after August 15) or early fall may help to control woody vegetation better than dormant season mowing because it prevents the plant from storing reserves in the root system. However, mowing during the growing season has the disadvantage of removing fall-flowering plants for pollinators and habitat for resident and migratory birds.

There are three options to consider when using mowing to control woody growth on CRP acreage:

Good - Soon after August 15, mow 1/3 to 1/2 of the CRP ground.

Better - Mow 1/3 to 1/2 of CRP ground in mid-winter to early spring (from December 1 to April 14), after herbaceous annuals and perennials have set seed. Delayed mowing retains habitat for pollinators, birds, and other wildlife during the growing season, but it may also require the use of additional measures to control woody vegetation, such as prescribed burning or targeted herbicide application.

Best - Develop an Integrated Vegetation Management (IVM) plan that eliminates or reduces mowing. Targeted herbicide treatment (also referred to as "spot treatment") will be the principal method of maintaining herbaceous cover.

MOWING VS. IVM

Mowing is often used to control woody vegetation because the equipment is readily available and the job can be done fairly quickly. However, this method usually provides only short-term results because it leaves live stems and root-stocks that re-sprout, thus perpetuating the need for mowing. Tree species that readily regenerate from cut stems include red maple, sweetgum, black cherry, tulip poplar, tree of heaven, and bradford pear, all of which are among the more common invaders in herbaceous plantings. Mowing these seedlings and saplings may also worsen the situation by replacing single-stemmed plants with multi-stemmed sprouts.

One alternative to mowing is the implementation of IVM, which can be defined as "the practice of promoting desirable, stable, low-growing plant communities — that will resist invasion by tall-growing tree species — through the use of appropriate environmentally sound, and cost-effective, control methods. These methods can include a combination of chemical, biological, cultural, mechanical, and/or manual treatments."[7] IVM is not the singular use of one treatment, but an integrated management technique used to reduce the overall costs of treatment and increase the effectiveness and outcome of vegetation treatments.

One of the main concepts of IVM is to establish low-growing vegetation that will out-compete woody species. This in turn will decrease maintenance costs by reducing the amount of time, labor, machinery, and other inputs used to mechanically control taller-growing species.[7] Small mammals, who are protected under the low-growing plant cover, may also eat some of the seeds and seedlings of woody species and help deter the spread of woody plants. Before implementing IVM, it is important to have knowledge of the different species, and species interactions, within the IVM area.[8]

TARGETED HERBICIDE TREATMENT AS A COMPONENT OF IVM

IVM plans often encourage the use of several different treatments to control woody vegetation, but targeted herbicide treatment alone can be an effective practice. Targeted treatment focuses on woody species, and avoids killing pollinator larvae and their food plants. Butterflies were seen much more frequently in areas where woody growth was controlled by herbicidal treatments than in areas where hand-cutting treatments were used.[9] According to Williams, et al. (1997), a "selective herbicide approach was recognized as the 'best' approach to achieve" stable growth of low-growing plant communities that require little maintenance over time and are beneficial to wildlife. After a single growing season, the benefits to pollinators can be significant.[5]

ECONOMIC BENEFITS OF IVM

As the landscape transitions, less money is spent on maintaining herbaceous vegetation because of a reduced or eliminated need for mowing and a focus on selective chemical controls.[7] Maintenance inputs are minimized due to diminished woody plant populations; this leads to direct and indirect cost savings.[8] Direct costs include labor, equipment, and materials, and indirect costs include the potential for environmental degradation (e.g., harm to pollinators). Although it is hard to find actual dollar amounts for indirect costs, the overall contribution of pollinators to the food supply should be factored into the economic benefits of IVM.[8]

The cost-effectiveness of IVM is explained by Nowak, et al. (2005), "IVM equates to using treatments that are least costly in terms of dollars, produce minimal risks for human health and the environment, and create the desired vegetation conditions and associated positive values over the long-term. Said differently, IVM can be used to maximize cost-effectiveness of maintenance efforts."

Table 1 provides example costs of different treatment methods to control woody plants. Although mowing is less costly on a per acre basis than the other methods listed, it is generally less effective than targeted herbicide treatment and may need to be used more frequently and over larger areas. As a result, total maintenance costs are often higher with mowing than when using herbicidal control.

Table 1. Cost Comparison of Different Methods for Controlling Woody Vegetation.

Treatment Method	Per Acre Cost*
Mechanical - Mowing	$120
Mechanical - Mowing and Herbicide Treatment	$485
Herbicide Treatment - Mechanized Spraying	$135
Herbicide Treatment - Spot Spray Individual Plants	$210
Herbicide Treatment - Hand Cut and Spray	$430

* Cost is based on MD NRCS estimates used in Fiscal Year 2017 financial assistance programs for a one-time application of Brush Management. Costs include labor, equipment and equipment repair, herbicides, and fuel, as applicable.

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