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CREATION AND MANAGEMENT OF UTAH BUTTERFLY HABITAT

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Fritillary butterfly. Photo by Cheryl Smith

This Technical Note provides guidance on butterfly habitat creation and management in Utah. Unique requirements for monarch and Great Basin Silverspot butterflies are described, and guidance is provided on site preparation, seed mixtures and necessary management inputs.

Introduction

NRCS has been promoting and funding practices designed to benefit native pollinators for over a decade; however, most of this has been targeted toward the benefit of native bees. Butterflies, while similar in their need for flowering plants for food, have other needs that differ from those used for general pollinator habitat. Additionally, Utah is home to two species of butterfly that may soon warrant listing as a threatened or endangered species. Monarch butterflies and the Great Basin Silverspot both have unique dietary and reproduction requirements that deserve special attention when developing and restoring habitat.

Monarch (*Danaus plexippus*)

Monarch butterflies have two major populations: an eastern population that overwinters in central Mexico, and a western population that overwinters in colonies along the coast of California (Figure 1). Western monarch numbers have been steadily and dramatically decreasing. Data from 2018-2019 wintering sites in California indicate a decline of more than 85% compared to the previous season and a decline of over 99% since monitoring began in the early 1980's. More research is needed to know all the elements that negatively impact monarchs, but factors that are thought to stress individual monarchs and the general population include pesticides, habitat fragmentation, climate and loss of breeding and foraging habitat. Creation and management of suitable habitat can help mitigate losses and keep this species from becoming endangered.

Each year, adult butterflies of the western population fly east and north from their winter roosts along the California coast, spreading out over the course of multiple generations. Monarch adults eventually arrive in Utah where they are most abundant from July through October (Figure 2). An adult monarch can lay up to 500 eggs, but they prefer to lay only one egg per plant. The eggs hatch in 3 to 12 days revealing the distinctive in black, white, and yellow banded caterpillars. The caterpillars then go through 5 instars of development before building a chrysalis in which they change into an adult monarch butterfly. In late summer and early fall, most adults in Utah fly south or west, heading back to California to overwinter.

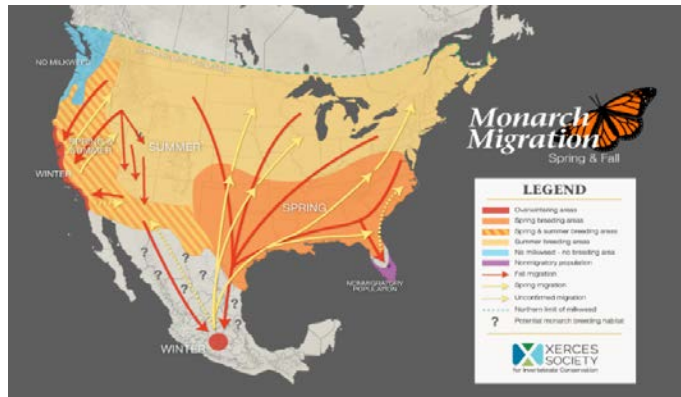


Figure 1. Migration of western and eastern monarch butterfly populations.

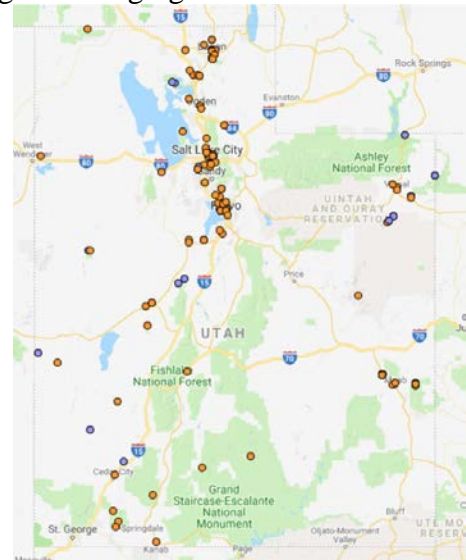


Figure 2. Utah monarch sightings. monarchmilkweedmapper.org Accessed January 2019.

Great Basin Silverspot (*Speyeria nokomis nokomis*)



Figure 3. Great Basin Silverspot (*Speyeria nokomis nokomis*) foraging on musk thistle. Photo by Alan Myrup.

The Great Basin Silverspot (Figures 3 and 4) is an orange-brown butterfly with a wingspan reaching 2 to 3 inches. The species was petitioned for listing as endangered or threatened in 2013. Reasons for its decline include habitat loss and fragmentation due to development, altered hydrology, heavy grazing, mineral extraction, and other human activities. It currently has no legal protection at either the state or federal level, with the exception of populations within the Navajo Nation.

