

Conservation and Management of Monarch Butterflies

*A Land Manager's Restoration Guide
for the Eastern U.S.*





**POLLINATOR
PARTNERSHIP**

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Benefits of Managing for Monarchs

The monarch butterfly (*Danaus plexippus*) is perhaps the most recognizable and beloved insect of North America. Across its 2,000 mile migration (one-way), the monarch connects ecosystems and captivates people. Unfortunately, this national treasure has endured a decline in population of more than 80% from the 21 year average, between 1994-95 and 2014-15, across North America. This dramatic deterioration has spurred numerous conservation groups, universities, government agencies, and other organizations and individuals to take action. Restoration of deteriorated monarch habitat, as well as the conservation of existing habitat, throughout its range is vital to preserving this hall-mark species.

Land managers are in a unique position to restore and protect monarch habitat. By incorporating monarch conservation into larger restoration plans, land managers can fuel the migration and create vital breeding habitat. Habitat of all shapes and sizes is valuable to monarchs, and connectivity is key. Monarchs rely on habitat corridors and “islands” to move along their migration pathways. Land managers have the ability to affect immediate change at a landscape level for monarchs.



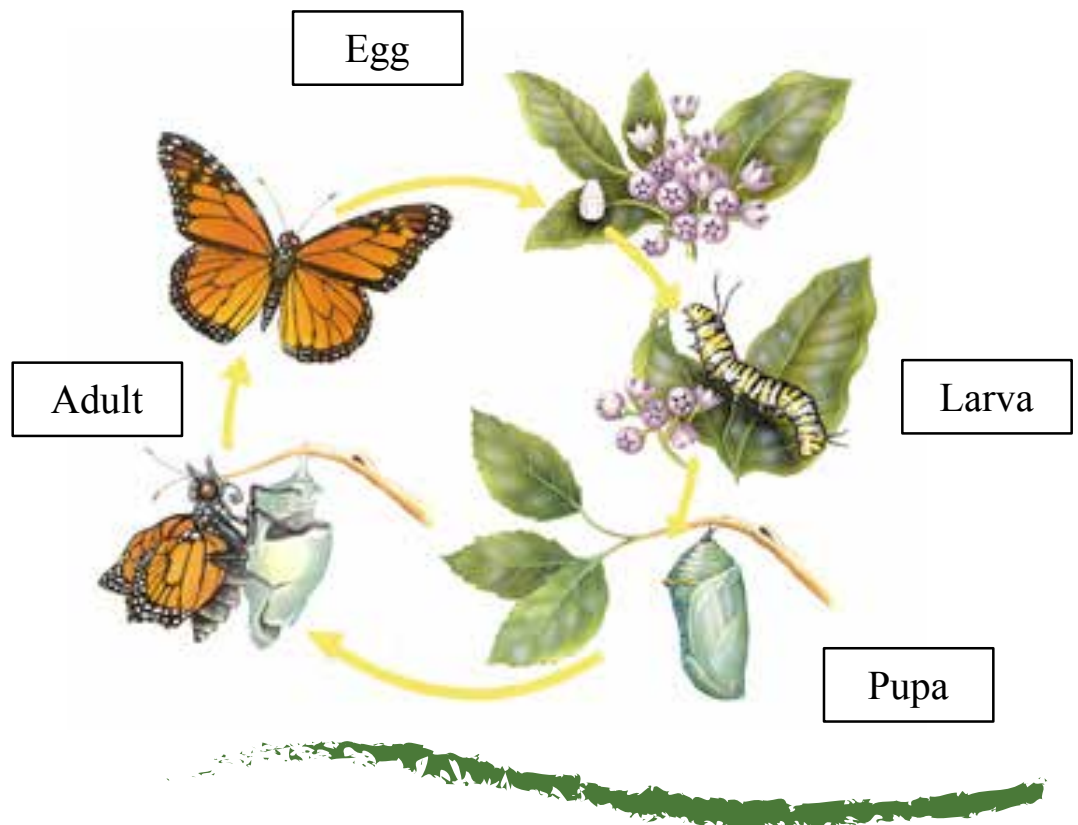
Monarch Biology

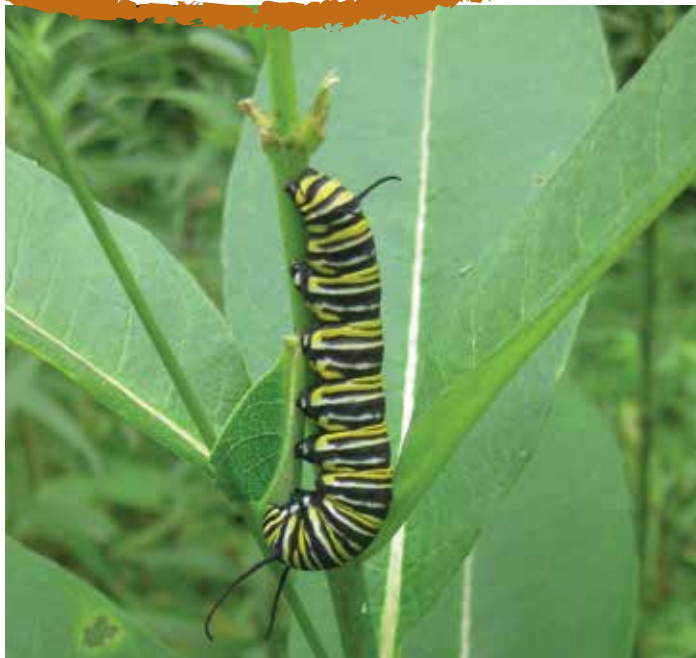
Life Cycle

In order to understand the habitat needs of the monarch, it is essential to first become familiar with its life cycle. The monarch has four distinct life stages: egg, larva (caterpillar), pupa (chrysalis), and adult. First, a monarch egg is laid on a milkweed leaf. This egg hatches into a caterpillar within 3 to 6 days. The caterpillar feeds and grows over a 2-week period. Once fully grown, it chooses a safe location to form its chrysalis. After about 10 days, an adult emerges from the chrysalis and begins to feed on nectar once its wings dry. This life cycle repeats throughout the monarch migration, resulting in multiple generations across an enormous spatial range.

While the journey south is comprised of a single generation of non-reproductive monarchs, the journey north is comprised of 3-4 generations of breeding monarchs. Because some monarchs will stay in a location to breed, it is important to have nectar sources available beyond the northern migration date range for any given region. Monarchs typically live 2-5 weeks during the summer breeding season. The final gener-

ation of the year does not reproduce and enters a state known as “reproductive diapause.” These butterflies migrate to Mexico where they overwinter, becoming reproductive again in February and March as they move north towards summer breeding grounds. Some monarchs have been known to live as long as 9 months.





Monarch caterpillar (*Danaus plexippus*) feeding on common milkweed (*Asclepias syriaca*)

Migration

The North American monarch migration is one of the largest known insect migrations on Earth. Weighing less than a gram, monarchs can travel 50-100 miles per day. The longest distance recorded traveled by a monarch in a single day is 265 miles.

The monarch population of North America is divided into two main subpopulations - one located east of the Rocky Mountains and the other to the west – although there is probably some interchange between these populations across the Rocky Mountains and in Mexico. Butterflies from the eastern population overwinter in Mexico, while those in the west overwinter at numerous sites along the California coast. There is also a nonmigratory population of monarchs that breeds year-round in southern Florida.

This guide focuses on conservation and management of the eastern population, but many of the same principles can be applied for the western population, as well.

Eastern Migration

The eastern migration starts in March as butterflies from Mexico travel north into Texas and other southern states, breeding as they move northward. The butterflies produced in these areas move northward in May and June to colonize the northern U.S. states and southern Canada. Two or three additional generations are produced before the southward migration begins two months later. Beginning in mid-August and continuing into fall, hundreds of millions of monarchs fly 2,000-3,000 miles south to spend the winter in high-elevation oyamel fir forests at an elevation of 2400-3600 meters in the Sierra Madre Mountains of central Mexico. Monarchs utilize the same 11-12 oyamel fir forest sites

each year, making the preservation of these forests a top priority. The journey south can take up to two months to complete.

