

Georgia Technical Guide - Monarch Habitat

Landowner		County	
Farm #		Date	
Tract #		Assisted by	



Monarch butterflies are one the most recognized butterflies. As caterpillars, monarchs require native milkweed to survive. Over the past several years milkweeds have been experiencing significant declines. Declines in milkweeds are believed to be causing significant declines of the monarch butterfly.

Monarchs occur throughout most the United States occupying areas with suitable habitat which includes milkweeds and a variety of nectar for year-round food sources. Females lay eggs on milkweed where the larva feed. Each fall monarchs migrate back to over winter sites; nectar sources along the migration route are essential for their survival.

Purpose: To provide food, shelter, and nesting resources for monarchs and other pollinator species.

General Specifications:

It is important to provide larval host plants for monarch caterpillars and the preferred nectar and pollen food resources for monarch adults throughout the growing season to support monarchs in during the summer breeding season and during fall migration. Monarch caterpillars require milkweeds (*Asclepias* spp.) as their obligate larval host (or food) plants to develop into the adult stage. As adults, monarch butterflies feed on nectar from milkweeds and variety of flowering plants.

Monarch habitat can be planned where wildlife habitat is identified as a resource concern and a plant community inventory or wildlife habitat evaluation indicates a benefit in altering the current vegetative conditions. The existing vegetation should be evaluated by completing a Wildlife Habitat Evaluation Guide (WHEG) to assess current conditions. To maximize monarch habitat, avoid disturbing any intact milkweed plants and other monarch preferred plants whenever possible (see Field Guide to Georgia Milkweeds).

Monarch habitat can be planned as whole fields, along field borders, or interspersed throughout the landscape. Habitat areas must be between 0.1 to 3 acres per field to allow for feasible site preparation, state biologist approval is required for acreage exceptions.

Milkweed plants contain cardenolides which is toxic to livestock. Milkweed poisoning is rare but may occur if fed hay containing milkweed or overstocking livestock in areas where milkweed is present. To prevent milkweed poisoning keep stocking densities low enough to ensure that animals have adequate forage, keep milkweed out of livestock trails, or do not allow livestock in areas where milkweed is present.

SEEDING RATES AND MIXTURES:

Selected species should be adapted to the climate and soils, use local ecotype where available. The seed mix or plug species should be selected to best fit the soil and moisture conditions on the site. Plants best adapted to the soil type will provide the best opportunity to for plants to establish.

Monarch seed mix must include a minimum of 4% native *Asclepias* (milkweed) and 60% wildflower species preferred by monarchs for pollen and nectar. A stand with a minimum of 9 wildflower (forbs, legumes) species should be established, including at least 3 flowering species that bloom during each season (spring, summer, and fall) including milkweed, and 1 native bunchgrass for a total of 10 or more species. See Table 1 for list of monarch preferred plants.

Many seed vendors carry milkweeds mixes or will create a custom mix. If purchasing pre-packaged seed mixes, verify the mix meets NRCS Conservation Practice Standards before purchasing and planting. Butterfly Milkweed (*Asclepias tuberosa*), Common Milkweed (*Asclepias syriaca*), and Eastern Swamp Milkweed (*Asclepias incarnata*) are often available, although some vendors may carry other species as well. Do not plant Tropical (Mexican) Milkweed (*Asclepias curassavica*) as this species continues to grow and produce flowers into the winter and fall which disrupts monarch migration.

Seeding rates are determined by pure live seed (PLS). Seed companies will sell seed at either a PLS rate or a bulk rate. The percent purity and percent germination are needed to calculate PLS.

