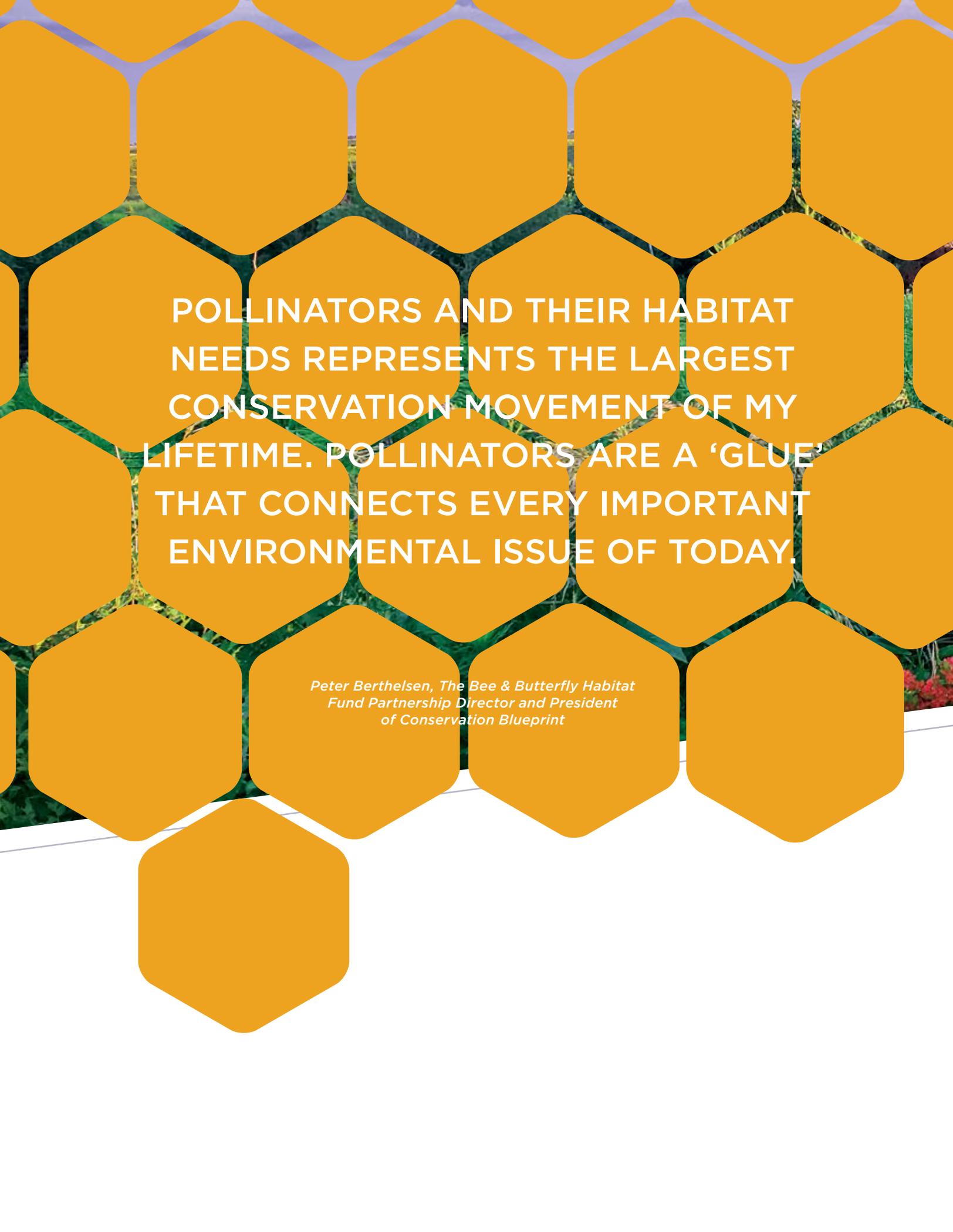


POLLINATOR HABITAT

ESTABLISHMENT &
MANAGEMENT GUIDE



POLLINATORS AND THEIR HABITAT
NEEDS REPRESENTS THE LARGEST
CONSERVATION MOVEMENT OF MY
LIFETIME. POLLINATORS ARE A 'GLUE'
THAT CONNECTS EVERY IMPORTANT
ENVIRONMENTAL ISSUE OF TODAY.

*Peter Berthelsen, The Bee & Butterfly Habitat
Fund Partnership Director and President
of Conservation Blueprint*



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OVERVIEW

Habitat loss is a major threat to bees, butterflies, and other beneficial insects. In the past decade, over 24 million acres of grassland and other pollinator habitat areas have been lost in the United States. The vast majority of those losses occurred in the Midwest and Great Plains. In the past, these areas provided abundant forage and habitat. About 40 percent of America's commercial honey bee colonies spend at least part of the year in the Great Plains. Beekeepers now struggle to find quality sites for their bees in the summer.

Bees pollinate 75% of the fruit, vegetable, and nut crops in the United States. Bee pollination adds flavor, color, and nutrients to our diets.

Providing access to high-quality habitat helps pollinator populations thrive. The Bee & Butterfly Habitat Fund (BBHF) currently provides pollinator habitat seed mixtures for projects in 12 Midwestern states. These states were selected because they provide critical habitat for beekeeping and eastern monarch butterfly population recovery. The BBHF provides land managers with free pollinator seed mixtures and one-on-one technical assistance for projects. The BBHF's goal is to make every acre of pollinator habitat the best it can be.

This guide outlines the steps that go into planning, preparing, planting, and maintaining great pollinator habitat.

Seed A Legacy Program States

These are the states covered as of 2021. Check our website for an updated list.

BeeAndButterflyFund.org

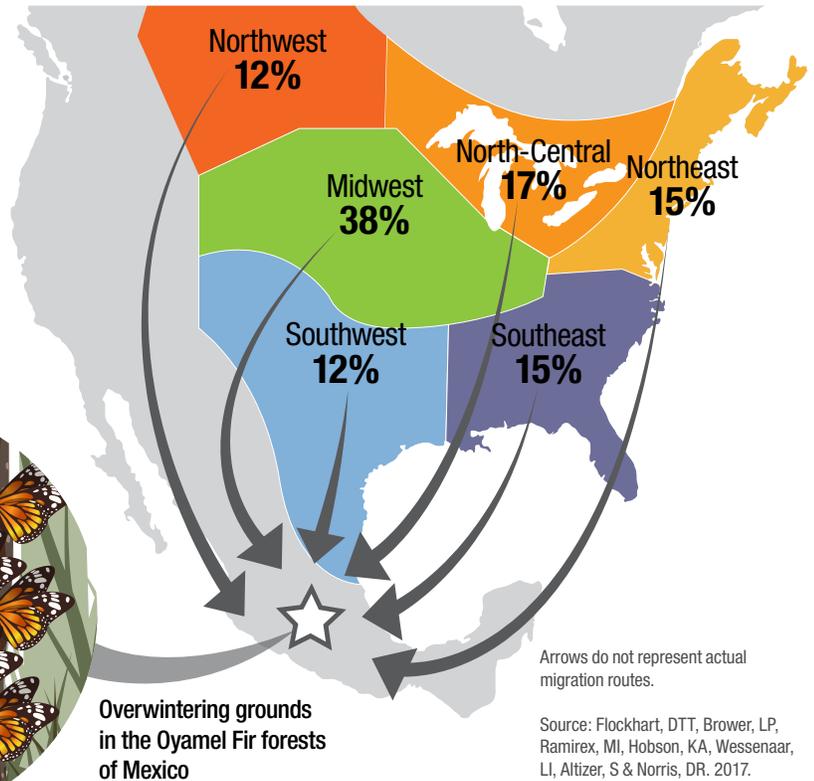


WHAT HAPPENED TO THE HABITAT?

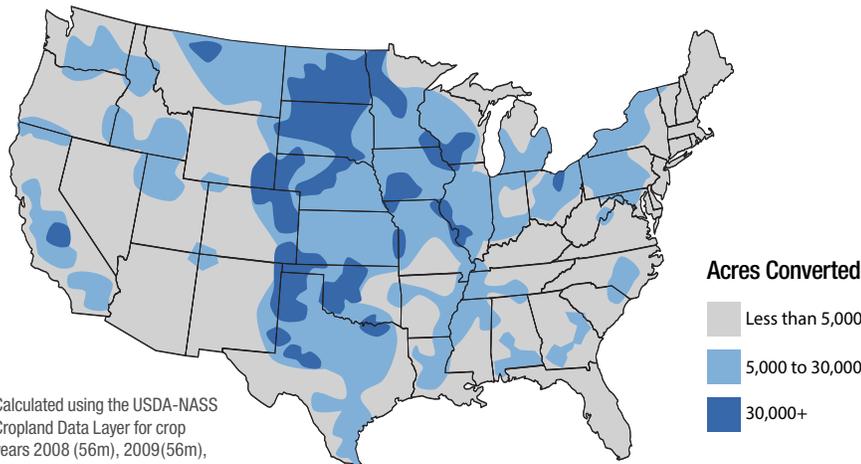
The regions of the country that are most critical for a wide and diverse range of pollinator species are located in the Midwest and Great Plains. These are also the regions of the country that have experienced dramatic landscape and land use changes in the past decade. Notice how the landscape changes are occurring in the regions most important to pollinator health and habitat.

Proportion of monarch butterflies overwintering in Mexico that came from six breeding regions.

WE ARE
LOSING HABITAT
IN THE MOST
IMPORTANT
AREAS



Acres of Grassland/Wetland/Shrub Land Converted to All Crops, 2008-2011



Calculated using the USDA-NASS Cropland Data Layer for crop years 2008 (56m), 2009(56m), 2010(30m) & 2011(30m).