Exactly how monarchs navigate to and from the same overwintering sites each year is still a mystery. Simple orientation mechanisms and major geographic features, such as the Appalachian and Sierra Madre mountain ranges, play a role in funneling monarchs towards their ultimate destination.

Visit Journey North (www.learn-er.org/jnorth/monarch/) to track the fall migration and monitor the arrival of monarchs in the spring. Monarch Watch (www.monarch-watch.org) has a tagging program that helps us understand the routes they take in their migration.

Western Migration

In their western range, monarchs winter in forested areas along the California coast, from Baja to Mendocino County. In the spring, western monarchs move inland, breeding in scattered habitats containing milkweeds throughout much of the west but primarily in California. Abundance of adult monarchs is driven by annual precipitation that supports late-season milkweeds suitable for caterpillars, and by suitable temperature regimes that allow for completion of the monarch life cycle. In November, western monarchs begin to return to their overwintering sites along the coast.



Photo: Danelle Hevron Studio



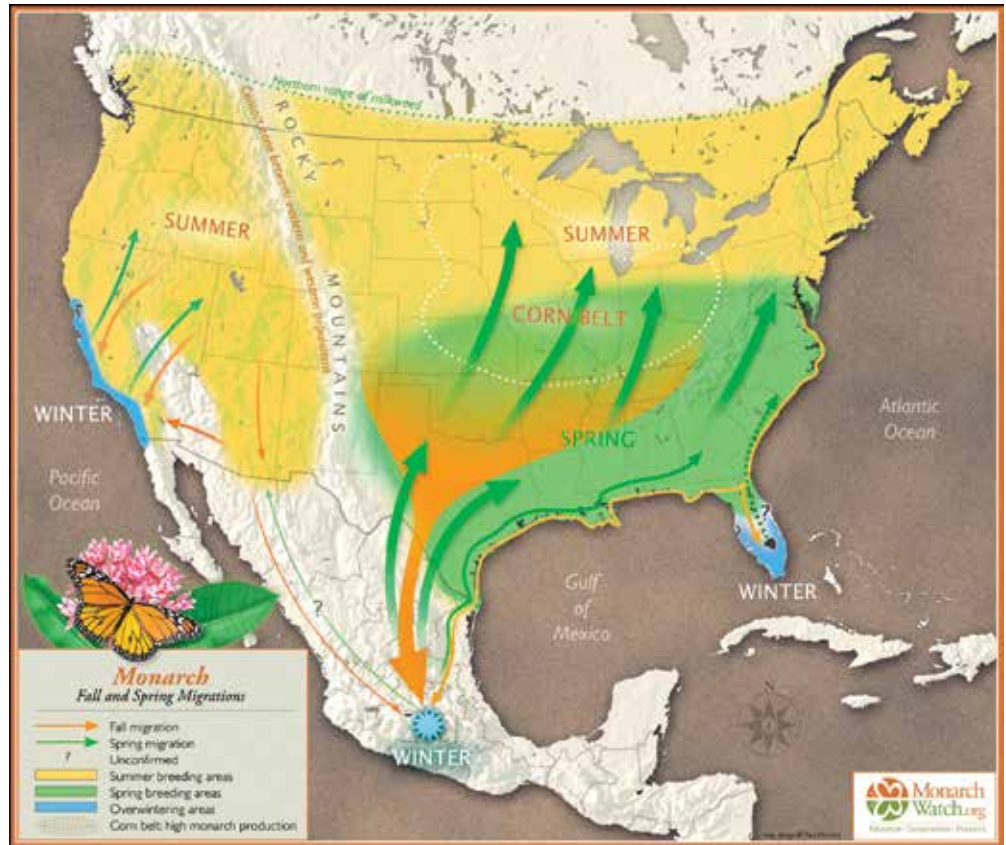
Monarch Habitat

Milkweed

Monarchs almost exclusively lay eggs on plants of the genus *Asclepias*, commonly referred to as milkweed, in the family *Apocynaceae*. Of the roughly 73 milkweed species native to the United States, monarchs utilize about 30 as host plants. Milkweed gets its name from its milky sap, which contains toxic cardenolide alkaloids that protect the plant from herbivory. After hatching, monarch larvae feed on the host milkweed plant and begin to sequester these cardenolides in their tissue, making them toxic to predators. The monarch's distinct, bright coloration functions as a warning to predators that it is toxic and should be avoided. This defense mechanism forms the basis of monarch survival, and the monarch is incredibly dependent on the availability of milkweed for reproduction.

Threats

Loss of milkweed across the monarch range is one of the greatest threats facing the North American monarch population. Urbanization, large-scale agricultural development, and the widespread use of herbicide and herbicide-resistant crops are largely considered the primary causes of milkweed decline. Milkweed losses in the



Midwest are coincident with the increased use of glyphosate herbicide for transgenic glyphosate-resistant corn and soybean crops, otherwise known as “Round-Up Ready” plants. Many scientists argue that this is the most serious threat to milkweed, and consequently monarch, populations.

Native vs. Nonnative

Restoring milkweed is a top priority for monarch conservation, but good intentions must be met with scientific understanding in order to be successful. Before



Butterfly weed (*Asclepias tuberosa*)



Swamp milkweed (*Asclepias incarnata*)

planting, land managers must determine which milkweed species are native to their area and select locally adapted plants for their project. Even for the most competent land managers, this is not always an easy task. Of the 70-76 milkweed species native to the U.S., only 30 are known to host monarch larvae. Seeds are commercially available by the pound



Gray goldenrod (*Solidago nemoralis*)

for only 7 species, by the ounce for another 5 species, and in small packets (suitable for home gardens) for 3 more species. Roughly 18 milkweed species are currently available as plugs through Monarch Watch's Milkweed Market. Consult the plant tables at the end of this guide for a regional list of "workhorse" milkweed species, which are both beneficial to monarchs and relatively easy to obtain.

Tropical milkweed (*Asclepias curassavica*) is an introduced species that is capable of persisting through the fall and can interfere with the behavior of migrating monarchs in the United States. A nonmigratory population of monarchs in southern Florida breeds throughout the year on this non-native species. Since it is often widely available, uninformed gardeners or land managers may be tempted to plant tropical milkweed in order to promote monarch populations on their land. However, the persistence of this species can potentially encourage monarchs to linger and forego their migration, which may result in the eventual death of the monarchs due to cold temperatures or an outbreak of the specialist protozoan, *Ophryocystis elektroscirrha*. Parasite spores, such as those of *O. elektroscirrha*, on monarch adults are deposited onto eggs and milkweed and then ingested by the larvae. The parasite can reduce larval survival, butterfly size, life span, mating success, and ability to fly. The prevalence of infection by *O. elektroscirrha* increases with monarch density at local scales and is negatively correlated to ability to migrate. Infection prevalence is highest in sedentary monarch populations, such as those in southern Flori-



Golden tickseed (*Coreopsis tinctoria*)

da, with about 70 percent of individuals being heavily infected. While the benefits of planting tropical milkweed are still widely debated, land managers should use native milkweed species for restoration projects.

