

Wildlife Habitat Evaluation Guide and Decision Support Tool

Southern High Plains Edition

Version 1.0 (2024)

INTRODUCTION

Monarch Butterfly and Habitat

The eastern U.S. population of the monarch butterfly (*Danaus plexippus*) has declined significantly over the past three decades. NRCS supports a habitat development and management effort within known migration routes and the primary breeding range. For general information on the monarch butterfly biology, staff are encouraged to read the document titled *NRCS Monarch Butterfly Habitat Development Project* ([USDA 2015](#)). For specific details on the status of the eastern monarch butterfly, consider reading the Monarch Butterfly Conference Report (USDA and USFWS 2016). NRCS conservation practices installed to benefit the monarch will benefit other wildlife species that occupy periodically disturbed grassland and open savannas.

Monarch butterflies rely on nectar-rich forbs for forage for adult butterflies, and milkweed species for successful reproduction. Monarch butterfly habitat assessments target the milkweed and forb plant community component, as well as accounting for pesticide risks to that habitat.

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 (USDA 2013). The objective of those WHEGs is to identify the most limiting factor for a species of wildlife, and take into account the proximity and interrelationships to adjacent habitats (on and off the farm or ranch). 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. When not migrating, the movement of individual monarchs is not well understood; however, they appear to move long distances to acquire life requirements (Brower 1995, Brower et al. 2011). Addressing the declines in the monarch butterfly population requires a modified approach.

Little is known about the importance of the spatial connectivity of habitats during the migratory or non-migratory periods of the monarch's life cycle. Accordingly, rather than evaluate habitat spatially within the context of home range of a population of a species of concern, this guide is narrowly applied to only those portion(s) of the agricultural operation under consideration for monarch habitat improvement, and does not consider connectivity to, or interactions with other habitats. Based on the best available science (Brower et al. 2011; Pleasants and Oberhauser 2012) the most limiting factors for monarchs are the availability of reproductive habitats (i.e., the abundance and distribution of the monarch caterpillar's host plant: milkweed) and availability of nectar plants to fuel adult flight (Agrawal 2018; Inamine et al. 2016). In the Southern High Plains, nectaring resources are particularly critical (Brower et al. 2006). This WHEG requires the user to measure abundance and species richness of milkweeds and nectar sources, while also assessing the risk to the habitat posed by pesticide use on or adjacent to the assessment area.

Scoring Monarch Habitat

Depending on the identified resource concern, this WHEG provides the flexibility to measure habitat quality for either reproductive habitat or nectaring habitat. The scores derived from this WHEG are not designed to be used as a ranking mechanism for Farm Bill conservation programs. Maintaining the integrity of this WHEG as a planning tool and not a Farm Bill program ranking tool allows the conservation planner some flexibility in applying the WHEG. Staff are encouraged to incorporate professional judgments deemed necessary for unique site conditions, varying financial resources, and varying client objectives.

Time Requirements to Apply the WHEG

This WHEG is designed to allow for most projects to use a Rapid Assessment method. It is anticipated that application of the rapid approach will add less than one hour to the traditional conservation planning process. Application of the vegetative sampling methods required in the comprehensive method will add approximately 2-3 additional hours to the conservation planning process.

Timing of the Evaluation

Conduct the evaluation during the growing season in order to determine the number and species richness of nectaring plants and milkweeds present on the assessment area.

REFERENCE DOMAIN

Figure 1 provides the reference domain (area of applicability) for the Southern High Plains edition of the NRCS Monarch WHEG. Application of this WHEG on lands located in LRRs immediately adjacent to the reference domain, may be appropriate if approved by the NRCS State Conservationist.

The reference domain is based on portions of two Land Resource Regions (LRR) (USDA 2022).

