Pollinator Plan

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Why Pollinator Populations and Habitat Restoration Matter

Each year native and domesticated bees pollinate around 30 percent of crops in the United States with a value of approximately $23 billion. They also pollinate around 70-80 percent of flowering plants in the Midwest, playing a key role in their seed production and their sustained ability to perform important environmental functions such as filtering stormwater, improving soil quality and providing wildlife habitat. Native bee populations that include more than 4,000 species in North America have declined in recent years due to habitat loss and pesticides use among other factors. At the same time, managed colonies of European honey bees have suffered a 50 percent decline in recent decades.

Lakeshore restoration in Carver County

The Minnesota Board of Water and Soil Resources (BWSR) is focused on targeted conservation of private lands that make up approximately 75% of Minnesota's landscape. Pollinators require clean water sources, pollen and nectar and nesting sites. These key habitat features are being protected and restored through BWSR programs and the efforts of BWSR partners that provide **wetland protection**, **conservation easements** (retirement of marginal agricultural lands), and **soil and water conservation grants**. Following is a summary of primary BWSR program areas with pollinator benefits.

Restored wetland in Wright County

Wetland Protection

The primary goal of the Minnesota Wetland Conservation Act is to achieve no net loss in the quantity, quality, and biological diversity of Minnesota's 10.6 million acres of existing wetlands. This is accomplished through avoiding direct or indirect impacts from activities that destroy or diminish wetlands and replacing wetland values through restoring wetlands where avoidance of such activity is not feasible and prudent. These wetlands and their buffers provide important water, food and nesting sites.

Conservation Easements

BWSR's RIM program is focused on the acquisition and enhancement of critical habitat in the predominantly agricultural areas of the state. This program includes restoring wetlands, establishing riparian buffers, protecting sensitive ground water areas, planting critical winter cover for wildlife, preserving habitat for rare plant and animal species, protecting and restoring native prairie and grasslands, increasing pollinator habitat, and preserving spawning and reproduction areas for fish.

Conservation easement often provide clean water, food sources and nesting sites for pollinators

Soil and Water Conservation Grants

BWSR's soil and water conservation grant programs provide funding to local government units for the implementation of targeted conservation projects and practices. A wide variety of conservation practices provide important benefits to pollinators including tree planting, grass planting, prairie and wetland restoration, windbreaks/shelterbelts, grassed waterways, contour buffer strips, filter strips, riparian buffers, critical area planting and cover crops. These projects often provide important food and nesting sites for pollinators in agricultural areas. They also play a key role in supplying clean water sources for pollinators.

Soil and water conservation grants involve the planting of a wide range of woody and herbaceous plants that benefit pollinators

BWSR's Work to Date

Since its origin in 1987 the Minnesota Board of Water and Soil Resources has played a significant role in preserving and restoring pollinator habitat by protecting and restoring wetlands, retiring and restoring marginal agricultural land to native vegetation and through soil and water conservation grants and the planting of native vegetation to provide multiple landscape benefits. Nearly 300,000 acres have been protected/restored over the last twenty-six years.

Efforts to Protect Pollinator Habitat

- The Minnesota Wetland Conservation Act has been in place since 1991 and has significantly reduced the loss of wetland acres, protecting important pollen and nectar sources, clean water and nesting sites. Many of these wetlands are in important habitat corridors that provide a refuge from pollutants and landscape stressors. As part of wetland protection efforts, approximately 16,000 acres of mitigation wetlands have also been restored.
- The BWSR's RIM program has protected approximately 20,000 acres of high quality natural landscapes including native prairies, shallow lakes and diverse wetlands.
- BWSR's RIM program has restored approximately 230,000 acres of marginal farm land (or prevented CRP conversion to agriculture) over the last 28 years with a focus on key habitat complexes and corridors.
- Approximately 24,000 acres of grassland and 6,500 acres of trees and shrubs have been planted through soil and water conservation grants providing important pollinator habitat in agricultural areas.

Wetland complex in Washington County providing important pollinator habitat

RIM project planted with native wildflowers

Program Guidance

BWSR has policies in place requiring the use of diverse native vegetation for projects to benefit pollinators and provide a variety of landscape functions (carbon sequestration, soil microbial health, stormwater infiltration, etc.). The BWSR Native Vegetation Establishment and Enhancement Guidelines were developed to assist resource professionals and landowners in making informed decisions about the planting and maintenance of state funded restoration and BMP projects. The guidelines assist with plant selection and source considerations for seed and plant material across the state of Minnesota. Goals of the guidelines are to create 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. The guidelines will be updated periodically as new research and field experience becomes available.

