

A DRAFT Illinois  
**Species Status Assessment**  
for  
**Mead's Milkweed (*Asclepias meadii*)**



Photo taken by Chris Benda

Illinois Department of Natural Resources  
**July 2022**

## SECTION 1. SPECIES DESCRIPTION

### Taxonomy

Mead's milkweed (*Asclepias meadii* Torrey) is a member of the milkweed family (Asclepiadaceae) (Steyermark 1981; Mohlenbrock 2014). The species was first collected by Dr. Samuel Barnum Mead in Hancock County, Illinois in 1843 (Mead 1846) and the first published description was made by John Torrey (Torrey 1856).

### Physical Characteristics

Mead's milkweed is a perennial rhizomatous forb, which often produces just one stem from each rootstock, but may also produce multiple stems (Betz 1989, USFWS 2003). Plants in Missouri and Kansas have been observed to reach an average height of 56 cm (Betz 1989). The species has opposite hairless leaves with a waxy covering (USFWS 2003). In flowering years, stems produce just one inflorescence, an umbel that bears an average of 12 flowers and nods downward; the nodding inflorescence is a unique characteristic to Mead's milkweed among North American milkweeds (Betz 1989; Betz and Lamp 1990). Usually one, but sometimes two, seed pods may be produced by a stem. These contain an average of 60 hairy seeds per pod (Betz 1989).

### Habitat

Mead's milkweed is known primarily as a member of mesic to dry-mesic tallgrass prairie communities (Axelrod 1985; Freeman 1988). Most extant populations now occur in native hay meadows in Kansas and Missouri (Bowles et al. 1998). Some extant populations of tallgrass prairies have persisted in areas where prairie remnants exist, such as prairies preserves and railroad prairies (Betz 1989; Row 2015). In addition to tallgrass prairie habitats, Mead's milkweed is also known from glade and barrens communities in Missouri, Illinois, and formerly Wisconsin (Steyermark 1981; USFWS 2012). Across its range the species occupies habitats in both glaciated and unglaciated regions (USFWS 2003). The soil conditions in which Mead's milkweed grows vary across its range and include acidic and nutrient poor soils in Missouri and southern Illinois, calcareous and nutrient rich soils in Iowa and northern Illinois, and intermediate soils in Kansas (Bowles et al. 1998).

In Illinois, Mead's milkweed formerly grew primarily in mesic to dry-mesic tallgrass prairie habitats, with the exception of extant populations [REDACTED] in southern Illinois, which occur in barrens communities.

### Life History and Reproduction

Mead's milkweed is a slow-growing species that may take four years (Betz 1989) or even 15 or more years (Bowles et al. 2001) after seed germination to reach reproductive maturity. Plants that have reached maturity may persist and reproduce for decades (Betz 1989). Most milkweed species are self-incompatible or experience high inbreeding depression and require outcrossing to produce viable seeds (Kephart 1981; Shannon and Wyatt 1986; Kahn and Morse 1991; Broyles and Wyatt 1993); Mead's milkweed has generally been considered self-incompatible as well (Tecic et al. 1998).

In Illinois, flowering occurs in May and June (Mohlenbrock 2014). The mining bee *Anthophora abrupta* is known to pollinate the plant and some bumblebee (*Bombus* spp.) species may also be pollinators (Betz

et al. 1994). Seeds mature in 100 to 110 days, so that flowers pollinated at the beginning of June produce ripe seeds by the middle of September (Betz 1989). Seed production and viability in Mead's milkweed is relatively low, as previous study has observed that only 6.4% of flowering stems produced seeds pods, pods produced an average of 60 seeds per pod, and the seed germination rate was 47.6% (Betz 1989, Betz and Lamp 1990).

### Conservation Status

Mead's milkweed is a species of conservation concern at the state, federal, and global level. Globally, NatureServe has given the species a Global Conservation Status Rank of G2 (Imperiled), a rank assigned to species that are "at high risk of extinction or collapse due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors" (NatureServe 2022).

At the federal level, Mead's milkweed is listed by the USFWS as a federally threatened species; it was added to this list on September 1, 1988 (USFWS 1988).

