Establishing and Managing Pollinator Habitat on Saturated Riparian Buffers

Conservation practices for water quality and pollinator habitat can be complementary – using some of the same land and resources can multiply ecological benefits for water and wildlife. It may also make investing in conservation more financially feasible for landowners.

Saturated riparian buffers, also known as saturated buffers or SRBs, are a new agricultural conservation practice that can reduce nitrate to surface waters flowing through subsurface drainage systems by 40-100%. Saturated buffers have an approved USDA Conservation Practice Standard (Code 604) and are eligible for cost-share under several state and federal conservation programs.

Native pollinators are on the decline in Iowa and throughout the country. This includes the beautiful, iconic monarch known for its incredible journey migrating between over-wintering grounds in Mexico and breeding territory in Iowa and as far north as southern Canada. The decline of monarchs and other pollinators has been linked to loss of habitat and food sources, including milkweed, the monarch's primary food.

The Iowa Monarch Conservation Consortium estimates that 480,000 to 830,000 new acres of monarch habitat are needed by 2038 to reverse the monarch's decline. Landowners and agencies are engaged in the large-scale effort to restore habitat by planting plant milkweed and other food sources for monarchs and other native pollinators. Success will require innovative approaches like "stacking" conservation practices.

Stacking for Multiple Benefits

Planting pollinator habitat on riparian land along waterways can create multiple benefits. Riparian lands are preferred areas for installation of saturated buffers and tend to be zones of potentially lower profitability for farmers. They are often eligible for public or private programs aimed at improving water quality or conserving habitat. However, there may be unique challenges and requirements to achieve habitat goals for specific species, such as monarchs.

Iowa State University recently completed a four-year demonstration project of pollinator habitat on sites where saturated riparian buffers can be installed. The following recommendations reflect highlights from these demonstration sites.

Patience and Persistence are Key to Success

Annual weeds are very common the first season after planting native grass and forb seeds, but this is not a major concern unless the weeds are approaching monoculture levels. A planting of native grasses and forbs creates a perennial system that can outcompete annual weeds if proper site management practices are used during the first two or three years after planting. The greatest concern is aggressive perennial or biennial weeds that can outcompete native species. For this reason, it helps to know your site history and expected weed potential before converting a site dominated by nonnative, cool-season grasses to pollinator habitat.

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Some Sites Work Better Than Others

Establishing habitat in areas that have been in corn and soybean production for several years is likely to have the best success with a reasonably low effort. Row crop production systems typically use repeated herbicide applications and/or tillage to actively manage and deplete the perennial weed seed bank and weed root stock.

Transitions from nonnative cool-season grasses to diverse native pollinator habitat require greater site preparation than converting corn and soybean fields. One of the most common site preparation methods used to convert nonnative cool-season grasslands to pollinator habitat is to mow in the summer and then make one or two fall broad spectrum herbicide applications before planting native seed. In most situations, this site preparation will not be successful. More intensive site preparation measures are going to be needed if there are issues with aggressive species, such as smooth brome grass, quackgrass, orchardgrass, fescue, Canada thistle or other competitive perennial species. Wild parsnip and musk thistle are examples of biennial species that may also require extra effort to control.

Results from this project, combined with findings from related studies, suggest that mowing and herbicide applications for one to two years after the saturated buffer tile has been installed, and before planting native seed, is an effective management strategy to reduce dominance of perennial and biennial weeds.

Reed canary grass and common horsetail in riparian areas pose additional challenges. A thick stand of reed canary grass will require multiple years of herbicide applications to provide, at best, partial control. Sites with thick stands of common horsetail (also known as snakegrass, puzzlegrass or equisetum) are best avoided. Neither mowing or tillage are likely to successfully manage this plant. Few herbicides provide consistent, effective control of common horsetail, and those that do, have a residual effect in the soil that would kill or greatly limit native forb establishment for several years after application.

Site Preparation and Establishment Guidelines

Corn-soybean transition

If a saturated buffer is installed in an area that has been cropped to corn and soybeans, the transition will be quite simple. (See Table 1.)

1. Install the saturated buffer.
2. Smooth off and compact soil over the tile line and complete all final construction work.
3. Plant in the late fall/dormant season (November 15 – March 31).
4. Mow three times in year one at a height of 6 inches (standard procedure for pollinator habitat establishment).
5. Potentially mow once (sometimes twice) in year two at a height of 10-12 inches to reduce seed set of particular weeds (such as biennials like musk thistle, wild parsnip and Queen Anne's lace).

TABLE 1. Corn-soybean transition: estimated investment for establishment *	
Contracted	$312-$512/acre
Project planning and decision making	2 hours/project
Self	$324-$674/acre
Broadcast planting 4 mowing events	3 hours/acre total
Project planning and decision making	4 hours/project
*Estimated investment includes cost of pollinator seed mix.	

