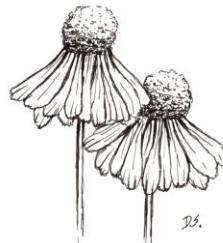


Agricultural Conservation Practices

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Document Purpose – This fact sheet is a companion to the BWSR Native Vegetation Establishment and Enhancement Guidelines and provides detailed considerations for project planning and design with an emphasis on vegetation selection, installation and management.



Introduction – A wide variety of agricultural conservation practices are designed to improve soil and water quality, including grass waterways, filter strips, windbreaks, cover crops and riparian buffers. In many cases agricultural conservation practices are funded through federal and/or state programs. Primary goals of these projects are to stabilize soil, to filter and infiltrate stormwater, and to protect surface water and groundwater resources. In some cases, they may also provide valuable wildlife cover and food sources in agricultural areas. In many cases non-native forage grasses and clovers are used for practices but native species can also be used in some areas.

Site Selection – Agricultural conservation practices should be targeted where they can make significant improvements in soil stabilization, water quality and protection of downstream resources. GIS Terrain Analysis, PTMApp, HSPF-SAM and other water quality targeting tools/models in combination with water quality monitoring data are particularly useful for the targeting of the most cost-effective projects. When native vegetation will be used as part of agricultural conservation practices it is important that it is used in areas that will be beneficial to wildlife species and will not be impacted by agricultural chemicals.

General Planning Considerations – Local conservation staff play a key role in working with willing landowners in priority areas. It is often most effective to combine conservation practices across the landscape (the treatment train approach) to slow the flow of water, hold the soil in place, capture pollutants, and improve project outcomes. To define the specific benefits of projects, BWSR has developed calculators and [pollution reduction estimation tools](#) for soil and water quality benefits.

Structural Design Considerations – Soil may be graded as part of some ag conservation practices, such as Water and Sediment Control Structures, Grade Stabilizations, Side Inlets and Water Retention Areas, to aid in runoff management from fields. It is important that these areas have suitable topsoils for growing vegetation and it may be necessary to loosen the top few inches with a tiller to allow for the successful growth of vegetation. These projects are often stabilized with cover crops or permanent seed mixes that include cover species.

Plant and Seed Selection – Agricultural practices tend to focus on trees and shrubs for windbreaks and some buffer plantings, and grasses and forbs for grass waterways, filter strips, critical area plantings, and riparian buffers. Species should be selected that are well adapted to site conditions.

Deep rooted prairie grasses are beneficial for many agricultural conservation practices as they have many stems, stand upright in flowing water, and their root systems help increase organic content in soil, prevent erosion and increase infiltration rates through root channels.



Forbs may be appropriate for planting if pesticide drift can be addressed. Pollinators that are attracted to forbs may be negatively impacted by pesticide overspray. Higher diversity buffers, including environmentally suitable annual, biennial and perennial species are appropriate for areas of low pesticide use where project goals may include providing habitat for pollinators, birds and a wide range of other species, or developing areas for future seed collection. A no-spray zone of 200 feet can also be used to allow pollinator plantings. The Minnesota Department of Agriculture oversees the state's [Pesticide Applicator Licensing](#). NRCS Agronomy Technical Note 9 "[Preventing or Mitigating Potential Negative Impacts of Pesticide on Pollinators Using Integrated Pest Management and Other Conservation Practices](#)" as well as a BWSR fact sheet on [Protecting Conservation Lands from Pesticides](#) provide detailed information about methods to minimize impacts to pollinators.

There is increasing interest in perennial crops that can be grown and harvested for food and beverages, livestock forage and feed, biofuels, and other products. Examples include native prairie grasses such as big bluestem and Indian grass, intermediate wheatgrass/Kernza (the harvestable seed), alfalfa, and other legumes such as clovers. These crops may replace conventional row crops or may be used as part of a rotation with corn or soybeans. They can provide benefits for soil stabilization, soil health, and water quality benefits.

Shorter lived [cover crops](#) such as annual ryegrass, winter cereal rye, buckwheat, oats, radish, and field peas also play a key role in stabilizing soils in agricultural areas. Both perennial crops and cover crops can substantially reduce wind and water erosion by keeping the soil covered when it would otherwise be bare in early spring, fall or winter. Cover crops can improve water and soil quality by adding soil organic matter. Keeping roots in the soil throughout the year helps hold plant available water and creates an open soil structure that promotes water infiltration, reducing runoff. Cover crops also protect groundwater quality by reducing or preventing nitrogen from leaching into the water table.

When temporary cover is necessary to stabilize project sites prior to the installation of structural conservation practices, pre-construction cover is allowed through BWSR policy. Temporary cover is particularly important on steep slopes, streambanks, and other erosion-prone areas. The table below lists recommended species and associated seeding dates and rates. This table is adapted from NRCS Technical Note #31. Temporary cover should remain in place until construction begins. Local conservation professionals can make decisions about use of these species, and should contact BWSR with questions, or when additional flexibility is needed. Check with applicable program policy(s) and BWSR's Grants Administration Manual for eligibility and program specific requirements.

