

IDAHO BIOLOGY TECHNICAL NOTE: 36

PACIFIC NORTHWEST (PNW) MONARCH BUTTERFLY WILDLIFE HABITAT EVALUATION GUIDE (WHEG)

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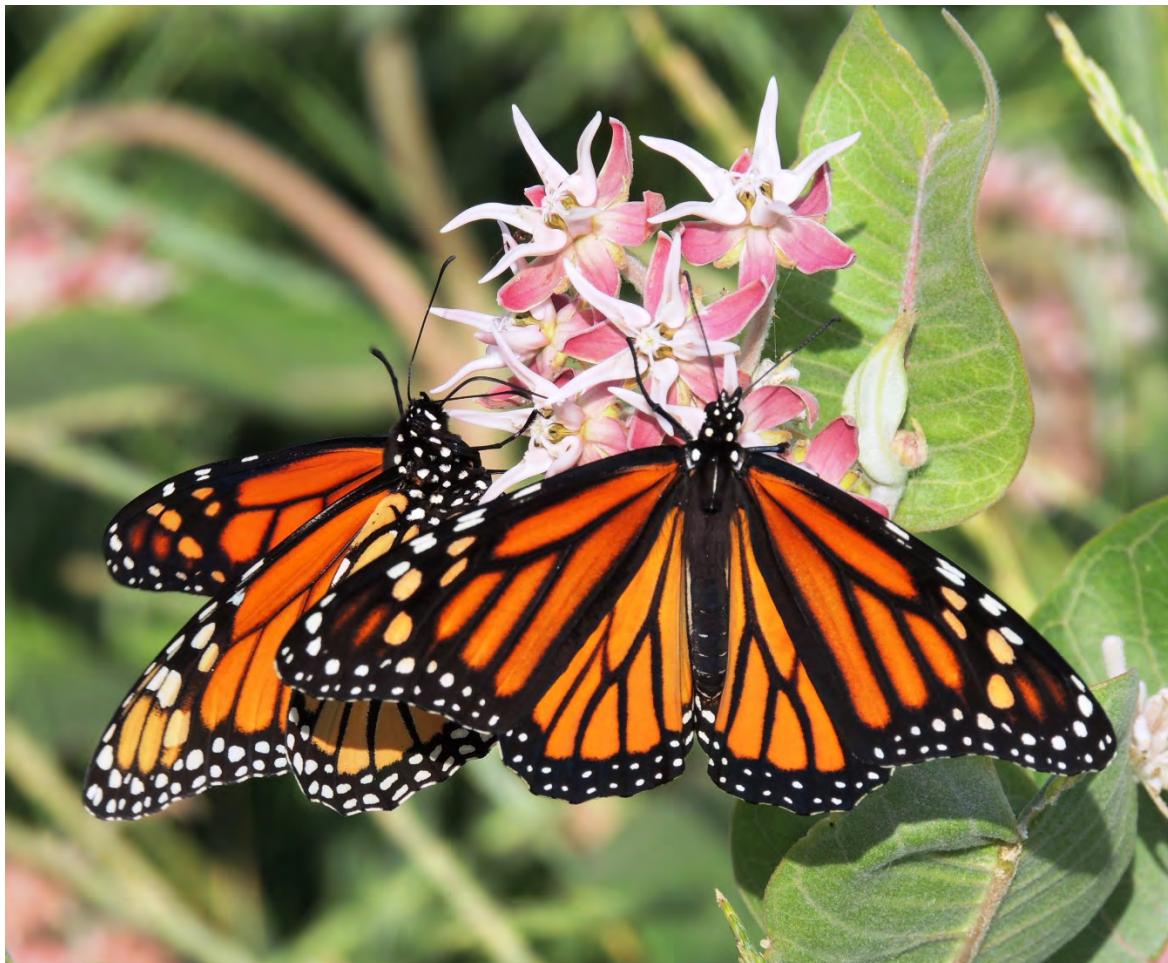


Photo Credit: Idaho Department of Fish and Game

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USDA NRCS MONARCH BUTTERFLY WILDLIFE HABITAT EVALUATION GUIDE AND DECISION SUPPORT TOOL: *PACIFIC NORTHWEST U.S. EDITION*

INTRODUCTION

Monarch Butterfly and Habitat

The western U.S. population of the monarch butterfly (*Danaus plexippus*) has suffered significant declines of over 95% between the 1980s and 2017 ([Schultz et al. 2017](#)). Then, between 2017 and 2018 alone, scientists documented an additional 86% drop in the California overwintering population. Only about 28,000 monarch butterflies were counted in the winter of 2018-19, down from the millions of monarchs that used to overwinter along the California coast.

NRCS is targeting a habitat development effort within the primary areas of breeding and migration for this western monarch population in the hopes that we can revive and sustain the butterflies that migrate from the California coast to Idaho, eastern Washington, eastern and southwest Oregon, southern British Columbia, and even western Montana. For general information on the monarch butterfly, staff are encouraged to read the document titled *NRCS Monarch Butterfly Habitat Development Project* ([NRCS 2015](#)), and for specific details on the status and annual migratory cycle of the western monarch butterfly see [Jepsen et al 2015](#) and [Schultz et al. 2017](#) or visit <https://xerces.org/save-western-monarchs/>.

Monarch butterflies rely on milkweed species for successful reproduction and nectaring, and on appropriate nectar-rich forbs, shrubs and trees to feed adult butterflies. Any monarch butterfly habitat assessment, therefore, must target the milkweed and nectar source component, as well as risks from adjacent or on-site pesticide use. Because well designed or managed monarch habitat requires floral diversity, protection from pesticide (especially insecticide) exposure, and appropriate timing and intensity of any disturbance (e.g. from grazing), NRCS conservation practices implemented to benefit the monarch will typically benefit other pollinators and wildlife species that occupy periodically disturbed mid-successional (seral plant community stage) habitats.

Evaluating Monarch Habitat

Most NRCS wildlife habitat evaluation guides (WHEGs) determine the quality of habitat at the farm/ranch scale (cumulative score for entire project area) where the objective is a resource management system (NRCS 2013). These WHEGs identify the most limiting factor for a species of wildlife and take into account the proximity to and interrelationships with adjacent habitats. This approach is particularly appropriate for resident species with limited mobility, distribution and home ranges.

The monarch butterfly, however, is a migratory species that uses habitat resources across a wide area in a single season (e.g., Zalucki et al. 2016). When not migrating, the movement of individual monarchs is not well understood; however, monarchs are very strong fliers and they appear to move long distances to acquire life necessities (Brower 1995, Brower et. al 2011). Accordingly, this guide is narrowly applied to only those portions of the agricultural operation under consideration for monarch habitat improvement, and does not consider connectivity to, or interactions with other habitats.

Outside of protecting monarch overwintering sites along the California coast, maintaining and expanding breeding and nectaring habitat availability, as well as helping to minimize risks of insecticide exposure, are likely some of the limiting factors for monarchs in the West (Jepsen et al. 2015). This habitat must include an abundance of both the monarch caterpillar's milkweed host plants and appropriate nectar plants to fuel adult flight. Therefore, this Monarch Butterfly WHEG identifies and considers milkweed and nectar plants as the most critical habitat components, while also assessing the risk to the habitat posed by insecticides and herbicides used on or adjacent to the assessment area.

In the case of the Pacific Northwest, research demonstrates that a significant percentage of butterflies that overwinter in California are coming from Idaho, western Montana, and eastern Washington and Oregon (Yang et al 2015). Therefore, taking action to protect and expand monarch breeding habitat in this region is important for sustaining the western monarch population and helping to send more butterflies back to California for the winter.

Planting Monarch Habitat

Monarch habitat plantings will include at least one species of native milkweed (*Asclepias* spp). Milkweeds can be planted as plugs or rhizomes (if available) to achieve the 500 stems per acre. Establishing milkweed from planting seeds has had limited success in the west. If trying to establish milkweed from seed, milkweed seeds should be at least 1.5% of the total seeds in the mix. The total seeds include pure live seed (PLS) from both grasses and forbs. At least 60% of the forb seeds PLS in the mix should come from the Conservation Planning Monarch Nectar Plants (Appendix B) to provide nectaring habitat. Milkweed seeds can be used in meeting the 60% minimum because milkweeds are excellent nectaring plants. Monarchs can be present in Idaho May through September, therefore, three nectaring species per bloom period (spring, summer and fall) is required. Use the following publications to determine bloom period: Plant Materials Technical No. 2A Plants for Pollinators in the Intermountain West, Good Nectar Providing Plants for Conservation Planning to Benefit Adult Monarch Butterflies in Idaho (Appendix B), Plant Materials Technical Note 71 Monarch Butterfly Habitat: Development and Maintenance, and the PNW Monarch Nectar Plant Profile (Appendix C). Bunch grasses may be included to improve ecological stability and weed control. Contact the State Biologist, State Range Specialist or Plant Material Center Director if attaining the three species per bloom period is unattainable for your area or if species are unavailable.

