
Native Vegetation Establishment and Enhancement Guidelines

Guidance for
State-Funded Programs
Section 1: Purpose and Applicability

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Section 1: Purpose and Applicability

Native plants and plant communities play an essential role in sustaining environmental and human health, providing wildlife habitat, and adding resiliency to our landscapes. The purpose of these guidelines is to assist resource professionals and landowners across Minnesota in meeting state vegetation policies and to guide the successful planting and management of restoration and other conservation projects. The guidelines are also designed to develop consistency among state programs; to avoid the use of [invasive species](#); and to ensure that plantings function at a high level and meet project goals. This guide is updated periodically, as new research and field experience become available.



How to Use This Guide

The guide includes the following sections, all of which can be viewed and downloaded from the BWSR webpage.

Section 1 – Summary of Contents, purpose, and guidelines

Section 2 – General Planning Considerations applicable to all types of native vegetation, including seed sourcing requirements

Section 3 – Project site preparation, planting and management

Section 4 – Guidance by Project Type: a series of factsheets for specific project types such as lakeshores, wetlands and forests

Section 5 – Appendices: Addressing Palmer Amaranth and Citations

Applicability to BWSR Programs

These guidelines apply to BWSR-funded projects that include establishment and management of vegetation, as further referenced in the relevant BWSR program policies. Environmentally suitable native annual, biennial and perennial plant species are required for projects to meet legislative requirements and provide multiple landscape benefits. For all BWSR-funded projects that include vegetative establishment and management, the seed and plant source sequence outlined in Part 2 must be followed, although native vegetation establishment and management may follow other practice standards (such as NRCS standards) if appropriate. The guidelines have also been adopted by a number of other state programs listed below.

Many BWSR grant, cost-share and easement programs have specific requirements for vegetation and seed sources. The relationship to these guidelines varies by program:

- **RIM easements** – Native vegetation and seed sources consistent with these guidelines are required but non-native forage and hay crops may be allowed for some working lands easements. NRCS practice standards may provide additional guidance for vegetation establishment and maintenance or management.¹ For additional information, refer to the [RIM Handbook](#).
- **Conservation Reserve Enhancement Program** – Native vegetation and seed sources consistent with these guidelines are required for CREP prairie and wetland restoration projects. NRCS practice standards may provide additional guidance for vegetation establishment and maintenance or management. For additional information, refer to the [CREP General Program Guidance Document](#).
- **Clean Water Fund projects** – Native vegetation and seed sources consistent with these guidelines are required, with the exceptions listed below.
- **Cost share (Erosion control and water management) programs** – Native vegetation and seed sources consistent with these guidelines are required, with the exceptions listed below.
- **Wetland replacement** – Native vegetation and seed sources consistent with these guidelines are required.
- **Pollinator and habitat programs** – Native vegetation and seed sources consistent with these guidelines are required for BWSR Lawns to Legumes, Habitat Enhancement Landscape Pilot (HELP) and Cooperative Weed Management Area (CWMA) programs. Some non-native species are allowed for bee lawn installation under the Lawns to Legumes program, including white clover, self-heal and creeping thyme.

Exceptions to Guidelines for BWSR Programs

The following exceptions apply to projects funded under [Clean Water Fund](#) programs and [State Cost Share](#) (Erosion Control and Water Management) programs:

- **Non-native, non-invasive perennial crops, hay crops or forage crops** may be used:
 - As part of a drinking water protection strategy in a vulnerable or highly-vulnerable DWSMA as designated by the Department of Health or in a Township Well Testing high-priority area as determined by the Department of Agriculture;
 - In buffers, borders, grass waterways or other areas likely to be exposed to pesticides or part of agricultural production;

¹ NRCS Practice 643, Restoration of Rare and Declining Habitats, has been updated to be consistent with these Guidelines. Other NRCS practices that may apply include 327, and 657, Wetland Restoration. See Table 1.1.