Its distribution includes Utah, Colorado, Arizona, and New Mexico. In Utah it has been observed in Duchesne, Uintah, Grand, and San Juan counties. The Uintah County site, located along Ashley Creek north of Vernal, contains the largest known colony. Extant populations were found in the Uintah County section of Dinosaur National Monument in 1997 and an ovipositing female was observed in Duchesne County in 1969 (Selby, 2007). Other sizeable colonies have been identified and studied along the rivers and streams of the south slope of the Uinta Mountains, particularly near Whiterocks in Uintah County and near Hanna along the north fork of the Duchesne River in Duchesne County (Myrup, 2019; Nielson, 2019). This species is restricted to streamside meadows, seepage areas, and marshes in otherwise arid environments. Bog violets (*Viola nephrophylla*) are the only confirmed food source for the Great Basin Silverspot caterpillar.



Figure 4. Great Basin Silverspot butterflies displaying two color phases. Photo by Alan Myrup.

Great Basin Silverspot eggs hatch in 17-18 days and are followed by six larval instars before the pupal stage (Scott and Mattoon 1981). Females deposit their eggs near their larval host plant, bog violets (Scott, 1986), often choosing hard substrates like tree trunks, logs, or other woody vegetation (Ellis personal communication, cited in NatureServe 2006). The first tiny instar must endure winter exposure, unfed, till it can find the new emerging violet leaves it needs in early spring (Selby, 2007). Caterpillars are described by Scott (1986) as “orangish ochre, dark beneath, with six rows of long orangish-ochre spines, black patches around dorsal and subdorsal spines, two black transversal stripes on the rear of each segment, and orangish-ochre lateral and dorsal stripes; head black, orangish on top and rear.” Great Basin Silverspots do not migrate, but they are strong flyers and can move between isolated colonies within a continuous riparian zone (Arnold 1989, Fleishman et al. 2002). It is unlikely that they will disperse long distances between highly isolated riparian systems (Selby, 2007). Great Basin Silverspot butterflies are

univoltine (having a single generation per year) with an adult flight from late July to mid-September (Scott, 1986, Tilden and Smith 1986).

Milkweeds for Monarchs

Monarch butterflies will only lay eggs on milkweed (*Asclepias* spp.) plants from which the caterpillars accumulate toxins making them unpalatable to birds and other predators. Without milkweeds, monarchs wouldn't be able to complete their life cycle; however, milkweed abundance has dramatically decreased over the past several decades as herbicide use and urban expansion have increased. At one time, milkweed was classified as a noxious weed due to reported toxic effects on livestock, and efforts were made to eradicate it. A better understanding of the risk factors regarding milkweed and livestock however can lead to successful management strategies and improve monarch habitat conditions without posing a serious threat to livestock.



Figure 5. Showy milkweed (*A. speciosa*). Photo by Derek Tilley, USDA-NRCS.



Figure 6. A monarch caterpillar forages on showy milkweed leaves. Photo by Tonya Kieffer-Selby, UT Division of Wildlife Resources.

There are 17 species of milkweed native to Utah, but many are either infrequently encountered or are restricted to specific micro-climates, soil type or other restrictive feature and therefore of limited applicability to monarch conservation practices. Two are especially valuable for monarch habitat plantings in Utah. Perhaps the most abundant milkweed species in Utah is showy milkweed (*Asclepias speciosa*) (Figures 5 and 6). This species is common along ditch banks, roadsides, pastures and meadows throughout the state up to elevations of about 7,500 ft, though specimens have been cited as high as 8,300 ft (Welsh et al., 2015). Like all milkweeds, showy milkweed is toxic to livestock, but

this species is not known to have caused major problems with grazing animals. Due to its bitter taste and large leaves is much less likely to be accidentally grazed than the narrow-leaved species.

One slightly less common milkweed that can be found in Utah is swamp milkweed (*A. incarnata*) (Figure 7). It is more limited in distribution than showy milkweed, but it is highly attractive to monarchs and grows in the wetter areas where monarchs are known to congregate. Swamp milkweed occurs naturally along river banks and pond shores throughout most of North America but is primarily found in wet areas in northern Utah. It can, however, be successfully grown in flower beds and pollinator gardens under proper growing conditions.

For most artificial monarch butterfly habitat plantings in Utah, it would be appropriate to plant a mixture of showy and swamp milkweed. For restoration and natural habitat projects, consult the distribution maps in the PLANTS Database and other sources to determine which species are native to the site.

Milkweed Propagation

Milkweed can be grown from seed which can be sown either directly into well-prepared weed-free soil, or into pots or other containers for later transplanting (Figure 8). The soil should be kept moderately moist; however, watch for signs of fungal infections like damping off and root rot. Milkweeds prefer well-drained soil and struggle if kept damp for extended periods (Luna and Dumroese, 2013). Under good conditions, transplants are ready after a few months.



