PLANTING GUIDE for Detroit, MI Pollinator Habitat Kits

The work to ensure your pollinator kit and native plants successfully find their forever home in your soils *starts now*. Developing and finalizing a planting plan before you obtain your habitat kit will ensure that your plants can be installed immediately and maintained accordingly. This guide contains information to help you craft a perfect planting plan, achieve your project goals, and create valuable, long-term pollinator habitat on your farm or garden.

Sections in this guide:

If you have questions or need technical assistance:

Stefanie Steele - (586) 225-8950

stefanie.steele@xerces.org

What's in the habitat kits?

The Detroit Pollinator Habitat Kits each contain three trays of 32 two-inch pot transplants (2.19" diameter by 3" depth) of native perennial wildflowers, grasses, sedges, and 2 native shrub plugs (2.25" diameter by 5" depth), totaling 98 plants. These plants have been documented to support a variety of pollinators and beneficial insects from spring to fall. A species list for the Detroit Kits (Appendix C) details the plant species and number included in each kit, their bloom period, flower color, height, and summary insect notes. This plant kit was designed to be planted in full sun to part-sun and soil moisture levels of dry-medium to medium.

Important:

- Transport: Each flat of 32 2" pots is approximately 9.12" by 18.1" or 1.2 square feet. *Plan accordingly for transporting the kit to your project site*. *Do not stack flats – plants will be damaged!* To accommodate **one kit** of 3 flats per kit + shrubs, you will need a total cargo area roughly 3.6 square feet or 1.9 ft by 1.9 ft in size.
- Plant the plugs *within a few days* and no more than 2 weeks of receiving your plants.

I. Initial care of plant trays

Plants should be planted within a few days of pick-up, but if needed, they can be left in their trays for up to two weeks until you are ready to transplant them into your habitat area. Regardless of whether your delay is a few days or a few weeks, you must care for your plants in their trays until they are planted.

1. Place plant trays in an area that receives shade or dappled shade. Trays can rest on the ground as long as the plants are protected from animal damage (mostly rabbits and/or squirrels).
2. Regularly water your trays, taking care not to over water them. Frequent, light watering multiple times a day is more effective at keeping your plants healthy and the soil moist compared to an occasional heavy soak.

II. Tips for site preparation and weed management

Final site preparation

Depending on your site preparation practice, you may want to complete one final weed control sweep just before planting out your kit to minimize weedy competition. This could be hand weeding, a shallow till of the top inch of soil, flame weeding or mowing down new weed growth, terminating a cover crop, finally pulling back your smothering tarp or solarizing plastic, or timing your sod removal to coincide with the subsequent planting. Regardless of your site preparation method, the planting area should be relatively smooth and level - not furrowed or strewn with chunks of soil.

Unless your site preparation plan requires cultivation, it's best practice to minimize soil disturbance preceding a planting as tillage can stimulate a flush of new weed germination and growth. Immediately applying a mulch weed barrier after your final site prep step and covering the bare soil will prevent any new weed growth (see subsequent mulch note on weed management).

For detailed guidance on site preparation practices, please see Xerces Organic Site Preparation guide and comparative overview table. Additionally, timelines for plastic smother or stale seed bed as site prep practices are well-presented in the NRCS New Hampshire - Transplanting Herbaceous Plant Plugs implementation form (the last four pages of the pdf).

Mulch application

Following the final step in your site prep we recommend you lay down your choice of **2-3 inches** of a loose mulch material (wood chips, leaves, weed-free straw) or a rollable mulch (paper, coir, straw netting). Loose mulch could be applied before or after planting; rollable mulch must be laid in place before planting. In either case, a layer of mulch will help your plants establish well in a weed-free environment and maintain soil moisture in their first year of growth.

We do not recommend using plastic or landscape fabric as a mulch barrier. These materials will prevent the natural outward establishment of your native plants from seed and rhizome. We also do not recommend using dyed wood chips, black walnut wood chips, or wood chips whose origins may be from chemically-treated wood. Following the first year or two of growth, additional applications of mulch should largely be unnecessary and may even prevent your plants from seeding out into the surrounding space. As the mulch decomposes, your native plants should naturally reseed or spread via rhizomes into the exposed soil space (rhizomes are underground "stems" that grow into new plants).