Current Protection and Restoration Efforts

BWSR is doing a wide variety of activities to restore and promote high quality pollinator habitat, including outreach and program guidance, native seed mixes, interagency coordination, habitat protection, and habitat restoration.

Outreach

BWSR uses a variety of outreach strategies to reach a broad audience with different learning styles to promote and guide the establishment of pollinator habitat and other associated landscape functions.

BWSR has developed a pollinator Initiative and pollinator toolbox that is focused on: Increasing awareness about declining pollinator populations, supporting Local Government Unit partners in enhancing pollinator habitat, and focusing outreach on how to incorporate pollinator habitat into all BWSR programs The BWSR "pollinator toolbox" and BWSR Native Vegetation Establishment and Enhancement Guidelines contain several pollinator resource that can also act as "stand alone" documents including a pollinator habitat fact sheet, and habitat assessment forms for urban and rural landscapes as well as for solar projects (see appendix B) developed to set criteria for solar developers to claim "pollinator habitat for projects (Minnesota DNR also has specific guidance for solar projects to guide solar developers). Other BWSR resources focus on project installation and maintenance guidance, seed mix recommendations, and a summary of state and federal programs that can be used for establishing pollinator habitat. The Minnesota Wetland Restoration Guide developed by BWSR also provides detailed information about methods to restore and maintain wetlands and uplands. Inter-seeding guidelines have also been developed to guide efforts to increase project floral diversity in plantings currently dominated with grasses. BWSR's "What's Working" webpage also summarized effective methods of restoring diverse plantings.

BWSR publishes featured plant articles each month to showcase species important for conservation and has been focused on species important to pollinators since April of 2013.

Five to ten native vegetation/Plant ID workshops are presented each year covering the topics of functional benefits of native vegetation (including pollinator habitat), vegetation management, and plant identification.

Native Seed Mixes

In partnership with Mn/DOT and DNR, BWSR has developed twenty seven state native seed mixes and several other mixes are being finalized as "pilot" mixes focused on accomplishing a variety of ecological functions while also providing pollinator habitat. In the last update of the mixes we focused on including a high percentage of forb species for pollinators. These mixes are used by federal, state and local agencies as well as consultants, non-profits and private landowners. The mixes are purchased from private seed vendors around the state. The BWSR Native Vegetation Establishment and Enhancement Guidelines provide new guidance about the use of existing state seed mixes for pollinator projects.

Inter-agency Coordination

BWSR is working with other agencies and organizations on the development of pollinator BMPs. With a focus on maintaining consistency between agencies BWSR will be linking to new DNR, MDA and other new resources as they are finalized. BWSR is also collaborating with several partners on grants focused on restoring pollinator habitat in Minnesota and studying how to be most effective with site selection and project design.

Habitat Protection

Administration of the wetland conservation act continues to protect wetlands in Minnesota that provide refuge for pollinators in addition to a wide range of other ecological benefits. BWSR's RIM program is also protecting 2,000 to 4,000 acres of native (high quality) habitat per year including native prairie, shallow lakes, and diverse wetlands that are all important for pollinator habitat.

A wide range of insects have a role in pollination and benefit from floral diversity

Habitat Restoration

BWSR is restoring approximately 5,000 to 8,000 acres of prairie and wetland on marginal agricultural lands as part of the RIM program each year. The "Minnesota Prairie Conservation Plan" is being used to guide restoration efforts in core areas of grassland habitat and corridors connecting these areas across the Minnesota Landscape. Seed mixes with a minimum of twenty species are being used for these projects following the BWSR Native Vegetation Establishment and Enhancement Guidelines. Many of the projects also have native seedbanks that provide additional native flowers that benefit pollinators such as mints, vervains and milkweeds. A new RIM program practice has been developed for establishing floral rich "pollinator plots" up to five acres in size. Cost-share funding is also being used to increase diversity of existing projects through a habitat enhancement program.

Grant/Information Links

Wetland Protection (Administration of the Minnesota Wetland Conservation Act)
http://www.bwsr.state.mn.us/cs/index.html
Conservation Easements (Reinvest in Minnesota): http://www.bwsr.state.mn.us/easements/index.html; http://www.bwsr.state.mn.us/grants/RIM_services.html
Soil and Water Conservation Grants: http://www.bwsr.state.mn.us/cleanwaterfund/index.html; http://www.bwsr.state.mn.us/cs/index.html; http://www.bwsr.state.mn.us/cs/index.html; http://www.bwsr.state.mn.us/cs/index.html
Disaster Recovery Assistance: http://www.bwsr.state.mn.us/grants/DRAP.html

Future Efforts

BWSR is committed to focusing on the improvement of pollinator habitat on conservation lands and water quality projects. The following are key strategies to guide future projects and outreach efforts based on feedback from conservation partners and researchers.