In Illinois, Mead's milkweed was added as an endangered species to the Illinois Endangered and Threatened Species list by the Illinois Endangered Species Protection Board on May 20, 1980 (Mankowski 2012). NatureServe has assigned Mead's milkweed a Subnational Conservation Status Rank of S2 (Imperiled) for the state of Illinois. Mead's milkweed has also received the following Subnational Conservation Status Ranks for the other states in which it was historically present: S2 (Imperiled) – Missouri and Kansas; S1 (Critically Imperiled) – Iowa; and SX (Presumed Extirpated) – Wisconsin and Indiana (NatureServe 2022) (Figure 1).

## **SECTION 2. DISTRIBUTION**

### North American Range

Mead's milkweed historically occurred throughout much of the tallgrass prairie region in the Midwestern United States and has been known from Kansas (Carruth 1877; Gates 1940; McGregor 1948), Missouri (Tracy 1886; Woodson 1954; Steyermark 1981), Iowa (Fitzpatrick 1899; Greene 1907), Illinois (Mead 1846; Lapham 1857; Patterson 1876; Brendel 1887; Huett 1897; McDonald 1899; Jones 1963; Mohlenbrock 2014), Wisconsin (Greene 1880; Greene 1898), and Indiana (Deam 1940) (Figure 1). The species is considered to have been extirpated from Wisconsin and Indiana (USFWS 2003, NatureServe 2022). Introductions were made in these two states in the 1990s and 2000s; however, it is not clear if viable populations have become established (USFWS 2012). A large percentage of the extant populations of Mead's milkweed across its range are located in Kansas and Missouri (NatureServe 2022) in the Osage Plains Physiographic Region (USFWS 2003).

### Illinois Distribution

Historical, modern, and introduced records of Mead's milkweed in Illinois have come from at least 14 counties in the state (Figure 2). These include records from the [REDACTED] (Schwegman 1973). As of 2003, extant populations of naturally occurring Mead's milkweed were known in Illinois only from Saline County in the [REDACTED] (Bowles et al. 2001) after a Ford County population on private land was destroyed due to prairie conversion to row crop production in

2001. Counties in which natural historical populations were reported to have become extirpated include Cook, Ford, Fulton, Hancock, Henderson, LaSalle, Menard, and Peoria (Phillippe et al. 2000).

In the 1990s, Mead's milkweed seeds were collected from many populations across multiple states for propagation at the Morton Arboretum in Lisle, IL. These materials were used to introduce both seeds and juvenile tubers at a number of sites, primarily between 1994 and 1996, but with some introductions possibly occurring as late as the 2010s. 9 of these introductions occurred at sites located within the historical range of Mead's milkweed but from which no naturally occurring populations had been reported. Introductions were made primarily in remnant prairies, and one mature restored prairie, in the [REDACTED] as well as at one barrens community in the [REDACTED]. The introduction activities conducted at many of these sites are described in Bowles et al. (2001 and 2015). Mead's milkweed was also introduced to supplement existing populations at 2 sites with extant populations in the [REDACTED].

While plants were observed regularly at introduced and extant populations in the 1990s and 2000s, there has been an overall trend of decreasing population size and, in some case, the disappearance of populations. Monitoring data submitted to the Illinois Natural Heritage Database (NHD) has also become sparser (this will be discussed below). As a result of these trends, a number of populations do not have an observation of Mead's milkweed recorded within the last ten years. This assessment can report a total of 12 populations in Illinois at which extant or introduced Mead's milkweed have been observed since 1990. Plants have only been found and reported to the NHD from five of these populations within the last ten years (Figure 3a and 3b).

#### Limitations of Surveys and/or Data Reporting

Following Mead's milkweed introduction efforts in the 1990s, monitoring was conducted annually at most sites for research purposes and restoration tracking. These data were recorded consistently in the NHD until roughly 2008-2012. After that time, the number of observations and monitoring visits recorded in the database drops significantly. It is known or suspected that regular monitoring has continued at some Mead's milkweed sites. Efforts are ongoing to locate individuals who have conducted monitoring and to obtain these monitoring data and use them to update the NHD.

The monitoring data present in the NHD do suggest that there have been population declines at all the introduced populations and that some populations may have disappeared. While it seems clear that some populations have declined to very small numbers, this trend is somewhat complicated by unsuccessful survey efforts that could be explained by staff changes. In the 10-15 years following most introductions, regular monitoring was conducted by the staff and researchers who conducted the introductions. They would have been familiar with the very specific locations where plants were introduced. Eventually, other staff (e.g. Natural Areas Preservation Specialists with the Illinois Nature Preserves Commission or District Heritage Biologists with the Illinois Department of Natural Resources) began to take over some of these monitoring assignments. However, several notes in the NHD indicate that these staff had difficulty finding Mead's milkweed plants and were sometimes not aware of the specific location of the population. This would clearly increase the likelihood of failed survey attempts, even if plants persisted.