Weed management

During the first growing season - and especially important if you forgo applying a mulch weed barrier - you should plan to carefully pull, cut, or otherwise control weeds throughout the habitat area. Scuffle hoes are especially useful when new weed growth has just emerged and - when used with regularity - can keep your planting weed free. As you weed, take care to not accidentally uproot or cut your native plants. Young growth of native plants may be difficult to distinguish from undesirable weeds. Stake flags can be used to mark desirable natives in the kit to help with the weeding process and identify the plants that you want to keep and those you want to remove.

After a few years of regular weed control, the prolific growth and dominant cover of your native plants should prevent most weeds from becoming a nuisance. Especially problematic weeds (field bindweed, Canada thistle, burdock, pigweed, dock, reed canary grass, sweet clover, others) should always be gently hand pulled or cut just below the soil surface and, if seed is present on the plant, removed entirely from the habitat area. For weeds that are well rooted into the ground and whose removal could kill an adjacent native plant, sever the plant at the base of its main stem either just below or at the soil surface with a garden knife or other tool, leaving the main root mass undisturbed in the soil.

Soil amendments

In most cases, the native plants included in these kits do not require any fertilizers, composts, or other amendments. Adding a bit of compost or other organic growing media (vermicompost, biochar, etc.) to each plant hole may add a helpful microbiota or nutrient boost, though this step certainly isn't necessary if you'd like to save time during your planting.

If you know your soils have been significantly altered, we recommend consulting your county's Extension, Soils, or Agronomy department (or other agriculture conservation professional) on appropriate soil restoration and remediation practices before planting.

III. Planting Considerations

Timing

For best establishment success, plant the entire habitat kit within a few days or no more than two weeks of receiving your plants and, most importantly, when your site preparation is complete. The sooner your plants are

in the ground, the sooner they will be able to adjust to your soils, build permanent root systems, and maximize new leafy growth. The longer the plants remain in their trays, the more susceptible they are to drying out, becoming root bound, and even dying.

Planting design

Your habitat kit planting is a freeform garden and will not always follow the same conventions of a manicured horticultural design. We recommend the following practices to maximize habitat value for wildlife, create attractive drifts of blooms, and improve your planting efficiency.

- Plant the same species in groups of 3 - 6 to improve garden aesthetics and create the larger bloom displays that some pollinators prefer. For example, 3 plants *of the same species* are planted near each other. Planting the same species in groups can help provide a better visual of floral resources and allow for more efficient foraging for pollinators.
- Use grasses and sedges to create natural drifts between clusters of flowers.
- If you are going for a very manicured look, you may wish to purposely mix groups of plants with different bloom periods or flower colors.
- Take care not to overwhelm a few shorter species with many tall species; and, plant taller species in the interior of the planting and shorter species along the habitat perimeter edge. The shorter 2' stature of species like sand coreopsis and nodding wild onion would do best along the habitat's perimeter edge.
- Wild strawberry is a low growing ground cover and over time, the wild strawberry will send out runners over the ground and provide a living mulch cover. Consider planting the strawberries towards the center of your habitat area so they have room to spread outward as they grow.
- The shrubby cinquefoil shrubs do best in full sun and are generally about 3-4' wide and tall but may reach heights and widths up to 5'. Keep these factors in mind when deciding on a location to plant, and the shrubs do not necessarily need to be planted next to each other.

For example, in one section of an area you could plant 3-6 sand coreopsis (early-mid bloom), 3-6 mountain mint (mid bloom), 3-6 smooth blue asters (late bloom), 3 swamp milkweeds (mid bloom/monarch host plant), and 2-3 wild strawberry (early bloom/ground cover). Then, plant 3-6 June grass on one end of the flowers and 3-6 plains oval sedge on the other end to create a natural grass and sedge "drift" between this flower cluster and the next. To see an example of a planting layout for this kit, see Appendix D.