INSTRUCTIONS FOR COMPLETING THE MONARCH WHEG

Timing of the Evaluation

Conduct the evaluation during the growing season, ideally between May to September, in order to determine the amount and variety of nectaring plants and milkweed present on the assessment area.

Equipment Needed

• 100 ft tape	• Field guides to plants	• Aerial photos / maps of assessment area	• Compass
• 12 pin flags	• Clipboard	• GPS for Lat/Long	• Camera
• Yard or range stick	• Pens/pencils		• Resources for estimating cover

STEP 1: Use a copy of the conservation plan map or aerial photo to develop a project base map.

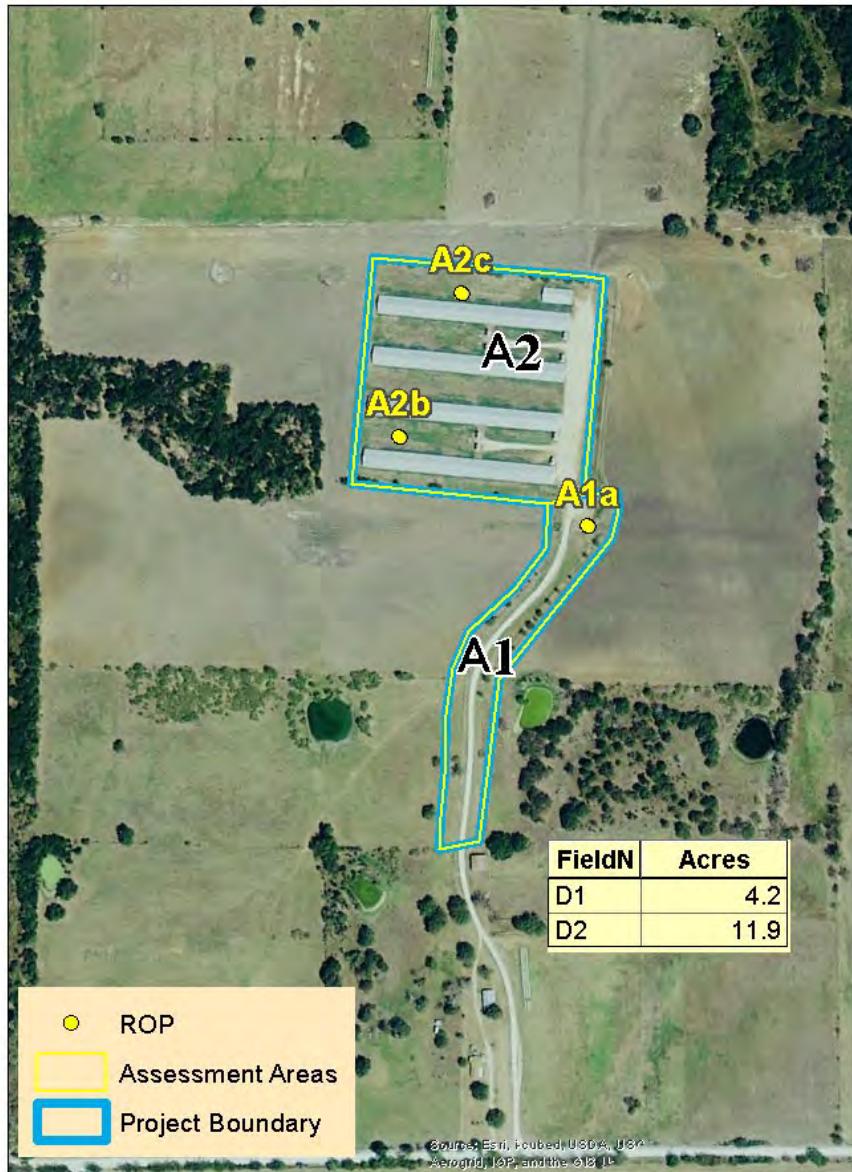
- a. Delineate the area to be evaluated on an aerial photograph. The area to be considered for monarch habitat improvements is referred as the “*project area*.” *Note: The project area may be the USDA Tract boundaries but not always. In some situations, it may be a single field or portion of field. The decision of the project area boundaries is left to the discretion of the conservation planner and decision-maker.*
- b. Delineate unique assessment areas within the project area. As appropriate, subdivide the project area into smaller, unique areas to be assessed based on consistent land type (i.e. similar ecological sites, vegetation, soils, slope, and management). These unique areas are referred to as *assessment areas* (AA). Identify and delineate each assessment area on the base map. To not conflict with Common Land Units (CLU) and USDA field numbering, choose an alphabetical notation (A, B, and C).

An assessment area need not be fully contained in a single contiguous polygon. For example, if more than one portion of the project area supports similar habitat characteristics (e.g. dense stands of *juniper* on steep slopes) then each polygon supporting these conditions will be assigned the same assessment area label. For these situations, follow a sequential numeric notation (A1, A2, A3, etc.) to denote that a group of non-contiguous areas (“sub-assessment areas” or “subareas”) have similar characteristics and will be considered as one assessment area. See Figures 1 and 2 for examples.

- c. Determine size of each area. Determine and denote the acres in each assessment area (including each subarea) on the base map.

USER NOTE: This WHEG allows the planner to rapidly screen out AAs that will not require the completion of a vegetation survey based on the plant community. For example, vegetative sampling to determine the density of milkweed and/or nectaring species has limited value in a cropland field or range dominated by cheat grass. See Step 2 for details.

Monarch Butterfly Habitat Base Map

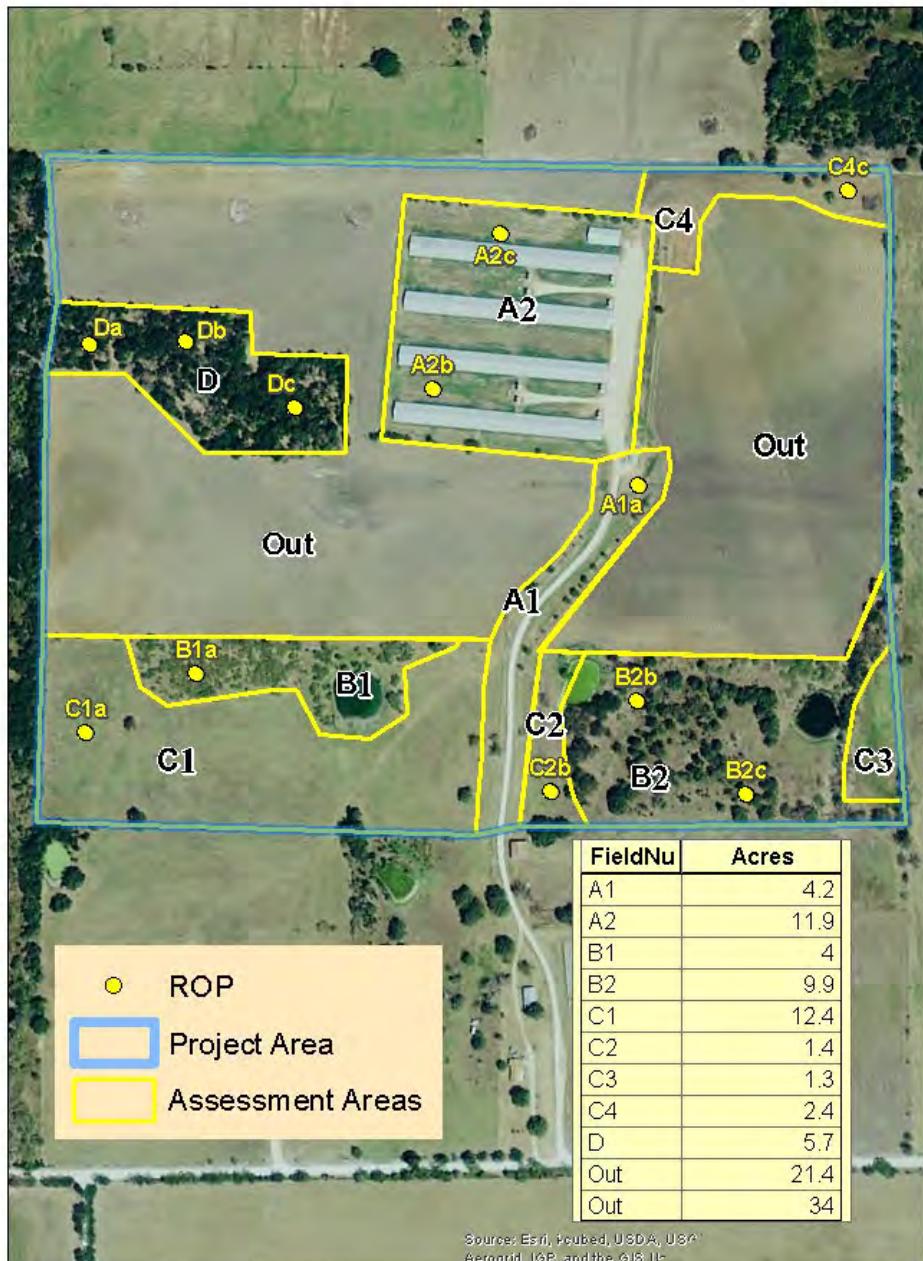


1:4,800

Map created: February 19, 2016
Central National Technology Support Center
USDA-NRCS, Fort Worth, Texas
Map No. 2016-25

Figure 1: Example of a monarch habitat development base map for a relatively simple project. Note the concept that an assessment area need not be contiguous. This assessment area (A) is divided into two subareas (A1 and A2). ROP denotes Representative Observation Point.