G: Western Great Plains Range and Irrigated Region

H: Central Great Plains Winter Wheat and Range Region

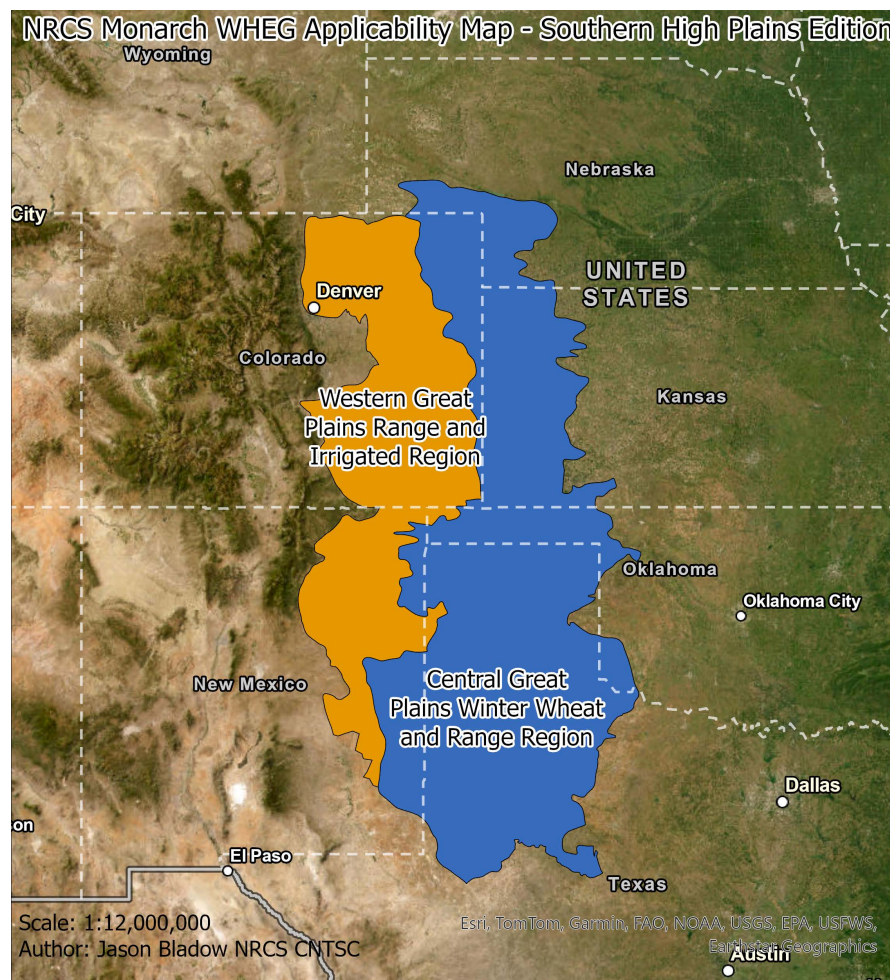


Figure 1: Applicability region for the NRCS Monarch WHEG; Southern Great Plains Edition.

EXCLUSIONS

This WHEG is designed for use on grasslands, savannahs or areas supporting brush or trees that were once grasslands or savannahs within the reference domain. This WHEG shall not be applied to forested areas (riparian forested areas or forested uplands that were historically forested) and are providing other important ecosystem services. Such areas contained within the project area are provided a rating of N/A. Historic grasslands that have been invaded by woody species do not fall under this exemption.

Equipment Needed¹

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

INSTRUCTIONS

STEP 1: Develop a project base map.

- a. Delineate the area to be evaluated on an aerial photograph or other mapping resource. 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 for the land under consideration.*
- 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 community type (i.e. similar ecological sites, vegetation, soils, slope, and management). These unique areas are referred to as *assessment areas* (AA). Identify 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 (i.e. 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 Figure 2 for an example. Each assessment area shall have its own datasheet, which corresponds to its own worksheet (tab) in the Southern High Plains Monarch WHEG spreadsheet.
- c. Determine size of each area. Determine and denote the acres in each assessment area (including each subarea) on the base map and the datasheet.

¹ The requirement for most of this equipment is limited to sampling the plant community. In many situations, the “rapid assessment” will be used and sampling will not be required.

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 existing plant community. For example, vegetative sampling to determine the density of milkweed or nectaring species has little value in a cropland field or areas dominated by invasive species or brush where conservation efforts specific to monarchs are not planned.