You can incorporate the above design suggestions into your habitat planting by creating a habitat project map (i.e. a "planting map") that describes the configuration and location of plants. A planting map can be as rough or as detailed as you'd like: broadly noting the species in each flower cluster and grass/sedge "drift" or describing exactly how many plants of each species should be situated in a given location.

Plant spacing

Plants should be planted anywhere from 12" - 24" apart (center-to-center), to fill the entire area of the habitat space. Plants can be planted in any configuration that fits your planting site and aesthetic: they can be arranged in a grid pattern (rectangular), offset (triangular), or planted willy-nilly.

When possible, we recommend a tighter plant spacing to better achieve rapid native plant coverage and suppress weed growth. For the most part, the grasses, sedges and flowers in the kit can be planted between 12" - 18" apart. Regardless of the plant type, don't overthink or stress about your plant spacing and configuration. The most important part is to get the plants in the ground and growing.

IV. Planting Instructions and Care

Whether you are planting by yourself or in a team, we recommend dividing your habitat planting into manageable sections. Start with a small area and set out a few dozen plants. Then, take the time to familiarize yourself with your soils, the plants, the tools, and the planting steps. This will help you to find a planting rhythm that works for you.

If you are working in a group, you can delegate roles: one person works on layout, a second on prep and digging holes, and a third person working on planting. As one person completes their task, they can cycle over to support the more tedious work - switching roles as needed. If you are working by yourself, we recommend working on the layout of a small section first before returning to prep, dig, and/or plant your plugs. For example, I may prep and dig 12 plant holes before returning to plant in the 12 plants I laid out earlier. You may even find it helpful to position the plants in their pots exactly where you'd like them as part of your initial layout work, but take care not to let the roots of the plants dry out too much in the process.

<u>Layout</u>

1. Stage your plant trays alongside the habitat. You can choose to organize them in whatever way you'd like to help with your plant layout.
    a. We suggest separating the plants into "short" and "tall" categories, using the *Height* column in the plant list. Within these two groups, keep flowers and grasses/sedges separate. Staging the plants by height makes it easier to plant diverse clusters of short plants together, next to a diverse cluster of tall plants. Mixing different bloom periods in the flower drifts can be helpful so that blooms are spread out across the habitat planting area.
2. Thoroughly water your planting area 24 hours before planting and water plant trays either before or after transporting your plants to your planting area.
3. Begin setting out sets of plant pots. Keep in mind that as you pull plants from the tray, you may lose track of their identifying tags.
    a. Plant the same species in groups of 3 - 6 plants by dropping groups of plants in pots roughly where you'd like the plants to go. Wild strawberry and shrubby cinquefoil are the exception to planting groups of the same species.
    b. Intersperse clusters of grass and sedge species amongst the flowers.

c. Position taller plants away from the perimeter edges and especially short species, since these can get "floppy" and spill out over the habitat edge or shade-out adjacent plants. (See Appendix C: Kit Species Lists for plant profiles)

d. Don't overthink plant design and configuration! The most important part is to get their roots happily in the ground.

4. Planting

Return to the staged plants, opting to either A) Prep, dig, and plant one plant before moving on to the next; or B) Prep and dig holes for many plants before returning to finally plant them in.

5. Prep a planting spot if mulch is present

a. Scrape the mulch material aside (as required) and down to bare soil or paper/cardboard barrier, creating sufficient bare soil space for you to plant your plug. After planting, keep mulch off your plants' stems.

b. If an additional mulch barrier is present (e.g. paper or cardboard), cut an "X" with a utility or garden knife or shovel to expose the soil.

6. Dig a hole

a. Create a hole using a dibble bar, auger, garden knife, trowel, or other planting tool. The hole should be slightly deeper and wider than the plant plug.

b. Position your plugs 12" - 24" apart (center-to-center). Use a rough measurement of a planting tool - e.g. garden knife or trowel - or other on-hand item to rapidly estimate plant spacing. Shrubby cinquefoil can be planted 3-5' apart depending on the size of your habitat planting area.