Outreach and Program Guidance

BWSR will be focusing outreach on pollinator habitat and developing projects to provide multiple landscape benefits through the "BWSR Pollinator Initiative", refinement of pollinator documents, program guidelines and web pages. Workshops, presentations and individual project assistance will also be used to promote and guide pollinator projects. We will be also be focusing on peer to peer learning through the sharing of information amongst partners about effective methods to restore pollinator habitat around the state.

Native bee on wild bergamot.

Native Seed Mixes

BWSR, MNDOT and DNR have been collecting feedback about the use and effectiveness of state seed mixes for pollinators and providing other ecological functions. This information will be used to update existing mixes and guide new mixes.

Inter-agency Coordination

BWSR will continue working with other agencies and partners to collaborate on outreach efforts, research the development of technical resources and grant funding for pollinator habitat. Interagency discussions will also play a key role in the identification of pollinator refuges in Minnesota to guide restoration site selection.

Restoration site with seed mixes and native seedbank contributing to floral diversity.

Habitat Protection and Restoration

- BWSR will continue protecting Minnesota's Wetlands through the Wetland Conservation Act, preserving pollinator habitat.
- Targeted habitat protection and restoration efforts will focus on habitat complexes and corridors that can act as pollinator reserves or refuges to provide long-term pollinator protection and maximize plant community benefits. Program ranking criteria will be updated to maximize benefits to pollinators as well as attaining other landscape services.
- In addition to larger landscape plantings, highly diverse plantings in smaller plots located in areas away from pesticide use will be encouraged to provide floral rich pollinator habitat. It will be important that these plantings are planned in areas that are sufficiently buffered from pesticides and other impacts. Additional cost-share funding will be needed to expand these efforts.
- More detailed recommendations about how to select pollinator habitat at a site scale will be developed to address pesticide concerns and maximize food, water and nesting resources. It will be important to determine buffer distances from fields where pesticides are applied.

- Additional guidance will be developed about how to incorporate pollinator habitat into urban BMPs while considering aesthetic needs.
- Research will be promoted to guide decision making about how to most effectively restore habitat and adapt management strategies for pollinators. Additional information is needed about what plant species are most important for pollinator plantings, as well as the most effective planting and management strategies to sustain floral diversity.
- More information will be developed about how to incorporate additional spring blooming species into projects and how to manage weeds in floral diverse plantings, as this can often be challenging and cause projects to fail or lose diversity.
- More detailed recommendations will be developed to benefit honeybees as we learn more about what plant species are most important to support populations. If it is determined that non-native legumes are necessary for honey production guidance will be developed on acceptable species that could be used in honey bee "pollinator plot" plantings and not cause maintenance issues for restored easements. Beehives are allowed on BWSR easements, allowing for cooperative efforts between bee keepers and easement holders with pollinator habitat.
- No-till farming, perennial vegetation and cover crops (such as clovers, buckwheat, canola and pennycress) will be promoted in agricultural areas to preserve nesting sites for pollinators and provide pollen and nectar sources (as well as improving soil and water quality). It will be important to ensure that pesticide residues are not in the soil prior to using cover crops to aid pollinators.
- Projects will be promoted that provide multiple functions (biofuels, carbon sequestration, conservation grazing, water quality, etc.) while incorporating native flowers.

Appendix A - Pollinator Fact Sheet

Pollinator Habitat

Each year native and domesticated bees pollinate around 30% of crops in the United States with a value of approximately $23 billion. They also pollinate around 70-80 percent of flowering plants in the Midwest, playing a key role in their seed production. Native bee populations that include more than 4,000 species in North America have declined in recent years due to habitat loss and pesticides use among other factors. At the same time, managed colonies of European honey bees have suffered a 50% decline in recent decades.

Habitat complexes and corridors are important nesting and food sources for pollinators

While Honey Bees and Bumble Bees are the most commonly known pollinators, they only make up about 2% of bee species in Minnesota. The remaining species are solitary bees that do not live in colony systems like Honey or Bumble bees (with division of labor and cooperative rearing of young). Supporting native solitary bee habitat is important, as like honey bees, their populations are also in decline. Pay attention to the various pollinators and their habitat needs in the landscape to help protect and enhance their existing habitat.