Figure 7. Swamp milkweed (*A. incarnata*). Photo by Derek Tilley, USDA-NRCS.



Figure 8. Showy milkweed seedlings here were grown in 10 cubic inch cone-tainers. Greenhouse produced seedlings are ready for outplanting approximately 60 days after germination.

Germination rates in field plantings are highly variable. As milkweeds can be slow to emerge and establish, they can be easily outcompeted by invasive weeds. We have had better success when planting milkweed alone in dedicated “islands” rather than in a seed mix with more aggressive species.

In addition to seed, milkweeds can be vegetatively propagated using rhizomes, or by transplanting entire plants. Showy milkweed produces a large taproot and rhizomes that may branch to produce multiple plants. These roots can be easily dug up in fall or in early spring before the new shoots have arisen and transplanted. The roots can be cut into smaller sections as little as 2 inches long, so long as each piece of rhizome has at least one bud (Figure 9).



Figure 9. Young milkweeds emerging from a cut section of rhizome. Photo by Derek Tilley, USDA-NRCS.

When fall planting, plant early enough in the season (September or October) so the plants can establish a root system to survive the winter. Plant the rhizomes fairly deep, about 4 to 6 inches, to avoid surface drying. Irrigation the first year will improve survival.

Wild-harvested transplants do best when planted before they go dormant in the fall. These should be watered in at the time of transplanting and may require additional irrigation during the first growing season. Both seedlings and rhizomes will usually bloom in the second year, although plants propagated from mature rhizomes will occasionally bloom their first year.

Northern Bog Violet for Silverspots



Figure 10. Northern bog violet. Photo by Gary Moore, courtesy of PLANTS Database.

Northern bog violet (*Viola Nephrophylla*), host plant for the Great Basin Silverspot caterpillars, is a rather widespread, low growing herbaceous forb occurring throughout North America with the exception of the southeastern states (Figure 10). In Utah it can be found in bogs, marshes, seeps, moist meadows and streambanks in all but Rich and Summit counties. Northern bog violet occurs throughout a broad elevational range and can be found in all plant communities from blackbrush to alpine forests so long as moist conditions exist.

No verifiable propagation information could be found for northern bog violet; however, it is described by some commercial nurseries as an “easy germinator”. Propagation protocols for other members of the violet genus typically involve a 90 to 120 cold-moist stratification period to break seed dormancy, so it might be safest to incorporate a stratification period when attempting to propagate this species from seed. Northern bog violet could likely also be propagated from rhizome cuttings, though we have not confirmed this.

Plants for General Butterfly Habitat



Figure 11. A swallowtail butterfly siphoning nectar from a hummingbird feeder. Photo by Kathy Paulin.

Adult butterflies differ from the caterpillars in obvious ways, but maybe not so obvious is the fact that adult butterflies have a completely different diet due to their changed mouth parts. During the metamorphosis from caterpillars to adults, all caterpillars lose their chewing mouthparts that they used to eat vegetative matter and develop a long straw-like feeding proboscis. With only this tube for eating, adults are limited to a very specific food source, nectar (Figure 11). Butterflies travel from flower to flower sucking the nectar that the plants make as a reward for pollination services, and while adult butterflies are generalists, many have specific floral preferences regarding which

species of plants they prefer get nectar from. Butterfly gardens in our area should have a diverse array not only of pollinator friendly plants, but specifically plants known to be good nectar

sources. The table at the end of this document lists commercially available plants known to be good sources of nectar for butterfly species.

Adult monarchs in the Intermountain West need large quantities of nectar to give them energy for egg laying, and to develop energy stores that can carry them on their long journey back to California. Data from monarch observations indicate that monarch adults in Utah primarily forage for nectar on milkweed, rabbitbrush (*Ericameria* spp.) and various native and introduced thistles (*Cirsium* spp. and *Carduus* spp.). Other common plants monarchs have been recorded frequently nectaring on in Utah and surrounding states include: goldenrod (*Solidago* spp. and *Euthamia* spp.), Aster (*Symphotrichum* spp.) and sunflower (*Helianthus* spp.) (Figure 12).

Adult silverspots forage for nectar on a variety of plant species though thistles appear favored (Scott 1986, Opler and Wright 1999). This sub-species seems to prefer blue- and yellow-flowered composites (Ellis, 1989). Documented flowers visited include native and introduced thistles, horsemint, and joe pye weed (NatureServe, 2006).



Figure 12. Monarchs foraging on goldenrod, an excellent source of nectar. Photo from USFWS.