To calculate the required amount of seed, multiply the % purity by % germination to get PLS, then divide the application rate by PLS. Purity and germination will be provided on the tag or by your supplier.

$$\text{seed purity(\%)} \times \text{germination rate(\%)} / 100 = \text{pure live seed}$$

$$\text{Bulk seeding rate} = \text{application rate} \div \text{pure live seed}$$

Example:

Pure seed: 67.62%

Other crop: 0.05%

Weed seed: 0.42%

Inert: 26.23%

Germination: 64.00%

Firm/Dormant: 22.00%

Total germination: 86.00

Noxious weed: NONE

The seed purity is 67.62% and the germination is 86%:

$$0.6762 \times 0.86 = 0.5815 \text{ PLS.}$$

The application rate is a total of 4 lb. PLS per acre:

$$4 \div 0.5815 = 6.87$$

6.87 lbs. of bulk seed is required for each acre.

To plant 2 acres:

$$6.87 \times 2 = 13.74$$

Total of 13.75 or ~14 lbs.

Adding annuals: Annuals or nurse crops can be included to stabilize soil, reduce weed growth, and give an early indication of success. Native annuals such as can be included as one of the minimum species required. Light rates of nurse crops such as oats, buckwheat (less than 20 lbs. per acre), and brown-top millet (less than 8 lbs. per acre) can be added to the mix but will not count as one of minimum the required species. *Do not use winter wheat, winter rye, perennial rye, or introduced clovers since some of these have properties that can suppress germination of planted seeds or can out-compete planted seedlings.*

Seedlings: Live plants in the form of plugs, or containerized material can be used if available. Plant seedlings in clumps of 10 to 20, 2-5 feet apart. Each clump can be about 25 feet from each other with approximately 1200-2000 plants per acre. This type of planting requires irrigation, especially during the first year of establishment.

Competition Control Before Planting:

Site preparation is crucial for a successful monarch habitat establishment. As much vegetation should be removed as possible. Seedbed preparation should start in the spring the year prior to planting and continue into the fall. For smaller acreages organic site preparation methods such as no till smothering with black plastic, tilling and solarizing with clear plastic, continuous tilling, and smother cropping can be used. Conventional seedbed preparation with herbicide application and tillage may also be used to control competition prior to planting, see Site Preparation Checklist for Producers.

Several steps are required to get successfully control undesirable competition to desired treatment levels prior to establishing the desired plant community. when using herbicide to control exotic species such as Bermuda grass, Bahia grass and tall fescue. It may also be necessary to control broadleaf weeds that will shade out the developing seedlings. These can be controlled with pre-emergent or post emergent herbicides. Follow University of Georgia Extension recommendations for specific herbicides and make sure to follow label recommendations on rates and time of year for application. Allow the required amount of time after the last herbicide application before planting to avoid residual effects that can inhibit germination or growth of desired species.



Example of seedbed preparation

For erodible sites, removal of existing vegetation may need to be delayed to until just prior to seeding or planted with a cover crop which will be killed just prior to seeding.

When to Plant

Dormant season planting: Milkweed mixes have higher rates of success when planted in the fall once the soil has cooled to less than 55° F, typically in starting in November. Fall planting exposes the seed to cold and moist conditions (stratification) triggering germination in most native seeds.

Dormant season planting may have risks such as soil erosion, cool season weed pressure, seed loss from heavy rain or wildlife consuming the seeds. Planting a nurse crop or annuals as part of the mix may reduce these risks. Proper site preparation is necessary for successful dormant season planting to eliminated failures from weed pressure.

Spring Planting: Spring planting is an option; however, this may favor grasses over forbs. Spring planting may reduce seed loss from wildlife and may prevent soil erosion. Planting should be completed before May 1st and watering the seeds will be needed if there is not sufficient rain. Artificial stratification is recommended for spring planting to enhance germination.

Many cool season weeds emerge before germination of monarch plantings, and it is important to control weeds to allow germination and growth of new plants. A post emergent herbicide may be needed to control weed growth. Follow University of Georgia Extension recommendations for specific herbicides.

Artificial stratification: Milkweed and other native seeds can be artificially stratified by combining with sand, sawdust, vermiculite, or other similar media; add 1 to 3 times the volume of seed. Add water to moisten the mixture, it should be moist but not wet (should not be dripping water). Place in a sealed plastic bag and store in a cool location (35-40°F) such as a refrigerator. Do not freeze. Keep cool for 4-6 weeks, although timing may vary for different species. Inspect the seeds for signs of mold or rotting. Plant immediately once removed from cold. Seeds will need to stay moist until germination.