Other pollinators of concern include Butterflies, moths, beetles, and native flies. Many of these pollinators have their own unique habits and needs, for example, many moths tend to pollinate white or dull colored blossoms that flower at night. Some plant species are dependent on others for the completion of their lifecycle, such as the Monarch butterflies dependence on milkweed, and the endangered Karner Blue butterflies need for Wild Lupine. By establishing native vegetation, one can support the intricate relationships foraged between native pollinators and native vegetation that keep both populations healthy.

Site Selection

Adequate food, shelter, and nesting sites are all needed to support healthy pollinator populations. The following are key considerations for selecting areas for pollinators:

1) Look for areas away from pesticide and fungicide use, as well as areas that lack widespread disturbances that may impact pollinators.

2) Habitat complexes and corridors provide “safe zones” and natural passageways for pollinators, as well as nesting and forage sites, and sources of water.

3) Some bees have a relatively small flight distance and benefit from having water and food sources within 200 feet of nesting sites.

4) Ground nesting bees benefit from planting clump forming native grasses. Bees that nest in tree and stem cavities benefit from farm hedgerows, windbreaks and treelines, as well as man-made nest structures.

Achieving High Function

Seed mixes for pollinators should include at least fifteen species and have a high percentage of forbs (40-70% by seed count). Grasses are also important for community structure, nesting sites and to provide fuel for prescribed burning. Shorter grasses can benefit forb growth and pollinator use. It is recommended to include at least three flowering species in each bloom period so there is a continuous food source throughout the season (few early blooming species are typically included in mixes). It is also helpful to plant forbs in masses to make them easier for pollinators to find and to increase foraging efficiency. Including a wide range of flower colors and shapes will benefit a variety of pollinator species. In addition to herbaceous plants, flowering trees and shrubs can be an important source of pollen and nectar for pollinators, particularly early in the spring. Avoid clearing fallen or dead trees, as they help create nesting sites for a wide range of pollinators.

Key Plant Species

Plant species can be selected for projects to support specific insects, such as planting milkweed species for monarchs (and a variety of pollinators), lupine for Karner Blue Butterfly, or basswood for a variety of bee species. The following are key pollen and nectar sources for pollinators in the spring, summer and fall. Species should be selected that are native to the area and well adapted to site conditions.

Spring:	Willows, Basswood, Dogwoods, Viburnums, Juneberries, Plums, Cherries, Blueberry, Lupine, Bloodroot, Buttercups, Dutchman's breeches, Columbine, Virginia bluebells, Spiderwort, Lobelias, Golden alexanders
Summer:	Buttonbush, Dogwoods, False indigo, New Jersey tea, Wild rose, Prairie clovers, Milkweed, Wild bergamot, Giant hyssop, Penstemons, Bush clovers, Canada milkvetch, Culver's root, Hedge nettle, Evening primrose, Ironweed, Leadplant, Coreopsis, Canada tick trefoil, Lobelias, Obedient plant, Mountain mint, Partridge pea, Yellow coneflower, Cup plant, Joe-pye weed and Blazing stars.
Fall:	Asters, Sneezeweed, Grass-leaved goldenrod, Gentian, Boneset, Goldenrods, Sunflowers

Source Recommendations

Local seed and plant sources are recommended for pollinator habitat projects to protect nearby native prairie populations and to provide plant species that are compatible with local insect populations. It is important that plants are purchased from nurseries that do not use insecticides as part of their production process.

Establishment

Thorough weed control is essential prior to establishing pollinator habitat. In many cases, projects are seeded into fields that were previously in soybeans or corn, as agricultural production can help ensure that weeds are sufficiently controlled. It is important that pesticides (such as neonicotinoids) that persist in the soil were not used prior to planting, as they can be taken up into plant tissues and affect pollinators. Individual pesticides should be investigated to determine their persistence in the soil. In residential yards it is recommended to cut away the sod prior to planting to remove weed roots and seed.

Cover crops such as oats or winter wheat can be used to stabilize sites if additional time is needed for pesticides to break down in the soil or to stabilize soils prior to the planned seeding date. Drill or broadcast seeding is often conducted in the fall to allow forbs to naturally stratify over winter and compete with grasses in the spring. Some forbs that are important for pollinators such as sneezeweed, Dutchman's breeches, bugleweed, wild bergamot, evening primrose, smooth blue aster, mountain mint and aromatic aster do not require pre-stratification and can be successful seeded in the spring. If broadcasting seed, rolling can be used afterward to help ensure good seed to soil contact and prevent the loss of seed from wind and birds.

Beyond bees, many other insects are useful pollinators like this sand wasp.