Monarch Butterfly Habitat Base Map



1:4,800

Map created: February 29, 2016
 Central National Technology Support Center
 USDA-NRCS, Fort Worth, Texas
 Map No. 2016-28

Figure 2: Example of a monarch habitat development base map for a complex project. Note the concept that an assessment area need not be contiguous. As an example, the open herbaceous assessment area C has four subareas (C1, C2, C3, and C4). ROP denotes Representative Observation Point.

STEP 2: Screen out low value (“Poor”) Monarch WHEG plant community types¹.

If you are able to document that the habitat is a type of cover with low value for monarchs, such as crop, intensively managed hay or pasture, or invasive species, then you can rapidly screen the assessment area as POOR without having to collect additional data. This allows you to move directly to planning quality habitat that meets the criteria of GOOD or EXCELLENT for each habitat component.

If applicable for an AA, determine if the site conditions are low-value plant community type and document the decision on the data sheet(s) for the assessment area. These low-value monarch plant communities include:

- i. CROPLAND: Any area that is being annually planted for harvest of a product.
 - A. **Document a benchmark condition rating of *poor* on the datasheet and end the assessment of benchmark habitat conditions.**
 - B. If any of the planning considerations below are an objective of the decision maker, continue to Step 4.

Alternatives and Planning Considerations (note: these are not comprehensive):

 - o Wildlife Habitat Planting (420) or Conservation Cover (327) with additional criteria to “enhance wildlife, pollinator and beneficial organism habitat,” with the monarch as the target wildlife species.
 - o Integrated Pest Management (595), with the purposes of:
 - Preventing or mitigating offsite pesticide risks to soil, water, air, plants, animals and humans from drift and volatilization losses, with the monarch being the target animal and milkweed and/or monarch nectaring forbs being the target plants. Consider drift/movement of insecticides, which includes sprays or planter dust emanating from seed treatments.
 - Preventing or mitigating on-site pesticide risks to pollinators and other beneficial species through direct contact, with monarchs being the target species.
 - The decision maker may opt to implement a *100-foot pesticide-free buffer* around the entire AA or area encompassing all implemented practices.
Note: These restrictions do not apply to pesticide applications intended to establish or maintain the AA as productive monarch breeding habitat.
- ii. INTENSIVELY MANAGED HAY or INTENSIVELY MANAGED PASTURE OR RANGE (including farmsteads and other frequently-managed OR low diversity grass stands): These areas support primarily monotypic or low diversity grass and livestock forage.
 - A. **Document a benchmark condition rating of *poor* on the datasheet and end the assessment of benchmark habitat conditions.**
 - B. If any of the planning considerations below are an objective of the decision maker, continue to Step 4.

Alternatives and Planning Considerations (note that these are not comprehensive):

 - o Wildlife habitat Planting (420), Conservation Cover (327) or Field Border (386)

¹ Monarch WHEG plant community types are related specifically to this WHEG and should not be confused with the term “landuse” in the NRCS National Conservation Planning Manual or program guidance.

with additional criteria to “enhance wildlife, pollinator and beneficial organism habitat,” with the monarch as the target wildlife species.

- Prescribed Burning (338) or Early Successional Habitat Development / Management (647) or Herbaceous Weed Control (315), if needed, will improve wildlife habitat as at least one of the purposes and the targeted habitat conditions of an increase in the forb component.
- Integrated Pest Management (595), with the purposes of:
 - Preventing or mitigating offsite pesticide risks to soil, water, air, plants, animals and humans from drift and volatilization losses, with the adult monarch and larva being the target animal, and milkweed and/or nectaring forbs, including milkweed, being the target plants. Consider drift/movement of pesticides (spray or planter dust with seed treatments).
 - Preventing or mitigating on-site pesticide risks to pollinators and other beneficial species through direct contact, with monarchs being the target species.
 - The decision maker may opt to implement a 100-foot pesticide-free buffer around the entire AA or area encompassing all implemented practices.

Note: These restrictions do not apply to pesticide applications intended to establish or maintain the AA as productive monarch breeding habitat.

iii. INVASIVE SPECIES DOMINATE: These areas support invasive woody vegetation (brush) or other invasive species at a density that eliminates milkweed and monarch nectar species. The planner and decision-maker agree that invasive species must be addressed prior to implementation of any other monarch habitat efforts. Note that some species of invasive species (e.g. some non-native thistle species) may provide abundant nectar for monarch butterfly adults. These should still be treated as low-value habitat for the purposes of this WHEG.

- A. **Document a benchmark condition rating of poor on the datasheet and end the assessment of benchmark habitat conditions.**
- B. If any of the planning considerations below are an objective of the decision maker, continue to Step 4.

Alternatives and Planning Considerations (note these are not comprehensive):

- Monarch habitat would require Herbaceous Weed Control (315) or Brush Management (314), followed by the consideration of other alternatives such as:
 - Wildlife Habitat Planting (420), Conservation Cover (327), Field Border (386), or Riparian Herbaceous Cover (390) with an additional criterion to “enhance wildlife, pollinator and beneficial organism habitat”, with the monarch as the target wildlife species. Note, that invasive species need to be under control before planting monarch habitat cover.
 - Prescribed Burning (338) or Early Successional Habitat Development / Management (647), will improve wildlife habitat as at least one of the purposes and the targeted habitat conditions of an increase in the forb component.

STEP 3: Evaluating other herbaceous plant communities

If an assessment area land type is designated as *Other Herbaceous Plant Communities*, follow instructions on the Western Monarch WHEG datasheet to determine the monarch habitat condition (see Step 4).

- i. OTHER HERBACEOUS PLANT COMMUNITIES: These areas support native and non-native grasses and may have a significant forb component. They may have past cropping or grazing history. Past cultural practices (e.g. cropping) may have changed the soil (structure, organic matter, biology) and microtopography such that the site's potential to support a rich mix of native herbaceous species is reduced. There may be some woody encroachment, but not to the level to warrant a land type of *Brush*.

STEP 4: Evaluate insecticide and herbicide risk conditions

Collect information concerning use of herbicides and insecticides by interviewing the client. Record it in the data sheet (see datasheet page 2).

STEP 5: Evaluate milkweed host plant condition

Determine the amount of milkweed present in the assessment area by conducting a .01-acre belt transect within the assessment area (see datasheet page 3). For large areas with greater variation in milkweed density, conduct three belt transects and average the results. See USDA-ARS Jornada Experimental Range Monitoring Manual for detailed instructions on conducting a belt transect.

STEP 6: Evaluate monarch nectar plant condition

Estimate the percent cover and number of different monarch nectaring plants in the assessment areas (see instructions at top of datasheet page 3, and blanks for recording data below the instructions). Use state-specific resources when available to identify nectar plants of high value to the monarch butterfly in your area.

- **Appendix A: Nectar plants for assessing monarch habitat.** This guide provides an overview and simple identification guide to key monarch nectar plants in your state. Note, that for simplicity, during the habitat evaluation process, planners are only required to look for plant genera of species known to provide nectar for monarch butterflies. However, during the habitat planning process, specific species known to be used by monarchs must be planted (see Appendix B).
- **Appendix B: Good nectar providing plants for adult monarchs.** Use this list of species when developing seeding recommendations for planned monarch habitat plantings.
- **Xerces Monarch Nectar Guides:** <https://xerces.org/monarch-nectar-plants/>

[Note: Line-point intercept can be used to actually measure nectar plant cover and diversity (richness) if that is desirable. See USDA – ARS Jornada Experimental Range Monitoring Manual for detailed instructions on conducting line point intercept.]

STEP 7: Calculate results

Enter data into the formula and determine the baseline condition (see datasheet page 3).

Develop a conservation plan for the Assessment Area (see suggested practices in the Conservation Planning Guide starting on page 4 of the datasheet). Estimate the impacts as if the planned conservation practices were applied successfully and determine the after or planned score. To meet minimum criteria, the final score needs to be excellent (>.75) **and** each habitat variable must achieve a minimum score of good (0.5).

STEP 8: Evaluate implemented condition

After the planned monarch habitat project is implemented, planners can return to project areas and use this same datasheet to evaluate and document habitat conditions to compare with the planned outcome.