7. Planting!

a. Remove the plants from the plastic pot containers.

i. Loosen the plant from the pot by gently squeezing the base of the plastic. Carefully grasp the plant near the base of the stem and gently work the plant plug out of the cell, taking care to protect the roots.

ii. If roots are tight around the soil ball of the plant, you can carefully spread them out at the base, so the roots do not continue to grow around the plant, becoming root bound.

b. Place the transplant into the hole and position the root collar (where the stem emerges from the plug) level with the surrounding soil. Work the excess soil back around the root mass, gently pressing the soil in with your hand to secure the plant into its new home.

i. A small trowels worth of compost could be added to the bottom of the hole at this time prior to the plant (as applicable).

c. If mulch is present, use your hand, or other tool to rake the mulch back around the plant.

8. If you have not yet mulched the area, apply 2-3" of your preferred mulch barrier of wood chips, leaves, or weed-free straw - taking care not to damage your plants as you do so. A 5-gallon bucket can be a good tool of getting wood chips or finer mulch materials carefully around plants after they have been planted.
9. Water in the planted plugs using a) a sprinkler to cover all or a portion of the planted area, or b) a hose to gently flood each plant plug, one-by-one, for a few seconds.
10. Remember to take photos throughout the planting process!

Watering

1. If there is no sufficient rain prior to planting, thoroughly water the planting area 24 hours in advance.
2. Water the newly installed plants immediately after planting. Continue to water for the first growing season so plants consistently receive at least 1 inch of water per week (adjust accordingly during natural rain events or drought conditions).
3. Regularly check the soil moisture levels to make sure you are watering appropriately. Use your hand or other small hand tool to move the mulch and soil to feel down to the first 3" of soil. If the soil is still moist, there is sufficient moisture and you don't need to water yet. If the soil in the top 3" is not moist, there is not sufficient moisture and you need to water.

Appendix A

Habitat Kit Planting Outline

AT A GLANCE: The following is a list of the steps needed to successfully plant your habitat project area: from initial plan development to plug planting. See Section IV of this guide for detailed guidance on *Kit Planting* steps.

Habitat Area and Kit Preparation

1. Make a plan! Create a rough planting map noting configuration and location of plant species.
2. Receive and care for kits. Place your plant trays in partial shade and water regularly prior to planting.
3. Complete the final site preparation steps for the habitat area.
4. (Optional) Apply a mulch barrier or barriers to cover the bare soil. You must apply your mulch barrier prior to planting if you will be using a rollable mulch barrier like paper, coir, or straw netting. (We do not recommend using plastics or landscape fabrics). Alternatively, you can apply 2-3" of loose mulch now or after planting if you are using loose mulches like wood chips, leaves, or weed-free straw.

Kit Planting

1. Water planting area 24 hours prior to planting (if no sufficient rain).
2. Stage the plant trays alongside the habitat area.
3. Thoroughly water the plants just before planting.
4. Following your planting map, begin laying out sets of plant pots.
5. Prep the planting spot by pulling back mulch (if necessary).
6. Dig or drill plant holes at your desired spacing.
7. Plant!
8. If you haven't already done so, spread your choice of natural mulch (wood chips, leaves, or weed-free straw).
9. Water in the planted plants (your choice, before or after spreading mulch - before will retain more moisture initially).

Appendix B

Materials, Supplies, Equipment

- Planting plan and/or map
- Appropriate vehicle to transport plants
- Predetermined location to store plants until planting
- Labor (organize a planting crew)
- Measuring tape, survey stake flags
- Weeding tools
- Water source and watering supplies
- Planting tools: planting auger, garden knife, trowel, or shovel
- Mulch (e.g. untreated wood chips, leaves, or weed-free straw)
    - Arborist mulch sources: Chip Drop or contact a local arborist directly
- Wheelbarrow and/or wagon
- Project journal
- Camera