**IN JUST
FOUR YEARS
ALMOST
24 MILLION
ACRES**

**OF GRASSLAND/WETLANDS/
SHRUBLAND HAS BEEN
CONVERTED TO CROPS**



THE STEPS TO GREAT POLLINATOR HABITAT RESULTS

This guide was created to provide step-by-step guidance for you to design, establish and manage pollinator habitat projects. It provides key details based on decades of experience working with habitat so your project can reach the best outcomes for pollinator health and habitat.



DEFINE THE PROJECT OBJECTIVES

The first step to providing great pollinator habitat is to pause long enough to think about and define the objectives of your project.

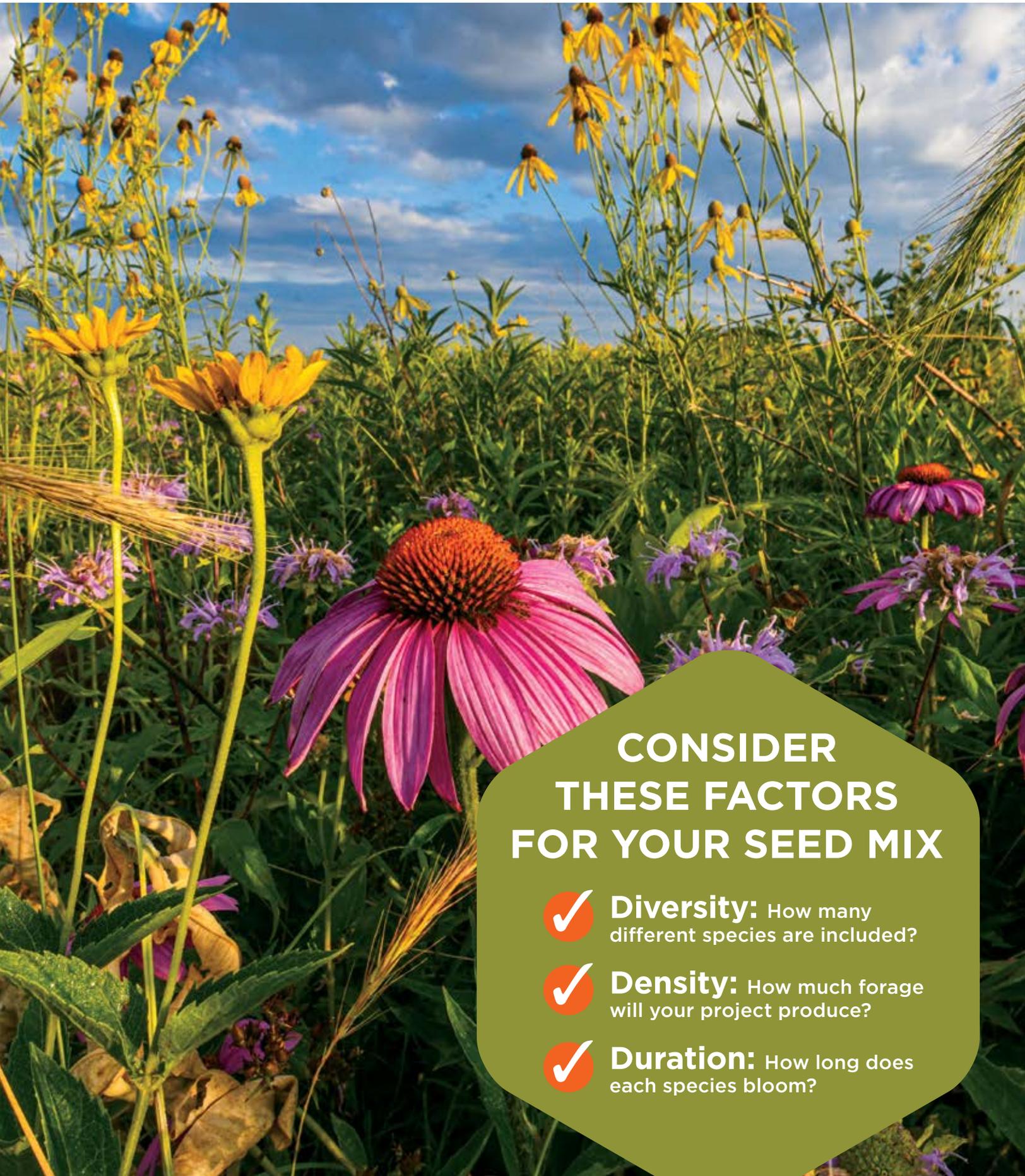
Your projects' overall objectives will guide the seed mixture design, site preparation, planting methods, site maintenance and future management.

Some of the questions that you should consider as you determine your objectives are listed below.

The answer to each of these questions will lay the foundation of your project and help guide the design, establishment and management of the project.

Questions to consider:

- What pollinator species do you wish to benefit?
 - How else will the site be used?
 - What is your project budget?
 - How long do you want this project to be on the site?
 - What tools and equipment can you use for site maintenance and future management?
 - How will the seed mixture be planted?
 - What soil type is associated with your project?
 - How will the land next to your pollinator habitat be used?
 - Is the proposed site currently in existing grass, cropland or other cover type?
 - Are you willing to invest 1 full year on site preparation for greater long-term success?
 - What is the annual precipitation at your location?
-



CONSIDER THESE FACTORS FOR YOUR SEED MIX



Diversity: How many different species are included?



Density: How much forage will your project produce?



Duration: How long does each species bloom?

2

SEED MIXTURE DESIGN

Not all pollinator habitat is created equal!

An ideal seed mix is cost-effective, has a high pollinator value, meets the land manager objectives and fits the site requirements. Seed mixtures should be designed to remain attractive to pollinators for years to come. Following these BBHF Seed Mixture Design Guidelines will help meet those goals.



Use an Up-to-Date Seed Calculator

A modern seed calculator considers each plant species' bloom period, cost, pollinator value, and growth habit. Seed mixes are then created based on the ideal distribution of the plants in the field. Older seed design tools prepared seed mixtures based on the weight of the seed. This is an outdated method that often results in more expensive mixes that do not provide additional value to pollinators.



More is Better!

The more diverse a pollinator habitat is, the more pollinator species it attracts and benefits. Using a diverse seed mix (40+ wildflower species) ensures that many pollinator species can be benefited throughout the entire growing season. Highly diverse pollinator habitat is able to withstand a variety of environmental conditions. Whether the year is wet or dry, hot or cold, some elements of the mix will perform well. A typical BBHF Honey Bee Mix contains 10 or more species, and a Monarch Butterfly Mix contains more than 40 native wildflower species.



**MOST
POLLINATORS**

60 SPECIES SEED MIX



**SOME
POLLINATORS**

20 SPECIES SEED MIX



**FEW
POLLINATORS**

9 SPECIES SEED MIX

Figures provided for graphical comparison only.
More plant species = more pollinator species benefited



Reduce Grass Competition

Grasses grow rapidly and can quickly overtake your pollinator planting if they comprise too much of the seed mix. **In general, no more than 10% to 20% of the pollinator seed mix should be comprised of grass.** Planting a seed mixture that establishes quickly will help to reduce pressure from fast-growing grasses.



Why Include Grasses at all?

Though grasses do not provide floral resources for pollinators, **they serve essential functions in pollinator habitats.** Some butterfly species lay their eggs on grasses, which the caterpillars then use as a food source. Native grasses have deep roots that stabilize the soil, reduce runoff, and prevent erosion. Grasses also provide valuable habitat for grassland songbirds and other wildlife species. For land managers using prescribed fire as a management tool, grasses also help create the conditions needed for a prescribed burn.



Include Plants from a Variety of Successional Stages

The composition of your pollinator planting will change over time. **Fast-growing annuals help to reduce early weed competition.** They also ensure abundant nectar resources in the first year, before many perennial and biennial plants have begun to bloom. In later years, the annuals will tend to drop out as they give way to slower-growing biennials and perennials.



Design for the Entire Bloom Period

Seed mixes should be designed to avoid “dearth periods” when there is little available forage. It is often more challenging to find early and late-blooming plants than plants that bloom in mid-summer. However, the scarcity of forage at these times makes planting early and late-blooming plants even more valuable. **An overall seed mixture should be designed to provide floral resources all the way from April & May to September & October.**



Adaptability to Site

Mixes should be designed to use appropriate species in the mixture based on:

- **Soil type:** the percentage of sand, silt, and clay in the soil.
- **Moisture conditions** at the site.
- **Geographic location:** consider the plants that are normally found in your area. A valuable pollinator plant in one geographic location could be considered too aggressive in another geographic location.



**CRITICAL
BLOOM TIMES
TO CONSIDER**

APRIL TO MAY

SEPTEMBER TO OCTOBER



Native vs. Naturalized Species

When designing a seed mix, it is important to consider whether native plant species alone or a combination of native and specific naturalized species will create the best results. Naturalized plant species are often perceived negatively because they can contain species with invasive characteristics. However, many plant species **critical to honey bee health are naturalized clovers** (*Trifolium* spp.) that are commonly used within agriculture, provide critical pollinator value to both native and managed bees and are not invasive.

An optimal seed mix is one that is cost-effective, has a high pollinator value, fits land manager objectives and site requirements, and will remain productive for years to come. **Designing a seed mixture that includes specific naturalized species can provide a cost-effective mix that is highly attractive to honey bees, native bees and butterflies.**

The honey bee (itself an introduced species) **benefits greatly from naturalized plant species like clover.** A 2017 US Geological Survey (USGS) study of honey bee pollen loads, sampled weekly from June through September, found that clover species such as sweet clover and alfalfa were the foundation of the bees' diet throughout the entire growing season.