Cover

In addition to nectar producing plants, adult monarchs require roosting sites and areas of shade during the summer heat. Good butterfly habitat will include nearby shrubs and trees where they can hide and rest; and in the case of the Great Basin Silverspot, a place for laying their eggs (Ellis personal communication, cited in NatureServe 2006). Descriptive information regarding woody species suitable for use in the Intermountain West can be found in Idaho Plant Materials Technical Note 43 Tree and Shrub Planting, Care and Management.

Establishment

Initial establishment is key to creating a sustainable butterfly and pollinator habitat. Once a well-designed and implemented pollinator habitat has achieved its climax phase, it can become largely self-sufficient; renewing desirable wildflowers and grasses from seed and limiting weed invasion thanks to increased cover and competition. However, successfully achieving the climax phase can be very challenging, especially on lands that have been disturbed or historically cultivated. Such lands are commonly infested with numerous species of introduced weeds that are aggressive in nature and propagate themselves from either a long-lasting soil seed bank or from migration from off-site.

Initial site preparation can take one to several years depending on the existing weed abundance, seed bank, and preparation method. Proper control of weeds cannot be understated, as planting failure resulting from weed competition is common. It is crucial to understand the weeds present at a site, their abundance or density and the likelihood of an underground seed bank. Obtaining adequate weed control takes time and effort. In some cases, two years of is necessary to significantly reduce long term competition (note: if using chemical fallow, do not till your site after you have begun weed eradication or you will bring up buried weed seed). However, for smaller areas (< 1acre), solarization is an extremely effective site-prep method and only requires one season. In the planning phase it is important to consider how much work will be required to control the current competition as well as weed seed bank implications. One should also consider the possible secondary effects of weed control such as residual herbicide activity and increased erosion potential. Post seeding herbicide treatment options are limited, especially where forbs and shrubs are planted. University Extension weed control specialists are an excellent resource for herbicide questions.

Typical Protocols for Preparing a Seedbed Currently in Perennial Vegetation

1. Reduce existing cover
 - a. Mow, graze, shred or burn
2. Treat existing weeds with one or more of the following techniques
 - a. Chemical
 - b. Mechanical
 - c. Solarization
3. Treat emergent weeds with repeat applications as necessary
 - a. Irrigate to promote emergence if possible or wait for natural precipitation
 - b. Do not allow emerging weeds to go to flower or to drop seed
4. Repeat for 1 to 2 full seasons
5. Seed/plant fall dormant if non-irrigated or during spring/summer if irrigation is available

It is important to remember that these are starting recommendations. Each site is different and may require variations to this starter recommendation. The bottom-line message is that competition needs to be controlled and the seedbed must be in the best condition possible to facilitate seed germination and establishment.

Seed Mixes

Butterfly habitat should include a diverse mixture of well-adapted forbs, particularly those that will provide nectar for adult butterflies as well as milkweed and violet species for reproduction. The floral mixture should be created to ensure that plants are flowering throughout the period in which butterflies could be in the area; May through October for monarchs, and July through September for Great Basin Silverspot. A small percentage of bunch grass seed should also be included in the mix for site stability and nesting habitat for other native insects. Idaho Plant Materials [Technical Note 2A: Plants for Pollinators in the Intermountain West](#) and [Technical Note 2C: Plant Materials for Pollinators and Other Beneficial Insects in Eastern Utah and Western Colorado](#), provide detailed instructions on seed mix development for general pollinator habitat.

For Utah NRCS funded monarch habitat there are additional recommendations listed below.

- All projects should be at 7,000 feet elevation or less. Additional core and facilitative practices are located on page 7 of the PNW Monarch Habitat Evaluation Guide.
- Monarch habitat projects must use the most recent PNW Monarch Habitat Evaluation Guide and supporting documentation located on the Utah Sharepoint site under Technical Services_Biology_Monarch folder.
- The planned cumulative score on the Habitat Evaluation Guide should be “Good” to meet planning criteria AND neither the breeding nor nectaring score can be less than “Good” to meet planning criteria.
- Management activities should correspond to the Western Monarch Management Window identified on the Sharepoint.
- All monarch habitat planting should include:
 - At minimum of one species of milkweed for reproductive habitat. Milkweed species planted must be either showy milkweed (*Asclepias speciosa*), spider milkweed (*A. asperula*), whorled milkweed (*A. subverticillata*), butterflyweed (*A. tuberosa*), or swamp milkweed (*A. incarnata*). Species selected should be identified on the Western Monarch and Milkweed Habitat Suitability Modeling Project found in the Monarch folder on the SharePoint site. Milkweed should comprise of a minimum of 1.5% of the mix.
 - At minimum, 45% of the seed mix should include forbs or shrubs from “Good nectar providing plants for adult butterflies in Utah” (located on the SharePoint site and in the Appendix below) or identified on the Xerces Monarch Nectar Guide (<https://xerces.org/monarch-nectar-plants/>) appropriate for the planning area. Increased percent of nectar plants including milkweed is encouraged.
 - Three flowering species per bloom period are required for monarch and other pollinator plantings. Bloom Periods (early, mid, late season) should coincide with monarch presence, which is typically May through October in in the Colorado

Plateau and Great Basin portions of UT, March through November in Washington Co. Utah.