### **SECTION 3. ABUNDANCE**

Abundance data for each population of Mead's milkweed known from Illinois are provided in Table 1. Most populations are quite small, with estimated abundance of less than 10 stems. The [REDACTED] population, which contains a combination of extant and introduced plants, is the only population in Illinois which has consistently been observed to possess more than 10 mature plants. Across the entire state, the entire population of Mead's milkweed seems likely to consist of less than 100 plants and may be much lower.

At six of the twelve populations, the most recent survey effort failed to discover any plants. In Table 1, these populations can be identified as populations for which the last survey year is different than the most recent observation year. Some of these populations may have become extirpated; however, this is not certain, as the small number of stems and staff unfamiliarity with stem locations may also explain negative survey results.

As mentioned previously, we are confident that recent monitoring efforts not recorded in the NHD have occurred at some populations. Efforts to update the NHD are ongoing, but without obtaining more recent survey records, all assumptions about Mead's milkweed abundance in Illinois are relatively uncertain.

#### **SECTION 4. POPULATION IDENTIFICATION AND VIABILITY**

This assessment identifies unique populations as those tracked in the Illinois NHD as unique Element Occurrences (EOs), which are a surrogate for populations used by NatureServe for a variety of biodiversity and conservation tracking purposes. Guidance for the delineation of unique Element Occurrences is provided by NatureServe and implemented with the Illinois NHD.

These delineation methods may differ somewhat from those used in other reports dealing with Mead's milkweed. Notably, the federal species recovery plan (USFWS 2003) reported four extant populations as occurring in the Shawnee Hills Natural Division. These occurred as several subpopulations spread between two EOs that are tracked in the Illinois NHD. While monitoring data from these smaller subpopulations is, to a degree, tracked separately within EOs in the NHD, the monitoring and observation records at the subpopulation level are not always clearly delineated within the database. Therefore, this assessment aggregates some of these adjacent subpopulations into a smaller number of consolidated populations (EOs). As a result, the number of populations reported here may not match exactly the numbers reported in previous reports.

NatureServe has developed a system of EO Ranks to serve as a viability estimate for EOs. Using criteria provided by NatureServe (2020), each Illinois population of Mead's milkweed was assigned an EO Rank by Stephen Tillman (Natural Resources Specialist, Division of Natural Heritage, Illinois Department of Natural Resources) in October 2022. These EO Ranks are reported in Table 1.

Of the 12 Illinois populations identified by this Species Status Assessment, 10 were given a rank of D (Poor Viability); this rank indicates that, if current conditions continue, the population is unlikely to persist for the foreseeable future (approximately 20-30 years). Given the long lifespan of Mead's milkweed, some of these populations could potentially be given a rank of CD (Fair Viability/Poor Viability), but D ranks were chosen instead due to the very low numbers of individuals reported from all Illinois populations. One population of Mead's milkweed was given an EO Rank of E (Verified Extant)

because the population was observed to be extant in 2015, but there is not sufficient data to otherwise rank the population. Another population was given a Rank of X (Extirpated) due to the known destruction of the population and its habitat in 2001.

These rank assessments would benefit from consideration and revision by other botanists familiar with the status of Mead's milkweed in Illinois.

## **SECTION 5. PAST RESEARCH**

Introduction efforts that were conducted in Illinois in the 1990s were accompanied by data collection and research on restoration outcomes that have generated several research publications (Bowles et al. 1998; Bowles et al. 2001; Bowles et al. 2015). This work provided estimates of plant establishment and survival and examined the effect that different introduction strategies and management techniques have had on the establishment, survival, and growth of Mead's milkweed introduced by seeding and planting of tubers. There was shown to be some advantage to planting juvenile tubers rather than seeds, as juvenile establishment and survival was greater than that of seeded plants when factoring in the loss of seeds that did not germinate successfully, juveniles showed faster growth than plants grown from seeds, and only individuals planted as tubers reached reproductive size and were observed to flower within the study period; however, there could be potential competitive disadvantages to planted individuals (Bowles et al. 2015).