Native plant species were attractive to foragers but highly ephemeral, and the bees relied upon naturalized species during those periods when few native plants were available. Including naturalized clover species with long bloom periods in your project can ensure that forage is available throughout the growing season, and is beneficial to both honey bees and native bees.

Including a **planned, appropriate balance of clover species** can be an important component of your project if honey bee health and habitat is an objective. If your objectives are to establish a native prairie, it would not be appropriate to include these non-native plant species.

OPTIMAL SEED MIX

- Is cost-effective
- Has high pollinator value
- Fits with the land manager objectives and site requirements
- Will remain productive for years to come.
- Establishes quickly to help reduce weed competition
- Provides pollinator value throughout the entire growing season.

**NATURALIZED
CLOVER**
IS CRITICAL TO
HONEY BEE HEALTH





**UNDERSTAND
YOUR SITE HISTORY.
IT SHOULD INCLUDE:**

- ✓ **Past herbicide use**
- ✓ **Cropping history**
- ✓ **Weed history**

3

SITE PREPARATION

Site preparation is the single most crucial aspect to ensure the success of your project. Disappointing future outcomes can almost always be traced back to an aspect of site preparation. Even if it means delaying a project for a growing season or a full year, **do not cut corners on this activity.** Once your site is planted, the options for improving or correcting the site become very limited. Understanding the history of the project site is the first step to creating a site preparation plan.



Cropping History

Any previous crops grown on the site can influence the success or failure of your establishment efforts. **Pollinator habitat establishes best in sites with reduced weed competition and sparse vegetation residue.** Sites that were previously planted to row crops can provide these conditions. Sites previously planted to soybeans have proven to provide the best establishment success.



Noxious Weed History

Noxious weeds are often an introduced species that grows rapidly and reproduces quickly. Noxious weeds are designated by federal, state or local government as being required to be controlled by law. **Land managers should obtain the noxious weed history from previous site managers as far back as possible.** Some weed seeds can remain dormant in the soil for up to 70 years. Tillage or other soil disturbance usually brings these previously dormant weed seeds to the soil surface and worsen the weed problem. Disturb the soil as little as possible in sites with any history of unwanted or noxious weeds.



Months to wait before planting pollinator habitat after herbicide application

Pre-emergence herbicide*	Months	Post-emergence herbicide*	Months
Acetanilide+atrazine premix (Harness Xtra)	9	2,4-D amine	3
Acetochlor (Surpass EC)	a	2,4-D LO-V 6E	3
Anthem	18	Accent Q	12
Atrazine	18	Affinity BroadSpec	1.5
Authority Assist	30	Assure II	4
Authority MTZ	18	Basis Blend	18
Boundary 6.5 EC	12	Buctril	1
Callisto	18	Callisto	18
Dicamba (Clarity)	4	Callisto Xtra	18
Dual II magnum	9	Capreno	18
Enlite	12	Classic	9
Envive	18	Dicamba (Clarity)	4
FirstRate	18	Extreme	4
Hornet WDG	26	FirstRate	18
Instigate	18	Flexstar	18
INTRRO	6	Flexstar GT 3.5	18
Lorox DF	4	Glyphosate	0
Lumax	18	Halex GT	18
Metribuzin 75	18	Harmony Extra SG	1.5
Metribuzin 75DF	18	Harmony SG	1.5
OpTill	4	Harmony SG	1.5
OpTill PRO	9	Hornet WDG	26
Outlook	6	Huskie	9
Prefix	18	Impact	18
Princep 4L	18	Laudis	18
Prowl H2O	12	Liberty 280 SL	6
Pursuit	4	NorthStar	18
Python WDG	26	Option	2
Resolve Q	18	Orion	9
Sharpen	6	Poast Plus	0
Surestart	18	Pursuit	4
Valor	10	Raptor	18
Valor XLT	18	Realm Q	18
Verdict	6	Resolve Q	18
Warrant	9	Resource	1
Zemax	18	Select Max	0
		Sequence	9
		Starane Flex	9
		Starane NXT	4
		Status	4
		Steadfast Q	18
		Stinger	18
		Synchrony XP	9
		Ultra Blazer	3.3
		Yukon	9
Pre-plant incorporated herbicide*	Months		
Acetochlor (Harness)	9		
Dual II magnum	9		
Prowl H2O	12		
Trifluralin (Treflan TR-10)	5		

*Plant-back period is based on the time required to plant a clover species. This herbicide summary does not contain all of the herbicides that could negatively impact pollinator habitat establishment. Source: Herbicide rotation restrictions in forage and cover cropping systems. Wisconsin crop weed science, University of Wisconsin - Extension. https://ipcm.wisc.edu/download/pubsPM/2019_RotationalRestrictions_final.pdf



Herbicide Use History

Because some herbicides can remain active in the soil for as long as 40 months, the land manager needs to know what the herbicide use history on the site is before making the next decisions about how to establish a project.

For fields that were cropped in the past 2 years, it is critical that the herbicide use history for that entire period be reviewed. If you did not manage the site yourself in the past 2 years, you should obtain the site history from the previous land manager.

The previous page lists some of the products from three classes of herbicides and the time that must elapse after an application in order to successfully install pollinator habitat.

For information on herbicides not included in this guide, consult the CDMS website that provides access to detailed product label information (www.cdms.net/LabelsSDS/home). Herbicide labels contain information on the proper use of an herbicide, including plant-back time for various crops following application.



Fertilizer

Fertilizer is not recommended for use in pollinator plantings.

The plants in pollinator seed mixes are generally adapted to soil low in nutrients. Though the desired plants will respond to fertilizer, weeds will usually benefit more. Adding fertilizer to your project will generally make the site more susceptible to weeds.

HERBICIDE FORMULATIONS INCLUDE:

- **Preemergence:**
Prevents seed germination
- **Postemergence:**
Kills plants in the seedling/adult stage
- **Preplant:**
Herbicides mixed into the soil prior to planting

See page 14 for examples of some herbicides and their application recommendations

BEST ROUNDUP READY SOYBEANS

GOLD PLAN

- Weeds should already be well-managed and under control from the previous farming practices.
- Soybean root nodules fix nitrogen, providing nutrients for the seed mix to establish and grow.
- Soybean stubble is also sparse and will not impede new seedlings as they emerge from the soil.

GOOD OTHER ROW CROP STUBBLE

SILVER PLAN

- Other row crops may provide adequate weed management and bare soil for planting pollinator habitat.
- Due to the wide variation of cropping practices among crops, thoroughly review the site history for herbicide use.

MODERATE GRASS REMOVED WITH HERBICIDES

BRONZE PLAN

- Removing grass with herbicides produces pollinator plantings with lower weed pressure compared to sites where grass was removed without herbicides.
- Multiple herbicide applications (n=2-4) are typically required to fully terminate the existing vegetation.

LOW GRASS REMOVED WITHOUT HERBICIDES

- Removing grass without herbicides is a challenging process with a long timeline.
- Combining tillage and cover cropping is the most effective method of removing grass on large-scale (greater than 0.5 acre) plots.
- This process often takes multiple years before the site is ready to be planted to pollinator habitat.



The 'Gold Plan' — Benefits of Planting into Roundup Ready Soybeans

The 'Gold Plan' of pollinator habitat establishment is when pollinator seed mixes are established into fields previously planted to soybeans. Without question, this technique produces the best short-term and long-term results for larger projects. Assuming that Glyphosate was applied as needed during soybean production, weed competition on the site should already be well-managed. In addition, soybean root nodules fix nitrogen, providing necessary nutrients for the pollinator seed mix to germinate, grow and become established. Soybean stubble also provides one of the best seed beds for planting. For areas that are in existing grasses, following the Gold Plan involves the termination of existing grasses by planting the site to soybeans for one full growing season and treating the site like conventional agriculture.



The Gold Plan formula for successful pollinator habitat projects:

1. **Designate your pollinator habitat project location** and then **terminate the existing vegetation** in the previous fall or in the spring of the year when vegetation is actively growing.
2. **Plant soybeans** in the spring into the area designated for your pollinator project and where existing vegetation was terminated.
3. **Control the grass and weed species** that will show up on the site throughout the growing season with regular applications of Glyphosate herbicide as you would treat conventional agriculture.

Note: Many weed species have seeds that can remain viable in the ground for up to 70 years. When grasses are first terminated, these species will often show up in abundance and provide significant competition for a newly planted pollinator habitat.

4. **Harvest soybeans** in the fall and **plant your pollinator habitat into the harvested soybean stubble** after soil temperatures have reached <50°F.
5. **We recommend planting your project with a broadcast seeding**, but a no-till drill may also be used. Be careful to monitor and control your seed planting depth to less than 1/8" deep.