RESOURCES

Nectar Plant list for completing the Pacific Northwest Wildlife Evaluation Guide (Appendix A)

Plant Material Center Technical Note 2A Plants for Pollinators in the Intermountain West and Technical Note 2B Plants for Pollinators in the Inland Northwest: [Aberdeen Plant Material Center](#)

Plant Materials Technical No. 71 Monarch Butterfly Habitat: Development and Maintenance [Aberdeen Plant Material Center](#)

Good nectar providing plants for conservation planning to benefit adult monarch butterflies in Idaho (Appendix B)

Xerces Society monarch nectar plant guides. <https://xerces.org/monarch-nectar-plants/>

Milkweed and Monarchs in the Western United States http://www.xerces.org/wp-content/uploads/2015/06/MonarchsandMilkweed-websec_May29.pdf

Milkweed guides. <http://www.xerces.org/milkweed/>

Western Monarch Milkweed Mapper. <https://www.monarchmilkweedmapper.org/>

Timing Management in Monarch Breeding Habitat <https://tinyurl.com/MonarchMgtTiming>

State of the Monarch Butterfly Overwintering Sites in California. 2016. http://www.xerces.org/wp-content/uploads/2016/07/StateOfMonarchOverwinteringSitesInCA_XercesSoc_web.pdf

Western Association of Fish and Wildlife Agencies, Monarch Working Group.

https://www.wafwa.org/committees_groups/monarch_working_group/

PNW Monarch Nectar Plant Profiles (Appendix C)

Western Association of Fish and Wildlife Agencies Western monarch butterfly conservation plan, 2019-2069. Version 1.0. [Western Monarch Butterfly Conservation Plan 2019-2069](#)

REFERENCES

ARS Monitoring Manual - <http://jornada.nmsu.edu/monit-assess/manuals/monitoring>

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Yang, L., D.M. Ostrovsky, M. Rogers, and J. Welker. 2015. Intra-population variation in the natal origins and wing morphology of overwintering western monarch butterflies (*Danaus plexippus*). *Ecography*. n/a-n/a. 10.1111/ecog.01994.

Zalucki, M. P., H. R. Parry, and J. M. Zalucki. 2016. Movement and egg laying in monarchs: to move or not to move, that is the equation. *Austral Ecology* 41(2):154-167.

Monarch Habitat Evaluation Guide: Pacific Northwest (2.0)

Client: _____	County: _____	Date: _____
Legal Description: _____	Planner: _____	
Assessment Area: _____	Acres: _____	Ecological Site(s): _____

Monarch Habitat Evaluation Guide - Rapid Assessment (screening of poor value plant communities)

Select Appropriate Monarch Plant Community Type being Assessed (Check appropriate)		Benchmark Rating	Management Alternatives
<input type="radio"/>	Cropland - Area is planted annually to produce a crop.	----	
<input type="radio"/>	Intensively managed hay - hayland that is commonly fertilized, mowed, and/or treated with herbicide with low forb richness. Grass often introduced.	----	Using habitat and scoring criteria in the remaining sections of this Monarch WHEG, conservation plan will convert all or part of AA to monarch friendly plantings using Range Planting (550), Wildlife Habitat Planting (420), Conservation Cover (327), Field Border (386), Riparian Herbaceous Buffer (390) or Upland Wildlife Habitat (645). -----and----- Complete the PESTICIDE THREATS ASSESSMENT (Pg 2)
<input type="radio"/>	Intensively managed pasture or range - grassland that is commonly fertilized, mowed, and/or treated with herbicide with low forb richness. Grass often introduced.	----	Plan Brush Management (314), consider other supporting practices and Complete the PESTICIDE THREATS ASSESSMENT (Pg 2)
<input type="radio"/>	Invasive species dominate: State or county invasive species present at a density such that monarch habitat is mostly absent.	----	Complete the PESTICIDE THREATS ASSESSMENT (Pg 2) <u>and</u> FIELD ASSESSMENT (Pg 3) to assess benchmark monarch habitat condition.
<input type="radio"/>	Other Herbaceous Community - passively managed pasture or range, ungrazed grassland, or unmanaged hayland.	----	

¹ Take photos to document the benchmark conditions.

Notes:

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1 Planned Rating of POOR or FAIR does not meet Planning Criteria, Poor <0.25, Fair = 0.25-0.49, Good = 0.50-0.74, Excellent ≥ 0.75.

Pg 1

Monarch Habitat Evaluation Guide - Pesticide Threat Assessment

Pesticides can adversely affect monarchs and monarch habitat. It is important that habitats established to attract monarchs be protected from pesticides when possible. Interview the client to assess direct and indirect (drift) threats of pesticide application and plan to mitigate against potential threats. This includes areas adjacent to monarch habitat that may not be controlled by the client.

V^{IR} Insecticide Risk	Value	Benchmark Score	Planned Score
<p>Either of the following is met:</p> <p>Any portion of the AA is treated with insecticides (including insecticidal seed treatments), OR</p> <p>If >25% of the AA is located within 100 feet of areas treated with insecticides (e.g. cropland), AND no practices are implemented for the purpose of preventing or mitigating insecticide risks to monarchs from drift to the AA that would achieve a target index score of 20 from Table 3 in TN 190-AGR-9.</p>			(Stop assessment & rate AA as "Poor" for monarchs)
<p>Both of the following are met:</p> <p>If >25% of the AA is located within 100 feet of areas treated with insecticides (e.g. cropland), AND farm management practices are implemented for the purpose of preventing or mitigating insecticide risks to monarchs from drift, using additional criteria to prevent or mitigate off-site insecticide risks to the AA, with a target index score of 20 from Table 3 in TN 190-AGR-9.</p>	0.5	<input type="radio"/>	<input type="radio"/>
<p>Both of the following are met:</p> <p>The AA meets conditions provided for a score of 0.5 (above), AND Insecticidal seed treatments are not used, or are planted only when the wind direction is carrying planting dust away from the AA.</p>	0.7	<input type="radio"/>	<input type="radio"/>
<p>The AA meets all conditions described for a score of 0.70 (above), and either of the following is implemented:</p> <p>No planting of systemic insecticidal treated seed occurs within 100 feet of the AA, OR</p> <p>Off-site drift prevention or mitigation practices and/or techniques from Table 3 of TN 190-AGR-9 are implemented to meet a target index score of at least 30.</p>	0.85	<input type="radio"/>	<input type="radio"/>
AA is > 100 feet from any area treated with insecticides, including insecticidal seed treatments.	1	<input type="radio"/>	<input type="radio"/>

V^{HR} Herbicide Risk	Value	Benchmark Score	Planned Score
AA is treated with or subject to drift from broad-spectrum herbicides	0.1	<input type="radio"/>	<input type="radio"/>
AA is treated with or subject to drift from select herbicides that do not affect milkweeds	0.5	<input type="radio"/>	<input type="radio"/>
None of the above	1	<input type="radio"/>	<input type="radio"/>

1 Poor = 0-0.24, Fair = 0.25-0.49, Good = 0.5-0.74, Excellent = 0.75-1

2 Resource Concern/Planning Criteria: if benchmark is ≥ 0.5 "NO" resource concern exists, if planning score is < 0.5 planning criteria is not ("NO") met.

Pg 2

Monarch Habitat Evaluation Guide - Field Assessment

Vegetative Survey: Locate 3 Representative Observation Points (ROP) within each Assessment Area, if size allows, and at each stretch a tape 72.6 ft. noting location of starting point and direction. Tally milkweed plants rooted within 3 ft. of each side of the tape (72.6' x 6' belt-transect). Within three 6'x 6' quadrates starting at the 10, 40 and 60 ft. marks on the tape, estimate percent cover and numbers of species of preferred monarch nectaring plants (refer to the monarch plant list).

Data Variables	R.O.P. #1			R.O.P. #2			R.O.P. #3			Aver.
Latitude/Longitude										
Compass bearing										
No Milkweed plants V^{MD}										#DIV/0!
<i>If no milkweed plants were counted in the belt transect but they are present in the Assessment Areas, check this box</i>										<input type="checkbox"/>
Quadrat Locations	10 ft.	40 ft.	60ft	10 ft.	40 ft.	60ft	10 ft.	40 ft.	60ft	
% Cover Monarch plants V^{FC}										#DIV/0!
No. Spp. Monarch plants V^{FR}										#DIV/0!