Watering is typically not required, however, if drought conditions are present watering may be needed to ensure successful establishment.

Establishment

The site may be broadcast seeded, no-till drilled, or hand seeded. For high forb content plantings, broadcast seeding may be more successful since small seeds may be planted too deeply with a drill. Fertilizer or other soil amendments are not recommended. Good seed to soil contact is important. Sites with excessive litter content or a dense thatch layer hinders seed to soil contact, contact of seed drills, and can prevent growth of new seedlings. Remove litter through burning, raking, haying and grazing to maximize sunlight availability and increase seed contact with soil. Seed can be planted ⅛-inch to ¼-inch deep, 30% of the seed may be visible on surface. DO NOT plant seeds deeper than ¼ inch. Small amounts of litter can prevent seedling desiccation and reduce soil erosion.

Broadcast Seeding: Conventionally tilled sites can be mechanically (broadcast spreader) or manually (push seeder, hand crank seeder, or by hand) broadcast seeded. The site surface will need to be culti-packed or rolled prior to seeding and then again after seeding to press the seed into the soil. When broadcast seeding, it is beneficial to broadcast at a half rate and seed over the area twice with the second pass at a right angle to the first pass to insure equal coverage. For small forb seed and light fluffy grass seed use a damp carrier such as pelletized lime, cat litter, sawdust, sand, rice hulls, cracked corn, etc. in order to facilitate good seed coverage. The more the seed is diluted, the better it will be distributed. Roll the site with roller, or drive across it with truck/tractor tires to firm the seed into the soil (if soil is wet, wait until it dries to roll).

No-till Seeding: Specialty warm-season grass drills are needed to for planting seed not de-bearded or containing harvest chaff. Some of these drills have features that compensate for the light fluffy seed and insure accurate seed depth placement. Specialty drills are recommended for sites that have not been conventionally tilled or large conventional tilled sites. Drills can also be used in sites prepared via herbicides only (to avoid disturbing competing weed seed) such as when planting between rows of pine trees. Seeds can be no-tilled directly though the thatch. On firm cultivated seed beds, roll with roller, or drive across it with truck/tractor tires to firm the seed.

Conventional Seed Drill: De-bearded seed and seed with the chaff removed can be drilled with conventional drills in some mixes. Use caution with conventional drills and ensure the drill is properly calibrated for proper seeding rate and planting depth.

Operation and Maintenance

Once established monarch habitat should receive little to no disturbance, including the turning of machinery or driving within monarch habitat. However, maintenance will be required in order to facilitate establishment and maintain desired species and structure. Monitoring and controlling weeds is very critical in the first and second years. Germination and growth can take time, do not expect to see blooms the first or possibly even the second year.

First Year - When undesirable vegetation reaches “12-18” tall, mow to no less than 6” high. This allows light to reach the slower growing perennials, helps prevent annual weed seed development, and avoids smothering the desirable species. Most native plants will grow deeper root systems than tops in the first year and mowing 6-8” high will not hurt them. Mow several times as needed over the growing season if competition continues to be a problem. Spot spraying and hand rouging can be very effective for small areas or limited invasions of perennial or otherwise troublesome weeds.

Second Year - Mow once close to the ground in early spring. Postponing mowing until early spring provides winter cover for wildlife. If weeds remain a problem in the second year, mow again in late spring or early summer. If you mow too late in the fall, you may destroy the seed heads of natives that feed birds in winter. However, if annual weeds are still predominant, it is better to prevent them from going to seed during the initial establishment.

Once the stand is established, periodic prescribed fire or mowing may be used to maintain plant diversity within the monarch habitat. However, it is important to note that some adult or immature insects may be killed during prescribed burns or other management actions.

To minimize the negative effects of management, no more than 1/3 - 1/2 of the stand should be mowed in a year, with such management not occurring more frequently than once every 3-6 years. Consider rotating management and maintenance activities throughout the managed areas to maximize spatial and temporal diversity.