City lot originally in grass...



then planted to soybeans to fully prepare the site for a pollinator planting later on



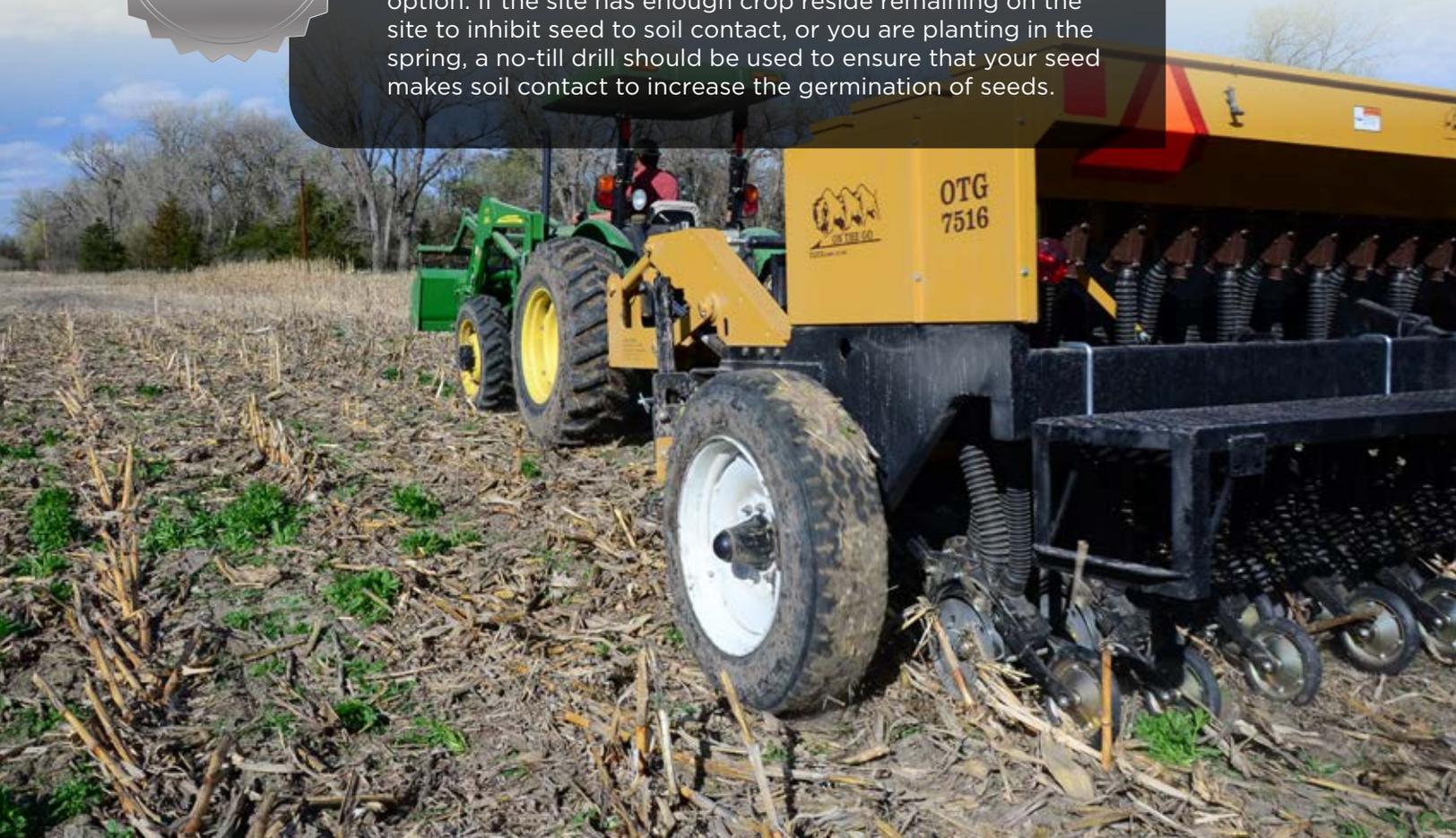
The 'Silver Plan' — Planting in Sites with Non-Soybean Crops

Pollinator habitat projects that are being established onto non-soybean crop fields can be a good option providing a few key factors have been considered and addressed. Conventional agriculture production has typically eliminated the grass and weed pressure on the site, but it is critically important to review the past herbicide use on the site. When a crop field was planted to corn in the previous growing season, there is about a 75% likelihood that a herbicide with a residual affect was used that will negatively impact your pollinator habitat establishment and long-term success. Remember that a crop herbicide residual would be 'doing its job' by preventing your pollinator habitat from establishing and growing. **Carefully review the past herbicide use and make sure that the window for residual effect has passed.** If it has not yet passed, a cover crop can be designed to plant on the site during the growing season that will allow you to plant in the fall using a dormant seeding on the site.



The Silver Plan

Like the Gold Plan you will plant your pollinator habitat seed mix into the existing crop or cover crop stubble. On sites where the amount of crop stubble allows for adequate seed to soil contact, a broadcast seeding in the late fall/early winter after soil temperatures are <math><50^{\circ}\text{F}</math> can be a good option. If the site has enough crop residue remaining on the site to inhibit seed to soil contact, or you are planting in the spring, a no-till drill should be used to ensure that your seed makes soil contact to increase the germination of seeds.





The 'Bronze Plan' — Planting in Sites with Existing Grass Cover

Pollinator habitat projects that are being established on sites that are currently in grass and existing vegetation are the most challenging of all sites to work with.

While successful pollinator habitat projects can be established, every effort must be made to fully terminate the existing grasses or the initial and long-term success of the pollinator planting will likely not meet your expectations. For this reason, applications in the **BBHF's Seed A Legacy program** need to be fully prepared, with existing grasses terminated, before the application will be accepted.



The Bronze Plan is not nearly as effective as the Gold Plan in establishing a pollinator habitat



BRONZE PLAN

The Bronze Plan

This method involves the termination of grasses following a plan using multiple herbicide applications over the course of 1+ growing seasons. While this plan can be effective at controlling grasses, it is **much less effective at controlling the early successional weeds** (thistle, pigweed, kochia, etc.) that will almost certainly appear on the site once the grasses have been terminated or set back.

It is important to note that while this technique can be successful, it is not nearly as effective at establishing a pollinator habitat as the use of the Gold or Silver Plan. If the overall success of your pollinator habitat project will be judged based on how quickly the pollinator habitat project becomes established, **the "Bronze Plan" may leave you disappointed with the overall results as this plan requires a longer timeline for the planting to look and function like an established pollinator planting.**

SITE PLAN DECISION TREE

Is the site planted with Roundup Ready Soybeans?

Yes

The site used only Glyphosate for weed control in the previous crop season

Yes

The site is ready to plant pollinator habitat



No

Ensure or wait for the herbicide residual effect period to pass

The site is ready to plant to pollinator habitat

No

The site is not planted to Roundup Ready Soybeans, but can be for one growing season before planting the Pollinator Mix

In the spring, plant Roundup Ready soybeans for one growing season and treat using Glyphosate to control and eliminate unwanted vegetation. After the harvest of the crop, proceed with planting in the fall



The site was planted to a non-soybean crop the previous crop season

Ensure or wait for the herbicide residual effect period to pass

The site is ready to plant to Pollinator Habitat



No

The site is not planted to Roundup Ready Soybeans and cannot be for one growing season before planting the pollinator mix

Remove the existing grass cover through mowing, haying or prescribed fire. Once the grass has begun to regrow, use Glyphosate herbicide application to terminate the grass

When existing grasses are fully terminated, the site is ready to plant to Pollinator Habitat



If no herbicide is used to terminate grass cover, there are a limited number of alternative options.

When grasses are fully terminated, the site is ready to plant to Pollinator Habitat





Glyphosate Application Guide

An effective management tool to terminate existing vegetation on the site is to apply a treatment of Glyphosate following the prescription of:

- Apply a Glyphosate herbicide application at a rate of 2 quarts/acre.
- Herbicide should be applied while air temperatures are between 60° and 85°F.
- Herbicide should be applied when relative humidity is less than 80%.
- Herbicide should be applied with no more than 10 gallons of solution (herbicide plus water) per acre and include Ammonium Sulfate (AMS) at a rate of 17 pounds/100 gallons of water.
- Herbicide should be applied on a sunny or mostly sunny time of the day.
- Herbicide should not be applied within 2 hours of sunrise or sunset.
- Apply in a manner where the herbicide makes as much contact with the still green and growing vegetation as possible.

To use Glyphosate or not use Glyphosate... that is the question.

The use of Glyphosate as a site preparation tool comes with many perspectives and thoughts—some of the concerns expressed about its use are real and some are over-emphasized. **The reality is that Glyphosate is one of the most cost-effective, timely and effective habitat establishment and management tools available.** This Pollinator Habitat Establishment Guide will provide you with the proven tools to produce great pollinator habitat results. Some of those recommendations will encourage the use of Glyphosate and some will not. We leave you to decide which of the various site preparation and habitat management plans outlined will fit with your overall objectives.



Timing of Planting

Deciding whether to establish your pollinator habitat in either the spring or fall/winter planting window is often determined by your site preparation methods.

Fall/Winter Dormant Seeding

Fall seeding involves drilling or broadcasting seed when soil temperatures are <50°F. The objective in a 'Dormant Seeding' is that the planted seeds do not germinate until the following spring when soil temperatures have reached >55°F. **Good seed-to-soil contact and planting depth is achieved with the rain and snow that occurs throughout the fall and winter.** The important process of seed scarification and stratification during the normal process of winter weather.

Spring Seeding

Cool season species germinate soon after seeding in the spring. Germination of warm season species usually occurs soon after soil temperature reaches 60°F. **One benefit of planting in the spring is that there is less seed loss due to decay and consumption by wildlife.** Broadcasting seed often does not provide enough seed-to-soil contact in the spring. Seed-to-soil contact should be accomplished by sowing seeds no deeper than 1/8" to 1/4".





Alternatives to Using Herbicides for Site Preparation

Herbicide-free weed control methods take longer to implement and are less effective than using herbicides. The site preparation options available without the use of herbicides will require a much longer period of time and typically range in the 2-4 year time period. Listed below are some alternative weed control methods for land managers who wish to avoid using herbicides.