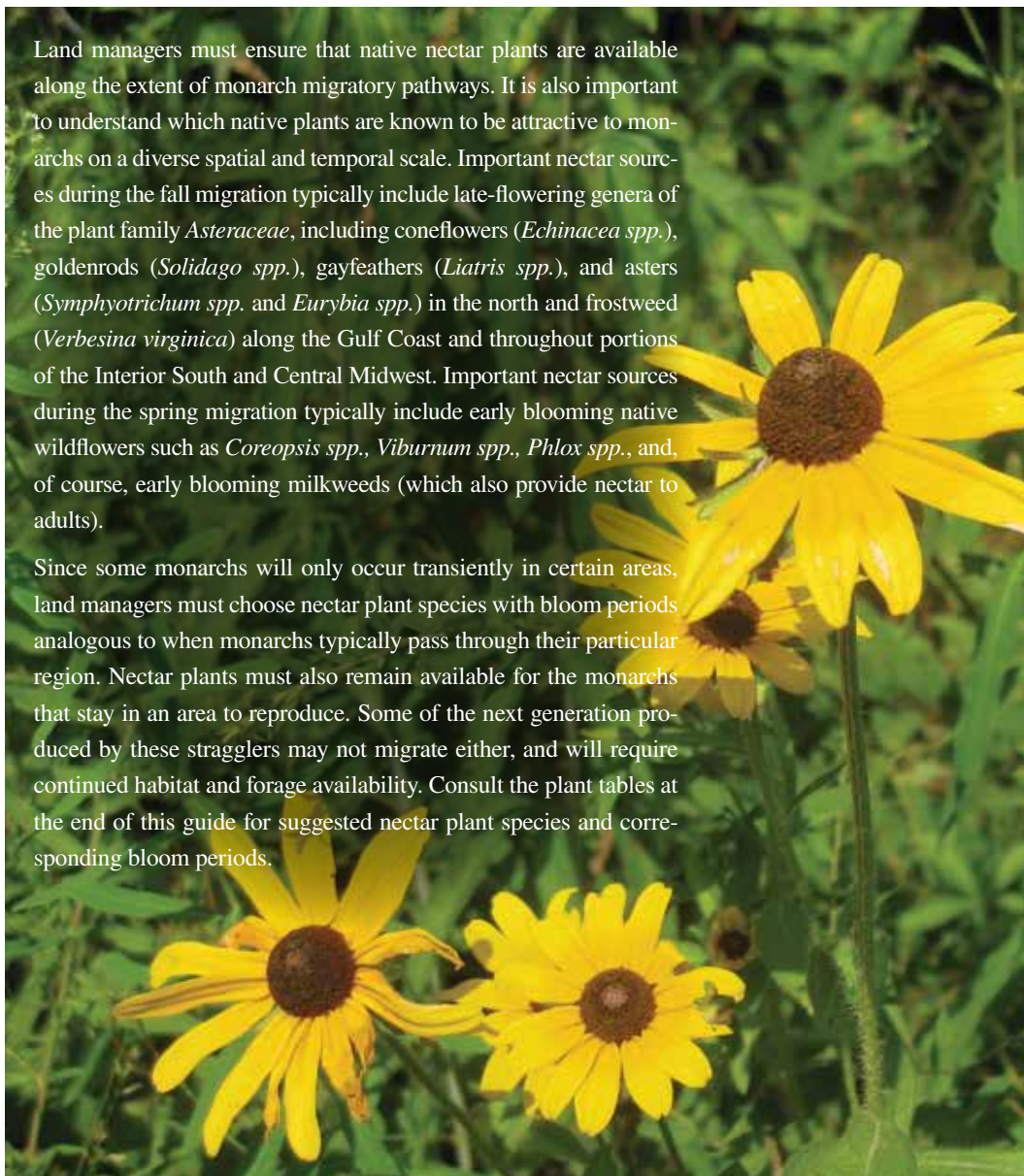
Tropical milkweed is not the only nonnative species related to native *Asclepias* that poses a threat to migrating monarchs. Within the plant family *Apocynaceae*, several species of the invasive European species, *Vincetoxicum* (often taxonomically placed in *Cynanchum*), attract female monarch butterflies to oviposit, or lay eggs, on their stems and leaves. This leads to imminent starvation of emerging monarch caterpillars, which are unable to survive on the foliage of this nonnative plant

Nectar Plants

Nectar plants provide the fuel necessary for monarchs to complete their massive journey. Just as with humans, monarchs require a nutritious and balanced diet to sustain their energy and health requirements.

Land managers must ensure that native nectar plants are available along the extent of monarch migratory pathways. It is also important to understand which native plants are known to be attractive to monarchs on a diverse spatial and temporal scale. Important nectar sources during the fall migration typically include late-flowering genera of the plant family *Asteraceae*, including coneflowers (*Echinacea spp.*), goldenrods (*Solidago spp.*), gayfeathers (*Liatris spp.*), and asters (*Symphotrichum spp.* and *Eurybia spp.*) in the north and frostweed (*Verbesina virginica*) along the Gulf Coast and throughout portions of the Interior South and Central Midwest. Important nectar sources during the spring migration typically include early blooming native wildflowers such as *Coreopsis spp.*, *Viburnum spp.*, *Phlox spp.*, and, of course, early blooming milkweeds (which also provide nectar to adults).

Since some monarchs will only occur transiently in certain areas, land managers must choose nectar plant species with bloom periods analogous to when monarchs typically pass through their particular region. Nectar plants must also remain available for the monarchs that stay in an area to reproduce. Some of the next generation produced by these stragglers may not migrate either, and will require continued habitat and forage availability. Consult the plant tables at the end of this guide for suggested nectar plant species and corresponding bloom periods.



Blackeyed susan (*Rudbeckia hirta*)



Monarch Habitat Restoration

Project Planning

The most important step in any restoration project is planning. Without clearly defined goals and measurable objectives, there is no way to establish a positive trajectory for the project or assess its long-term success.

If the overall goal is to develop monarch habitat and support migrating monarch populations, then the objectives should include specific and measurable outcomes that support this goal, such as establishing a functional, sustainable community of native milkweed and nectar plants.

Performance standards are empirical measures or indicators of the extent to which objectives have been achieved and how well the objectives reflect the overall goals of the project. With precise performance standards in mind, such as a specific range of native plant species richness or a certain abundance of monarchs at

particular life stages, seasonal surveys can be conducted at the restoration site to evaluate progress

Site Selection

Creating pollinator habitat does not need to take acres of land. In fact, it is recommended that your first project area be less than a quarter of an acre (10,890 ft.²). Consider expansion after success is achieved with the initial monarch habitat development project.

Before forming a team with external members, you may want to select several sites that would all be suitable and decide as a team which will be used as the initial monarch habitat site. Site selection can be influenced by the potential partnerships that may be formed at a specific site. For example, if a piece of land has an environmentally active neighbor, or is in the jurisdiction of a conservation authority, these groups may work together to achieve a common goal. Additionally, sites that can be used for public outreach, or that are more accessible to the public may be more desirable and thus, should be considered in site selection.

If the site is known habitat for a sensitive species, review all laws, regulations, and guidelines. Consult with the U.S. Fish and Wildlife Service for additional guidance. Even the slightest change in sensitive habitat can have negative effects on the rare, threatened, and endangered species it supports. However, with careful planning, a habitat enhancement project could benefit both the species at risk AND monarchs.

Plant Selection

Milkweed and nectar plants are the foundation of a successful



monarch restoration project, but selecting the right plants can be tricky. Plants must be native, locally sourced, attractive to monarch butterflies, easily obtained, and feature bloom periods that correspond with seasonal monarch presence. See the plant tables at the end of this guide for regionally appropriate native species that will provide both habitat and nectar for adult monarchs, as well as support larvae development. Check local nativity with www.PLANTS.USDA.gov or Biota of North America (www.bonap.org).

Choosing Plant Materials

Budget and scale are the most important factors when determining the correct combination of plants and seeds for your project. Plant materials such as plugs are usually more costly than purchasing seeds. Plants are showier and more appealing to community members, but may require advance ordering. If you are short on labor and do not have access to water, planting thousands of plug plants across many acres will be impractical, whereas broadcasting seed across many acres will be much less labor intensive. Generally, 3-5 plug plants are needed per square meter. Reduce this amount if using a combination of seeds and plugs. For the most immediate results, install mature plants or incorporate them into a mix of seeds and plugs. Consider using mature plants when working in a highly visible area.