Research consistently showed that prescribed fire is an important tool for managing Mead's milkweed in both natural and introduced populations, as burned habitats produced a higher percentage of flowering in adult plants, increased seed germination and the survival and growth of seeded and planted Mead's milkweed, and decreased the extinction probability of introduced populations (Bowles et al. 1998; Bowles et al. 2015). Years of above average rainfall were also shown to be an important factor in the establishment of introduced populations (Bowles et al. 1998).

While some introduced populations exhibited very low numbers of flowering plants and no seed production more than a decade after introduction, populations at highly suitable sites subject to beneficial management practices did regularly produce flowering plants and some seed production, providing evidence that population growth could potentially occur from introductions (Bowles et al. 2015). However, this work did show that the long life cycle and slow growth exhibited by Mead's milkweed indicate that introduced populations may require decades to exhibit successful and consistent sexual reproduction.

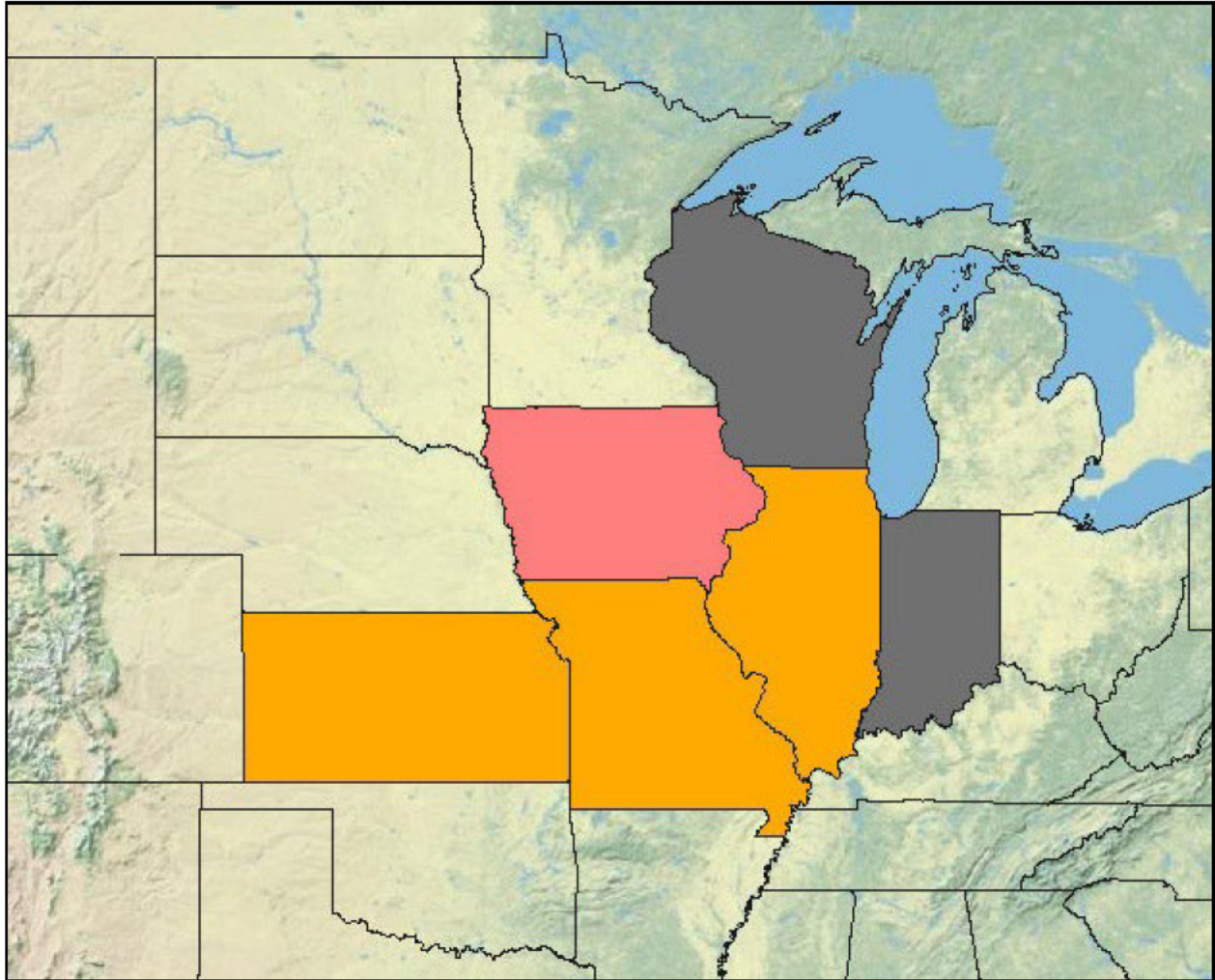
## **SECTION 6. CURRENT RESEARCH, MONITORING, AND DATA NEEDS**

Researchers at the Missouri Botanical Garden are conducting ongoing research on the factors affecting the reproductive success of Mead's milkweed. There are early indications that their results will be highly relevant to recovery efforts for this species. This work will be added to this Species Status Assessment when it becomes available.

As mentioned previously, we are confident that the NHD does not include data from the most recent monitoring efforts for some populations. Updating that database with the most current records and

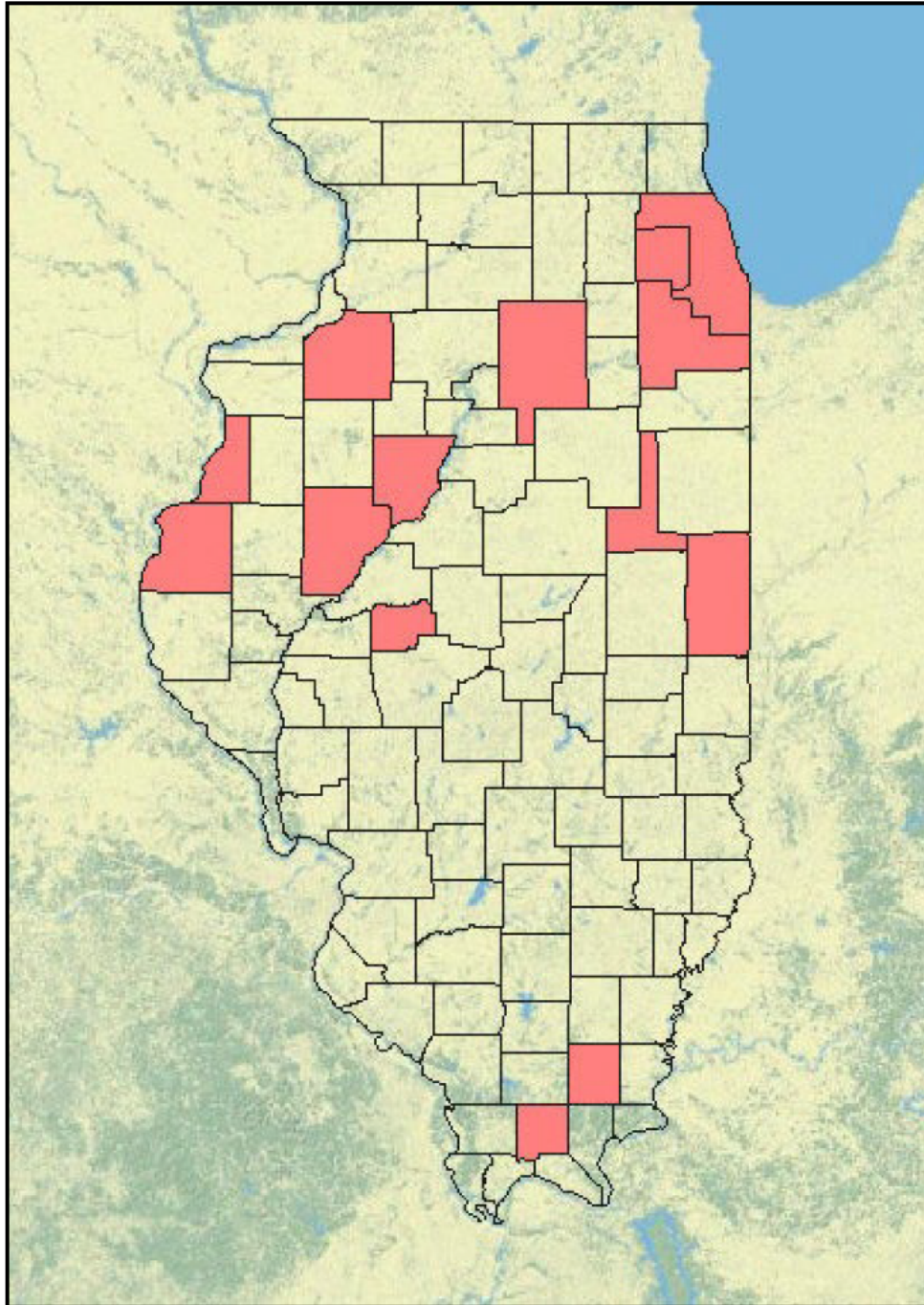
conducting monitoring to relocate introduced populations that have not been seen in the last ten years are the highest priority monitoring and data needs.