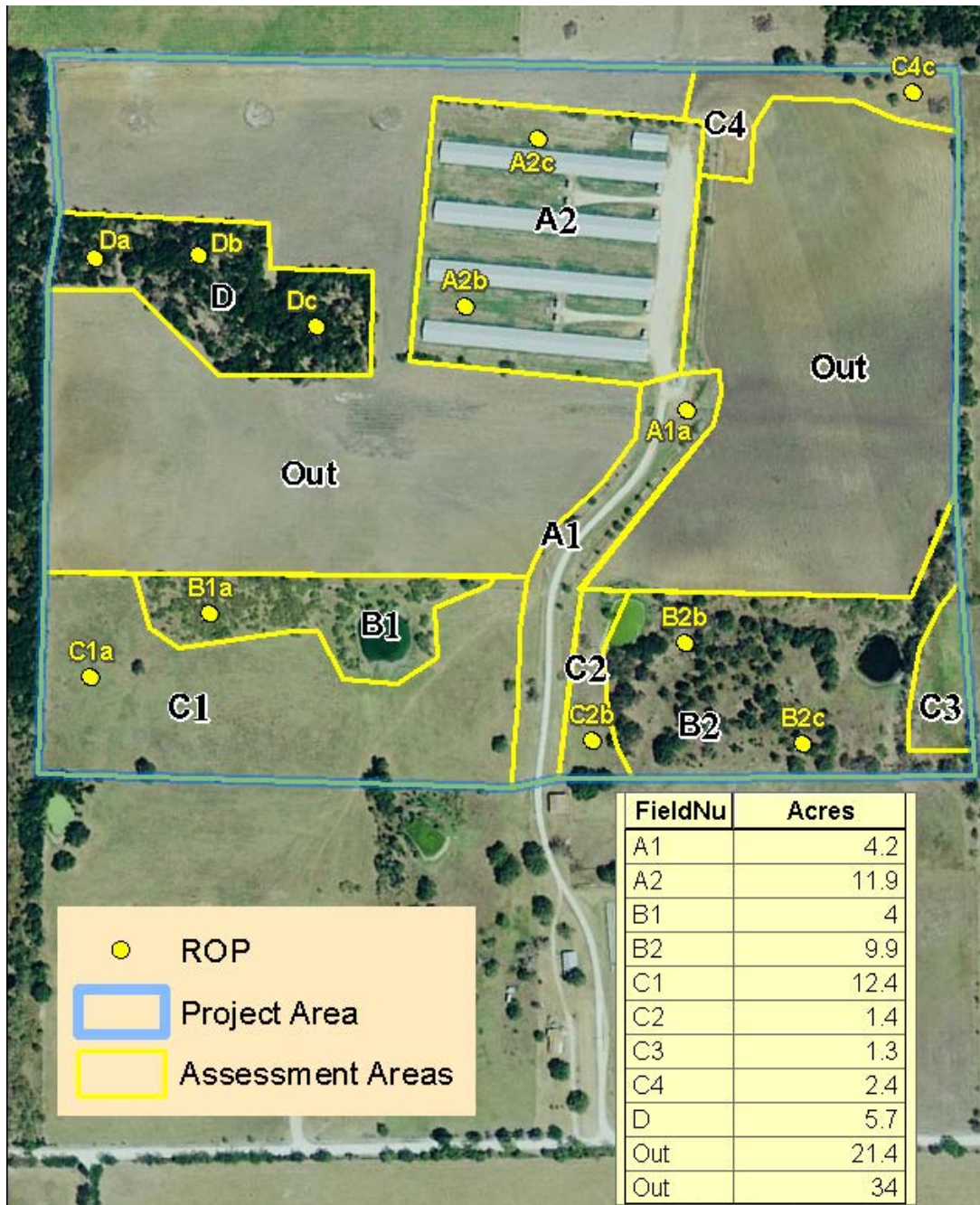


Figure 2: Example of a monarch habitat development base map. Note the concept that an assessment area need not be contiguous. As an example, the open herbaceous assessment area C has four subareas (C1, C2, C3, and C4). ROP denotes Representative Observation Point. Also, note that assessments need not be performed on areas where the decision-maker is not interested in providing monarch habitat (e.g. Out).

STEP 2: Rapid Screening of Monarch WHEG Plant Community Types².