Locally Sourced

Restoration managers should use locally sourced plant material (e.g. seeds, seedlings, etc.), preferably from within the same ecoregion or watershed as the proposed



Field of swamp milkweed (*Asclepias incarnata*)

project. Various environmental conditions and microclimates can produce genotypic variability and phenotypic plasticity in individuals of the same species at different locations. These differences can be negligible across a species' range or glaring across a single watershed, depending upon the species and the heterogeneity of the landscape. Plant material from faraway or dissimilar sources may not possess the necessary adaptations required to survive and reproduce at the project site. Additionally, the introduction of unadapted individuals may pollute the local gene pool and reduce the local population's resistance to stress and resilience to disturbance. Managers should always confirm the origin of the plant material before planting or seeding.

“Workhorse Species”

With these strict criteria in mind, it can be difficult to locate appropriate plant material, especially for larger projects. The tables at the end of this guide provide suggestions for native “workhorse” milkweed and nectar plant species for 9 regions throughout the eastern monarch migratory route.

“Workhorse” species are generally easily obtained and practical to work with. Rather than overwhelm land managers with an exhaustive list of plant species that may not even be available or relevant, this guide seeks to facilitate habitat restoration and improvement by suggesting common, available, and region-specific plant species that are beneficial to monarchs.

Site Preparation

The main components to site preparation are weed removal and ordering and receiving plant materials.

Removing Weeds

If undesirable species are the dominant plants at the site, decide what tactics will be used to remove them. Make sure the plants and seed you will be planting have been ordered. Coordinate the delivery so they can be planted shortly after the area has been cleared of invasive or undesirable species. If the site goes unplanted for an extended length of time after invasive plant removal, the invasive species will return to fill the ecological void. Planting as soon as possible after invasive species



are removed allows the desirable species to fill the open ecological niche. When doing hand removal of persistent multi-stemmed woody plants, consider carrying a spray bottle of herbicide on your belt and directly spray the cuts as you work through the site. This will avoid over spraying or killing desired plants, and spraying the cuts immediately will prevent the cut from healing over and allowing the undesired plant to persist and thrive. Always read the labels and follow them exactly when using herbicide. Once the undesirable species have been sprayed, new plants and seeds should be installed approximately one week later. Covering soil with a tarp or plastic will kill beneficial mycorrhizae, which many plants need to survive. Also, tilling the site may be problematic, as it tends to promote growth of invasive species by disturbing the seed bank. It can also create a very muddy and unattractive area, which may not be desirable if you are bringing in volunteers to help plant your habitat.

Ordering Plants and Seed

Use the plant species recommendations at the end of this guide to

develop a planting list for your site. Many nurseries and seed vendors post their inventories on the web. Since their production is so closely tied to the weather, the prices of plants and seeds can fluctuate on a daily bases. At peak ordering seasons (spring and fall), inventories can be exhausted in a matter of hours. Some nurseries accept future orders, which can aid in project planning and hedge against missing out on a particular species. Since inventories fluctuate daily, calling the vendor is recommended over placing an order online. Additionally, many of the native seed vendors have plant ecologists on staff that can aid in creating a cost effective seed mix. For example, if there are 12 species you would like included in the seed mix, but several are very costly (\$100+/lb.) working with a seed vendor will help you find the balance between cost and diversity. The seed with a \$100/lb. price tag is more budget friendly when that particular species only makes up 2% of a 3 lb. seed mix.

When purchasing plant material from a commercial grower, you should know the source, collec-

tion date, and Percent Live Seed (PLS) rating. It is particularly important to consider the PLS rating when developing a seed mix, as the PLS can vary widely between species and even within the same species, depending on the year and grower. Seed with a low PLS might need to compose an exaggerated proportion of the seed mix in order to achieve the desired number of surviving plants. Restoration managers can use spreadsheets to calculate the appropriate ratios of pounds of seed in a mix based on current PLS ratings.

Receiving Plugs, Container Plants, and Seeds

Specify an exact delivery date with the company you are ordering from, so live plant orders will be delivered when someone is on-site to receive them. Have an area available to hold the plants before the delivery date. If you do not have a lath house onsite, prepare an area that has water available and semi-filtered sunlight. Remember, these plug plants were just shipped in the dark after spending a large amount of time in a greenhouse or other full sun

setting and could possibly be experiencing some shock. Prevent shock by providing a neutral environment. Arrange for seeds to be delivered as close to the planting date as possible. Store seeds in a low-humidity, environmentally controlled area that is inaccessible to rodents and other pests. Never store seeds in a car for any length of time. Never store seeds in the direct sun, in plastic, or in a high humidity environment. Conduct a visual inspection as soon as the seeds and/or plants arrive. Confirm that the delivery contains the right species in the correct quantity. If the quality of plants is less than acceptable, photograph the worst offenders and contact the nursery immediately for replacement plants or a refund. Check your seed for insect damage and rot, photograph any damage, and contact the seed company immediately. Remember, when plants are shipped they are often in dark, uncontrolled environments for several days. Nurseries and seed companies want to know if their courier has subjected the plant material to excessive heat or mishandling.

Installation

Timing of Planting

Determine the optimal planting time(s) for your region. Optimal planting times depend on precipitation, elevation, and temperature. There are both spring and fall planting windows across much of the monarch's eastern range.



Seeding

The species listed at the end of this guide are generally available as seeds. There are many techniques for seeding a site. Depending on the location of your site and the equipment you have available, decide which method is best for your project.

Broadcast Seeding

Broadcast seeding is when seed is scattered either by hand or machine. The soil should be lightly tilled or at least raked when broadcast seeding. Divide the seed in half then scatter the first half of the seed across the site by walking the site in the north-south direction, and then scatter the second half of seed in an east-west pattern. Although not necessary, watering the newly seeded site regularly for the following 4-6 weeks after seeding will promote establishment. As an erosion and invasive plant control measure, cover the site with certified weed-free straw if desired.

Drill Seeding

Drill seeding uses mechanical equipment – a drill seeder – to cut into the soil and drop in the seed. By mechanizing the tasks of

tilling, laying seed, raking over, and packing the seed into the soil, drill seeding can be an efficient alternative. However, you will need a specialized drill seeder.

Hydroseeding

Hydroseeding combines seed with an organic mulching liquid that is hydraulically launched out of a hose attached to an energy source, usually a vehicle. Hydroseeding typically takes place in 2 stages. The first pass sprays the area with a mixture of seed, water, and a light binding agent to ensure good soil contact. The second pass distributes a layer of mulch (e.g. straw, compost, chipped wood) over the seeded area to improve insulation and available soil moisture, and reduce erosion. Hydroseeding is an efficient option for covering large areas and/or areas that are difficult to access on foot. When applied correctly, germination can occur faster than broadcast or drill seeding. However, it is more expensive than broadcast or drill seeding.



Plug Planting

Plugs are often more successful than seeds, and they can be cost-effective in smaller projects (~2 acres) or when rapid establishment is required. The higher survival rate of plugs can help offset the increased cost. A great resource for milkweed plugs is the Milkweed Market at <http://monarchwatch.org/milkweed/market/>. Develop a planting strategy and communicate it to your group. Holes for plug plants can be dug with a basic trowel or small auger. To save time, have the holes dug in ad-



vanced. Generally, 3-5 plug plants are needed per square meter. Reduce this amount if using a combination of seeds and plugs. If you are planning on using volunteers to help manage invasive species in your habitat, plant your plugs in groups. Having patches of the same species will help volunteers identify “good plants” from weeds in the early growing season, before flowers have blossomed. Once in bloom, it is easier for all pollinators to find grouped plants.

