

FWS: Milkweed and Monarch Observation Codes and Definition Sheet

Only the fields with asterisks * are required, the rest are optional, but please fill them out if you have the opportunity.

Block ID#: Block identification number **Plot Number:** Plot number

Milkweed Observation Definitions and Codes:

Milkweed Structure: The spatial arrangement of the milkweed plants within the landscape. Milkweed population occurrence at the site – scattered, clumped, linear. Choose one:

Code	Milkweed Structure	Definition
S	Scattered	Single plants or closely-spaced groups which can be readily delineated by a single GPS point and/or discernable patch size; other milkweeds usually out of view and/or easily mapped separately
C	Clumped	close to loosely-spaced grouping of plants, much longer than wide, whose spatial extent cannot be readily delineated by a single GPS point or patch size; plants may be continuously or discontinuously distributed; gaps between plants generally less than 50' (15 m); occur along road margins, fence lines, or other discreet habitat edges that limit population expansion in 1 or more directions. Coordinates should be approximately mid-line when feasible
L	Linear	single plants or closely-spaced groups which cannot be readily delineated by a single GPS point and/or discernable patch size; usually distributed somewhat continuously throughout a habitat or field; plants mainly in sight-distance from each other, without large gaps (>50') that break the continuity of the distribution.

Plant Count: Complete count or estimated number of plants (or stems) in the patch designated by the GPS Coordinates. *If no milkweed was observed put a 0 in this cell.*

Choose one: 0, 1-5, 6-10, 11-20, 21-50, 51-75, 76-100, 101-500, 501-1000, 1001-1500, 1501-2000, 2000+

Plant Count Method: This field is to enter how you derived your plant count and percentages for the stages of phenology – vegetative, flowering, pods. Choose one:

Code	Plant Count Method	Definition
CC	Complete plant/stem count	all visible plants or stems were counted within the area designated as the site
OE	Optical Estimation	count and percentages estimated
SM	Standardized Methodology	counts and percentages derived from accepted and documented subsampling methods
OM	Other Methods	

Count Type: Indicate whether the count is of stems (clonal) or plants. Some milkweed species are clonal and produce single stems without above-ground branching, such as *A. speciosa*. Choose one:

Code	Count Type	Definition
P	Plant	single multi-branched plants
S	Stem	single, unbranched stems from clonal species

Milkweed Patch Size: Patch size of milkweed delineated by GPS coordinates, reported in square meters (length x with) 1 meter = 3 feet.

Choose one: <1, 1-3, 3-5, 5-7, 7-10, 10-15, 15-20, 20-30, 30-50, 50-100, 100-200, >200

Percent Vegetative Plants: Percent of plants without buds, flowers, or pods

Choose one: 0%, 10%, 25%, 50%, 75%, 100%

Percent Flowering Plants: Percent of plants with buds and/or open flowers

Choose one: 0%, 10%, 25%, 50%, 75%, 100%

Percent Plants with Pods: Percent of plants with pods (includes young to mature pods)

Choose One: 0%, 10%, 25%, 50%, 75%, 100%

Average Height of Plants: Average height of plants in the patch in inches

Ripe Pods? : This field is intended to document approximate dates of seed dispersal to facilitate future seed collections. Pods are brown, splitting, or dispersing seed

Choose One: Yes or No

Seed Collection? : This field is to document that ripe milkweed seed was collected from this location

Choose One: Yes or No

Larvae Herbivory: Plants show evidence of herbivory from caterpillars. Choose One: Yes, No, or Not Checked

Monarch Observation Definitions and Codes:

Female Monarch Count: # of adult female monarchs observed at the site

Male Monarch Count: # of male monarchs observed at the site

Total Monarch Count: Total number of adult monarchs observed. *If none were observed put a 0 in this cell*

Behavior Notes: Observed behavior of monarchs at site (multi-select, separate by commas)

Code	Behavior Notes	Definition
FM	Flying (Migrant)	Subjective - monarch flying out of or over the site in a relatively straight direction and altitude that indicates migratory behavior
FF	Flying (Foraging)	Subjective - monarch flying near ground-level, flight path non-directional
L/P	Loafing/Perched	Monarch perched on a non-flowering plant or other object during daytime
NR	Night Roosting	Monarch perched in a tree, shrub or other sheltered site, just prior to sunset
N	Nectaring	Monarch actively nectaring from a flower
M	Mating	Male and female monarchs clasped together
EL	Egg Laying	Female monarch actively laying eggs
E	Eclosing	Butterfly is emerging from pupal case
O	Other	None of the above behavior
NO	None Observed	None observed