- Grasses and grass-like species should not comprise of more than 25% of seed mix. A grass component of the mix is important to provide ecological stability, competition for undesirable plants, and create fuel continuity for prescribed burning. An example of a seeding recommendation is posted on the Sharepoint site.

Seed can be planted either with a drill seeder or by broadcast seeding. Most of the forb species native to the Intermountain West are very small seeded with weak seedling vigor and should be planted near the surface. Drill seeding should be very shallow, no more than ¼ inch. Broadcast seeding followed by a light harrowing and packing with a roller is very effective.

Successfully establishing milkweed as a component of a larger seed mix can be challenging. Supplementing the seeding with milkweed rhizomes or containerized plants can help ensure adequate establishment. To achieve a target density of 2,000 milkweed stems per acre, planting 400 to 500 rhizomes or plants is recommended. Concentrating milkweed plantings into groups or islands can make it easier to provide special management or irrigation during the establishment period if needed.

If the site can be irrigated, the planting can occur practically any time during the growing season provided there is enough time (6 to 8 weeks) for sufficient establishment before going into winter. Planting during extremely hot spells should also be avoided. If no irrigation is available, the seeding should be done late in the fall as a dormant seeding. This is generally after about the middle of October in most of Utah. Also, if there are plant species in the mix with seed dormancy issues or a stratification requirement, it may be best to use a fall-dormant planting. See the FOTG or [Plant Materials TN 24: Conservation Plant Species for the Intermountain West](#) for specific dates by MLRA for NRCS programs.

Depending on weed pressure, it may be advisable to mow the site one or more times during the growing season of the establishment year. This can be used to prevent competing annual weeds from setting seed; however, if there are annual forbs in the seed mix (e.g. sunflower or beeplant) mowing will likely prevent them from successfully flowering as well.

Management

With proper species selection and adequate management, monarch and other pollinator friendly habitat can be functional and aesthetically attractive for many years, eventually becoming self-sustaining. However, **inputs will be required** for a successful pollinator habitat project. Pollinator habitat requires two things to remain healthy and attractive. The first is annual residue removal, and the second is on-going spot weed control.

Fall or early spring mowing or grazing is the best option for removing dead foliage and for keeping the area neat. Mow or graze to a height of 4 to 6 inches late in the fall when all plants

have finished dispersing seed or leave standing residue over winter for wildlife habitat and mow again early in the spring.

Grazing Considerations

- Collect detailed inventory and analysis – species composition, production, cover, invasive species, infrastructure, livestock type and number, management skill of the operator.
- Identify period of use and reproductive stage of monarchs in your area – This can help with timing and intensity of grazing to optimize suitable conditions for reproduction and feeding. In most of UT, management windows when Monarchs are not breeding would be between Sept 31 and May 1 or Oct 31 and May 1. For more information see: <https://xerces.org/2018/04/30/managing-for-monarchs-in-the-west-a-new-guide-to-protecting-the-monarch-butterfly-from-the-pacific-to-the-rockies/>.
- Manage grazing periods to facilitate increased diversity and increase health and vigor of the vegetation. Varying stocking rates, residual material, recovery times, and species of grazing animals can alter composition of pastures. Milkweed responds to disturbance by releasing new tillers, and many pollinator plants are early successional species that take advantage of disturbance.
- Monitor.... Monitor.... Monitor – Monitor changes in composition, timing of butterfly use, animal health, pasture condition or range health. The purpose of monitoring is to identify if current management is meeting the landowner objectives. Make adjustments to plans as necessary.
- Consider additional plantings or reseeding to increase diversity and abundance of milkweeds and desirable nectar plants.

Even after significant effort to reduce weeds prior to seeding, some weeds will inevitably find their way back into the site. Annual weeds such as prickly lettuce, mustards, and cheatgrass will likely spread into the habitat. These weeds can be controlled by hand-pulling or roguing. Persistent perennial weeds such as Canada thistle, knapweeds, and a few others will re-establish over time. No chemical controls are available to broadcast over the site to prevent broadleaf weeds without damaging some of the desired species, so these should be controlled by digging out the invading plants or spot spraying with glyphosate. Additionally, managing habitat edges is very important in mitigating encroachment of un-wanted species into the area.