Determine the Monarch WHEG plant community type and document the decision on the data sheet for the assessment area. 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, invasive species or brush, then you can rapidly screen the assessment area as POOR without having to collect data on milkweeds or nectar plants. You will carry out Steps 3, 6 and 7 (skipping Steps 4 and 5). If habitat is “other herbaceous community” (and thus might have significant milkweed or nectar plant populations), carry out Steps 3 through 7.

- i. **CROPLAND** – Any area that is being annually planted for harvest of a product.
 - A. **Document a benchmark rating of *poor* on page 1 of the datasheet.**
 - B. If any of the planning considerations below are an objective of the decision maker, continue to Step 3.
Alternatives and Planning Considerations:
 - o Habitat establishment using conservation practice(s) Wildlife Habitat Planting (420), Conservation Cover (327), Field Border (386), Riparian Herbaceous Cover (390), Hedgerow (422), and Range Planting (550) with additional criteria to “enhance wildlife, pollinator and beneficial organism habitat,” with the monarch as the target wildlife species.
- ii. **INTENSIVELY MANAGED – LOW DIVERSITY HERBACEOUS COMMUNITIES** (includes farmsteads, pastures, hayland and other frequently-managed OR low diversity grass stands) - These areas are primarily monotypic or low diversity grass stands that commonly receive intensive management through fertilization, mowing and/or herbicide applications. Native haylands with high forb richness should be classified as “OTHER HERBACEOUS COMMUNITIES” (see iv below).
 - A. **Document a benchmark condition rating of *poor* on page 1 of the datasheet.**
 - B. If any of the planning considerations below are an objective of the decision maker, continue to Step 3.
Alternatives and Planning Considerations:
 - o Habitat establishment using conservation practice(s) Wildlife Habitat Planting (420), Conservation Cover (327), Field Border (386), Riparian Herbaceous Cover (390), Hedgerow (422), and Range Planting (550) with additional criteria to “enhance wildlife, pollinator and beneficial organism habitat,” with the monarch as the target wildlife species.
 - o Habitat management through Forage Harvest Management (511), Prescribed Burning (338), Prescribed Grazing (528) or Early Successional Habitat Development /Management (647), if planner deems such activities will improve monarch habitat by increasing the richness and cover of the forb component.
- iii. **BRUSH and/or INVASIVES SPECIES DOMINATE** – These areas contain woody vegetation (brush) or invasive species at densities such that monarch habitat is largely absent. Areas of brush infestation that also support a diverse herbaceous plant community should be assessed using the field evaluation methodology (Steps 3 – 7).
 - A. **Document a benchmark condition rating of *poor* on page 1 of the datasheet.**

² 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.

- B. If any of the planning considerations below are an objective of the decision maker, continue to Step 3.

Alternatives and Planning Considerations:

- o Monarch habitat management requires the implementation of Brush Management (314) or Herbaceous Weed Control (315).
 - o In addition, Prescribed Burning (338), Early Successional Habitat Development / Management (647) and/or Prescribed Grazing (528) may be applied for the purpose of enhancing wildlife habitat by increasing the cover and richness of flowering species.
- iv. *OTHER HERBACEOUS COMMUNITY*– These areas support native and non-native grasses, and a significant forb component worthy of inventory. 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, but is not eliminated. There may be some woody encroachment, but not to the level to warrant a monarch rapid screening community type indicative of “*Brush*”.
- A. If your assessment area qualifies as “other herbaceous community”, a more comprehensive approach to habitat assessment will be required. Proceed to Step 3.

Comprehensive Approach

STEP 3: Pesticide Threat Assessment

Collect information on use of insecticides and herbicides by interviewing the client. Consider drift/movement of neonicotinoids, including sprays or planter dust emanating from seed treatments. Record notes on the data sheet (see datasheet page 2), and assign benchmark scores for insecticide (V^{IR}) and herbicide risk (V^{HR}). If decision-maker is not agreeable to avoiding direct pesticide treatments to the area once habitat is established, then stop the planning process as planning criteria will not be met.

- o Alternatives and Planning Considerations:
 - If the decision-maker is interested in reducing the threat of pesticides to the proposed monarch habitat, consider implementing an Integrated Pest Management Plan (595)⁴ or utilizing drift mitigation techniques as described in Table 3 of Technical Note 190-Agr-9.
 - 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.*

If assessment area is plant community type identified as poor in Step 2 (Rapid Screening), skip to Step 6. Otherwise, proceed to Step 4.