Egg Count: Number of monarch eggs observed

Larvae Count: Number of monarch larvae observed

Pupae Count: Number of monarch pupae observed

Pupae Substrate: Plant species pupae was attached to (use scientific name)

Nectar Species Used: Enter the genus and/or species of nectar plant that monarch is using, if genus/species is known

Other Nectar Species Used: Enter the dominant genus and/or species of other potential flowering plants at site that monarch might use, if genus/species is known; enter up to 3; enter as genus species1, genus species2, genus species3

Temperature: Enter temperature (F) at time of sighting, if known

Wind Speed: Enter approximate wind speed range (in MPH) at time of sighting, if known

Choose One: <1, 1-3, 4-6, 7-10, 11-16, 17-21, 22-27, >27

Precipitation: Enter any precipitation at time of sighting

Choose One:

Precipitation	None	Trace	Light	Moderate	Heavy
Code	N	T	L	M	H

Cloud Cover: Enter range of cloud cover at time of sighting. Choose One: 0,10,20,30,40,50,60,70,80,90,100

Habitat Association: Habitat parameters that more effectively describe the milkweed stand location. Multi-Select (separate by commas in data collection sheet):

Code	Habitat Association	Definition
EH	Edge Habitat	milkweed plants occur within a 5 meter transition zone between 2 habitat types
FH	Floodplain Habitat	milkweed plants occur along shorelines of a waterbody or within the natural floodplain of a river or stream
FR	Fence Row	milkweed occurs predominantly along a fenceline, usually in a linear fashion, and excluded from expansion by management actions or other features
GP	Garden-Park	
R	Roadside	milkweed plants occur within a roadside right-of-way, usually in a linear fashion, and excluded from expansion by impervious surfaces or other features
PUC	Public Utility Corridors	any rights-of-way or facilities managed by a utility company; e.g., under transmission lines, pipelines
IC	Irrigation Canals	open artificial water conveyance systems generally associated with agriculture
IAF	Irrigated Agriculture Fields	Fields or crops irrigated for agricultural purposes, usually with sprinkler systems or watered through crop rows
NA	None of the Above Apply	Milkweed plants do not occur in any of the above scenarios

Habitat Type: General habitat type that the milkweed occurs in Multi-Select (separate by commas):

Code	Habitat Type	Habitat Description
CC	Cultivated Crops	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
DF	Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
EHW	Emergent Herbaceous Wetlands	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
EF	Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
G	Garden	Garden
G/H	Grassland/Herbaceous	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
MF	Mixed Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
P-OS	Park-Open Space	Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
P/H	Pasture/Hay	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.
S/S	Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
WW	Woody Wetlands	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.
D-HI	Developed-High Intensity	Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
D-MI	Developed-Medium Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
D-LI	Developed-Low Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

Threats: Known or potential issues that may threaten the persistence of a population (multi-select)

Code	Threats	Definitions
M	Mowing	Repeated seasonal mowing or mowing during monarch breeding season
H	Haying	Repeated seasonal haying or haying during the monarch breeding season
HA	Herbicide Application	Application directly on milkweed or in close proximity (<50')
IA	Insecticide Application	Application directly on milkweed or in close proximity (<50')
G	Grazing	Excessive grazing that causes trampling of plants
FR	Flooding Regimes	Natural floodplain function lost due to dams or other management actions
VE	Vegetation Encroachment	Lack of fire and other natural disturbance regimes that promote vegetation succession
IS	Invasive Species	Presence of invasive grass or shrub species that suppress milkweed growth
RD	Recreational Disturbance	Site subject to off-road vehicle use, foot traffic that can impact plant growth

Management Actions: Known land management or other actions that occur on the site that may affect (positively or negatively) the milkweed plants. Multi-Select (separate by commas in data collection sheet):