Mature Plant Installation

Planting recommendations will vary by species. When planting mature specimens, make sure water is available immediately following the planting. You can also use a combination of seed, plugs, and mature specimens. If you are creating a garden setting, installing mature woody plants, using plugs for forbs and then seed for annuals and grasses is often a budget-friendly and visually attractive option. However, any combination of seed, plugs and plants will work in creating monarch habitat.

Supplemental Planting

Evaluate the site after every growing season and determine if sup-

plemental plant materials are needed. Projects that have used mainly seed to create habitat will see plant establishment 1-3 years after the initial seeding. Do not be discouraged if your project site has not completely established after the first growing season.

Fencing

Deer fencing may be necessary until plants are established. Consider installing temporary fencing around your site, at least 7 feet high. There are many companies that provide deer fencing in various materials and price points. Some fencing material is more visible than others; consider the aesthetic before making a purchase. If your project site is in

a highly visible area where you hope to bring a lot of visitors, you might opt for ‘invisible’ fence materials.

Maintenance

In addition to selecting the right plant species for your project, identify the correct maintenance needs for your site once the planting is completed.

Watering

Native plants are well adapted to your ecoregional conditions and seeds will grow and establish without watering. As discussed in previous sections, when planting plants, have water available for at least one month after planting to ensure success.





Mowing

Areas neighboring your monarch habitat planting project can also support monarchs, other pollinators, and wildlife. To maximize the floral resources of these areas, which will further enhance your monarch habitat development project, consider switching to a bi-seasonal mowing schedule; early season mowing and summer mowing. A bi-seasonal mowing schedule will enhance the health of the monarch and pollinator populations by providing floral resources in addition to the monarch habitat planting project.

Invasive Plant Removal

Weed scouting and reporting is a great task to delegate to volunteers and community members. For example, a weed scout volunteer group can survey the project area weekly, and report findings to the monarch habitat coordinator. This saves the lead project organization on scouting time, while engaging the community in the project.

Monitoring

A major flaw of many attempted restoration projects is the assumption that restoration is complete when plants are in the ground. Many

projects focus so much time and money on the planning and installation phases that there is little left to ensure that the restoration was successful in the long-term. Restored sites should be monitored for at least 5 years in order to assess the success of the project and ensure that the ecosystem is functioning properly. The established community should be self-sustaining, resistant to stress, and resilient to the sporadic natural disturbances of the region.

Adaptive Management

Restoration managers should always build adaptive management strategies into their monitoring

programs. Monitoring helps restoration managers understand what is working and what is not working in a project, and also affords an opportunity to learn from mistakes and refine the project's trajectory. If performance standards and goals are not being achieved, then the project can be reevaluated to determine the source of the issue. Methods and strategies may be adjusted to account for previously unknown or misunderstood issues. Lessons learned during monitoring can benefit the current restoration project, as well as future projects.



Education and Outreach

Education

Your newly created monarch habitat will provide an excellent learning opportunity for everyone, from school children and college students to other land management professionals. Educational visits are a great way to showcase your commitment to the community and connect with others. Register your habitat site with the Million Pollinator Garden Challenge (www.pollinator.org/million) and hold an event during National Pollinator Week (www.pollinator.org/npw_events.htm) to ensure that others outside of your community learn about your efforts to support pollinators.

Outreach

There are many ways to reach out to the community. Consider installing interpretive signage so that any visitor to the site not only becomes more informed about monarchs but also learns about your organization and its commitment to the environment and community. Additionally, providing information on your website in the form of background, project summary, and future plans will reach beyond your local community to others that have interest in similar projects or learning more about your organization. The Pollinator Partnership (P2) has a wide variety of outreach materials available at www.pollinator.org. Once the monarchs come to your area, tagging them through Monarch Watch is a popular activity for children and adults.

Photo courtesy Friends of LakeManawa



Additional Resources

Journey North: www.journeynorth.org

Monarch Watch: www.monarchwatch.org

Million Pollinator Garden Challenge: www.millionpollinatorgardens.org

Monarch Joint Venture: www.monarchjointventure.org

Pollinator Partnership: www.pollinator.org

US Forest Service: www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/index.shtml

Photo: Danelle Hevron Studio





Ecoregions of the Eastern Monarch Migratory Corridor Covered in this Guide



221 (*split into two parts*)

221(a): Eastern Broadleaf Forest (Oceanic) Province – Interior [TN to PA]

221(b): Eastern Broadleaf Forest (Oceanic) Province – Coastal [NH to NJ]



M221

M221: Central Appalachian Broadleaf Forest – Coniferous Forest – Meadow Province



222 (*split into two parts*)

222(a): Eastern Broadleaf Forest (Continental) Province – Upper Midwest [OH, IN, MI, WI, IL, and MN]

222(b): Eastern Broadleaf Forest (Continental) Province – Central Midwest



231 (*split into two parts*)

231(a): Southeastern Mixed Forest Province – Interior South [TX to SC]

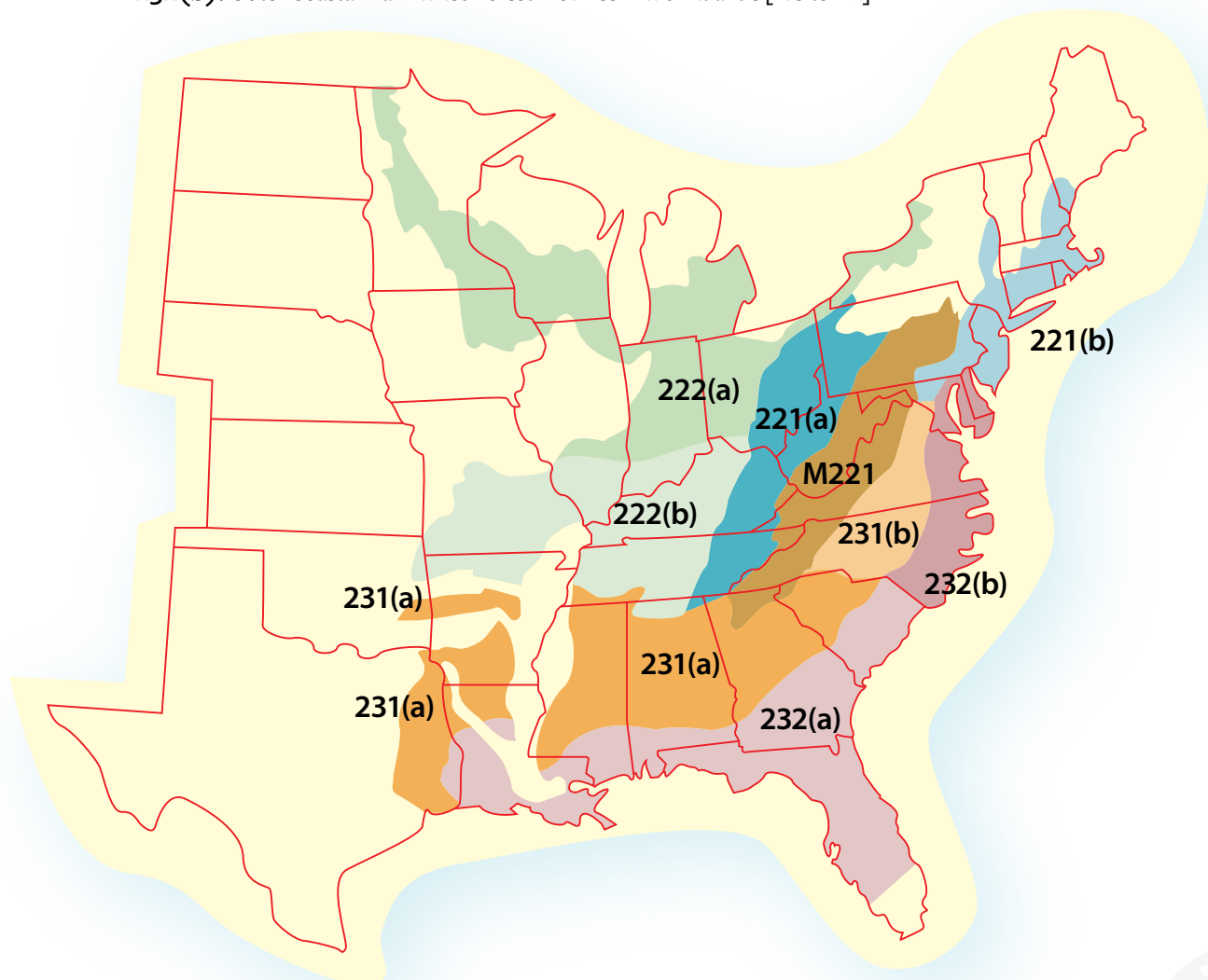
231(b): Southeastern Mixed Forest Province – Interior Mid-Atlantic [VA, NC, and MD]