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Good nectar providing plants for adult butterflies in Utah.

Latin Name	Common Name	Life Span	Flower Color	Plant Form	Bloom Period	Precip. Range (in)
<i>Achillea millefolium</i>	common yarrow	P	white	Forb	May-Jul	8-60
<i>Agastache urticifolia</i>	nettleleaf giant hyssop	P	white/purple	Forb	Jun-Jul	18-36
<i>Amelanchier alnifolia</i>	Saksatoon serviceberry	P	white	Shrub	May-Jun	12-60
<i>Amelanchier utahensis</i>	Utah serviceberry	P	white	Shrub	May-Jun	12-40
<i>Anaphallis margaritaceae</i>	pearly everlasting	P	white	Forb	May-Jul	10-35
<i>Asclepias asperula</i>	spider milkweed	P	green/purple	Forb	Jun-Jul	7-12
<i>Asclepias incarnata</i>	swamp milkweed	P	pink	Forb	Jul-Sep	15-40
<i>Asclepias speciosa</i>	showy milkweed	P	pink/white	Forb	May-Aug	16-30
<i>Asclepias subverticillata</i>	horsetail milkweed	P	white	Forb	Jul-Aug	8-20
<i>Asclepias tuberosa</i>	butterfly milkweed	P	orange	Forb	Jun-Aug	20-40
<i>Baccharis salicifolia</i>	mule-fat	P	white	Shrub	Apr-May	10-18
<i>Baccharis salicina</i>	willow baccharis	P	white	Shrub	Apr-May	10-18
<i>Baileya multiradiata</i>	desert marigold	P	yellow	Forb	Mar-May	4-15
<i>Balsamorhiza hookeri</i>	Hooker's balsamroot	P	yellow	Forb	Apr-Jun	10-25
<i>Balsamorhiza macrophylla</i>	cutleaf balsamaroot	P	yellow	Forb	Apr-Jun	10-25
<i>Balsamorhiza sagittata</i>	arrowleaf balsamroot	P	yellow	Forb	Apr-Jun	10-25
<i>Chaenactis douglassii</i>	Douglas' dustymaiden	P	white	Forb	May-Jun	12-25
<i>Chamaebateria millefolium</i>	fern bush	P	white	Shrub	May-Aug	16-60
<i>Chilopsis linearis</i>	desert willow	P	pink	Shrub	Apr-May	6-25
<i>Chrysothamnus viscidiflorus</i>	yellow rabbitbrush	P	yellow	Shrub	Jun-Oct	7-24
<i>Cirsium arizonica</i>	Arizona thistle	P	red	Forb	Jul-Aug	10-24
<i>Cirsium undulatum</i>	wavyleaf thistle	B/P	pink	Forb	Jun-Jul	6-40
<i>Cleome lutea</i>	yellow spiderflower	A	yellow	Forb	May-Jun	8-12
<i>Cleome serrulata</i>	Rocky Mountain beeplant	A	purple	Forb	Jul-Sep	13-20
<i>Crepis acuminata</i>	tapertip hawksbeard	P	yellow	Forb	May-Jul	8-20