Appendix C

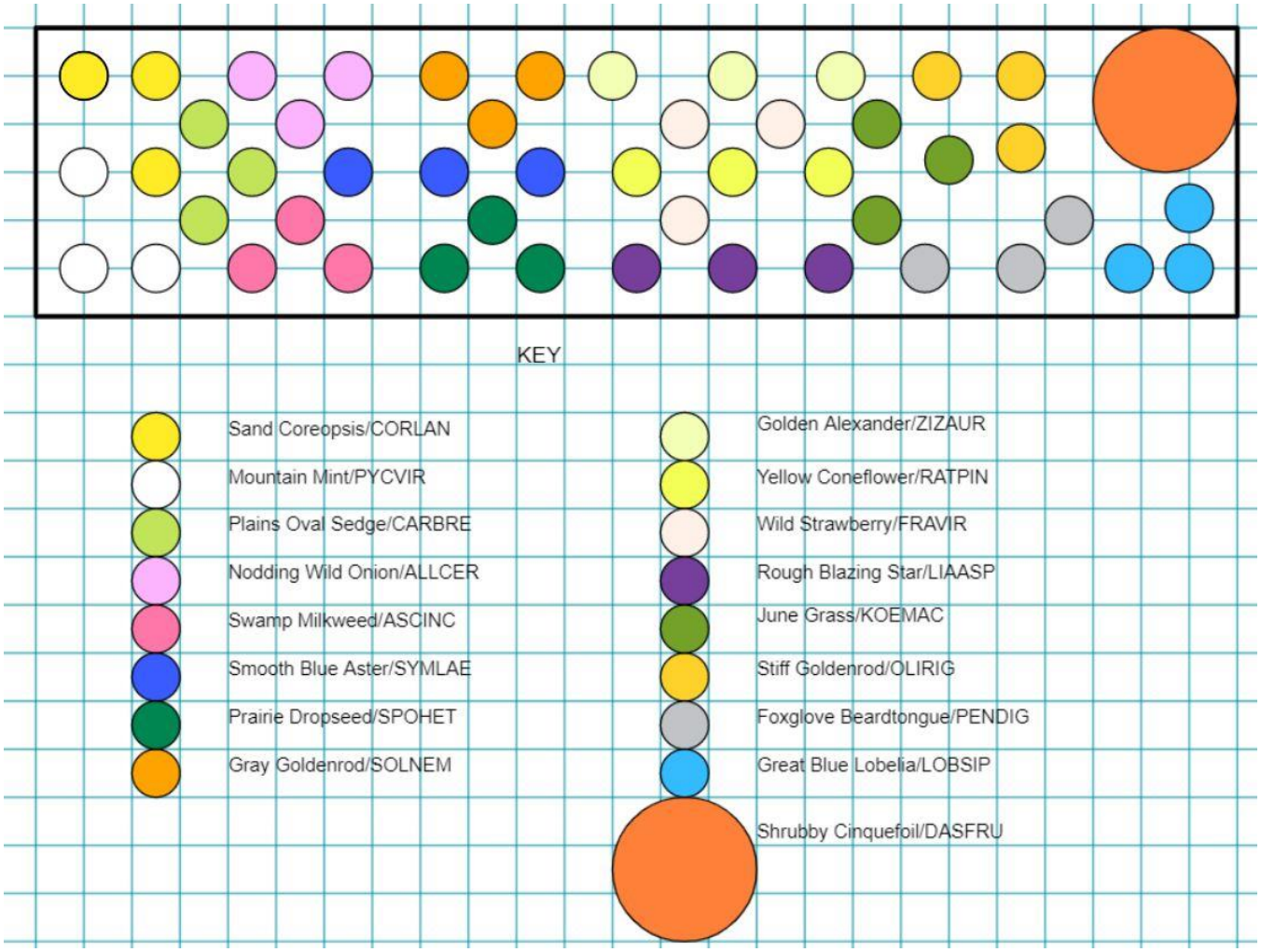
Kit Species List

Species List for Detroit, MI Pollinator Habitat Kit

Bloom Period		Common Name	Scientific Name	Flower Color	Height	Number of Plants	Notes
Grasses and Sedges							
Early-Mid	1	June Grass	*Koeleria macrantha*		2'	6	Grasses and sedges are integral components of any pollinator habitat, providing vegetation cover and materials for nesting. Bumble bees will sometimes use the tent-like mass of bunchgrass foliage, nesting just below the soil surface and underneath the messy, grass canopy. Bees, syrphid flies, and beetles will also feed on their accessible and abundant pollen. Lastly, grasses and sedges are important larval-hosts for many different skipper butterflies and a select few Ctenuchinae moth species.
Early-Mid	2	Plains Oval Sedge	*Carex brevior*		1'	6	
Mid-Late	3	Prairie Dropseed	*Sporobolus heterolepis*		2'	6	
Forbs							
Early-Mid	4	Wild Strawberry	*Fragaria virginiana*	white	6"	6	This low growing ground cover plant offers spring blooms for small carpenter bees (*Ceratina*) and parasitoid chalcid wasps
Early-Mid	5	Golden Alexanders	*Zizia aurea*	yellow	3'	6	An early nectar and pollen resource for mining bees (*Andrena*) and other bees, as well as flies and beetles; stem nesting resource
Early-Mid	6	Sand Coreopsis	*Coreopsis lanceolata*	yellow	2'	6	This early bloomer can hold its own among grasses and taller species; bees and syrphid flies are common visitors
Early-Mid	7	Foxglove Beardtongue	*Penstemon digitalis*	white	4'	6	A prolific nectar producer and visited by a diversity of butterflies, moths, and bees, including honey bees; stem nesting resource
Mid	8	Swamp Milkweed	*Asclepias incarnata*	pink	4'	6	Milkweeds are host plants for the monarch butterfly and nectar sources for many bees; stem nesting resource
Mid	9	Nodding Wild Onion	*Allium cernuum*	pink	2'	6	This early bloomer can hold its own among grasses and taller species; bees and syrphid flies are common visitors