Very light winter strip disking is sometimes conducted on thick stands, can help reduce grass density and encourage forb growth. However, it may also release weed seeds in the soil bank. Disking should not be used to manage areas of high-quality native vegetation because it may destroy rare or sensitive plants in these systems. Burning will return better results in these areas.

Pesticide and herbicide use on or near a monarch habitat can have significant negative effects on insect populations. Plan habitat establishment where chemical drift will not be an issue. Alternative means of managing pests (mowing, haying, burning, etc.) should be considered; however, for small areas and isolated infestations of undesirable species, targeted spot spraying may be effective. Maintenance practices must be adequate to control noxious and exotic invasive species.

Tract/field Number _____

	Field _____	Field _____
Site Prep Method ¹		
Method of Establishment ²		
Acres		
Planting Dates		

² Broadcast, no-till seeding, conventional seed drill

[illegible]³ Total=[PLS/(% germination X % purity)] X acres[illegible]

Table 1: List of plants preferred by Monarchs

* Use low rates only, avoid in high diversity mix

Common Name	Scientific name	Bloom Season			Growth Type	Region	Wetland Indicator Status	Moisture Needs	Sunlight Needs	Flower Color
Annual Phlox	<i>Phlox drummondii</i>	sprg	sum		A	P, CP	-	low	sun to part shade	pink, red
Aster, Calico	<i>Aster laterifolius</i>		sum	fall	P	All	FAC	moderate	full sun	purple, white
Aster, Common Blue Wood (heartleaf aster)	<i>Aster cordifolius</i>		sum		P	P	-	low	full sun	white, lavender
Aster, Eastern Showy (NC ecotype)	<i>Aster spectabilis</i>		sum	fall	P	P	-	low	full sun	purple
Aster, False / White Doll's Daisy (FL ecotype)	<i>Boltonia asteroides</i>		sum	fall	P	P, CP	FACW	moderate	full sun	white
Aster, Health / Hairy White Oldfield	<i>Aster pilosus</i>		sum	fall	P	All	FACW	moderate	sun to part shade	white
Aster, Late Purple (NC ecotype)	<i>Aster patens</i>		sum	fall	P	All	-	moderate	shade	purple
Aster, New England	<i>Aster novae-angliae</i>		sum	fall	P	M	FACW	moderate	part shade	purple
Aster, New York	<i>Aster novi-belgii</i>			fall	P	All	OBL	moderate	sun to part shade	blue
Aster, Purple Stemmed	<i>Aster puniceus</i>			fall	P	M, P	OBL	high	full sun	purple
Aster, Smooth Blue	<i>Aster laevis</i>		sum	fall	P	All	-	moderate	part sun	blue
Beard Tongue, Appalachian (SC ecotype)	<i>Penstemon laevigatus</i>	sprg	sum		P	All	FAC	high	full sun	purple
Beard Tongue, Eustis Lake/Slender (NC ecotype)	<i>Penstemon australis</i>	sprg	sum		P	ALL	FACU	low	part shade	lavender
Beggarsticks, Bearded/Showy Tickseed (NC, SC ecotypes)	<i>Bidens aristosa</i>		sum	fall	A	All	FACW	moderate to high	full sun or partial shade	yellow
Beggarsticks, Devil's/Tickseed Sunflower	<i>Bidens frondosa</i>		sum	fall	A	ALL	FACW	high	sun to part shade	yellow
Blazing Star, Elegant (GA ecotype)	<i>Liatris elegans</i>			fall	P	P, CP	-	low	full sun	pink
Blazing Star, Grass-leaf (NC ecotype)	<i>Liatris graminifolia</i>		sum		P	All	-	low	full sun	purple
Blazing Star, Marsh or Spiked (FL ecotype)	<i>Liatris spicata</i>		sum	fall	P	M, P	-	moderate	part shade to sun	pink, purple