TABLE 2. Non-native cool-season grass transition: estimated investment for establishment *	
Contracted	$559-$909/acre
Project planning and decision making	4 hours/project
Self	$324-$674/acre
1 prescribed fire or baling event 4 broad spectrum herbicide applications Broadcast planting 4 mowing events	8 hours/acre total
Project planning and decision making	12 hours/project
*Estimated investment includes cost of pollinator seed mix.	

Nonnative cool-season grass transition

If a saturated buffer is installed in an area already vegetated with nonnative, cool-season grasses, the transition to pollinator habitat requires additional work and patience. Below is the recommended procedure. (See Table 2.)

1. Install the saturated buffer.
2. Smooth off and compact the tile line and complete all final construction work.
3. Remove the existing residue (bale, mow and rake off, or burn). This step can be done before the saturated buffer is installed, which may be preferable.
4. Kill vegetation: apply repeated broad-spectrum herbicides. Apply herbicides throughout an entire growing season (three applications) and preceding fall (one application). Late fall is the best time to kill cool-season grasses by spraying.
5. Plant in late fall/dormant season (November 15 – March 31).
6. Mow three times in year one at height of 6 inches (standard procedure for pollinator habitat establishment).
7. Potentially mow once (sometimes twice) in year two at height of 10-12 inches to reduce seed set of particular weeds (such as biennials like musk thistle, wild parsnip, Queen Anne's lace).

Long-Term Management

Expect sites to require management in the long-term to maintain a competitive and balanced native plant community. Once a site has become established (which usually takes three to four years), a regular cycle of prescribed fire or baling will be needed. See the USDA Natural Resources Conservation Service's "Native Prairie Planting Guide: Establishing and Managing Native Prairie" for details, at https://www.nrcs.usda.gov/wps/portal/nrcs/ia/technical/ecoscience/bio/

Seed Mixes

Work with your local NRCS and a native seed dealer to select an appropriate seed mix for your project and site conditions. In some cases, riparian areas with saturated buffers may need seed mixes which are specifically adapted to wetter soils. The NRCS and many Iowa native seed dealers use the NRCS Iowa Native Prairie Seeding Calculator to help landowners design seed mixtures based on program criteria and landowner goals. The calculator is tailored to show options that qualify for various cost-share programs. The NRCS has also released three "Native Prairie Planting Guides" to help landowners through the pollinator habitat establishment and maintenance process. Find the calculator and planting/management guides at www.nrcs.usda.gov/wps/portal/nrcs/ia/technical/ecoscience/bio.

Seed Mix Cost (Approximate)–Summer 2019		
Native Pollinator	10:30	$200-$400
Native 50/50	20:20	$175
Native Grass Dominated	30:10	$125
Native Grass	40:0	$75
Non-Native Cool-Season Grass	25 pounds/acre grass	$45

Assistance

Interested landowners who have land that may fit the requirements for a saturated riparian buffer are encouraged to reach out to their local USDA Service Center for information on assistance that may be available through programs like the federal Environmental Quality Incentives Program at www.nrcs.usda.gov/wps/portal/nrcs/ia/programs/financial/eqip, administered by NRCS, and the Farm Service Agency's Conservation Reserve Program at www.nrcs.usda.gov/wps/portal/nrcs/ia/programs/nrcs142p2_007948/. Incentives through the Iowa Water Quality Initiative may also be available.

Review program requirements and ask questions. Beaware that some rules may prevent cost-share for multiple projects installed on the same property.

Additional sources of funding for seed or technical assistance are often available through other sources, including state conservation programs or private groups like Pheasants Forever at http://www.iowapf.net. Find a map of Iowa Wildlife Habitat Programs and Consultation compiled by Iowa State University, at https://naturalresources.extension.iastate.edu/wildlife/contacts/wildlife-habitat-programs-and-consultation

Additional Resources

The Iowa Monarch Conservation Consortium, at https://monarch.ent.iastate.edu, under "Habitat How To." Among the practical resources available is an Iowa State University Seed Mix Guide and a USDA NRCS guide for "Best Management Practices for Monarch Butterfly: Achieving Best Results for the Monarch in the Midwest."

Iowa Extension and Outreach, Questions and Answers about Saturated Buffers for the Midwest at https://store.extension.iastate.edu/product/15479, in the "Transforming Drainage" series.

USDA NRCS website, Working Lands for Monarch Butterflies fact sheet at www.nrcs.usda.gov/wps/portal/nrcs/detail/national/plantsanimals/pollinate/?cid=nrcseprd402207, which also includes information on how gardeners can help pollinators.

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