232 (*split into two parts*)

232(a): Outer Coastal Plain Mixed Forest Province – Gulf Coast and Coastal Southeast [LA to SC]

232(b): Outer Coastal Plain Mixed Forest Province – Mid-Atlantic [NC to DE]





Ecoregional Plant Tables of the Eastern Monarch Migratory Corridor

The following 9 plant tables cover 5 ecoregions within the eastern monarch migratory corridor – 4 of which have been divided in two to provide more regionally specific planting recommendations. Reference the map (above) and visit <http://www.fs.fed.us/rm/ecoregions/products/map-ecoregions-united-states/> to learn more about your ecoregion.

The plant tables have been assembled to guide restoration managers in selecting species that are beneficial to monarchs, as well as widely available and practical to use. Each table includes a list of native milkweed (host) species and a list of native nectar plant (food) species native to a particular ecoregion or segment of an ecoregion within the

eastern monarch migratory corridor. These lists are not exhaustive and are only meant to serve as a starting point for planning monarch restoration projects.

Always use locally-adapted, genetically appropriate plants in your restoration and pollinator enhancement work. Seed zones—areas with genetically similar plants—help determine the right plant materials to use; poorly chosen plants usually fail to thrive. See http://fs.bioe.orst.edu/web_maps/Seed_Zones.html for provisional seed zones, and select plant materials from your zone. Planting non-natives to attract monarchs is against policy and destructive, as these plants can become invasive and disrupt ecosystems.

221(a): Eastern Broadleaf Forest (Oceanic) Province - Interior [TN to PA]

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 221-Interior	Commercially Available
Poke Milkweed	<i>Asclepias exaltata</i>	July-August	Yes	Yes
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Butterfly Weed	<i>Asclipas tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: May 10 – June 15

Common Name	Botanical Name	Bloom Period (approx.)	Native to 221-Interior	Commercially Available
Meadow Garlic	<i>Allium canadense</i>	May-July	Yes	Yes
Spreading Dogbane	<i>Apocynum androsaemifolium</i>	June-August	Yes	Yes
Indianhemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Golden Tickseed	<i>Coreopsis tinctoria</i>	April-June	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Foxglove Beardtongue	<i>Penstemon digitalis</i>	June-July	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Flame Azalea	<i>Rhododendron calendulaceum</i>	May-June	Yes	Yes
Fragrant Sumac	<i>Rhus aromatica</i>	March-May	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Lyreleaf Sage	<i>Salvia lyrata</i>	March-June	Yes	Yes
Highbush Blueberry	<i>Vaccinium corymbosum</i>	February-June	Yes	Yes
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	May-August	Yes	Yes
Southern Arrowwood	<i>Viburnum dentatum</i>	May-June	Yes	Yes

221(a): Eastern Broadleaf Forest (Oceanic) Province - Interior [TN to PA]

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Possumhaw	<i>Viburnum nudum</i>	June - July	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: September 20 – October 10

Common Name	Botanical Name	Bloom Period (approx.)	Native to 221-Interior	Commercially Available
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Purple Joe Pye Weed	<i>Eupatorium purpureum</i>	July-September	Yes	Yes
Bigleaf Aster	<i>Eurybia macrophylla</i>	August-October	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Rough Blazing Star	<i>Liatris aspera</i>	July-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Wild Bergamot	<i>Monarda fistulosa</i>	July-September	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada Goldenrod	<i>Solidago canadensis</i>	July-October	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	August-October	Yes	Yes
New England Aster	<i>Symphyotrichum novae-angliae</i>	August-October	Yes	Yes
Blue Vervain	<i>Verbena hastata</i>	July-September	Yes	Yes
Culver's Root	<i>Veronicastrum virginicum</i>	July-September	Yes	Yes

221(b): Eastern Broadleaf Forest (Oceanic) Province - Coastal [NH to NJ]

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 221-Coastal	Commercially Available
Poke Milkweed	<i>Asclepias exaltata</i>	July-August	Yes	Yes
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: May 15 – June 10

Common Name	Botanical Name	Bloom Period (approx.)	Native to 221-Coastal	Commercially Available
Meadow Garlic	<i>Allium canadense</i>	May-July	Yes	Yes
Spreading Dogbane	<i>Apocynum androsaemifolium</i>	June-August	Yes	Yes
Indian Hemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Pale Purple Coneflower	<i>Echinacea pallida</i>	May-July	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes

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221(b): Eastern Broadleaf Forest (Oceanic) Province - Coastal [NH to NJ]

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Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Foxglove Beardtongue	<i>Penstemon digitalis</i>	June-July	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Fragrant Sumac	<i>Rhus aromatica</i>	March-May	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Lyreleaf Sage	<i>Salvia lyrata</i>	March-June	Yes	Yes
Highbush Blueberry	<i>Vaccinium corymbosum</i>	February-June	Yes	Yes
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	May-August	Yes	Yes
Southern Arrowwood	<i>Viburnum dentatum</i>	May-June	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: September 15 – October 20

Common Name	Botanical Name	Bloom Period (approx.)	Native to 221-Coastal	Commercially Available
Yellow Giant Hyssop	<i>Agastache nepetoides</i>	July - October	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Trumpetweed	<i>Eupatoriadelphus fistulosus</i>	July-September	Yes	Yes
Hyssopleaf Thoroughwort	<i>Eupatorium hyssopifolium</i>	August-October	Yes	Yes
Common Boneset	<i>Eupatorium perfoliatum</i>	July-September	Yes	Yes
Purple Joe Pye Weed	<i>Eupatorium purpureum</i>	July-September	Yes	Yes
Bigleaf Aster	<i>Eurybia macrophylla</i>	August-October	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Common Sunflower	<i>Helianthus annuus</i>	July-October	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Wild Bergamot	<i>Monarda fistulosa</i>	July-September	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada Goldenrod	<i>Solidago canadensis</i>	July-October	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	August-October	Yes	Yes
New England Aster	<i>Symphyotrichum novae-angliae</i>	August-October	Yes	Yes
Blue Vervain	<i>Verbena hastata</i>	July-September	Yes	Yes
Culver's Root	<i>Veronicastrum virginicum</i>	July-September	Yes	Yes

M221: Central Appalachian Broadleaf Forest – Coniferous Forest – Meadow Province

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to M221	Commercially Available
Poke Milkweed	<i>Asclepias exaltata</i>	July-August	Yes	Yes
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: May 5 – June 5

Common Name	Botanical Name	Bloom Period (approx.)	Native to M221	Commercially Available
Meadow Garlic	<i>Allium canadense</i>	May-July	Yes	Yes
Spreading Dogbane	<i>Apocynum androsaemifolium</i>	June-August	Yes	Yes
Indianhemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	
Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Foxglove Beardtongue	<i>Penstemon digitalis</i>	June-July	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Flame Azalea	<i>Rhododendron calendulaceum</i>	May-June	Yes	Yes
Fragrant Sumac	<i>Rhus aromatica</i>	March-May	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Lyreleaf Sage	<i>Salvia lyrata</i>	March-June	Yes	Yes
Highbush Blueberry	<i>Vaccinium corymbosum</i>	February-June	Yes	Yes
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	May-August	Yes	Yes
Possumhaw	<i>Viburnum nudum</i>	June - July	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: September 20 – October 10