Maintenance

The maintenance of pollinator plantings can be challenging due to the high forb diversity and difficulty of removing weeds without harming native plants or pollinators. Key steps to the maintenance of pollinator plantings involve:

- Mowing annual and biennial weeds to 4-6 inches as needed during the first one to two years of establishment to provide sunlight and to decrease competition for seedlings.
- Hand pulling of weeds. This is often most effective after rainfall when weeds are easier to pull.
- Prescribed burning to maintain diversity and to control woody species after establishment. Burning should only be conducted on 1/4-1/2 of large sites each year to minimize impact on insects and patchy burns are ideal to provide areas of refuge. Burns are often conducted in the fall or early spring to promote floral diversity and minimize impact to pollinators.
- Conservation grazing following grazing plans can be used to reduce the percent of cool-season grasses in conservation plantings and promote floral diversity.
- Biocontrol of invasive species may also be a long-term maintenance strategies to minimize herbicide use and control weeds. Biocontrols are available for leafy spurge, spotted knapweed, purple loosestrife and Canada thistle.
- When herbicides will be used for management it is important that target species (such as Canada thistle or wild parsnip) are not in bloom when they are sprayed and that spot herbicide application is conducted rather than broadcast spraying.

Early spring prescribed burn.

Information Sources

Minnesota NRCS Pollinator Conservation Planning Documents
Pollinator Habitat Assessment Form and Guide
Upper Midwest Plants for Native Bees
Pollinators and Roadsides, Roadside Management for Bees and Butterflies
Pollinator Conservation in Minnesota and Wisconsin
Pollinators in Natural Areas
Protecting Bees from Neonicotinoids in Your Garden
Using Farm Bill Programs for Pollinator Conservation
Monarch Habitat Guidebook
Conserving Bumblebees

Appendix B – Solar Site Pollinator Habitat Assessment Form (website link)

Solar Site Pollinator Habitat Assessment Form

For solar companies to claim pollinator/wildlife habitat benefits on solar sites

Minnesota Board of Water & Soil Resources

1. PERCENT OF SITE DOMINATED BY WILDFLOWERS

☐ 1-15 percent	10 points
☐ 16-30 percent	15 points
☐ 31-45 percent	20 points
☐ 46-60 percent	25 points
☐ 61+ percent	30 points

Total points ☐

Note: Project may have "array" mixes and diverse border mixes; forb dominance should be averaged across the entire site. Forb dominance should exclude native ragweeds.

2. % OF SITE DOMINATED BY NATIVE SPECIES COVER

☐ 1-25%	5 points
☐ 26-50%	10 points
☐ 51-75%.	15 points
☐ 76-100%	20 points

Total points ☐

3. COVER DIVERSITY (# of plant species with >2% cover)

☐ 1-9 species	5 points
☐ 10-19 species	10 points
☐ 20-39 species	15 points
☐ > 40 species	20 points

Total points ☐

Exclude invasives from species totals.

4. SEASONS WITH AT LEAST 3 BLOOMING SPECIES PRESENT (check/add all that apply)

☐ Spring	10 points
☐ Summer	5 points
☐ Fall	5 points

Total points ☐

See BWSR Pollinator Toolbox for Information about bloom season

5. AVAILABLE HABITAT COMPONENTS WITHIN .25 MILES (check/add all that apply)

☐ Native bunch grasses for nesting	5 points
☐ Trees and shrubs for nesting	5 points
☐ Clean, perennial water sources	5 points

Total points ☐

6. AVAILABLE HABITAT COMPONENTS ON-SITE (check/add all that apply)

☐ At least 2% milkweed cover	
☐ At least 3% native shrub cover	5 points
☐ Detailed mgmt. plan developed (see example plan)	5 points 10 points
☐ 3 or more signs legible at twenty or more feet stating pollinator friendly habitat	5 points

Total points ☐

7. INSECTICIDE RISK (% of project adjacent to insecticide use such as non-organic cropland, or on-site use)

☐ 1-25%	-10 points
☐ 26-50%	-15 points
☐ 51-75%	-20 points
☐ 76-100%	-25 points
☐ On-site use	-30 points

Total points ☐

This doesn't include herbicide being used for weed control

Grand Total ☐

Provides Exceptional Habitat	**85 TO 100**
Meets Pollinator Standards	**70-84**

Note: Measurements of percent "cover" should be based on "absolute cover" defined as the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above. To measure cover diversity it is recommended to use plots, and/or transects in addition to meander searches for accurate measurements. Wildflowers in question 1 refer to "forb" which are flowering plants that are not woody, and are not gaminoids (grasses, sedges, rushes).