- For soil stabilization, erosion prevention and carbon sequestration in an agricultural production setting;
- On fields that will be hayed, grazed or harvested.
- For the exceptions above, if the project area is under 20 acres in size, the exception may be approved by local conservation staff.
- If the project area is 20 acres or larger, or for any exceptions not listed above, grantees must request approval from BWSR's Board Conservationists or Clean Water Specialists.
- **Cover crops** used to improve soil health and/or water quality are allowed without a maximum size limit.
- **Temporary cover** is allowed without a maximum size limit when needed to stabilize project sites prior to the installation of structural conservation practices.
- **Cultivars of native** species may be used in urban stormwater plantings if they accomplish similar or greater ecological functions, help achieve aesthetic goals and do not pose an invasive or other environmental risk.
- **Prohibition:** Use of invasive species such as reed canary grass, non-native phragmites or miscanthus species is prohibited in all projects. Non-native species must not pose a risk to native plant communities.

Applicability to Other State Programs

As noted above, these guidelines have been adopted or referenced by several state conservation and restoration programs.

- The Lessard-Sams Outdoor Heritage Council makes recommendations for projects funded under the **Outdoor Heritage Fund**, one of four funds created by the Clean Water, Land and Legacy Amendment. The fund's enabling statute requires annual evaluations of restoration and enhancement projects relative to whether they meet BWSR's guidelines and project goals ([Minn. Stats. § 97A.056, sub. 10](#)).
- The enabling statute for the **Clean Water Fund** (also established by the Legacy Amendment) and annual CWF appropriations to BWSR provide for restoration evaluations, using the guidelines as criteria ([Minn. Stats. § 114D.50, subd. 6](#)).
- The [Legislative-Citizen Commission on Minnesota Resources](#) recommends projects for funding by the **Environment and Natural Resources Trust Fund (ENRTF)**. Applicants for ENRTF funding must provide information on how restoration efforts will use and follow the guidelines to ensure ecological integrity and pollinator enhancement. Bill language also requires that restoration projects "use native plant species according to the Board of Water and Soil Resources' native vegetation establishment and enhancement guidelines and include an appropriate diversity of native species selected to provide habitat for pollinators throughout the growing season as required under Minnesota Statutes, section 84.973." Any exceptions to these guidelines for (non-BWSR) ENRTF projects must be made by LCCMR staff.

Many other state and federal agencies provide guidance and/or requirements for native and non-native plant selection and management, summarized in Table 1.1.

Table 1.1 State and Federal Programs: Relationship to BWSR Guidelines

Agency	Relationship to BWSR Guidelines
Environment and Natural Resources Trust Fund/Legislative-Citizen Commission on Minnesota Resources	The BWSR Native Vegetation Establishment and Enhancement Guidelines are required for restorations (see above)
Outdoor Heritage Fund/Lessard-Sams Outdoor Heritage Commission	BWSR Guidelines required as criteria for annual evaluations of projects (see above)
Clean Water Fund (not including BWSR-funded projects)	BWSR Guidelines may be used as criteria for project evaluations (BWSR-funded projects are discussed in the previous section)
Department of Natural Resources – Native Plant Communities https://www.dnr.state.mn.us/npc/index.html	Guidance for identifying relevant plant communities for restoration or conservation practices; guide planning of restoration projects; seed mixes.
Department of Natural Resources – MNTaxa: Minnesota vascular plant checklist https://www.dnr.state.mn.us/eco/mcbs/plant_lists.html	Reference used to identify native, non-native and invasive plants for all conservation projects.
Department of Transportation - roadside seed mixes http://www.dot.state.mn.us/environment/erosion/vegetation.html	MnDOT standards apply to all MnDOT sponsored or funded roadside and right-of-way projects and may also be used on county or township road projects. May overlap in some cases with BWSR guidelines.
MN Department of Agriculture – Minnesota Noxious Weed Law https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list	Regulatory: official, updated list of state prohibited and controlled noxious weeds. Referenced in BWSR guidelines.
NRCS practice standards – Field Office Technical Guide https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fortg/	NRCS practice standards are used for most BWSR-funded projects. NRCS Standard 643, Restoration of Rare and Declining Natural Communities, is used in RIM and CWF projects and is consistent with these guidelines regarding the vegetative source sequence. Other NRCS standards commonly used in restoration include 327, Conservation Cover, and 657, Wetland Restoration. When these or other standards are used, BWSR guidelines for seed and plant source sequence should be followed.
U.S. Forest Service New source map http://www.easternseedzones.com/	Guidance for seed source decision making for National Forest System, currently under development.
U.S. Fish and Wildlife Service	Standards are specific for USFWS funded projects and included in project plans; not applicable to BWSR projects.