Technique	Description	Timing
Solarization	Solarization uses heat captured from solar radiation to kill existing vegetation and to reduce the weed seed bank. Heat is generated by covering the ground with UV-stable plastic. Solarization is the most effective herbicide-free method of weed control. However, solarization is impractical for fields larger than half an acre. UV-stable plastic can be expensive, may be difficult to obtain, and may not be appropriate for sites with steep slopes or uneven topography.	<ul style="list-style-type: none">• In cooler climates, the process takes 5-12 months and planting occurs in the fall or winter dormant period.• In warmer climates, the process takes 3-6 months and planting can occur in the fall.
Cover Cropping	Cover cropping uses dense, fast-growing vegetation to suppress weeds through competition for resources such as light, water, nutrients, and space. Only landowners with a long timeline for planting their pollinator habitat should consider cover cropping. In sites with moderate weed pressure, 2-4 years of preparation may be required before planting pollinator habitat. One benefit of the cover cropping method is that some cover crops, such as buckwheat and phacelia, are attractive to pollinators. These cover crops can provide floral resources while the site transitions to pollinator habitat.	<ul style="list-style-type: none">• Takes 6-24 months in sites with low weed pressure.• Takes 24-48 months in sites with moderate weed pressure.• This technique may not prove effective in areas with high weed pressure issues.
Shallow Cultivation	Repeated shallow cultivation reduces the weed seed bank by repeated disturbance and kills the root systems of annual and perennial weeds. Weeds are repeatedly allowed to grow and then the ground is cultivated to damage the newly emerged weed seedlings. Timing is critical, because the weeds must be controlled before producing seeds. This process should not be used on sites susceptible to erosion, such as those with steep slopes. This method is effective on sites with low weed pressure. Additional weed control measures are necessary on sites with moderate or high weed pressure.	<ul style="list-style-type: none">• Takes 6-9 months in sites with low weed pressure.• Takes 12-24 months in sites with moderate weed pressure.• Planting occurs in late fall or in the spring following a final cultivation pass.
Organic Herbicides	Organic herbicides are usually ineffective at controlling grasses and perennial broadleaf weeds. When used properly, they may control annual broadleaf weeds. Organic herbicides have no residual toxicity and are not translocated through the plant. As a result, these chemicals do not usually kill the plant with an initial application. They must be applied multiple times when weeds are at the cotyledon or "first leaf" stage.	<ul style="list-style-type: none">• Takes 6-9 months in sites with low weed pressure, planting fall• Takes 12-36 months in sites with moderate weed pressure.• This technique can take multiple years.



4

HOW TO PLANT THE POLLINATOR HABITAT

When designing a seed mix, it is important to know how it will be planted. There are two primary seeding methods recommended by the BBHF: broadcast-seeding and using a no-till seed drill.



Broadcast Seeding

This involves spreading the seeds over the surface of the soil. Seeds may then be shallowly incorporated into the soil by dragging a harrow or by allowing the snow and rain to incorporate the seeds into the seed bed. This technique does an excellent job of ensuring that small seeds are not planted too deep in the ground which would negatively affect their germination and growth.

For this method, it is critically important to have a high seed to soil contact ratio. If the broadcast seeds do not fall on bare soil, they will have a significantly reduced germination rate and impact the establishment of your project.

It is more difficult to precisely spread seed mixes by broadcast seeding. As a result, mixes that will be applied using the broadcast seeding method should include a high proportion of an inert 'carrier' such as rice hulls or Cocoa bean hulls. One way the BBHF is able to provide cost-effective seed mixes is by supplying the precise amount of seed needed for the field area. Rice hulls are biodegradable and inexpensive, and they are an effective carrier to evenly spread a small amount of seed over a large field area. Seed mixes that will be broadcast-seeded receive a much higher proportion of filler than seed mixes which are seeded using a seed drill.



- Can be used for frost seeding and spring seeding.
- Seeds cannot be planted too deeply.



- More seed loss can occur due to consumption by wildlife.
- More challenging to spread seeds evenly over a large area.
- Requires more inert carrier material in the seed mix.



No-till Drill

By contrast, a no-till seed drill places the seeds into a narrow opening and precisely drops them into the soil. Consequently, a seed drill is a much more precise method of seeding and it is possible to calibrate and drill a very small volume of seed over a large area.

When properly calibrated, a seed drill meters out seeds precisely, placing seeds at equal distances and depth throughout the planting.

Traditional drill seeding equipment is designed to work in cultivated soil, whereas no-till drills are able to plant in untilled soil. In most cases, the BBHF recommends the use of no-till drills as opposed to traditional seed drills, because less soil disturbance is produced.

OBTAINING EQUIPMENT

No-till seed drills can often be rented from county conservation district offices or state wildlife agencies.

These offices may also provide technical assistance in operating a no-till seed drill. Farm equipment rental services can often supply broadcast spreaders, cultipackers, and drag harrows.



- Easier to distribute seeds evenly throughout the project site.
- Requires less carrier material.
- Less seed consumption by wildlife.



- Possible to plant the seed too deeply (greater than 1/4").
- Equipment may be difficult to locate for use or rental.
- Difficult on steep or highly uneven land.



Planting Depth

There is no way to repair a seeding job once it's been planted. **Make sure your seeding depth is correct before your seed is planted.** When a second party is hired or obtained to perform the planting, the discussion and agreement on proper planting depth is an important conversation to have and reach agreement on prior to planting.

Sowing seeds at the correct depth is critical for successful germination. **The rule of thumb for proper planting depth is two times the diameter of the seed.** Many of the seeds commonly used in pollinator seed mixes are as small as a grain of sand (e.g. Missouri Goldenrod has 6,312,130 seeds per pound of seed). Since the seeds used in pollinator habitat mixes tend to be very small, it is easy to plant them too deep. Planting seeds deeper than 1/8" to 1/4" will reduce both the diversity of your planting and the speed at which it becomes established. No-till grass drills are typically calibrated to plant grass seeds at a depth of 1/4" to 1/2", which is too deep for a pollinator planting. Many species will fail to establish if planted at this depth.



Seed-to-Soil Contact

Good seed-to-soil contact is essential for consistent germination throughout a field. **Even under dry conditions, firmly packed soil maintains moist air pockets between soil particles.** Moisture is also able to move through firmly packed soil by capillary action. **Firmly packing soil allows seeds to obtain enough moisture to germinate.**

Broadcast seeding is not appropriate in sites with a substantial amount of residue. In this scenario, seeds will not achieve sufficient contact with the soil. Sites where existing grasses and weeds were terminated, but the residue remains, should be planted with a no-till drill.

**PLANTING DEPTH =
2X DIAMETER OF SEED**



The importance of planting your project in different seed mixtures

The BBHF uses two different pollinator seed mixes on each project. While a wide range of pollinator species use and benefit from each of the seed mixes, one mix is tailored to honey bees, and the other provides habitat for monarch butterflies. Each mix is established on 50% of the site. There are different planting and management considerations for the BBHF Honey Bee and Monarch Butterfly seed mixes.



Honey Bee Seed Mix

Many of the species included in the Honey Bee seed mix do not germinate until the soil temperature has reached 60°F. Don't be surprised if the field initially appears to have a low diversity of flowering plants. In the first year, slow-establishing plants will still be at the seedling stage in early summer. By mid-to-late summer, these plants will be growing rapidly and many will begin to flower. In subsequent years, perennials and biennials will achieve a strong presence in the field. Expect the composition of flowering plants to evolve and change slightly each year.

Because of its seed mixture design, the honey bee seed mix is often established around the perimeter of a proposed project so it can also serve as a Green Firebreak. A Green Firebreak can help landowners conduct future management using prescribed burns on the monarch butterfly seed mix in a safe and effective manner. Learn more here (<https://youtu.be/cB4naEGVqNQ>).



Monarch Butterfly Seed Mix

Patience is necessary when growing a highly diverse mix of native wildflowers and milkweed species. A minimum of 40 different wildflower species are used in every Monarch Mix.

This seed mixture contains a combination of annual, biennial and perennial plants that will establish over time. Monitor the establishment of this plot using the 'Sleep, Creep and Leap' philosophy: in year 1, the planting appears to be asleep; in year 2, it starts to creep; and in year 3, it leaps as a successful project.

OPTIONS FOR SEEDING A BBHF POLLINATOR HABITAT PROJECT

1. Projects that are side by side.
2. Projects in separate locations.
3. Using the honey bee mix as a green firebreak around the monarch butterfly mix.





BENEFITS OF REGULAR MAINTENANCE

Management practices such as grazing, mowing, herbicide application and prescribed burning can be used to manage your planting. Management activities should be planned and scheduled on an annual, regular basis.

5

PROJECT MAINTENANCE

All habitat plantings require some form of regular maintenance to control weeds and encourage establishment. If you wait until a weed problem needs to be addressed, it will require more of your action. Grasses and other weedy species can quickly overtake a pollinator planting without some type of regular, annual maintenance. Management practices such as grazing, mowing, herbicide application and prescribed burning can be used to limit woody plant encroachment, suppress weeds, and enhance native plant diversity. Management activities should be scheduled to limit disturbance to bee and butterfly species.



Mowing

Mowing at the right time can prevent weed plants from setting seed and stimulate the growth and establishment of the desirable pollinator plants. Mowing in the year of establishment is especially important in locations that receive more than 30" of annual precipitation because vegetation is able to grow rapidly.

Time your mowing activities to make sure that a mulch is not being created on top of the young, fragile seedlings. **Mow before vegetation has reached 20" to 24" tall (knee high) and mow to a height of 10" to 12" tall (calf high).**

BEST PRACTICES

FOR MOWING POLLINATOR HABITAT

- **Mow no more than 50% of the habitat at one time.** This will allow for insect recolonization of the mowed site.
- **Time mowing to suppress weeds and limit damage to pollinators and other wildlife.** Mowing must be completed before the weed plants set seed.
- **Mow no more than twice per year.** During the first year of establishment, more frequent mowing (n=2) may be needed for weed control.
- **Use a minimum cutting height of 10-12 inches.** Mowing at this height will effectively control the most invasive plants while minimizing impact to native plants and many insects.