Mid	10	Mountain Mint	*Pycnanthemum virginianum*	white	3'	6	This and related species have fragrant foliage, and are visited by blue and copper butterflies, honey bees, and more; stem nesting resource
Mid-Late	11	Yellow Coneflower	*Ratibida pinnata*	yellow	5'	6	Natural enemies frequent the tall yellow flowers, including beetles, wasps, lacewings, and syrphid flies; stem nesting resource
Mid-Late	12	Great Blue Lobelia	*Lobelia siphilitica*	blue	3'	6	Attracts sweat bees, small carpenter bees, and bumble bees; natural enemies like parasitoid wasps, and predatory beetles and bugs
Mid-Late	13	Rough Blazing Star	*Liatris aspera*	purple	3'	6	A monarch butterfly magnet, *Liatris* also support swallowtails, skippers, and sulfurs; and long or short-tongued bees; stem nesting resource
Late	14	Gray Goldenrod	*Solidago nemoralis*	yellow	3'	6	Frequented by beneficial solitary wasps, soldier beetles, many native bee species, butterflies, and more; stem nesting resource
Late	15	Stiff Goldenrod	*Oligoneuron rigidum*	yellow	4'	6	This late blooming, hairy stemmed, broad leafed goldenrod attracts similar pollinators as *Solidago* species, and provides nest materials
Late	16	Smooth Blue Aster	*Symphyotrichum laeve*	blue	4'	6	Asters attract bee species, including *Agapostemon*, and a variety of wasps, flies, and other insects. Butterflies like monarchs and silver checkerspots are also common visitors; stem nesting resource
Shrubs							
Mid-Late	17	Shrubby Cinquefoil	*Dasiphora fruticosa*	yellow	4'	2	Native bees and natural enemies are attracted to this shrub including syrphid flies, wasps, and minute pirate bugs; provides nest materials
Total Number of Plants:						**98**	

Appendix D

Example Planting Layout



Each square represents 1 square foot, total area shown is 150 square feet (6x25 ft), about the size of half of 1 kit. Each colored circle is one plant and the different colors represents different species. The key shows plant species common names and 6 letter code for the scientific name (first 3 letters of genus and species).