STEP 4: Field Assessment

The field assessment involves conducting vegetative surveys located at three Representative Observation Points (ROPs). Planners should locate ROPs that represents the average condition of the AA. At each ROP, stretch a tape 72.6-feet noting the geographic coordinates of the starting point

⁴ NRCS CPS 595 – IPM provides for different levels of consideration. For monarch habitat, considerations are limited to drift and application to the habitat itself. Consideration of movement of pesticides via water is not required for evaluation of monarch habitat.

and the direction the tape is stretched. This will serve as the belt transect from which vegetation measures are taken (see top of page 3 of datasheet for detailed instructions).

Milkweed species that are regionally important in the SHP display significant variability in the number of stems per plant. As such, breeding habitat is based in part on the numbers of milkweed stems present. Milkweed stems rooted within 3-feet of the tape along both sides (6' x 72.6') should be recorded on the datasheet. If no milkweeds were rooted within the survey transect but were observed within the AA, the appropriate box should be checked on page 3 of the datasheet.

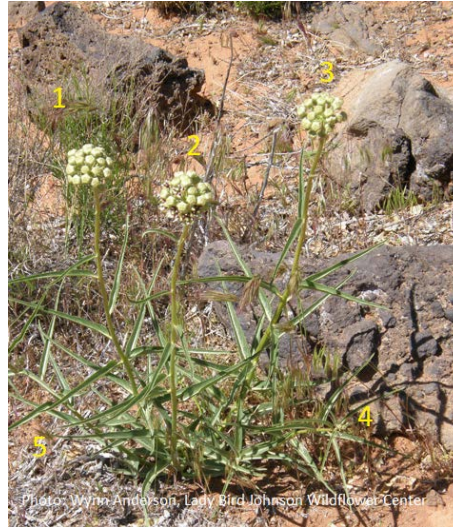


Figure 3: This milkweed has multiple stems originating from the same plant. Count all stems rooted in the plot. This milkweed has 3 upright stems beginning to flower and 2 more prostrate stems that are still vegetative.

The planner should then estimate the percent cover and number of species of monarch nectar plants within three 6' x 6' quadrats starting at the 10, 40 and 60-foot marks on the tape. To identify monarch nectar plants in your area, use the "NRCS Monarch WHEG Appendix: Southern High Plains" located on the NRCS Monarch Butterfly webpage;

<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/plantsanimals/pollinate/?cid=nrcseprd402207>

STEP 5: Enter data into the excel spreadsheet, which is designed to automatically calculate averages and benchmark scores for breeding habitat and nectaring habitat (see datasheet). Data collected and averaged is used to assign values as displayed on the datasheet for milkweed density (V^{MD}), percent cover of monarch plants (V^{FC}), and the average richness of monarch nectaring species (V^{FR}). The assigned values of habitat and pesticide variables are then used to calculate habitat scores based on the following equations;

$$\text{Breeding Habitat Score} = ((VIR) + (VHR) + 6(VMD))/8$$

$$\text{Nectaring Habitat Score} = ((VIR) + (VHR) + 4(VFC) + 2(VFR))/8$$

$$\text{Overall Habitat Score} = ((\text{Breeding Habitat Score}) + 2(\text{Nectaring Habitat Score}))/3$$

Habitat scores are then used to establish habitat Ratings as follows:

Poor = <0.30

Fair = 0.30-0.49

Good = 0.50-0.69

Excellent = > 0.70

Habitat that is rated as "Poor" or "Fair" is defined as having a resource concern for monarch habitat.

STEP 6: Help decision maker select planned conservation practices. Assuming that planned conservation practices will be applied successfully, predict future (planned) values of milkweed abundance and nectar plant species richness and abundance, enter planned values into spreadsheet and allow its formulae to calculate the planned habitat scores. To meet minimum planning criteria (PC), planned ratings must be “Good” or “Excellent” (score > 0.5).

STEP 7: POST-IMPLEMENTATION. After full implementation of planned conservation practices the success of the project may be measured by applying the WHEG once again. If the results fail to meet expectations (planned scores), consider maintenance actions or modification of the plan (adaptive management).

RESOURCES

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