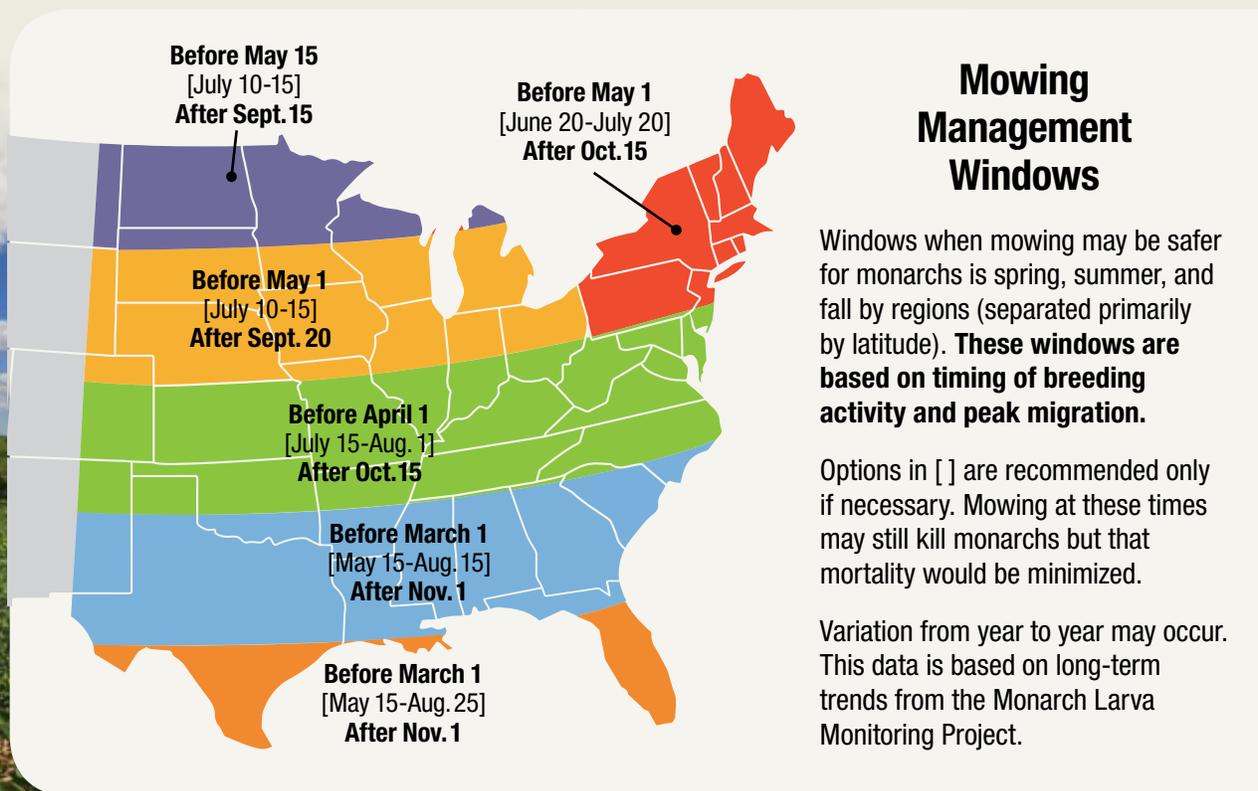


Mowing and the Monarch Butterfly Life Cycle

It is critical to time any mowing activities throughout the growing season to avoid interfering with the monarch butterfly's life cycle.

The eastern monarch butterfly performs an epic migration each year. In the spring, they migrate from northern Mexico all the way to Canada. In the fall, they return to the mountains of northern Mexico. The migration passes through the states east of the Rocky Mountains. It takes three to four generations of monarchs to complete the northward migration. On the journey north, reproduction occurs on a variety of milkweed species. The southward migration takes one generation. Adults stop to feed on flowering plants (non-milkweed) along the way.

For mixes or areas that include milkweed, avoid mowing during the periods indicated in the map below. Mowing during periods of high monarch reproduction or migration can damage eggs, larval and pupal stages, or adult monarchs. Monarchs prefer to lay eggs on young, tender milkweed. In areas where monarch activity is low for an extended period during the summer, mowing in mid-summer can actually improve monarch habitat by causing milkweed plants to regrow fresh shoots.





Grazing

Short-duration, high-intensity grazing in the spring or fall can help control non-native cool-season grasses from setting seed and reduce woody encroachment. Thorough grazing and rotation should be monitored and timed to ensure that target plant species (non-native cool-season grasses) are being selectively grazed, and native plant species are protected with limited grazing pressure. Spring grazing events ensure that annual grasses do not set seed. Fall grazing targets perennial, cool-season grasses.

Preparation for grazing may involve installing fences and water sources for livestock. The fences keep livestock contained in the desired area. Having a water source in the field means livestock won't need to walk back over previously grazed areas to obtain water.



SHORT-DURATION, HIGH-INTENSITY GRAZING
CAN HELP CONTROL NON-NATIVE ANNUAL GRASSES FROM SETTING SEED
& REDUCE WOODY ENCROACHMENTS.



Haying

Haying requires similar precautions to those followed with mowing:

1. **Fields should be hayed in a rotation or in sections**, to provide a refuge for pollinators.
2. **Harvest from one end of the field to the other**, rather than from the perimeter inward, to allow pollinators and other wildlife to escape.
3. **Use a minimum cutting height of 10-12 inches.** Cutting at this height will remove seed structures of most invasive plants while minimizing impact to native plants and many insects.
4. **Try to time haying when pollinator plants are not blooming.**





COMBINING PRESCRIBED FIRE & SHORT-TERM, HIGH-INTENSITY GRAZING

ALLOWS MULTIPLE GRASS
SPECIES TO BE CONTROLLED
AND WILDFLOWERS
ENHANCED



Prescribed Fire

Prescribed fire mimics the natural cycle of prairie landscapes. Benefits include reducing the risk of wildfires, preventing woody encroachment, restoring nutrients to the soil, and improving the germination of many native prairie plants. Prescribed fire should be applied in a rotation to protect habitat for pollinators and other wildlife. The appropriate time for a prescribed burn is determined by your management objectives.

Conduct burns when warm-season plants are mostly dormant, but cool-season grasses are growing. Burn before cool-season grasses have set seed. If you wish to promote wildflowers, a growing season burn conducted in late summer can improve wildflower abundance and diversity. Learn more here (<https://youtu.be/muY1BcSrP3I>).



Patch-Burn Grazing

One challenge of controlling cool-season grasses with prescribed fire is that different species set seed at different times. For example, bluegrass sets seed earlier than smooth brome. In a field containing both bluegrass and smooth brome, burning to control one species may stimulate the other. **Combining the management techniques of both prescribed fire with short-term, high-intensity grazing allows multiple grass species to be controlled.**



Herbicides

Herbicide applications conducted in the late fall after wildflower species have become dormant is the most effective technique at controlling and eliminating cool-season grasses in an established pollinator project.

Because cool-season grasses remain actively growing following a hard freeze when other plants are dormant, they can be eliminated from a planting by applying Glyphosate on the project while air temperatures are 60°F or warmer and there is plenty of sun. This technique allows you to selectively impact the cool-season grasses while not impacting the desired wildflower species and warm-season grasses.



Best Practices for Controlling Cool-Season Grasses in Pollinator Habitat

1. **Hay or use prescribed fire in late summer to remove vegetative material** which may prevent herbicide from contacting actively growing smooth brome and fescue. Time haying or burning so that there will be enough time for cool season grasses to regrow to a height of at least 6".
2. **Wait a minimum of 7 days after the first hard freeze of the fall to ensure the dormancy of your desired plant species.** This herbicide application can actually take place very late in the year as long as the air temperature is at least 60°F at the time of spraying.
3. **After dormancy is reached, apply Glyphosate herbicide.** This application will not harm the native warm season grasses or wildflowers that have gone dormant for the season, but will eliminate the actively growing cool season grasses.
4. **Spray with Glyphosate on a sunny to mostly sunny day while the air temperature is at least 60°F.** Make sure the herbicide is being applied to the green and still actively growing cool-season grasses.



FALL GLYSOPHATE APPLICATION PROCESS & BEST PRACTICES

- Wait to apply the herbicide until the area has gone through a hard freeze to ensure the desired wildflowers and grasses in the project have all gone dormant for the season.
- Apply a Glyphosate herbicide **application at a rate of 2 quarts/acre.**
- Herbicide should be applied while air temperatures are **between 60° and 85°F.**
- Apply the herbicide **on a sunny or mostly sunny time of the day.**
- Herbicide should **not be applied within 2 hours of sunrise or sunset.**
- Apply in a manner where the **herbicide makes as much contact as possible with the still green and growing vegetation.**



BEST MANAGEMENT PRACTICES FOR REDUCING PESTICIDE RISK TO POLLINATORS

- ✓ Timing of Application
- ✓ Pesticide Formulation
- ✓ Minimize Pesticide Drift
- ✓ Communication with Beekeepers

6

POLLINATOR HABITAT ASSOCIATED WITH AGRICULTURAL LANDS

Great pollinator benefits can still be achieved even if projects are co-located with agriculture. There are a variety of steps landowners can take to reduce the pesticide risks to pollinators. Attempt to work with nearby land managers to reduce risk of pesticide exposure, especially if the lands are growing crops that are attractive to bees. Communication with nearby land managers will increase interest in your pollinator habitat project.