Latin Name	Common Name	Life Span	Flower Color	Plant Form	Bloom Period	Precip. Range (in)
<i>Crepis occidentalis</i>	largeflower hawksbeard	P	yellow	Forb	May-Jul	12-20
<i>Crepis runcinata</i>	fiddleleaf hawksbeard	P	yellow	Forb	May-Jul	18-30
<i>Dalea candida</i>	white prairie clover	P	white	Forb	Jun-Aug	10-20
<i>Encelia frutescens</i>	button brittlebush	P	yellow	Shrub	Apr-Sep	4-15
<i>Encelia farinosa</i>	brittlebush	P	yellow	Shrub	Mar-May	5-10
<i>Ericameria (Chrysothamnus) nauseosa</i>	Rubber rabbitbrush	P	yellow	Shrub	Aug-Oct	7-16
<i>Erigeron pumilus</i>	shaggy fleabane	P	blue	Forb	May-Jun	8-16
<i>Erigeron speciosus</i>	aspen fleabane	P	blue	Forb	Jul-Sep	16-25
<i>Eriogonum corymbosum</i>	crispleaf buckwheat	P	cream	Forb/subshrub	Jul-Sep	8-25
<i>Eriogonum heracleoides</i>	parsnipflower buckwheat	P	cream	Forb/subshrub	Jun-Jul	12-25
<i>Eriogonum umbellatum</i>	sulphur-flower buckwheat	P	yellow	Forb/subshrub	Jun-Aug	8-18
<i>Eurybia (Aster) glauca</i>	gray aster	P	white/blue	Forb	Jun-Aug	12-20
<i>Euthamia occidentalis</i>	western goldentop	P	yellow	Forb	Sep-Nov	16-32
<i>Gaillardia aristata</i>	blanketflower	P	yellow/red	Forb	Jul-Sep	12-18
<i>Gaillardia flava</i>	yellow blanketflower	P	yellow	Forb	May-Sep	10-20
<i>Geranium richardsonii</i>	Richardson's geranium	P	pink	Forb	Jun-Jul	14-30
<i>Geranium viscosissimum</i>	sticky purple geranium	P	pink	Forb	Jun-Jul	14-30
<i>Grindelia squarrosa</i>	curlycup gumweed	B	yellow	Forb	Jul-Oct	8-20
<i>Hedysarum boreale</i>	Utah sweetvetch	P	purple	Forb	May-Jul	12-18
<i>Helianthella uniflora</i>	oneflower sunflower	P	yellow	Forb	Jun-Aug	16-35
<i>Helianthus annuus</i>	annual sunflower	A	yellow	Forb	Jul-Sep	8-15
<i>Helianthus petiolaris</i>	prairie sunflower	A	yellow	Forb	May-Sep	8-20
<i>Heliomeris multiflora</i>	showy goldeneye	P	yellow	Forb	Jul-Sep	18-25
<i>Heterotheca (Chrysopsis) villosa</i>	hairy false goldenaster	P	yellow	Forb	Jun-Aug	12-25
<i>Lathyrus pauciflorus</i>	fewflower pea	P	purple	Forb	Jun-Jul	16-20
<i>Linum lewisii</i>	Lewis flax	P	blue	Forb	May-Jul	8-20
<i>Linum perrene</i>	blue flax	P	blue	Forb	May-Jul	10-20

Latin Name	Common Name	Life Span	Flower Color	Plant Form	Bloom Period	Precip. Range (in)
<i>Lobelia cardinalis</i>	cardinalflower	P	red	Forb	Jul-Aug	25-60
<i>Lomatium dissectum</i>	fernleaf biscuitroot	P	yellow	Forb	Apr-Jul	14-30
<i>Lomatium triternatum</i>	nineleaf biscuitroot	P	yellow	Forb	Apr-Jul	8-20
<i>Lupinus argenteus</i>	silvery lupine	P	blue	Forb	Jun-Jul	10-45
<i>Lupinus caudatus</i>	tailcup lupine	P	blue	Forb	Jun-Jul	20-60
<i>Lupinus sparsiflorus</i>	Coulter's lupine	A	blue	Forb	Feb-May	4-15
<i>Machaeranthera canescens</i>	hoary tansyaster	P	blue	Forb	Jul-Oct	8-60
<i>Machaeranthera tanacetifolia</i>	tansyleaf tansyaster	A/B	blue	Forb	May-Oct	16-24
<i>Monarda fistulosa</i>	wild bergamot	P	purple	Forb	Jun-Jul	20-60
<i>Monarda pectinata</i>	pony beebalm	A	purple	Forb	Jul-Aug	8-20
<i>Monardella odoratissima</i>	mountain monardella	P	purple	Forb	Jun-Aug	16-25
<i>Oenothera caespitosa</i>	tufted evening primrose	P	white/pink	Forb	Apr-May	7-40
<i>Oenothera elata</i>	Hooker's evening primrose	B/P	yellow	Forb	Jul-Aug	10-25
<i>Oenothera pallida</i>	pale evening primrose	B/P	white/pink	Forb	May-Jun	8-18
<i>Penstemon angustifolius</i>	broadbeard beardtongue	P	blue	Forb	May-Jun	9-35
<i>Penstemon barbatus</i>	beardlip penstemon	P	red	Forb	May-Aug	8-15
<i>Penstemon cyananthus</i>	Wasatch beardtongue	P	blue	Forb	Jun-Jul	16-35
<i>Penstemon cyanocaulis</i>	bluestem beardtongue	P	blue	Forb	Jun-Aug	20-45
<i>Penstemon eatonii</i>	firecracker penstemon	P	red	Forb	May-Jun	10-20
<i>Penstemon pachyphyllus</i>	thickleaf beardtongue	P	blue	Forb	Jun-Jul	6-25
<i>Penstemon palmeri</i>	Palmer's penstemon	P	pink	Forb	May-Jun	10-16
<i>Penstemon rydbergii</i>	Rydberg's penstemon	P	purple	Forb	Jun-Aug	20-30
<i>Penstemon speciosus</i>	royal penstemon	P	blue	Forb	Jul-Aug	12-18
<i>Penstemon strictus</i>	Rocky Mountain penstemon	P	purple	Forb	Jul-Aug	14-26
<i>Penstemon whippleanus</i>	Whipple's penstemon	P	purple	Forb	Jul-Aug	13-35
<i>Peraphyllum ramosissimum</i>	wild crabapple	P	white	Shrub	May-Jun	12-25
<i>Phacelia hastata</i>	silverleaf phacelia	P	purple	Forb	Jun-Jul	10-18