Benefits of Native Vegetation

Native annual, biennial, and perennial plants and the plant communities that they support provide a wide range of ecological and human services. The following information is a summary of key benefits of native vegetation.

Environmental Quality Benefits:

- Removal of nutrients and pollutants, providing protection for water resources
- Carbon sequestration by drawing carbon into root systems and soil
- Increased water infiltration and groundwater recharge through the creation of deep root channels
- Water interception and filtration by leaves, stems and roots
- Slope stability provided by extensive root systems
- Prevention of soil erosion and sedimentation caused by water and wind
- Soil health promoted by stabilizing soils, adding organic content through root decomposition, and by supporting healthy microorganism populations
- Evapotranspiration (releasing excess stormwater through leaves)
- Cooling and temperature moderation of soil and water
- Air quality improvements
- Flood attenuation by slowing flood waters
- Healthy nutrient cycling and food chain support
- Preservation of biodiversity

Wildlife Habitat Benefits:

- Pollinator habitat and food sources, supporting hummingbirds, bees, moths, butterflies, and other insects
- Host plants for a wide variety of insects
- Food sources for insects and other animals
- Source of fruit and seed used by insects, birds, and other animals
- Shelter and nesting habitat for birds and other animals
- Aquatic habitat for insects, fish, birds and other animals

Landscape Resiliency Benefits

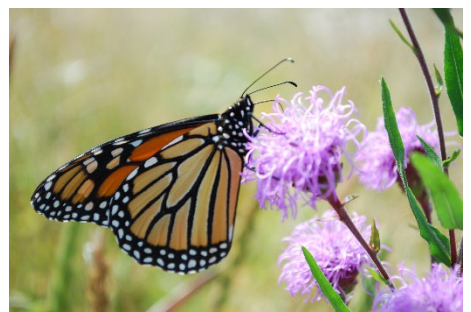
- Suitability to local conditions
- Providing connectivity between essential habitat
- Ability to adapt through genetic adaptation, succession and natural colonization



Vegetation providing water quality and wildlife habitat benefits



Raingarden designed to infiltrate and filter stormwater



Monarch butterfly on meadow blazing star

- Providing competition for invasive species

Other - Human Services

- Regional character and identity
- Urban cooling from tree and shrub canopies
- Landscape aesthetics
- Human physical and mental health benefits from healthy ecosystems
- Low maintenance once established
- Educational opportunities
- Medicinal needs
- Food security



Shorebirds using a restored wetland

Principles for Restoring Resilient, Functional Landscapes and Maintaining Ecological Diversity

The following information summarizes guiding principles for increasing the resiliency, ecological function and plant and animal diversity of landscapes.

1. **Engaging Communities:** Landscapes have evolved through human interaction and management for thousands of years. Making connections with a wide range of partners including conservation partners, tribal nations, community groups, schools, and local residents can strengthen project planning, restoration and the long-term stewardship of projects.
2. **Strategic Site Selection:** Work with project partners and local communities to identify the functions that are most beneficial for an individual landscape and where projects should be located to best provide those functions. In many cases, this involves restoring habitat for plant and animal communities and buffering water resources (both ground and surface waters) and restoring natural processes such as nutrient cycling. Also consider linear areas between larger habits that may provide travel corridors for wildlife.
3. **Design for Multiple Functions:** Be strategic in the selection of primary and secondary goals but remember that multiple functions, including wildlife habitat, plant diversity, food production, water storage, stormwater treatment, soil quality, carbon sequestration, and nutrient cycling can often be accomplished together. It is important to have project teams with diverse backgrounds and expertise to help reach project goals. See the BWSR [Climate Resiliency Toolbox](#) for strategies to address climate impacts.