Timing of Application:

- **Avoid bee-toxic pesticide use during bloom.**
- If it is necessary to apply a pesticide harmful to bees, **time the application to occur at night or in the early morning**, so that the pesticide has dried on the plant by the time bees are active and foraging. Many pesticides are most toxic when they are first applied and still wet.
- **Pesticides with an extended residual toxicity** of between 4 to 8 hours may be applied from late evening, after bees have stopped foraging, until midnight. Pesticides with a short residual toxicity of under 4 hours may be applied between late evening and early morning.



Pesticide Formulation

Use the least bee-toxic formulation of the pesticide. Dust and microencapsulated formulations tend to be the most toxic because they are similar in size to pollen and stick to bee hairs. Emulsifiable concentrates typically have shorter residual toxicity than wettable powders and often pose less risk to bees. Granular formulations tend to be the least toxic to bees.



Minimize Pesticide Drift:

- **A common recommendation is to apply pesticides when wind speeds range between 3 and 10 miles per hour.** At less than 3 miles per hour, a temperature inversion can occur, which results in vertical mixing of the air and can cause long-range drift.
- **Larger pesticide droplets are less susceptible to remain airborne and drifting.** A higher boom height also increases the risk of drift. Don't raise the boom higher than it needs to be for adequate sprayer operation.



Communication with Beekeepers:

BBHF participants are encouraged to locate their pollinator habitats near apiaries. Encourage communication between nearby land managers and beekeepers to reduce the likelihood of bee poisoning. Make sure that bee hive locations are registered in your state (driftwatch.org). Many states and counties also request that land managers notify beekeepers when they spray.





PRAIRIE RESTORATION

Maintenance of long-term habitat restoration projects that are designed to restore the native vegetation were once common throughout much of the Midwest and Great Plains.

Much of the earth's grasslands and prairies have been converted to agriculture because these locations make high-quality farmland. Pollinator habitat establishment allows us to recover some of the ecosystem services once performed by prairies to provide habitat for threatened wildlife species and to improve landscape diversity. There is a saying about establishing pollinator habitat: "the first year it sleeps, the second year it creeps, the third year it leaps." In actuality, habitat establishment is not completed in three years. However, there is a lot of truth to that saying.

Native, perennial plants can be slow-growing, and remain quite small in the first year. As a result, it is common practice to mow several times during the establishment year to prevent tall, weedy grasses from shading out the new seedlings. In many locations, this means mowing from spring until fall at a height of 10" to 12" tall. The second year, weeds are controlled through hand pulling, spot applications of herbicide, or selectively mowing weedy patches. The third year and beyond, management is less frequent and consists of controlled burns, mowing, and/or grazing. While valuable and necessary, prairie restoration is a long and labor-intensive process.

WHY DOESN'T THE BBHF FOCUS ON NATIVE PRAIRIE RESTORATION?

Despite the importance of restoring prairie, other forms of pollinator habitat can require less labor and provide more value to pollinators. In addition, many project locations may not be well-suited for a prairie restoration (Solar Energy projects, projects with short life spans [5-10 years], etc.).

Prairies are grasslands and their seed mixes often contain a 50:50 combination of grasses and wildflowers. By contrast, at least 75% of BBHF seed mixes are wildflowers and forbs attractive to pollinators.

BBHF seed mixes are also designed with some plant species that establish quickly to reduce weed competition. Prairie plants tend to establish slowly, which necessitates more effort to control weeds. In addition, by including naturalized plants, BBHF projects provide a full season of forage. Without seeking to recreate native prairie, BBHF seed mixes provide the form and function of high-quality pollinator habitats.





FREQUENTLY ASKED QUESTIONS

1. If I don't want to use an herbicide application, can I still apply for free seed and how long will it take to fully prepare the site for a pollinator planting?

The BBHF absolutely accepts projects that don't want to use any herbicide. The site just needs to be fully prepared for a successful planting. The timeline answer will vary by site, but it will usually take 2+ years of regular activity to reduce the grass competition. The drawbacks are that non-herbicide management will typically involve regular disking/plowing of the site, which is detrimental to soil health. This may encourage erosion and is marginally successful at eliminating grasses. It requires years of preparation and often introduces weeds.

2. Why does the BBHF recommend the use of herbicides?

Site preparation is the single most important aspect of any project and the well-planned use of herbicides

provides the shortest timeline to a successful pollinator planting. As outlined in this habitat guide, there are other options available to you, but they all come with a longer timeline for success and usually require more aggressive future management. We recommend the Gold Plan to produce the best results for your project.

3. Will I need to replant my pollinator habitat?

No. BBHF pollinator seed mixes are designed to be a perennial planting that changes over time. With the proper future management activities described in this guide, a pollinator planting should perform for you year after year. Please note that there is nothing we can plant, walk away from it and always have great habitat. You will need to think about and manage your pollinator habitat a bit each year to ensure its future success.

4. Why is the Seed A Legacy program only available in 12 states?

The Seed A Legacy program is growing and targeting the most important states of the Midwest and Great Plains for Monarch Butterfly population recovery and honey bee health. We are strategically adding states to this region on a regular basis. Check back in the future for additional states being added or contact BBHF staff to learn how your state/location can be added even sooner.

5. How long will it take for my pollinator habitat to become established?

You should approach any pollinator habitat planting with the philosophy of “Sleep, Creep and Leap”. This means that many pollinator plantings tend to “sleep” in year 1 and many of the planted species are difficult to locate. The planting may appear weedy and you are left wondering if it was a success. In year 2, the planting starts to “creep” and the annual and biennial plant species in the planting are most abundant. You may still be wondering about the success of your overall planting, but things are starting to happen. In year 3, the project starts to “leap” and actually look like a success. This is all part of the process and we encourage you to watch and think about how the project establishes and changes over time. This is a marathon and not a sprint...enjoy the process!

6. Can pollinator habitat be located adjacent to Agriculture?

Yes! There are many reasons to consider establishing pollinator adjacent to agricultural production. The first is that pollinators need more habitat and that’s our goal. The second is that pollinator habitat can serve as a refuge for beneficial insects that will aid crop production by targeting the non-beneficial insects that are affecting the crop.

Please have your pollinator habitat philosophy be guided by the saying of “*Do what you can where you can*”. We need more pollinator habitat!

7. Why do we plant two different mixtures and we don’t mix all the seed together?

The BBHF establishes its habitat projects by designing and using two pollinator seed mixes on each project. We provide the use of a Monarch Butterfly seed mixture and a Honey Bee seed mixture each on 50% of the project. The seed mixtures are strategically designed to contain plant species that establish and are managed differently.

While pollinator species will use and benefit from both seed mixtures, the seed mixtures establish at a different pace.

8. How can I design my project to be able to safely use prescribed fire as a management tool in the future?

Because of their design, the BBHF seed mixtures can be used where the Honey Bee seed mix can serve as a Green Firebreak for future prescribed burning activities. In this case, consider establishing the Honey Bee mix around the perimeter of the project and planting the Monarch Butterfly mix in the middle of the project. This will allow you to more safely use fire on the monarch butterfly mix in the future with the honey bee mix serving as a green safety zone for the application of fire.

9. Why does the BBHF use introduced, naturalized plant species like clover in some of its Honey Bee seed mixtures?

Because honey bee health and habitat is a key component of our efforts, we want to make sure we are using the plant species

documented to provide the most critical needs for honey bees. That means we include some clover species in our Honey Bee mix and they are all an introduced, naturalized plant species. Please note that ‘introduced’ does not necessarily mean ‘invasive’. These clover species are routinely used throughout agriculture and are not known to spread across the landscape as some invasive plant species have.

10. I don't have farming equipment, how can I follow your Gold Plan recommendations?

On projects where the landowner doesn't have access to the farming equipment needed to convert a grass area to soybeans, we often recommend talking to an adjacent farmer. Having a neighbor farmer convert your grass area to soybeans for one growing season and then allowing them to harvest the crop produces an income for the farmer and site preparation for the pollinator planting. A great exchange of benefits.

11. Is it better to plant pollinator habitat in the spring or the fall?

Both seasons can work, but a dormant season planting in the late fall/early winter generally produces the best results. This is because the winter rain/snow helps increase the seed to soil contact of the planting and the freezing/thawing action of winter helps to break the seed dormancy for many of the plant species in the Monarch Butterfly seed mix.

12. Where do the seeds in my pollinator seed mix come from?

BBHF places our seed mixture designs out for a bid each year with national seed vendors that have an established history of providing seed for conservation programs across the country. The BBHF uses multiple seed vendors each year and they are all located within the Seed A Legacy program states.



13. Can I continue to enroll more projects each year?

There is no limit on the number of applications you can submit, now or in the future, as long as they are different sites.

14. Can the BBHF recommend someone to prepare my site and plant the pollinator habitat?

Yes. We team up with several companies that have extensive experience in preparing sites, planting them and managing sites after planting. We would be happy to provide you with the contact information for some of these sources.

15. Can I enroll something smaller than two acres?

Currently, the minimum project size in the Seed A Legacy program is 2 acres, but they do not have to be 2 contiguous acres. If you have multiple sites on the same property, or adjoining properties, that can add up to 2+ acres, you may be able to enroll them as one project.



16. Can I purchase BBHF seed mixes on my own?

Yes. Our seed mixes are available for purchase. Contact the BBHF staff for pricing and ordering information for seed mixes. Minimum order is 1.0 acre of seed.

17. Can I hay or graze my pollinator project in the future?

Seed A Legacy projects are prohibited from haying and grazing each year of the contract from April 1st to September 30. On projects that are >10 acres in size, BBHF staff can design a rotational haying guide that can be applied to the Honey Bee mix portion of a project.

18. Can I combine the Seed A Legacy program with a USDA conservation program?

This is a complicated question that's really up to the USDA. If the USDA conservation program will approve the BBHF seed mixture designs and the use of two different seed mixes, the answer would be yes. The foundation of the BBHF pollinator habitat is to establish two unique seed mixtures to deliver specific, proven pollinator benefits. In our experience, USDA conservation programs typically don't have the flexibility to establish their programs following those methods.