V^{MD} Average MILKWEED plants per transect	Value	Planned
No milkweeds in belt transects or observed in AA	0	<input type="radio"/>
No milkweeds within transects, but observed in AA	0.2	<input type="radio"/>
0.33 - 4 stems average for transects	0.3	<input type="radio"/>
4.1-10 stems average for transects	0.5	<input type="radio"/>
10.1-20 stems average for transects	0.75	<input type="radio"/>
20.1-40 stems average for transects	1	<input type="radio"/>

V^{FC} Average COVER of monarch nectaring forbs	Value	Planned
< 1 percent cover	0.1	<input type="radio"/>
1.0 - 4.0 percent cover	0.2	<input type="radio"/>
4.1-7.5 percent cover	0.6	<input type="radio"/>
7.6 - 10 percent cover	0.75	<input type="radio"/>
> 10 percent cover	1	<input type="radio"/>

V^{FR} Average RICHNESS (number) of monarch nectaring species observed within quadrates	Value	Planned
< 2 monarch nectaring forb species	0.1	<input type="radio"/>
2-4 monarch nectaring forb species	0.5	<input type="radio"/>
> 4 monarch nectaring forb species	1	<input type="radio"/>

Rating¹ - Poor = 0-0.24, Fair = 0.25-0.49, Good = 0.5-0.74, Excellent = 0.75-1

RC² - To meet Quality Criteria Planned Nectar and Breeding Scores ≥ 0.5 and Cumulative Score needs to be $\geq .75$

Planning Alternatives (see pg 4) A, B & D			
$Score = (V^{IR})*((V^{HR})+3*(V^{MD}))/4$			
Breeding Habitat Scores			
	Score	Rating ¹	RC ²
Benchmark Score			----
Planned Score			----
Nectaring Habitat Scores			
$Score = [(V^{IR})*((V^{HR})+3(V^{FC})+(V^{FR}))/5]$			
Planning Alternatives (see pg4): A, C & D			
	Score	Rating ¹	RC ²
Benchmark Score			----
Planned Score			----
Cumulative Habitat Scores			
$Score = ((Breeding Score)+(Nectaring Score))/2$			
	Score	Rating ¹	RC ²
Benchmark Score			----
Planned Score			----

Monarch Habitat Evaluation Guide - Conservation Planning Guide

A. Manipulate native vegetation to promote abundance of milkweed and monarch nectar plants.

1. Upland Wildlife Habitat Management (645) and/or Prescribed Grazing (528): Design wildlife management plan and/or grazing plans based on the following principles to encourage the plant cover and diversity monarchs need.
 - Collect detailed inventory and analysis: species composition, production, cover, invasive species, infrastructure, livestock type and number, and management skill of operator.
 - Identify period of use and reproductive stage of monarchs in your area (<https://tinyurl.com/MonarchMgtTiming>). This can help with scheduling the timing and intensity of management actions and/or grazing to optimize suitable conditions for monarch reproduction (milkweed) and feeding sites.
 - Manage grazing periods to facilitate increased diversity, abundance, health and vigor of milkweed and monarch nectar plants. 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 frequently changes in plant composition, timing of monarch use, animal health, pasture condition or range health. The purpose of monitoring is to identify if current management is meeting landowner objectives for livestock production and monarch habitat. Make adjustments to plans as necessary.
 - Consider plantings or reseeding to increase diversity and abundance of milkweeds and desirable nectar plants.
 - Consider use of Fence (382) to protect or manage livestock access to stands of milkweed and nectar plants, especially along riparian corridors or other sub-irrigated areas.
2. Early Successional Habitat Restoration and Management (647): Schedule light disking to encourage diversity and abundance of milkweed and monarch nectar plants. For example, light disking of milkweed stands may help increase the number of milkweed stems the following year (milkweed responds well to disturbance).
3. Forage Harvest Management (511): Time mowing or haying to set back dominate cool or warm-season grasses to encourage wildflower abundance.

B. Establish milkweed by direct seeding and/or transplanting using one or more of the following conservation practices (see Idaho PMC Tech Note 71).

1. Wildlife Habitat Planting (420) or Conservation Cover (327): Plant appropriate milkweed species adapted to site conditions.
2. Range Planting (550): Plant appropriate milkweed species adapted to site conditions.
3. Field Border (386): Select milkweed species for planting that are adapted to site conditions.
4. Riparian Herbaceous Cover (390): Plant milkweed species that are adapted to site conditions.

Pg 4

C. Establish a diverse mix of monarch nectaring plants by direct seeding or transplanting using one or more of the following conservation practices (see Idaho PMC Tech Note 71, and ID NRCS *Good Nectar Producing Plants for Monarch Conservation in Idaho*).

1. Wildlife Habitat Planting (420) or Conservation Cover (327): Plant monarch nectaring species adapted to site conditions and that are in bloom while monarchs are present in the region.
2. Range Planting (550): Plant monarch nectaring species adapted to site conditions and that are in bloom while monarchs are present in the region.
3. Field Border (386): Select monarch nectaring species for planting that are adapted to site conditions and that are in bloom while monarchs are present in the region.
4. Riparian Herbaceous Cover (390): Plant monarch nectaring species that are adapted to site conditions and that are in bloom while monarchs are present in the region.
5. Hedgerow (422): Plant hedgerows of woody and/or perennial herbaceous species that provide nectar and milkweed host plants for monarch butterflies when they are present in the region.
6. Riparian Herbaceous Cover (390): Plant monarch nectaring species that are adapted to site conditions and that are in bloom while monarchs are present in the region.

D. Increase the abundance of milkweed and monarch nectaring plants occurring within the Assessment Area and/or help release those plants that are expected to be part of the natural seedbank by using one or more of the following conservation practices:

1. Brush Management (314) or Herbaceous Weed Control (315): Brush or herbaceous weeds are currently displacing native vegetation and its removal is expected to yield gains in monarch nectaring habitat by release of dormant plants and/or the germination of plants within the seedbank. Low densities of native monarch nectar and host plants will require additional planting practices.
2. Forage Harvest Management (511): Time mowing or haying to set back dominate cool or warm-season grasses to encourage wildflower abundance.
3. Early Successional Habitat Restoration and Management (643): Create physical disturbances to encourage early successional monarch nectar species and increased abundance of milkweed.
4. Upland Wildlife Habitat (645) and/or Prescribed grazing (528): Use targeted or high intensity grazing disturbances to stimulate response from milkweed and nectaring plants. Combine with grazing strategy for operation. See additional details above (A).

OTHER:

Appendix A: Nectar Plant List for Completing the Pacific Northwest Monarch Wildlife Habitat Evaluation Guide (WHEG)								
genus	common name	life span	flower color	plant form	bloom period	species observed^	common name of species observed	
1	<i>Agastache</i> spp.	hyssop	perennial	purple/red	forb	Jun—Jul	<i>Agastache urticifolia</i>	nettleleaf giant hyssop
2	<i>Arabis</i> spp.	rockcress	perennial/biennial	purple	forb	May—Jun		
3	<i>Asclepias</i> spp.	milkweed	perennial	pink/purple/white/ yellow	forb	May—Aug	<i>A. speciosa</i> , <i>A. fascicularis</i> *, <i>A. incarnata</i> *, <i>A. cryptoceras</i> *	showy milkweed, Mexican whorled milkweed, swamp milkweed, pallid milkweed
4	<i>Aster</i> spp.	aster	perennial	purple	forb	Apr—Jun	<i>Aster alpinus</i>	alpine aster
5	<i>Ceanothus</i> spp.	ceanothus	perennial	purple/white	shrub	Apr—Jun		
6	<i>Clematis</i> spp.	clematis	perennial	white	vine	May—Jul	<i>Clematis ligusticifolia</i>	western white clamatis
7	<i>Cleome</i> spp.	spiderplant	annual	yellow	forb	May—Jun	<i>Cleome lutea</i>	yellow spiderplant
8	<i>Cleome</i> spp.	beepplant	annual	purple/pink	forb	Jul—Sep	<i>Cleome serrulata</i>	Rocky Mountain beepplant
9	<i>Coreopsis</i> spp.	tickseed	annual/biennial/perennial	yellow	forb	Aug—Oct	<i>Coreopsis tinctoria</i>	golden tickseed
10	<i>Dasiphora</i> spp.	cinquefoil	perennial	yellow	shrub	May—Jun	<i>Dasiphora fruticosa</i>	shrubby cinquefoil
11	<i>Dianthus</i> spp.	pink	annual/biennial/perennial	pink/white	forb	May—Jul		
12	<i>Ericameria</i> & <i>Chrysothamnus</i> spp.	rabbitbrush	perennial	yellow	shrub	Aug—Oct		
13	<i>Eriogonum</i> spp.	buckwheat	perennial	white/yellow	forb	Jul—Sep	<i>Eriogonum umbellatum</i>	sulphur-flower buckwheat
14	<i>Erysimum</i> spp.	wallflower	biennial/perennial	red/orange/	forb	May—Jun	<i>Erysimum capitatum</i>	sanddune wallflower
15	<i>Euthamia</i> spp.	goldentop	perennial	yellow	forb	Sep—Nov	<i>Euthamia occidentalis</i>	western goldentop
16	<i>Gaillardia</i> spp.	blanketflower	perennial	red/yellow	forb	Jul—Sep	<i>Gaillardia aristata</i>	blanketflower
17	<i>Gilia</i> spp.	gilia	annual/perennial	purple/white	forb	Jun—Aug	<i>Gilia capitata</i>	bluehead gilia
18	<i>Helianthus</i> spp.	sunflower	annual/perennial	yellow/brown	forb	Jul—Sep	<i>H. annuus</i> , <i>H. maximiliani</i> , <i>H. nuttallii</i>	common sunflower, Maximilian sunflower, Nuttall's sunflower
19	<i>Heracleum</i> spp.	cowparsnip	perennial	white	forb	Jun—Jul	<i>Heracleum maximum</i>	cowparsnip
20	<i>Ipomopsis</i> spp.	gilia	biennial/perennial	red	forb	May—Jun	<i>Ipomopsis aggregata</i>	scarlet gilia
21	<i>Machaeranthera</i> spp.	tansyaster	annual/biennial/perennial	purple	forb	July—Sep	<i>Machaeranthera canescens</i>	hoary tansyaster
22	<i>Mertensia</i> spp.	bluebells	perennial	blue	forb	May—Jun	<i>Mertensia ciliata</i>	tall fringed bluebells
23	<i>Monardella</i> spp.	monardella	perennial	white/blue/purple	forb	Jun—Aug	<i>Monardella odoratissima</i>	mountain monardella
24	<i>Penstemon</i> spp.	penstemon	perennial	blue	forb	Jul—Aug	<i>Penstemon speciosus</i>	royal penstemon
25	<i>Prunus</i> spp.	chokecherry	perennial	white	shrub/tree	Apr—May	<i>Prunus virginiana</i>	chokecherry
26	<i>Rosa</i> spp.	rose	perennial	pink	shrub	Jun—Jul	<i>Rosa woodsii</i>	Woods' rose
27	<i>Rudbeckia</i> spp.	coneflower	perennial	yellow/green	forb	Jun—Jul		
28	<i>Salix</i> spp.	willow	perennial	yellow/purple	shrub/tree	Jan—Jun		
29	<i>Salvia</i> spp.	sage	perennial	blue/purple	shrub	May—Jun	<i>Salvia dorrii</i>	purple sage
30	<i>Scabiosa</i> spp.	pincushions	biennial/perennial	white/yellow	forb	May—Aug	<i>Scabiosa ochroleuca</i>	cream pincushions
31	<i>Solidago</i> spp.	goldentop	perennial	yellow	forb	Jul—Oct		
32	<i>Sphaeralcea</i> spp.	globemallow	perennial	orange	forb	Apr—Jun		
33	<i>Sympphyotrichum</i> spp.	aster	perennial	white/pink/purple	forb	Jul—Sep		
34	<i>Verbena</i> spp.	verbena	annual/biennial, perennial	white/purple	forb	Jul—Sep	<i>Verbena stricta</i>	verbena

