Habitat Assessment Survey Instructions

Protocol for the Xerces Society's Western Monarch Count

Thank you for your interest in conducting a western monarch overwintering habitat assessment. The information that you collect is valuable to document site conditions, boundaries, and threats. And, if used regularly, these assessments can be used to document changes in a site over time. The data may also be useful to site managers and conservation groups to help inform overwintering site restoration and management. To get started, gather the supplies you will need.

Equipment List

- Habitat Assessment datasheets (hardcopies, or set up on the Survey123 app)
- Binoculars
- Clipboard & pen/pencil (if using paper datasheets)
- GPS unit or smart phone w/ GPS capability (helpful but not required)
- Compass or smart phone w/ Compass app (helpful but not required)
- Kestrel pocket weather meter or outdoor weather thermometer (helpful but not required)
- Plant identification field guide or smartphone apps: Seek, iNaturalist
- Camera or phone for taking pictures

Instructions

There are two versions of Habitat Assessment datasheets—the Short Form and the Long Form—feel free to use whichever datasheet you have time and equipment for. We typically suggest that land managers and conservation professionals use the Long Form and community scientist volunteers use the Short Form. Once you have chosen a datasheet, complete all fields to the best of your ability. If you are unsure about any fields, leave them blank; no information is better than inaccurate information. The majority of fields listed on the datasheet are self explanatory. However, we've listed a few definitions and instructions for fields that require further explanation under the section titled "Monitoring Definitions" below.

When and How Often to Count

Habitat Assessments can be conducted at any time of year and day, but they are most helpful during the monarch overwintering season when clustering monarchs may be observed. Temperature during the survey is less important for the Habitat Assessments (compared to Monarch Counts), so conduct the Monarch Count first if you're completing both surveys in one field visit. Aim to fill out a habitat assessment once a year per overwintering site, and anytime significant changes occur at a site (e.g., downed trees, new development, etc). We recommend conducting Habitat Assessments in December or January during the mid-season or late-season count.

Submitting Data

Habitat Assessment data should be submitted as soon as possible through the Survey123 mobile app *or* online forms available at WesternMonarchCount.org. Monitoring partners will need to decide who is responsible for submitting their joint datasheet and plan accordingly to avoid submitting multiple reports of the same data. If inconsistencies, missing data or protocol concerns are noted, a Xerces staff person or regional coordinator will attempt to contact the individual(s) for clarification, using the email provided in their datasheet.

Monitoring Definitions

General Site Information

- **Site ID:** This is the unique 4-digit number assigned to the site from the Xerces Society's Western Monarch Overwintering Sites Database. You can find a Site ID using the interactive map on the project website, WesternMonarchCount.org.
- **Property Owner:** This is the legal owner of the property that the overwintering site is located on. This may be a public agency such as the U.S. National Forest Service or California Department of Parks and Recreation (State Parks), private landowners such as home owners or business owners or non-profit organizations. List multiple owners if applicable. If the property owner is a private landowner, please provide the individual, family, or company's name and contact information, if known.
- **Current Land Use:** This is the primary human use of a specific land area. Some examples include city, regional, county, state or national parks; state or national forests; residential; commercial; industrial; agricultural; golf courses; or other land uses. List multiple land uses if applicable.
- **Site Location/Directions:** Please be as specific as possible, make the directions so that anyone with the directions could find the site, particularly if you are documenting a new site. Be sure to include relevant information such as town names, highway or street names, river or stream names, and distances, if applicable.

Site Access Categories

- **Open Access:** Unrestricted direct access to the site/cluster trees (e.g., public parks or open spaces that remain open all/most hours, public walkways, roadways, or parking lots)
- **Limited Access:** Complete or partial access to the site/cluster trees *with* limitations or restrictions (e.g., fees, limited operating hours, requires site access coordination or special permissions, environmental obstacles, etc.)
- **No Access:** No direct access at this time; however, the site may or may not be visible from a nearby location, such as a public road (e.g., private property,

restricted access area, environmental barriers, etc.)

Weather Data

If you have access to a Kestrel pocket weather meter (or similar device), please use this to collect the microclimate data. If you do not have access to this device, please skip the relative humidity data field and use an outdoor weather thermometer to record the temperature data. If you do not have access to any weather device, leave this section blank.

Habitat Information

Answer habitat information questions based off of the core cluster areas where monarchs typically congregate at the site. Clustering is defined as three or more adjacent monarchs with closed wings. If you do not know where monarchs cluster at the site and do not see any clustering while you are doing this survey, indicate that on the form. You can contact your regional coordinator or Xerces Society staff (wmc@xerces.org) to get a copy of the site report and any spatial information we have about where monarchs typically cluster so you can refine your search area in advance.

Community Structure

Record a visual estimate of the percentage each forest structure layer (i.e. tree, shrub, herbaceous layer) occupies. CNPS has some helpful diagrams that can serve as examples. *Note: The total for all layers combined can be greater than 100%. Consider each layer on its own.*

- **Tree cover:** measured by imaging that the tree cover is viewed from above in two dimensions as if it were pressed flat against the ground. Densely growing trees would be 80-100% cover, whereas very sparsely growing trees would be 20% or less cover.
- **Shrub cover:** includes woody species that do not reach tree height.
- **Herbaceous cover:** includes forbs (most non-woody flowers), grasses, or other plants that are not woody.
- **Leaf litter:** percentage of dead material such as leaves, branches, and tree bark that covers the ground.
- **Bare soil:** cover includes all exposed soil not covered by plants or dead material.

Site Threats or Disturbances

Record any threats or disturbances you observed inside or directly adjacent to the boundary of the site. Threats may be due to human activities such as construction, high human visitation, development, vehicle traffic, pesticide use, etc., weather events such as erosion, drought, fire, and other natural occurrences such as pest infestation and old and aging trees. Select all that apply.

Photopoints

If you are able, please take several photographs of the site. Try to capture images of the monarch cluster trees (core zones) with notable landmarks visible, any threats or disturbances observed at the site, and any key resources (e.g., wind buffers, nectar/water sources, etc.) that monarchs are using. Record a description of each photopoint and note the GPS coordinates and what each photo is showing. Send in your photos when you submit your datasheet. You may need to resize your photos to meet the datasheet requirements.

Survey Area

Providing a map of the area surveyed is very helpful. You will need to be online/connected to the internet to draw the polygon for this datasheet field. You can change the baselayer using the Map Gallery option (four square icon); the Imagery or Imagery hybrid layers are especially helpful for visualizing the grove.

Thank you for participating in the Western Monarch Count!

Please refer to the resources available at WesternMonarchCount.org for more information.