19. I only have a small area available on my property. Is it worth establishing pollinator habitat on it?

Yes! The Seed A Legacy program works with projects that are a minimum of 2 acres in size, but that does not mean smaller projects or pollinator gardens are not beneficial. You should operate under the guidance of *"Do what you can, where you can"*. Smaller projects should critically think about providing the plant species that will provide the most value in smaller areas.

21. I have an upcoming meeting or newsletter (Beekeeping Club, Master Gardener, etc.) where I would like to share information about BBHF pollinator seed mixes. Can I receive information so I can share this?

We would be happy to provide you with copies of the Seed A Legacy program flyer or share an electronic file with you so you can print them, include in a newsletter or share on social media. Since many people interested in pollinator habitat have still never heard of the BBHF, we are looking for more ways to get our positive pollinator habitat message out to the public.

22. I have a new solar energy project coming to my area or state. Can the BBHF help us make sure pollinator habitat is included in that project?

Yes! The BBHF is currently working on solar energy + pollinator habitat projects in 17 states and would be happy to make sure that pollinator habitat is included in the new solar energy project in your area. Have your solar developer contact the BBHF staff to find out how we can help them provide pollinator benefits by designing seed mixes and potentially providing the seed for the project.

23. Do you have any results from the research projects that are evaluating BBHF seed mixes?

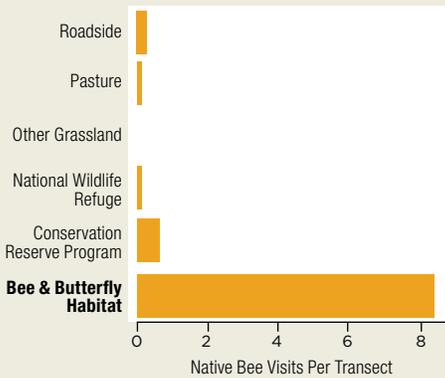
There are currently 4 research projects that are evaluating the pollinator benefits of BBHF pollinator seed mixes. One of the earliest results we can share comes from a study conducted by the US Geological Survey. This study compared BBHF seed mixes to the available pollinator habitat options on the landscape. The study found that BBHF seed mixes provided significant increases in flower abundance, honey bee visits and native bee visits. This encouraging information has now been published with a more detailed data set and summary of information.

BBHF HABITAT & SEED MIXES

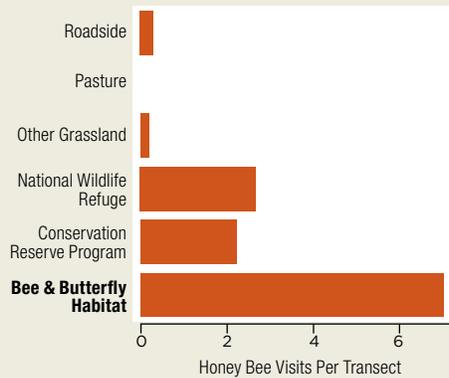
ARE MORE LIKELY TO ATTRACT NATIVE BEES & HONEY BEES THAN THE OTHER OPTIONS AVAILABLE ON THE LANDSCAPE



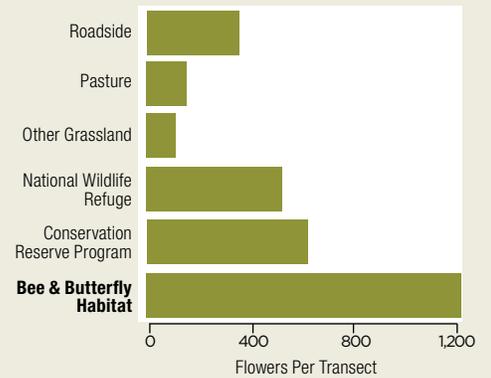
Native Bee Flower Visits by Land Use



Honey Bee Flower Visits by Land Use



Flower Abundance by Land Use



SEED A LEGACY

Pollinator Habitat Program

**Critical pollinator & wildlife habitat is disappearing.
YOU can help reverse the trend!**

Pollinators across the country are experiencing population declines due to reduced access to diverse, nutritious habitat. The SEED A LEGACY program restores high quality pollinator habitat with FREE or REDUCED COST seed.



Monarch Butterfly
80%
decrease in population
in the last 20 years



Honey Bee
40%
annual
hive losses



Native Bees
Continued steep
declines in both habitat
and populations



**RESEARCHED & PROVEN
SEED MIXES** to provide
superior pollinator habitat



FREE OR REDUCED COST
seed mixes to sites that are
prepped and ready to plant



**ONE-ON-ONE TECHNICAL
GUIDANCE** to ensure the
success of your project



APPLY ONLINE TO
RECEIVE FREE SEED!

BeeAndButterflyFund.org



The Bee & Butterfly
Habitat Fund
A Unique Conservation Solution.

Join the largest conservation effort of our lifetime!

With your help, we can restore pollinator habitat to the landscape.

WHO QUALIFIES?

- Land managers in the 12 highlighted states
- Private, public and corporate lands
- Minimum project size is 2 acres
- Projects must meet program guidelines found on

BeeAndButterflyFund.org

Applications are ranked for their pollinator habitat potential and planted in the next spring or fall cycle

SEED MIX COST:

FREE up to 25 acres!

Contact us about cost share opportunities for planting more than 25 acres.

READY TO APPLY?

Visit BeeAndButterflyFund.org for program guidelines, seed mixes, application, habitat establishment guide and other resources.

ABOUT THE BEE & BUTTERFLY HABITAT FUND

The Bee & Butterfly Habitat Fund is dedicated to establishing high quality pollinator habitat to ensure pollinator populations thrive. We work with landowners, conservationists, scientists, and beekeepers to design and build healthy and sustainable pollinator habitat.



“We are loving our Bee and Butterfly Habitat Fund pollinator plot. This year it really took off! What once was a non-productive corner of a corn field is now a beautiful spot for pollinators.”

Ashley Hazen, Iowa.



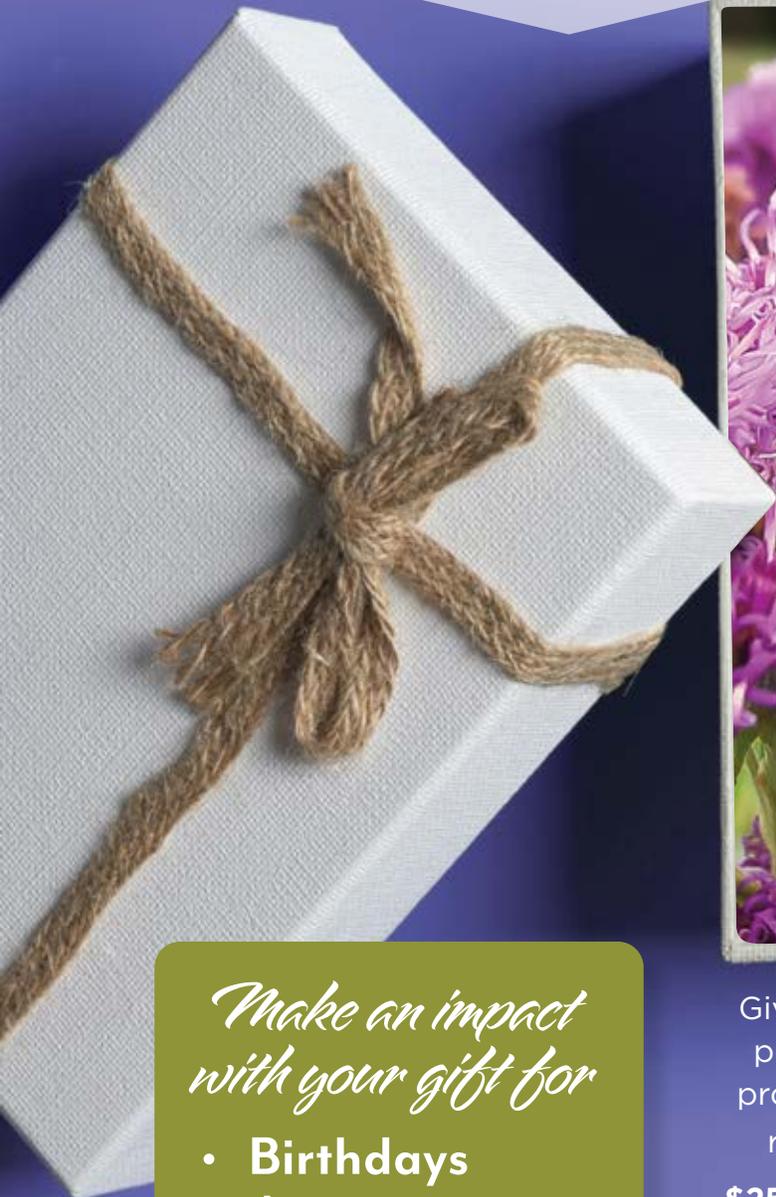
The Bee & Butterfly
Habitat Fund

A Unique Conservation Solution.

Contact Us: 800-407-5337

The Bee & Butterfly Habitat Fund is a 501(c)3 organization and donations are tax deductible to the donor. Consult your tax advisor for deductibility of expenses.

Give a gift that grows!



Make an impact with your gift for

- Birthdays
- Anniversaries
- Memorials
- Fundraisers

Send an eCard!



Giving a donation in honor of a loved one provides wildflower seeds for pollinator projects. Give a gift that matters and help restore high quality pollinator habitat!

\$25=1/4 acre \$50=1/2 acre \$100=1 acre

GIVE NOW

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