Temporary Cover Seeding Rates and Dates

Cover Crop	Seeding Rate/Acre	Seeding Dates - Statewide
Oats	80 lbs.	April 1 to June 1, August 1 to Sept. 1
Barley	72 lbs.	April 1 to June 1 August 1 to Sept. 1
Spring or Winter Wheat	75 lbs.	April 1 to June 1
Spring or Winter Rye	60 lbs.	April 1 to June 1
Annual Ryegrass	8 lbs.	April 1 to June 1 August 1 to Sept. 1
Proso Millet	12 lbs.	May 15 to June 10
Sorghum/Sudangrass	12 lbs.	May 15 to June 10
Grain Sorghum	10 lbs.	May 15 to June 10

Commonly Used Native Species in Agricultural Settings

Shrubs:	Willows, Red-osier dogwoods, Gray dogwood, High bush cranberry, serviceberry, prairie plum, black cherry, chokecherry, wild rose
Grasses:	Big bluestem, Indian grass, Little bluestem, Switchgrass, Canada wild rye, Virginia wild rye, Slender wheatgrass, Kalm's brome, Prairie brome
Forbs:	Yellow coneflower, golden alexanders, New England aster, Maximillian sunflower, Prairie clovers, Bergamot, Mountain mint, Grass-leaved goldenrod, Showy goldenrod, Canada goldenrod, Stiff goldenrod, Penstemons, Canada milk vetch, Sneezeweed, Cup plant

Plant Source Considerations – The seed and source requirements for native vegetation summarized in Section 2 of the Guidelines must be followed for agricultural conservation practices, with the exceptions discussed below. Cultivars and certain varieties of native species (and non-native forage species) must not be used if the agricultural conservation practice is within ¼ mile of a remnant prairie or savanna.

For BWSR-funded projects, native vegetation should be the first priority for planting. A wide range of state native seed mixes have been developed including a native construction mix and a harvestable buffer native seed mix. Non-native, non-invasive species may be allowed under certain conditions: see “Exceptions to Guidelines for BWSR Programs” in Section 1 of the Guidelines. In an agricultural setting, these species include:

- Perennial crops, hay crops or forage crops
- Non-native grasses and forbs in buffers, grass waterways and field borders that will be likely be exposed to pesticide drift

Local conservation staff may approve the exceptions above on sites of less than 20 acres. On sites 20 acres or larger, BWSR staff must review and may approve the exception.

Potential non-native species to be used on sites that will be hayed, grazed, or exposed to pesticide drift include perennial rye grass, timothy, Kentucky bluegrass, intermediate wheatgrass/Kernza, orchard grass, smooth brome grass, red clover, alsike clover and white clover. Invasive species, state Noxious Weeds and aggressive species, such as reed canary grass, sweet clover, non-native Phragmites species and Miscanthus species cannot be used (see invasive species discussion in Section 2 of the Guidelines) and non-native species should not be used next to high quality plant communities.

Other exceptions allowed without a maximum size limit include cover crops used to improve soil health and/or water quality, and temporary covers for soil stabilization

Vegetation Establishment – Drill seeding into fields that were in corn or soybeans is the most common practice conducted for agricultural practices. Broadcast seeding followed by rolling may be used in areas inaccessible for seed drills. It is important that seed has good contact with the soil; some projects may need erosion control mulching or blankets to prevent erosion, especially in areas of concentrated flow.

Operations and Maintenance – Key maintenance steps involve mowing annual and biennial weeds to 4-6 inches during the first couple of years, as needed, to provide sunlight and decrease competition for seedlings; hand weeding or spot herbicide treatment of perennial weeds; and in some cases, prescribed burning to maintain diversity and to control woody species after establishment. Conservation grazing and biocontrol of invasive species may also be long-term maintenance strategies. Haying for feed or bioenergy may be allowed by some

conservation programs. Conservation plans should include information about the timing, frequency and mowing height for haying.

Haying should be scheduled to minimize impact to ground-nesting birds. The nesting season is generally considered to be between June 1 and August 1st in the north half of the state and between May 15 and August 1st in the southern half of the state (for state and federal programs). As a result, haying is commonly conducted in August or September. Typical cutting heights of 4-6 inches leave more leaf area for rapid regrowth to rebuild root reserves for future growth, and maintain stubble to filter stormwater. Cutting height should be increased if the cutting date is delayed or if the site has a slow growth rate.

Mowing equipment can be a vector for the spread of weed seeds that can become lodged on the mower, in dried clippings, or mud attached to equipment. It is important that seed be removed from mowing equipment before the mower is brought to a new part of a restoration site or to a new project. To the extent possible, mowing should be conducted shortly before invasive plants flower to prevent them from setting viable seeds.

Forage or biomass production sites with a dominance of warm season native grasses are typically hayed once a year or every other year to allow for adequate growth of plant material. The re-growth is essential for rebuilding root reserves and providing important nesting and wintering cover for grassland wildlife. The yield gained from a second cutting in one season will often reduce yields by the same amount the following year.

For prairies managed for biomass production, it is recommended that no more than fifty percent of a field be hayed in any given year. This can improve production in the future and maintain adequate cover for wildlife habitat while lowering equipment and fuel costs for the operator. It can also help maintain species diversity that otherwise might be lost by harvesting at the same time each year. Brushy vegetation can still be controlled in a rest-hay rotation, especially if prescribed burning is introduced.



Information Sources

NRCS Field Office Technical Guide: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg>

Agricultural BMP Handbook for Minnesota (MN Department of Agriculture):

<https://bbe.umn.edu/agricultural-best-management-practices-handbook-minnesota>

[Buffer Establishment and Management Toolbox](#)

[Building Better Buffers](#)