*Some of these species listed are toxic to livestock

^ species observed column are species within the genus that have documented Monarch use in Idaho or surrounding areas

This list was developed in collaboration with The Xerces Society to be Idaho specific and is not exhaustive. Additional nectar producing species for your region can be found on The Xerces Society website: <https://xerces.org/monarch-nectar-plants/>

USDA, NRCS. 2017. The PLANTS Database (<http://plants.usda.gov> 21 November 2017). National Plant Data Team, Greensboro, NC 27401-4901 USA.

Appendix B Good Nectar Providing Plants for Conservation

Planning to Benefit Adult Monarch Butterflies in Idaho

Latin Name	Common Name	Life Span	Flower Color	Plant Form	Bloom Period	precip
<i>Agastache urticifolia</i>	nettleleaf giant hyssop	perennial	purple/red	forb	Jun—Jul	18-36
<i>Arabis and Boechera spp.</i>	rockcress	annual/perennial	purple/white/pink	forb	May—Jun	10-16
<i>Asclepias speciosa</i>	showy milkweed	perennial	pink	forb	May—Aug	16-30
<i>Asclepias fascicularis*</i>	Mexican whorled milkweed	perennial	pink	forb	Jun—Aug	16-30
<i>Asclepias incarnata*</i>	swamp milkweed	perennial	pink/purple/ white	forb	Jul—Sep	15-40
<i>Asclepias cryptoceras*</i>	pallid milkweed	perennial	yellow-green/purple	forb	May—Jun	8-14
<i>Aster alpinus</i>	alpine aster	perennial	purple	forb	Apr—Jun	18-36
<i>Ceanothus spp.</i>	ceanothus	perennial	purple/white	shrub	Apr—Jun	16-36
<i>Clematis ligusticifolia</i>	western white clamatis	perennial	white	vine	May—Jul	10-20
<i>Cleome lutea</i>	yellow spiderplant	annual	yellow	forb	May—Jun	8-12
<i>Cleome serrulata</i>	Rocky Mountain beeplant	annual	purple/pink	forb	Jul—Sep	13-20
<i>Coreopsis tinctoria</i>	golden tickseed	annual	yellow	forb	Aug—Oct	20-55
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	perennial	yellow	shrub	May—Jun	18-25
<i>Dianthus spp.</i>	pink	annual/ biennial/perennial	pink/white	forb	May—Jul	14-24
<i>Ericameria and Chrysothamnus spp.</i>	rabbitbrush	perennial	yellow	shrub	Aug—Oct	7-24
<i>Eriogonum umbellatum</i>	sulphur-flower buckwheat	perennial	white/yellow	forb	Jul—Sep	8-18
<i>Erysimum capitatum</i>	sanddune wallflower	biennial/ perennial	orange/yellow	forb	May—Jun	8-25
<i>Euthamia occidentalis</i>	western goldentop	perennial	yellow	forb	Sep—Nov	16-32
<i>Gaillardia aristata</i>	blanketflower	perennial	red/yellow	forb	Jul—Sep	12-18
<i>Gilia capitata</i>	bluehead gilia	annual/ perennial	purple/white	forb	Jun—Aug	12-25
<i>Helianthus annuus</i>	common sunflower	annual	yellow	forb	Jul—Sep	8-15
<i>Helianthus maximiliani</i>	Maximilian sunflower	perennial	yellow/brown	forb	Jul—Sep	18-25
<i>Heracleum maximum</i>	cowparsnip	perennial	white	forb	Jun—Jul	14-45
<i>Helianthus nuttallii</i>	Nuttall's sunflower	perennial	yellow	forb	Jul—Sep	12-20
<i>Ipomopsis aggregata</i>	scarlet gilia	biennial/ perennial	red	forb	May—Jun	10-25
<i>Machaeranthera canescens</i>	hoary tansyaster	perennial	purple	forb	July—Sep	8-15
<i>Mertensia ciliata</i>	tall fringed bluebells	perennial	blue	forb	May—Jun	18-65

<i>Monardella odoratissima</i>	mountain monardella	perennial	white/blue/ purple	forb	Jun—Aug	16-25
<i>Penstemon speciosus</i>	royal penstemon	perennial	blue	forb	Jul—Aug	12-18
<i>Prunus virginiana</i>	chokecherry	perennial	white	shrub/tree	Apr—May	16-60
<i>Rosa woodsii</i>	Woods' rose	perennial	pink	shrub	Jun—Jul	12-40
<i>Rudbeckia spp.</i>	coneflower	perennial	yellow/green	forb	Jun—Jul	16-25
<i>Salix spp.</i>	willow	perennial	yellow/purple	shrub/tree	Jan—Jun	18-40
<i>Salvia dorrii</i>	purple sage	perennial	blue/purple	shrub	May—Jun	8-14
<i>Scabiosa ochroleuca</i>	cream pincushions	biennial/	yellow/white	Forb	May-Aug	14-20
<i>Solidago spp.</i>	goldentop	perennial	yellow	forb	Jul—Oct	16-40
<i>Sphaeralcea spp.</i>	globemallow	perennial	orange	forb	Apr—Jun	7-15
<i>Symphyotrichum spp.</i>	aster	perennial	white/pink/ purple	forb	Jul—Sep	14-60
<i>Verbena hastata</i>	verbena	perennial	white/purple	forb	Jul—Sep	wet/ saturated

***Some of these species listed are toxic to livestock and should be used with caution.**

This list was developed in collaboration with The Xerces Society to be Idaho specific and is not exhaustive. Additional nectar producing species for your region can be found on The Xerces Society website: <https://xerces.org/monarch-nectar-plants/>

USDA, NRCS. 2017. The PLANTS Database (<http://plants.usda.gov> 21 November 2017). National Plant Data Team, Greensboro, NC 27401-4901 USA.

Appendix C: PNW Monarch Nectar Plant Profiles

Reference ID Plant Material Center Technical Note 2: Plants for Pollinators in the Intermountain West for other pollinator plant species information.



Nettleleaf giant hyssop. Derek Tilley, NRCS Idaho.

Agastache urticifolia, nettleleaf giant hyssop

Origin: native forb

Mature Height: 2-3 ft

Growth Rate: rapid

Growth Habit: upright

Wildlife Value: good forage; good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: lavender

Bloom: June-July

Seeding Rate: 1 lb/ac

Recommended precipitation range: 18-36 in

Life Span: perennial

Attracts: bees, butterflies, monarchs

Flowers: white-pink

Bloom: June-July

Seeding Rate: 1 lb/ac

Recommended precipitation range: 8-14 in

Life Span: annual, biennial, perennial



Applewood Seed Co. Used with permission.