Common Name	Scientific name	Bloom Season			Growth Type	Region	Wetland Indicator Status	Moisture Needs	Sunlight Needs	Flower Color
Blazing Star, Rough or Tall	<i>Liatris aspera</i>		sum	fall	P	All	-	low to moderate	full sun	purple
Blazing Star, Scaly (VA ecotype)	<i>Liatris squarossa</i>		sum		P	All	-	low	full sun	purple
Blazing Star, Slender (FL ecotype)	<i>Liatris gracilis</i>		sum	fall	P	CP	FACU	low to moderate	full sun	purple
Blue Mistflower (VA , FL ecotypes)	<i>Eupatorium coelestinum</i> / <i>Conoclinium coelestinum</i>		sum	fall	P	All	FAC	moderate	sun to part shade	blue, purple
Blue Vervain	<i>Verbena hastata</i>		sum	fall	P	ALL	FAC	moderate to high	sun to shade	purple, blue
Blue-eyed Grass, Narrowleaved	<i>Sisyrinchium angustifolium</i>	sprg			P	All	FAC	moderate	sun to part shade	blue
Boneset (FL ecotype) *	<i>Eupatorium perfoliatum</i>			fall	P	All	FACW	moderate to high	full sun or partial shade	white
Columbine, Red	<i>Aquilegia canadensis</i>	sprg	sum		P	All	FACU	low to moderate	part shade	
Common Sunflower	<i>Helianthus annuus</i>		sum	fall	A	All	FAC	low	sun	yellow
Coneflower, Purple	<i>Echinacea purpurea</i>		sum		P	All	-	moderate	full sun	purple
Coreopsis, Greater (AL ecotype)	<i>Coreopsis major</i>	sprg	sum		P	All	-	low to moderate	full sun	yellow
Coreopsis-Goldenmane Tickseed (FL ecotype)	<i>Coreopsis basalis</i>		sum		A	P, CP	-	low	full sun	yellow/red
Coreopsis-Lance Leaved (NC ecotype)	<i>Coreopsis lanceolata</i>	sprg	sum		P	All	UPL	low	part shade	yellow
Coreopsis-Largeflower Tickseed (GA ecotype)	<i>Coreopsis grandiflora</i>	sprg	sum		P	All	-	low	full sun	yellow
Coreopsis-Plains	<i>Coreopsis tinctoria</i>	sprg	sum		A	All	FAC	high	sun to part shade	yellow
Coreopsis-Tall (AL ecotype)	<i>Coreopsis tripteris</i>		sum	fall	P	M, P	FAC	moderate	part shade	yellow
Coreopsis-Whorled/Threadleaf Tickseed (SC, VA ecotype)	<i>Coreopsis verticillata</i>	sprg	sum		P	CP	-	low to moderate	full sun	yellow
Culiver's Root	<i>Veronicastrum virginicum</i>		sum	fall	P	M, P	FACW	low to moderate	full sun	white, pink, blue
False Indigo / River Locust	<i>Amorpha fruticosa</i>	sprg	sum		P	All	FACW	moderate	full sun to part shade	purple
False Indigo, Clusterspike (NC ecotype)	<i>Amorpha herbacea</i>	sprg	sum		P	All	FAC	low	sun to part-shade	pink, purple