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<i>Phacelia sericea</i>	silky phacelia	P	purple	Forb	Jun-Jul	15-60
<i>Potentilla arguta</i>	tall cinquefoil	P	yellow	Forb	May-Jun	10-50
<i>Potentilla (Dasiphora) fruticosa</i>	shrubby cinquefoil	P	yellow	Shrub	May-Jun	18-25
<i>Potentilla glandulosa</i>	sticky cinquefoil	P	yellow	Forb	Jun-Jul	8-35
<i>Potentilla gracilis</i>	slender cinquefoil	P	yellow	Forb	Jun-Jul	20-60
<i>Prunus virginiana</i>	chokecherry	P	white	Shrub/tree	Apr-May	16-60
<i>Purshia mexicana</i>	Mexican cliffrose	P	yellow	Shrub	Jun-Jul	7-10
<i>Purshia tridentata</i>	antelope bitterbrush	P	yellow	Shrub	May-Jun	8-20
<i>Ratibida columnifera</i>	prairie coneflower	P	yellow	Forb	Jun-Aug	16-40
<i>Ribes aureum</i>	golden currant	P	yellow	Shrub/tree	Apr-May	12-20
<i>Ribes cereum</i>	wax currant	P	pink	Shrub/tree	May-Jun	13-35
<i>Rosa woodsii</i>	Wood's rose	P	pink	Shrub	Jun-Jul	12-40
<i>Rudebeckia hirta</i>	blackeyed Susan	P	yellow	Forb	Jun-Jul	16-25
<i>Rudbeckia occidentalis</i>	western coneflower	P	black	Forb	Jun-Jul	16-40
<i>Salix spp.</i>	willow	P	cream/yellow	Tree	Apr-Jul	18-40
<i>Senecio multilobatus</i>	multilobed groundsel	B	yellow	Forb	May-Jun	8-16
<i>Solidago canadensis</i>	Canada goldenrod	P	yellow	Forb	Jul-Oct	16-40
<i>Sphaeralcea ambigua</i>	desert globemallow	P	orange	Forb	May-Jun	5-15
<i>Sphaeralcea coccinea</i>	scarlet globemallow	P	orange	Forb	May-Jun	6-35
<i>Sphaeralcea grossularifolia</i>	gooseberryleaf globemallow	P	orange	Forb	May-Jun	7-14
<i>Sphaeralcea parvifolia</i>	small-leaf globemallow	P	orange	Forb	May-Jun	5-15
<i>Symphyotrichum (Aster) ascendens</i>	western aster	P	blue	Forb	Jul-Sep	14-16
<i>Symphyotrichum (Aster) eatonii</i>	Eaton's aster	P	purple/white	Forb	Aug-Sep	13-25
<i>Thermopsis montana</i>	mountain goldenbanner	P	yellow	Forb	May-Jul	15-40
<i>Vanclevea (Chrysothamnus) stylosa</i>	pillar false gumweed	P	yellow	Shrub	Jun-Oct	8-15
<i>Verbena goodingii</i>	southwestern mock vervain	P	purple	Forb	Apr-May	6-15

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<i>Verbena hastata</i>	swamp verbena	P	purple	Forb	Jul-Sep	10-25
<i>Verbesina encelioides</i>	golden crownbeard	A	yellow	Forb	Jun-Jul	10-20
<i>Vicia americana</i>	American vetch	P	purple	Forb	May-Jun	9-50
<i>Viola adunca</i>	Kirk's violet	P	purple	Forb	May-Jul	14-45
<i>Viola nephrophylla</i>	northern bog violet	P	purple	Forb	May-Jun	12-60
<i>Viola purpurea</i>	goosefoot violet	P	yellow	Forb	May-Jul	15-45
<i>Wyethia amplexicaulis</i>	mule-ears	P	yellow	Forb	May-Jun	12-20
<i>Wyethia scabra</i>	badlands mule-ears	P	yellow	Forb	May-Jun	6-10

This list was developed in collaboration with Xerces Society and is not exhaustive. Please work with your local NRCS Field Office or Plant Material Center to determine the species composition that is best adapted to your area or visit <http://xerces.org/monarch-nectar-plants/>.