Arabis spp, rockcress

Origin: introduced forb

Mature Height: 0.5-1 ft

Growth Rate: rapid

Growth Habit: upright-spreading

Wildlife Value: good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: white-pink

Bloom: June-July

Seeding Rate: 1 lb/ac

Recommended precipitation range: 14-25

Life Span: annual, biennial, perennial



Arabis drummondii. Photo by Barry Breckling.

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Arabis spp, rockcress

Origin: native forb

Mature Height: 2-3 ft

Growth Rate: rapid

Growth Habit: upright

Wildlife Value: good nectar plant



USDI-BLM. Courtesy of PLANTS Database.

Asclepias fascicularis, Narrow-leaved milkweed

Origin: native forb

Mature Height: 3-4 ft

Growth Rate: moderate

Growth Habit: upright

Wildlife Value: good nectar plant; **can be toxic to livestock**

Attracts: bees, butterflies, monarchs; larval host plant for the monarch

Flowers: white-pink

Bloom: June-August

Seeding Rate: 17 lb/ac

Recommended precipitation range: 16-30 in

Life Span: perennial



Swamp milkweed Derek Tilley, NRCS Idaho.

Asclepias incarnata, swamp milkweed

Origin: native forb

Mature Height: 3-4 ft

Growth Rate: moderate

Growth Habit: upright

Wildlife Value: good nectar plant; **can be toxic to livestock**

Attracts: bees, butterflies, monarchs; larval host plant for the monarch

Flowers: pink

Bloom: July-September

Seeding Rate: 15 lb/ac

Recommended precipitation range: 15-40 in

Life Span: perennial



Showy milkweed. Derek Tilley, NRCS Idaho

Asclepias speciosa, showy milkweed

Origin: native forb

Mature Height: 2-3 ft

Growth Rate: moderate

Growth Habit: upright

Wildlife Value: good nectar plant; **can be toxic to livestock**

Attracts: bees, butterflies, monarchs; larval host plant for the monarch (*Danaus plexippus*) and the queen butterflies

Flowers: pink

Bloom: May-July

Seeding Rate: 8 lb/ac

Recommended precipitation range: 16-30 in

Life Span: perennial



Butterfly milkweed, J.S. Peterson @ PLANTS Database

Asclepias tuberosa, butterfly milkweed

Origin: native forb

Mature Height: 1-3 ft

Growth Rate: rapid

Growth Habit: upright

Wildlife Value: good nectar plant; **can be toxic to**

livestock

Attracts: butterflies, monarchs
Flowers: orange
Bloom: July-August
Seeding Rate: 15 lb/ac
Recommended precipitation range: 28-45 in
Life Span: perennial



Aster. G.A. Cooper @ PLANTS Database
Aster spp. and Symphytum spp., Aster
Origin: native forb
Mature Height: 0.5-3 ft
Growth Rate: moderate
Growth Habit: upright
Wildlife Value: excellent food/cover; good nectar plant
Attracts: bees, butterflies, monarch; larval host plant for field crescent (*Phyciodes pulchellus camilla*) and northern crescent (*Phyciodes cocyta*) butterflies
Flowers: creamy white to purple
Bloom: June-September
Seeding Rate: 1 lb/ac
Recommended precipitation range: 14-60 in
Life Span: perennial



Alfred Brousseau @ PLANTS Database
Ceanothus spp., Ceanothus
Origin: native shrub
Mature Height: 2-9 ft
Growth Rate: moderate
Growth Habit: upright

Wildlife Value: excellent browse; berries and seeds for birds; good nectar plant
Attracts: bees, butterflies, monarch
Flowers: white
Bloom: June-July
Seeding Rate: NA
Recommended precipitation range: 14-40 in
Life Span: perennial



Clematis. Tim Dring, NRCS Washington
Clematis ligusticifolia, clematis
Origin: native shrub or vine
Mature Height: 1 ft
Growth Rate: moderate
Growth Habit: spreading and climbing vine
Wildlife Value: cover; good nectar plant
Attracts: moths, bees, butterflies, monarchs
Flowers: white
Bloom: May-July
In-row Spacing: 2-6 ft
Recommended precipitation range: 10-20 in
Life Span: perennial



Yellow beeflower. Idaho Dept. of Transportation
Cleome lutea, Yellow beeflower
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good nectar plant

Attracts: bees, butterflies, monarchs
Flowers: yellow
Bloom: May-June
Seeding Rate: 11 lb/ac
Recommended precipitation range: 8-12 in
Life Span: annual



Al Schneider @ PLANTS Database
Cleome serrulata, Rocky Mountain bee plant
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: pollinator forage; good nectar plant
Attracts: bees, wasps, butterflies including monarchs;
larval host plant of *Pontia* and *Pieris* butterflies
Flowers: purple
Bloom: May-June
Seeding Rate: 17 lb/ac
Recommended precipitation range: 13-20 in
Life Span: annual



Coreopsis tinctoria. Applewood Seed Co. Used with permission.
Coreopsis spp., tickseed
Origin: native forb

Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: primarily for pollinators
Attracts: bees, butterflies
Flowers: yellow
Blooms: July-Sept
Seeding Rate: 1 lb/ac
Recommended precipitation range: 20-40 in
Life Span: perennial



Shrubby cinquefoil. Photo ©Al Schneider, www.swcoloradowildflowers.com, used with permission.
Dasiphora fruticosa, shrubby cinquefoil
Origin: native shrub
Mature Height: 2-4 ft
Growth Rate: slow
Growth Habit: upright
Wildlife Value: food and cover
Attracts: moths, bees, butterflies
Flowers: yellow
Blooms: May-June
In-row Spacing: 4-6 ft
Recommended precipitation range: 18-25 in
Life Span: perennial



Dianthus barbatus. Applewood Seed Co. used with permission
Dianthus spp., pink
Origin: introduced forb

Mature Height: 1-2 ft
 Growth Rate: rapid
 Growth Habit: upright
 Wildlife Value: good nectar plant
 Attracts: bees, butterflies, monarchs
 Flowers: white, pink, red
 Bloom: July-August
 Seeding Rate: 3 lb/ac
 Recommended precipitation range: 15-40 in
 Life Span: biennial



Rubber rabbitbrush. USDI-BLM
***Ericameria* and *Chrysothamnus* spp.**, rabbitbrush
 Origin: native shrub
 Mature Height: 2-6 ft
 Growth Rate: moderate
 Growth Habit: open spreading
 Wildlife Value: loafing, food and browse; good nectar plant
 Attracts: small bees, butterflies, monarchs
 Flowers: yellow
 Bloom: August-October
 Seeding Rate: 0.5 lb/ac
 In-row Spacing: 3-6 ft
 Recommended precipitation range: 7-16 in
 Life Span: perennial

Origin: native sub-shrub
 Mature Height: 1-3 ft
 Growth Rate: moderate
 Growth Habit: spreading, open sub-shrub
 Wildlife Value: cover, fall forage
 Attracts: moths, butterflies, bees
 Flowers: white, cream
 Bloom: July-September
 Seeding Rate: 4 lb/ac
 In-row Spacing: 1-3 ft
 Recommended precipitation range: 12-25 in
 Life Span: perennial



Sulphurflower buckwheat. Derek Tilley, NRCS Idaho
Eriogonum umbellatum, sulphurflower buckwheat
 Origin: native sub-shrub
 Mature Height: 0.5-2 ft
 Growth Rate: moderate
 Growth Habit: spreading, open sub-shrub
 Wildlife Value: cover, fall forage; good nectar plant
 Attracts: moths, butterflies, bees
 Flowers: yellow
 Bloom: July-September
 Seeding Rate: 4 lb/ac
 In-row Spacing: 1-3 ft
 Recommended precipitation range: 8-20 in
 Life Span: perennial



Whorled buckwheat. Derek Tilley, NRCS Idaho
Eriogonum heracleoides, whorled buckwheat



Erysimum asperum. Derek Tilley

Erysimum spp., wallflower

Origin: native forb

Mature Height: 1-1.5 ft

Growth Rate: moderate

Growth Habit: upright

Wildlife Value: good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: orange, yellow

Bloom: April-June

Seeding Rate: 3 lb/ac

Recommended precipitation range: 16-30 in

Life Span: perennial



Blanketflower. Casey Burns, NRCS Utah.

Gaillardia aristata, blanketflower

Origin: native forb

Mature Height: 1-1.5 ft

Growth Rate: moderate

Growth Habit: upright

Wildlife Value: great food/cover; good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: orange, yellow

Bloom: July-September

Seeding Rate: 5 lb/ac

Recommended precipitation range: 16-30 in

Life Span: perennial



Mace Vaughan. Xerces Society.