Common Name	Botanical Name	Bloom Period (approx.)	Native to M221	Commercially Available
Yellow Giant Hyssop	<i>Agastache nepetoides</i>	July - October	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Purple Joe Pye Weed	<i>Eupatorium purpureum</i>	July-September	Yes	Yes
Bigleaf Aster	<i>Eurybia macrophylla</i>	August-October	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Wild Bergamot	<i>Monarda fistulosa</i>	July-September	Yes	Yes
Wild Quinine	<i>Parthenium integrifolium</i>	June-September	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada goldenrod	<i>Solidago canadensis</i>	July-October	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	August-October	Yes	Yes
New England Aster	<i>Symphyotrichum novae-angliae</i>	August-October	Yes	Yes
Blue Vervain	<i>Verbena hastata</i>	July-September	Yes	Yes
Culver's Root	<i>Veronicastrum virginicum</i>	July-September	Yes	Yes

222(a): Eastern Broadleaf Forest (Continental) Province - Upper Midwest [OH, IN, MI, WI, IL, and MN]

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 222-Upper Midwest	Commercially Available
Poke Milkweed	<i>Asclepias exaltata</i>	July-August	Yes	Yes
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: May 20 – June 20

Common Name	Botanical Name	Bloom Period (approx.)	Native to 222-Upper Midwest	Commercially Available
Meadow Garlic	<i>Allium canadense</i>	May-July	Yes	Yes
Spreading Dogbane	<i>Apocynum androsaemifolium</i>	June-August	Yes	Yes
Indianhemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Pale Purple Coneflower	<i>Echinacea pallida</i>	May-July	Yes	Yes
Purple Coneflower	<i>Echinacea purpurea</i>	July-September	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Wild Quinine	<i>Parthenium integrifolium</i>	May-June	Yes	Yes
Foxglove Beardtongue	<i>Penstemon digitalis</i>	June-July	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Fragrant Sumac	<i>Rhus aromatica</i>	March-May	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Highbush Blueberry	<i>Vaccinium corymbosum</i>	February-June	Yes	Yes
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	May-August	Yes	Yes
Blackhaw	<i>Viburnum prunifolium</i>	May-June	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: September 1 – October 1

Common Name	Botanical Name	Bloom Period (approx.)	Native to 222-Upper Midwest	Commercially Available
Yellow Giant Hyssop	<i>Agastache nepetoides</i>	July - October	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Common Boneset	<i>Eupatorium perfoliatum</i>	July-September	Yes	Yes
Purple Joe Pye Weed	<i>Eupatorium purpureum</i>	July-September	Yes	Yes
Bigleaf Aster	<i>Eurybia macrophylla</i>	August-October	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Common Sunflower	<i>Helianthus annuus</i>	July-October	Yes	Yes
Rough Blazing Star	<i>Liatis aspera</i>	July-October	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Wild Bergamot	<i>Monarda fistulosa</i>	July-September	Yes	Yes

222(a): Eastern Broadleaf Forest (Continental) Province - Upper Midwest [OH, IN, MI, WI, IL, and MN]

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Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada Goldenrod	<i>Solidago canadensis</i>	July-October	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Showy Goldenrod	<i>Solidago speciosa</i>	September-October	Yes	Yes
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	August-October	Yes	Yes
New England Aster	<i>Symphyotrichum novae-angliae</i>	August-October	Yes	Yes
Blue Vervain	<i>Verbena hastata</i>	July-September	Yes	Yes
Culver's Root	<i>Veronicastrum virginicum</i>	July-September	Yes	Yes

222(b): Eastern Broadleaf Forest (Continental) Province - Central Midwest

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 222 - Central Midwest	Commercially Available
Poke Milkweed	<i>Asclepias exaltata</i>	July-August	Yes	Yes
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Showy Milkweed	<i>Asclepias speciosa</i>	May-September	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: April 15 – May 30

Common Name	Botanical Name	Bloom Period (approx.)	Native to 222 - Central Midwest	Commercially Available
Meadow Garlic	<i>Allium canadense</i>	May-July	Yes	Yes
Spreading Dogbane	<i>Apocynum androsaemifolium</i>	June-August	Yes	Yes
Indianhemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Golden Tickseed	<i>Coreopsis tinctoria</i>	April-June	Yes	Yes
Pale Purple Coneflower	<i>Echinacea pallida</i>	May-July	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Wild Quinine	<i>Parthenium integrifolium</i>	May-June	Yes	Yes
Fragrant Sumac	<i>Rhus aromatica</i>	March-May	Yes	Yes
Blackhaw	<i>Viburnum prunifolium</i>	May-June	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: September 25 – October 15

Common Name	Botanical Name	Bloom Period (approx.)	Native to 222 - Central Midwest	Commercially Available
Yellow Giant Hyssop	<i>Agastache nepetoides</i>	July - October	Yes	Yes
Tall Thistle	<i>Cirsium altissimum</i>	July - October	Yes	Yes
Common Boneset	<i>Eupatorium perfoliatum</i>	July-September	Yes	Yes

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222(b): Eastern Broadleaf Forest (Continental) Province - Central Midwest

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Purple Joe Pye Weed	<i>Eupatorium purpureum</i>	July-September	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Common Sunflower	<i>Helianthus annuus</i>	July-October	Yes	Yes
Rough Blazing Star	<i>Liatris aspera</i>	July-October	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Wild Bergamot	<i>Monarda fistulosa</i>	July-September	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada Goldenrod	<i>Solidago canadensis</i>	July-October	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
New England Aster	<i>Symphyotrichum novae-angliae</i>	August-October	Yes	Yes
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	August-October	Yes	Yes
Blue Vervain	<i>Verbena hastata</i>	July-September	Yes	Yes
Frostwhite	<i>Verbesina virginica</i>	August-November	Yes	Yes
Culver's Root	<i>Veronicastrum virginicum</i>	July-September	Yes	Yes



231(a): Southeastern Mixed Forest Province - Interior South [TX to SC]

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 231-Interior South	Commercially Available
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes
Whorled Milkweed	<i>Asclepias verticillata</i>	May-September	Yes	Yes

Nectar Plants

Northbound: April 1 – May 10

Common Name	Botanical Name	Bloom Period (approx.)	Native to 231-Interior South	Commercially Available
Indianhemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Golden Tickseed	<i>Coreopsis tinctoria</i>	April-June	Yes	Yes
Pale Purple Coneflower	<i>Echinacea pallida</i>	May-July	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Trumpet Honeysuckle	<i>Lonicera sempervirens</i>	March-June	Yes	Yes
Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Wild Quinine	<i>Parthenium integrifolium</i>	May-June	Yes	Yes
Wild Blue Phlox	<i>Phlox divaricata</i>	April-May	Yes	Yes
Fragrant Sumac	<i>Rhus aromatica</i>	March-May	Yes	Yes
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	May-August	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: October 1 – October 25 (plants blooming in September are listed to accommodate resident monarchs or early arrivals)

Common Name	Botanical Name	Bloom Period (approx.)	Native to 231-Interior South	Commercially Available
Tall Thistle	<i>Cirsium altissimum</i>	July - October	Yes	Yes
Common Boneset	<i>Eupatorium perfoliatum</i>	July-September	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Rough Blazing Star	<i>Liatris aspera</i>	July-October	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Wild Bergamot	<i>Monarda fistulosa</i>	July-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada Goldenrod	<i>Solidago gigantea</i>	August-September	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Frostwhite	<i>Verbesina virginica</i>	August-November	Yes	Yes
Culver's Root	<i>Veronicastrum virginicum</i>	July-September	Yes	Yes

231(b): Southeastern Mixed Forest Province - Interior Mid-Atlantic [VA, NC, and MD]