Common Name	Scientific name	Bloom Season			Growth Type	Region	Wetland Indicator Status	Moisture Needs	Sunlight Needs	Flower Color
Golden Alexanders	<i>Zizia aurea</i>	sprg	sum		P	All	-	moderate	full sun to part shade	yellow
Goldenrod, Anise-scented (GA ecotype)	<i>Solidago odora</i>		sum	fall	p	All	-	moderate	full sun	yellow
Goldenrod, Early	<i>Solidago juncea</i>	sprg	sum		P	M	-	low to moderate	sun to shade	yellow
Goldenrod, Erect	<i>Solidago erecta</i>		sum	fall	P	All	-	low to moderate	full sun	yellow
Goldenrod, Flat top / Lance-Leaved	<i>Euthamia graminifolia</i>		sum	fall	P	M, P	FAC	moist	full sun	yellow
Goldenrod, Gray (VA, PA ecotypes)	<i>Solidago nemoralis</i>		sum		P	All	-	moderate	full sun	yellow
Goldenrod, Pinebarren (FL ecotype)	<i>Solidago fistulosa</i>		sum		P	CP	FAC	moderate	full sun	yellow
Goldenrod, Rigid	<i>Solidago rigida</i>		sum	fall	P	P	FACU	moderate	sun to part shade	yellow
Goldenrod, Rough-Leaved	<i>Solidago patula</i>			fall	P	All	OBL	high	sun to part shade	yellow
Goldenrod, Showy (GA, WV ecotypes)	<i>Solidago speciosa</i>		sum	fall	P	All	-	high	part shade	yellow
Goldenrod, Tall	<i>Solidago altissima</i>			fall	P	All	FACU	moderate	part shade	yellow
Goldenrod, Wand	<i>Solidago stricta</i>			fall	P	P, CP	OBL	moderate to high	full sun	yellow
Goldenrod, Wreath	<i>Solidago caesia</i>	sprg			P	All	FACU	moderate	sun to part shade	yellow
Goldenrod, Wrinkle-Leaved	<i>Solidago rugosa</i>		sum	fall	P	All	FAC	moderate	sun to part shade	yellow
Great Blue Lobelia	<i>Lobelia siphilitica</i>		sum	fall	P	M,P	OBL	moderate	sun to part shade	Blue
Indian Blanket/Blanketflower, Annual	<i>Gaillardia pulchella</i>	sprg	sum	fall	A	P, CP	-	low to moderate	full sun	red
Indianhemp/Dogbane*	<i>Apocynum cannabinum</i>	sprg	sum		P	All	FACU	moderate	sun to part shade	white
Ironweed, Giant (FL ecotype)	<i>Vernonia gigantea/ Vernonia altissima</i>		sum	fall	P	All	FAC	moderate	sun to shade	purple
Ironweed, Giant* (FL ecotype)	<i>Vernonia gigantea or altissima (FL)</i>		sum	fall	P	All	FAC	moderate	sun to shade	purple
Ironweed, New York (NC ecotype)	<i>Vernonia noveboracensis</i>		sum	fall	P	All	FAC	moderate	sun to shade	purple
Ironweed, Stemless (SC ecotype)	<i>Vernonia acaulis</i>		sum		P	All	-	low	sun to part shade	purple