Euthamia occidentalis, western goldentop

Origin: native shrub

Mature Height: 3-6 ft

Growth Rate: moderate

Growth Habit: upright

Wildlife Value: cover; good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: yellow

Bloom: September-November

In-row Spacing: 2-6 ft

Recommended precipitation range: 16-32 in

Life Span: perennial



Gilia capitata. Applewood Seed Co. Used with permission.

Gilia spp., gilia

Origin: native forb

Mature Height: 1-2 ft

Growth Rate: rapid

Growth Habit: upright

Wildlife Value: good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: white, blue

Bloom: May-July

Seeding Rate: 1 lb/ac

Recommended precipitation range: 12-25 in

Life Span: mostly annual



Annual sunflower. A. Schneider @ PLANTS Database
Helianthus annuus, annual sunflower
Origin: native forb
Mature Height: 2-6 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good winter forage; good nectar plant
Attracts: butterflies, monarchs, bees
Flowers: yellow to orange
Bloom: July-September
Seeding Rate: 13 lb/ac
Recommended precipitation range: 8-15 in
Life Span: annual

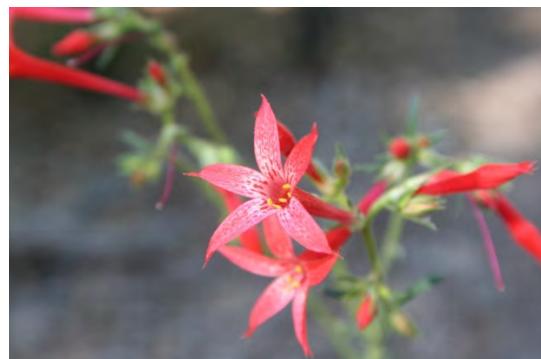


Maximilian sunflower. Larry Allain @ PLANTS Database
Helianthus maximiliani, Maximillian sunflower
Origin: native forb
Mature Height: 2-5 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good winter forage; good nectar plant

Attracts: butterflies, monarchs, bees
Flowers: yellow
Bloom: July-September
Seeding Rate: 5 lb/ac
Recommended precipitation range: 18-25 in
Life Span: perennial



Nuttall's sunflower. PLANTS Database
Helianthus nuttallii, Nuttall's sunflower
Origin: native forb
Mature Height: 3-6 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good winter forage; good nectar plant
Attracts: butterflies, monarchs, bees
Flowers: yellow
Bloom: July-September
Seeding Rate: 9 lb/ac
Recommended precipitation range: 12-20 in
Life Span: perennial



Derek Tilley
Ipomopsis spp., gilia
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: biennial
Growth Habit: upright
Wildlife Value: forage
Attracts: bees, hummingbirds
Flowers: red
Bloom: April-July
Seeding Rate: 6 lb/ac

Recommended precipitation range: 10-25 in
Life Span: biennial/perennial



Hoary tansyaster. Derek Tilley, NRCS Idaho
Machaeranthera canescens, hoary tansyaster
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: erect
Wildlife Value: forage; good nectar plant
Attracts: bees, butterflies
Flowers: blue to purple
Bloom: August-October
Seeding Rate: 2 lb/ac
Recommended precipitation range: 8-15 in
Life Span: annual/biennial/perennial



© Thomas G. Barnes
Mertensia ciliata. Thomas G. Barnes @ PLANTS
Database
Mertensia spp., bluebells
Origin: native forb
Mature Height: 1-2 ft
Growth Rate: rapid

Growth Habit: erect
Wildlife Value: forage; good nectar plant
Attracts: bees, butterflies
Flowers: blue to purple
Bloom: July-August
Seeding Rate: 2 lb/ac
Recommended precipitation range: 8-15 in
Life Span: perennial



Mountain monardella. Al Schneider @ PLANTS Database
Monardella odoratissima, mountain monardella
Origin: native forb
Mature Height: 1-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good nectar plant
Attracts: bees, butterflies, monarchs
Flowers: white-purple
Bloom: June-August
Seeding Rate: 4 lb/ac
Recommended precipitation range: 16-25 in
Life Span: perennial



Royal penstemon. Derek Tilley, NRCS Idaho
Penstemon speciosus, royal penstemmon
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid

Growth Habit: erect
 Wildlife Value: fair forage; good nectar plant
 Attracts: bees, butterflies, monarchs
 Flowers: light blue
 Bloom: July-August
 Seeding Rate: 3 lb/ac
 Recommended precipitation range: 12-18 in
 Life Span: perennial



Chokecherry. Derek Tilley, NRCS Idaho.

***Prunus virginiana*, chokecherry**

Origin: native shrub
 Mature Height: 12-25 ft
 Growth Rate: moderate
 Growth Habit: oval to round; suckering
 Wildlife Value: excellent food/cover; good nectar plant
 Attracts: bees, butterflies, monarchs
 Flowers: white
 Bloom: April-May
 In-row Spacing: 8-12 ft
 Recommended precipitation range: 16-60 in
 Life Span: perennial

nectar plant
 Attracts: bees, butterflies, monarchs
 Flowers: pink
 Bloom: June-July
 In-row Spacing: 3-5 ft
 Recommended precipitation range: 12-40 in
 Life Span: perennial



Blackeyed Susan. P. Alexander @ PLANTS Database

***Rudbeckia hirta*, blackeyed Susan**

Origin: native forb
 Mature Height: 2-3 ft
 Growth Rate: rapid
 Growth Habit: upright
 Wildlife Value: seed is food for birds; good nectar plant
 Attracts: bees, butterflies
 Flowers: yellow
 Bloom: June-July
 Seeding Rate: 1 lb/ac
 Recommended precipitation range: 16-25 in
 Life Span: perennial



Wood's rose. Derek Tilley, NRCS Idaho.

***Rosa woodsii*, Wood's rose**

Origin: native shrub
 Mature Height: 3-6 ft
 Growth Rate: moderate
 Growth Habit: upright to semi-weeping shrub
 Wildlife Value: nesting, cover, excellent forage; good



Prairie coneflower. Derek Tilley, NRCS Idaho.

***Ratibida columnifera*, prairie coneflower**

Origin: native forb
 Mature Height: 1-1.5 ft
 Growth Rate: rapid
 Growth Habit: upright
 Wildlife Value: good forage
 Attracts: bees
 Flowers: yellow/orange
 Bloom: June-August

Seeding Rate: 3 lb/ac
Recommended precipitation range: 16-40 in
Life Span: perennial



© James L. Reveal
Geyer willow. James Reveal @ PLANTS Database



Salix amygdaloidea Derek Tilley.
Salix spp., Willow
Origin: native shrub or tree
Mature Height: 8-30 ft
Growth Rate: moderate
Growth Habit: upright; single base or rhizomatous
Wildlife Value: nesting, cover, excellent food; good nectar plant
Attracts: bees, butterflies, monarchs
Flowers: yellow
Bloom: April-July
In-row Spacing: 10-15 ft
Recommended precipitation range: 18-40 in
Life Span: perennial



Purple sage. Richard A. Howard @ PLANTS Database
Salvia dorrii, Purple sage
Origin: native shrub
Mature Height: 1-2.5ft
Growth Rate: moderate
Growth Habit: erect low shrub
Wildlife Value: nesting, cover, excellent food; good nectar plant
Attracts: bees, butterflies, monarchs
Flowers: purple
Bloom: May-June
In-row Spacing: 2-3 ft
Recommended precipitation range: 8-14 in
Life Span: perennial



Scabiosa sp. Applewood Seed Co. Used with permission.
Scabiosa spp., pincushions
Origin: introduced forb
Mature Height: 1-2 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: limited
Attracts: bees, butterflies, monarchs
Flowers: white, pink, red
Bloom: July-August
Seeding Rate: 10 lb/ac

Recommended precipitation range: 15-40 in
Life Span: annual/perennial



Goldenrod. Thomas Barnes @ PLANTS Database

***Solidago* spp.**, goldenrod

Origin: native shrub

Mature Height: 3-6 ft

Growth Rate: moderate

Growth Habit: spreading shrub

Wildlife Value: cover; good nectar plant

Attracts: butterflies, bees

Flowers: yellow

Bloom: July-October

In-row Spacing: 2-6 ft

Recommended precipitation range: 16-40 in

Life Span: perennial

Bloom: April-June
Seeding Rate: 2 lb/ac
Recommended precipitation range: 7-15 in
Life Span: perennial



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***Verbena* spp.**, verbena

Origin: native forb

Mature Height: 14-6 ft

Growth Rate: rapid

Growth Habit: upright

Wildlife Value: good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: purple

Bloom: July-August

Seeding Rate: 2 lb/ac

Recommended precipitation range: wet/saturated soils

Life Span: annual/perennial



Globemallow. Al Schneider @ PLANTS Database

***Sphaeralcea* spp.**, globemallow

Origin: native forb

Mature Height: 1-3 ft

Growth Rate: rapid

Growth Habit: upright

Wildlife Value: excellent forage; good nectar plant

Attracts: bees, butterflies, monarchs

Flowers: orange to red