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 231-Interior Mid-Atlantic	Commercially Available
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: April 1 – June 1

Common Name	Botanical Name	Bloom Period (approx.)	Native to 231-Interior Mid-Atlantic	Commercially Available
Meadow Garlic	<i>Allium canadense</i>	May-July	Yes	Yes
Spreading Dogbane	<i>Apocynum androsaemifolium</i>	June-August	Yes	Yes
Indianhemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	
Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Flame Azalea	<i>Rhododendron calendulaceum</i>	May-June	Yes	Yes
Fragrant Sumac	<i>Rhus aromatica</i>	March-May	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Lyreleaf Sage	<i>Salvia lyrata</i>	March-June	Yes	Yes
Highbush Blueberry	<i>Vaccinium corymbosum</i>	February-June	Yes	Yes
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	May-August	Yes	Yes
Possumhaw	<i>Viburnum nudum</i>	June - July	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: September 20 – October 20

Common Name	Botanical Name	Bloom Period (approx.)	Native to 231-Interior Mid-Atlantic	Commercially Available
Yellow Giant Hyssop	<i>Agastache nepetoides</i>	July - October	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Purple Joe Pye Weed	<i>Eupatorium purpureum</i>	July-September	Yes	Yes
Bigleaf Aster	<i>Eurybia macrophylla</i>	August-October	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Wild Bergamot	<i>Monarda fistulosa</i>	July-September	Yes	Yes
Wild Quinine	<i>Parthenium integrifolium</i>	June-September	Yes	Yes
Fall Phlox	<i>Phlox paniculata</i>	July-September	Yes	Yes
Virginia Mountainmint	<i>Pycnanthemum virginianum</i>	June-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada Goldenrod	<i>Solidago canadensis</i>	July-October	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Anisescented Goldenrod	<i>Solidago odora</i>	August-October	Yes	Yes
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	August-October	Yes	Yes
New England Aster	<i>Symphyotrichum novae-angliae</i>	August-October	Yes	Yes
Blue Vervain	<i>Verbena hastata</i>	July-September	Yes	Yes
Culver's Root	<i>Veronicastrum virginicum</i>	July-September	Yes	Yes

232(a): Outer Coastal Plain Mixed Forest Province - Gulf Coast and Coastal Southeast [LA to SC]

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 232-Gulf Coast and Coastal Southeast	Commercially Available
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Aquatic Milkweed	<i>Asclepias perennis</i>	May-September	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: March 15 – April 15

Common Name	Botanical Name	Bloom Period (approx.)	Native to 232-Gulf Coast and Coastal Southeast	Commercially Available
Spanish Needles	<i>Bidens alba</i>	March-November	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Golden Tickseed	<i>Coreopsis tinctoria</i>	April-June	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	Yes
Trumpet Honeysuckle	<i>Lonicera sempervirens</i>	March-June	Yes	Yes
Lyreleaf Sage	<i>Salvia lyrata</i>	March-June	Yes	Yes
Golden Alexanders	<i>Zizia aurea</i>	April-June	Yes	Yes

Southbound: October 15 – October 30 (some plants blooming in September are listed to accommodate resident monarchs or early arrivals)

Common Name	Botanical Name	Bloom Period (approx.)	Native to 232-Gulf Coast and Coastal Southeast	Commercially Available
Spanish Needles	<i>Bidens alba</i>	March-November	Yes	Yes
False Blazing Star	<i>Carphephorus corymbosus</i>	August-October	Yes	Yes
Mist Flower	<i>Conoclinium coelestinum</i>	July-November	Yes	Yes
Common Boneset	<i>Eupatorium perfoliatum</i>	July-September	Yes	Yes
Flat-Topped Golden Rod	<i>Euthamia caroliniana</i>	September-November	Yes	Yes
Narrowleaf Yellowtops	<i>Flaveria linearis</i>	August-October	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Swamp Sunflower	<i>Helianthis angustifolius</i>	August-October	Yes	Yes
Slender Blazing Star	<i>Liatris gracilis</i>	August-October	Yes	Yes
Grassleaf Blazing Star	<i>Liatris pilosa</i>	August-October	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Winged Lythrum	<i>Lythrum alatum</i>	June-September	Yes	Yes
Snow Melanthera	<i>Melanthera nivea</i>	August-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Pine Barren Goldenrod	<i>Solidago fistulosa</i>	October-November	Yes	Yes
Canada Goldenrod	<i>Solidago gigantea</i>	August-September	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Aniscented Goldenrod	<i>Solidago odora</i>	August-October	Yes	Yes
Frostwhite	<i>Verbesina virginica</i>	August-November	Yes	

232(b): Outer Coastal Plain Mixed Forest Province -Mid-Atlantic [NC to DE]

Milkweed

Common Name	Botanical Name	Bloom Period (approx.)	Native to 232-Mid-Atlantic	Commercially Available
Swamp Milkweed	<i>Asclepias incarnata</i>	June-October	Yes	Yes
Common Milkweed	<i>Asclepias syriaca</i>	May-August	Yes	Yes
Butterfly Weed	<i>Asclepias tuberosa</i>	May-September	Yes	Yes

Nectar Plants

Northbound: April 15 – May 30

Common Name	Botanical Name	Bloom Period (approx.)	Native to 232-Mid-Atlantic	Commercially Available
Meadow Garlic	<i>Allium canadense</i>	May-July	Yes	Yes
Indianhemp	<i>Apocynum cannabinum</i>	May-August	Yes	Yes
Field Thistle	<i>Cirsium discolor</i>	June-September	Yes	Yes
Lanceleaf Tickseed	<i>Coreopsis lanceolata</i>	April-June	Yes	Yes
Golden Tickseed	<i>Coreopsis tinctoria</i>	April-June	Yes	Yes
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	March-June	Yes	Yes
Trumpet Honeysuckle	<i>Lonicera sempervirens</i>	March-June	Yes	Yes
Golden Ragwort	<i>Packera aurea</i>	April-June	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Lyreleaf Sage	<i>Salvia lyrata</i>	March-June	Yes	Yes
Highbush Blueberry	<i>Vaccinium corymbosum</i>	February-June	Yes	Yes
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	May-August	Yes	Yes
Possumhaw	<i>Viburnum nudum</i>	June - July	Yes	Yes

Southbound: October 10 – October 30

Common Name	Botanical Name	Bloom Period (approx.)	Native to 232-Mid-Atlantic	Commercially Available
Mist Flower	<i>Conoclinium coelestinum</i>	July-November	Yes	Yes
Common Boneset	<i>Eupatorium perfoliatum</i>	July-September	Yes	Yes
Purple Joe Pye Weed	<i>Eupatorium purpureum</i>	July-September	Yes	Yes
Flat-Topped Golden Rod	<i>Euthamia caroliniana</i>	September-November	Yes	Yes
Common Sneezeweed	<i>Helenium autumnale</i>	July-October	Yes	Yes
Swamp Sunflower	<i>Helianthus angustifolius</i>	August-October	Yes	Yes
Grassleaf Blazing Star	<i>Liatris pilosa</i>	August-October	Yes	Yes
Cardinalflower	<i>Lobelia cardinalis</i>	May-October	Yes	Yes
Wild Quinine	<i>Parthenium integrifolium</i>	June-September	Yes	Yes
Fall Phlox	<i>Phlox paniculata</i>	July-September	Yes	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	June-September	Yes	Yes
Canada Goldenrod	<i>Solidago canadensis</i>	July-October	Yes	Yes
Pine Barren Goldenrod	<i>Solidago fistulosa</i>	October-November	Yes	Yes
Canada Goldenrod	<i>Solidago gigantea</i>	August-September	Yes	Yes
Gray Goldenrod	<i>Solidago nemoralis</i>	August-October	Yes	Yes
Anisescented Goldenrod	<i>Solidago odora</i>	August-October	Yes	Yes



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