Code	Management Actions	Definitions
G	Grazing	Livestock grazing occurs at least once every 3 years
IM	Intense Mowing	Mowing occurs annually or more frequently
LM	Light Mowing	Mowing occurs, but with at least 1 year of rest between each mowing
H	Haying	Haying occurs at least once every 3 years
IH	Intense Haying	Haying occurs annually or more frequently;
PB	Prescribed Burning	Prescribed burning occurs at least once every 3 years
FHA	Frequent Herbicide Applications	Herbicide applications occur annually or more frequently; may or may not target milkweed
IHA	Infrequent Herbicide Applications	Herbicide applications occur every 2 years or less; may or may not target milkweed
IA	Insecticide Applications	Insecticide applications occur at least once every 3 years or more frequently
TH	Timber Harvest	Milkweed plants occur in a designated timber harvest area
BC	Brush Clearing	Understory vegetation is cleared at least once every 3 years for fire suppression or other reasons
RG	Road Grading	Roads and/or road ditches are graded at least once every 3 years
SW	Supplemental Watering	Milkweed plants receive supplemental water directly as part of landscape or nursery operations
IW	Indirect Watering	Milkweed plants receive supplemental water from agricultural runoff, sprinkler systems, roadside ditches, agricultural ponds
IDM	Irrigation Ditch Maintenance	Ditch maintenance occurs once every 3 years or less

Milkweed Species (subspecies):

Code	Milkweed Scientific Name	Code	Milkweed Scientific Name
ASAL	<i>Asclepias albicans</i>	ASSU	<i>Asclepias subulata</i>
ASAN5	<i>Asclepias angustifolia</i>	ASSU2	<i>Asclepias subverticillata</i>
ASAS	<i>Asclepias asperula</i>	ASSY	<i>Asclepias syriaca</i>
ASASA	<i>Asclepias asperula</i> ssp. <i>asperula</i>	ASTU	<i>Asclepias tuberosa</i>
ASASC	<i>Asclepias asperula</i> ssp. <i>capricornu</i>	ASTUI	<i>Asclepias tuberosa</i> ssp. <i>interior</i>
ASBR	<i>Asclepias brachystephana</i>	ASUN4	<i>Asclepias uncialis</i>
ASCA3	<i>Asclepias californica</i>	ASUNR	<i>Asclepias uncialis</i> ssp. <i>ruthiae</i>
ASCAC3	<i>Asclepias californica</i> ssp. <i>californica</i>	ASUNU2	<i>Asclepias uncialis uncialis</i>
ASCAG	<i>Asclepias californica</i> ssp. <i>greenei</i>	ASVE	<i>Asclepias verticillata</i>
ASCO	<i>Asclepias cordifolia</i>	ASVE2	<i>Asclepias vestita</i>
ASCR	<i>Asclepias cryptoceras</i>	ASVEP	<i>Asclepias vestita</i> ssp. <i>parishii</i>
ASCRC2	<i>Asclepias cryptoceras</i> ssp. <i>cryptoceras</i>	ASVEV	<i>Asclepias vestita</i> ssp. <i>vestita</i>
ASCRD2	<i>Asclepias cryptoceras</i> ssp. <i>davisii</i>	ASVI	<i>Asclepias viridiflora</i>
ASCU	<i>Asclepias curassavica</i>	ASWE3	<i>Asclepias welshii</i>
ASCU9	<i>Asclepias cutleri</i>		
ASEL	<i>Asclepias elata</i>		
ASEN	<i>Asclepias engelmanniana</i>		
ASER	<i>Asclepias eriocarpa</i>		
ASER2	<i>Asclepias erosa</i>		
ASFA	<i>Asclepias fascicularis</i>		
ASFR13	<i>Asclepias fruticosa</i>		
ASGL5	<i>Asclepias glaucescens</i>		
ASHA6	<i>Asclepias hallii</i>		
ASHY5	<i>Asclepias hypoleuca</i>		
ASIN	<i>Asclepias incarnata</i>		
ASINI	<i>Asclepias incarnata</i> ssp. <i>incarnata</i>		
ASIN14	<i>Asclepias involucrata</i>		
ASLA	<i>Asclepias labriformis</i>		
ASLA4	<i>Asclepias latifolia</i>		
ASLE13	<i>Asclepias lemmonii</i>		
ASLI6	<i>Asclepias linaria</i>		
ASMA10	<i>Asclepias macrosperma</i>		
ASMA	<i>Asclepias macrotis</i>		
ASNU	<i>Asclepias nummularia</i>		
ASNY	<i>Asclepias nyctaginifolia</i>		
ASOE	<i>Asclepias oenotheroides</i>		
ASOV	<i>Asclepias ovalifolia</i>		
ASPU	<i>Asclepias pumila</i>		
ASQU2	<i>Asclepias quinqueidentata</i>		
ASRU6	<i>Asclepias rusbyi</i>		
ASSO	<i>Asclepias solanoana</i>		
ASSP	<i>Asclepias speciosa</i>		
ASST	<i>Asclepias stenophylla</i>		