Common Name	Scientific name	Bloom Season			Growth Type	Region	Wetland Indicator Status	Moisture Needs	Sunlight Needs	Flower Color
Ironweed, Tall (SC ecotype)	<i>Vernonia angustifolia</i>		sum	fall	P	P, CP	FACU	moderate	sun to part shade	purple
Joe Pye Weed, Trumpetweed	<i>Eupatorium fistulosum</i>		sum	fall	P	All	FAC	moderate	part shade	pink
Lespedeza, Roundhead (legume)	<i>Lespedeza capitata</i>		sum	fall	P	All	FACU	low	full sun	yellow
Milkweed, Butterfly	<i>Asclepias tuberosa</i>		sum		P	All	-	low	full sun	orange
Milkweed, Common	<i>Asclepias syriaca</i>		sum		P	All	-	low to moderate	full sun	pink
Milkweed, Eastern Swamp	<i>Asclepias incarnata</i>			fall	P	All	OBL	high	full sun	pink
Mint, Clustered Mountain	<i>Pycnanthemum muticum</i>		sum		P	All	FAC	moderate	sun to part shade	white
Mint, Hoary Mountain	<i>Pycnanthemum incanum</i>		sum		P	All	-	low to moderate	part shade	white, purple
Mint, Slender Mountain	<i>Pycnanthemum tenuifolium</i>		sum	fall	P	All	FACW	low to moderate	sun to part shade	white
Mint, Spotted Bee Balm (SC, NC ecotypes)	<i>Monarda punctata</i>		sum		A	All	FAC	low	full sun	purple
Mint, Wild Bergamot	<i>Monarda fistulosa</i>		sum		P	M, P	-	high	part sun	pink
Narrowleaf Sunflower	<i>Helianthus angustifolius</i>			fall	P	All	FACW	high	part shade	yellow
Nodding Onion	<i>Allium cernuum</i>	sprg	sum		P	M, P	FACU	low to moderate	full sun to part shade	white, pink
Partridge Pea-Small Flowered (legume)	<i>Chamaecrista nictitans</i>		sum		A	All	FACU	low	sun	yellow
Primrose, Evening	<i>Oenothera biennis</i>		sum	fall	P	All	FACU	low to moderate	full sun to light shade	yellow
Primrose, Showy	<i>Oenothera speciosa</i>	sprg	sum		P	All	-	low	full sun	yellow
Rattlesnake Master (SC, FL ecotypes)	<i>Eryngium yuccifolium</i>		sum		P	All	FAC	low to moderate	sun to part shade	white
Rattlesnake Master, Marsh (SC Ecotype)	<i>Eryngium aquaticum var. aquaticum</i>	sprg	sum	fall	P	CP	OBL	high	part shade	lavender, white
Rosinweed, Starry (SC, GA, FL ecotypes) *	<i>Silphium asteriscus</i>		sum	fall	P	All	-	moderate	full sun	yellow
Senna, Wild/Maryland (legume)	<i>Senna marilandica</i>		sum		P	All	FAC	low to high	full sun to light shade	yellow
Shaggy Blazingstar	<i>Liatris pilosa</i>		sum	fall	P	CP	-	moderate	sun	purple
Snakeroot, White	<i>Eupatorium rugosum (Ageratina altissima)</i>		sum	fall	P	All	FACU	high	shade, part shade	white

Common Name	Scientific name	Bloom Season			Growth Type	Region	Wetland Indicator Status	Moisture Needs	Sunlight Needs	Flower Color
Sneezeweed, Common (FL, VA, PA ecotypes)	<i>Helenium autumnale</i>			fall	P	All	FACW	moderate	full sun	yellow
Sunflower, Ox Eye	<i>Heliopsis helianthoides</i>	sprg	sum	fall	P	All	-	low to moderate	full sun	yellow
Susan, Black-Eyed (NC ecotype)	<i>Rudbeckia hirta</i>	sprg	sum		P	All	FACU	low to moderate	full sun	yellow
Susan, Brown-Eyed	<i>Rudbeckia triloba</i>	sprg	sum	fall	P	All	FACU	low to moderate	sun to part shade	
Sweetscented Joe Pye Weed	<i>Eupatorium purpureum</i>		sum	fall	P	P	FAC	moderate	sun or part shade	pink, purple
Tall Thoroughwort	<i>Eupatorium altissimum</i>		sum	fall	P	M,P	-	high	sun to part shade	white, green
White Wingstem	<i>Verbesina virginica</i>		sum	fall	P	CP	FACU	low	shade	white
Whorled milkweed	<i>Asclepias verticillata</i>	sprg	sum	fall	P	All	FACU	low	sun to part shade	green, white
Wild Blue Lupine (legume)	<i>Lupinus perennis</i>	sprg			P	P, CP	-	low	full sun	blue
Wild Indigo - Catbell (legume)	<i>Baptisia perfoliata</i>	sprg			P	CP	-	low	full sun	yellow
Wild Indigo - Horsefly Weed (legume)	<i>Baptisia tinctoria</i>		sum		P	All	-	low	full sun	yellow
Wild Indigo, Blue (legume) -WV ecotype	<i>Baptisia australis</i>	sprg			P	M,P	-	moderate	full sun	purple, blue
Wild Indigo, Spiked (legume) -NC, SC ecotypes	<i>Baptisia albenscens</i>	sprg			P	All	-	low	sun to part shade	white
Wild Indigo, White (legume)	<i>Baptisia alba</i>	sprg			P	All	FAC	moderate	full sun	white
Wingstem✱	<i>Verbesina alternifolia</i>		sum	fall	P	All	FAC	moderate	sun	yellow