4. **Combine Conservation Practices:** Different types of plantings and conservation projects can be combined to develop treatment trains to improve water quality or to establish a larger matrix of habitat to support wildlife. In agricultural systems regenerative agriculture practices such as no-till and strip till, cover crops, nutrient and pest management, crop rotation, and conservation grazing can be combined. In developed areas raingardens, biofiltration areas, stormwater swales and ponds along with urban natural areas and habitat plantings help create a system of green infrastructure.
5. **Make Landscape Connections:** Establish strong connections through landscapes. Create habitat and genetic dispersal corridors and decrease landscape fragmentation. Or create a network of conservation practices in agricultural areas. Linking small areas plays a key role in restoring landscape resiliency and providing refugia for pollinators and other at-risk species.
6. **Match Plant Communities to the Site:** Match your targeted vegetation to the native plant community that best fits the topography, soils, hydrology, and climate conditions (including the potential future climate) of your site. Restore natural hydrologic regimes to aquatic and wetland systems as applicable. Historic plant community information can be used as a guide for decision making. Determine the kinds of native wildlife that live in or migrate through the area, and include native plants natural to the site that will provide food and shelter for target species.
7. **Restore and Maintain Biodiversity:** Microorganism and plant diversity, and structural diversity (different vegetation heights) of plant communities can support a variety of wildlife species and help plant communities continue functioning as intact systems, maintaining vital functions through climate variations and other disturbances. These same principles can be applied to agricultural systems to reduce soil erosion, maintain nutrients necessary for growing a crop, and storing water in the soil. Filling niches with native species also prevents the establishment of invasive species. Restoring natural disturbances such as prescribed fire, grazing and water fluctuations plays a key role in maintaining diversity. Using site-appropriate sources can protect the genetic diversity of individual plant species, enabling them to adapt to future conditions.



8. **Assist Ecological Adaptation** – Healthy native plant communities tend to be connected, diverse, ecologically functional and resistant to invasion. They have the ability to adapt through genetic adaptation, succession and natural colonization. Promote these processes through detailed site analysis and planning, promoting native seedbanks, supporting microorganism populations, and including diverse functional groups and species (cool season grasses, warm-season grasses, sedges/rushes, legume forbs, and non-legume forbs) in seed mixes. Consider assisted migration when appropriate to steer the trajectory of landscapes through adaptive management.
9. **Provides Habitat for Pollinators and other Beneficial Insects** - Pollinators and other insects play an essential role in supporting ecosystems by pollinating as much as 70% of flowering plants and providing food sources for a wide range of wildlife species and humans. Support insect populations by minimizing pesticide use, buffering natural areas and diverse plantings from pesticide exposure, restoring habitat complexes and wide natural corridors, increasing plant diversity, managing invasive plants, providing nesting sites and shelter, and restoring clean water sources. In developed areas, replacing lawn with native plantings can provide a wide range of landscape benefits and establish a matrix of habitat to support a diversity of pollinators. See BWSR's [Pollinator and Biodiversity Toolbox](#) for additional information.
10. **Effective Water Management, Treatment and Use** - A variety of practices including perennial crops, conservation tillage, conservation drainage, cover crops, buffer strips, infiltration basins, raingardens and wetland restoration help manage water resources. Incorporate these practices in urban and rural landscapes to reduce runoff, erosion and sedimentation, recharge groundwater, maintain agricultural productivity, improve water quality, and reduce flooding. Promote the wise use of water resources and the use of catchment systems to help ensure adequate supplies into the future.
11. **Preserving and Restoring Soil Health** - Soils that have good soil structure, organic content and microorganism populations translate into healthy and productive ecological and cultural landscapes and play a key role in sequestering carbon. Soil health can be restored through planting cover crops, no-till and strip till cultivation, composting, and establishing perennial vegetation.



Managing Invasive Species Across Boundaries - Invasive species are effective at dispersal, giving them an advantage in adapting to climate change. Learn which species to be on the lookout for and what to do if you find them by visiting the [DNR invasive species page](#). Plan to work in partnerships, prioritize species and manage invasive plants across ownership boundaries to restore resilient landscapes.



12. **Practicing Adaptive Management** - Adjust management practices based on monitoring efforts, research and experience with successes and failures to improve the function and resiliency of plant communities. It is often beneficial to combine practices such as water level management, prescribed burning, prescribed grazing, mowing and haying to replicate natural disturbances and promote diversity, function and resiliency.

13. **Learning from Project Experience** – Be patient! Restoration work takes time. Information about project successes and innovative practices is valuable. What practices provide the most benefits in our landscapes? What common activities are not worth the cost, or make a problem worse? BWSR’s “[What's Working](#)” web page collects and shares practitioner experience about real-world outcomes.