## SECTION 7. FIGURES

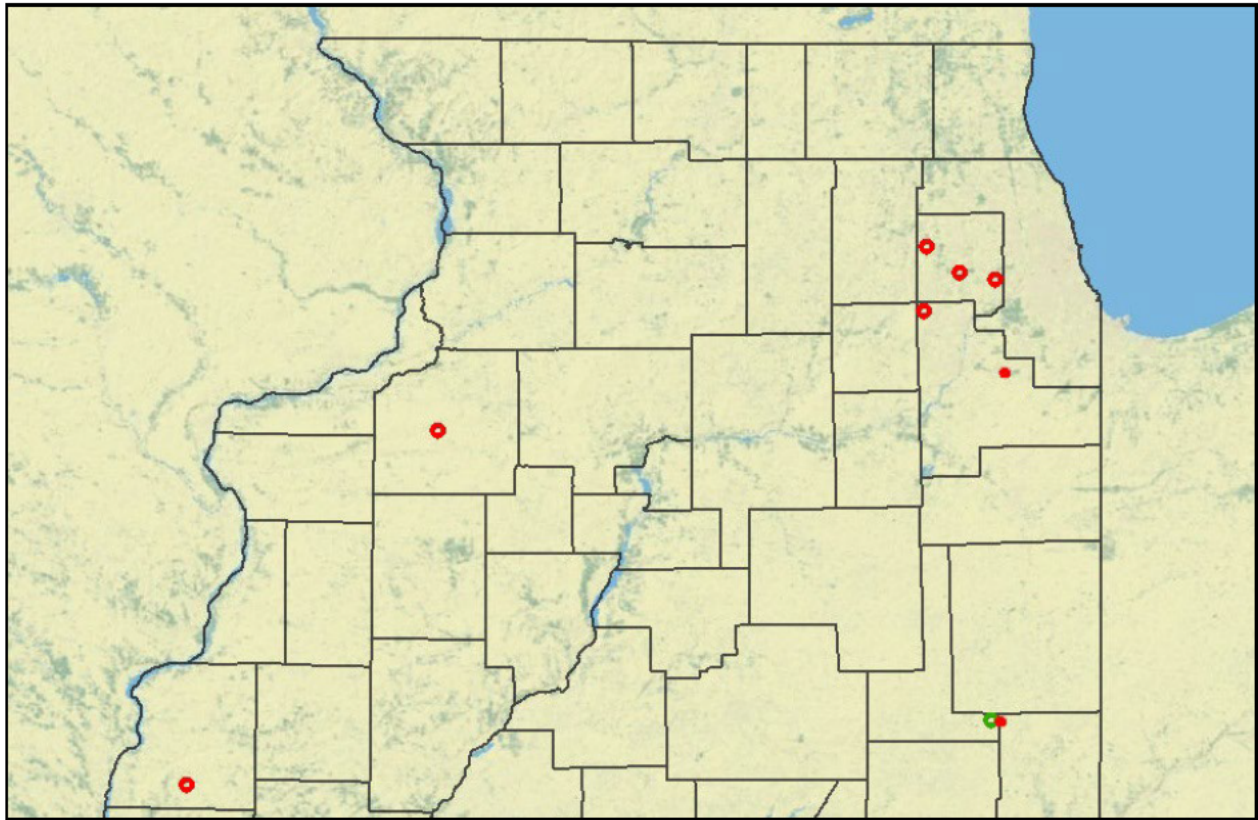


**Figure 1.** Global and national distribution of Mead's milkweed (*Asclepias meadii*). Shaded colors reflect the Subnational Conservation Status Rank assigned by NatureServe for each state within which Mead's milkweed occurs (or formerly occurred) (NatureServe 2022). The status ranks indicated by each color are as follows: Red – S1 (Critically Imperiled); Orange – S2 (Imperiled); Gray - SX (Presumed Extirpated).

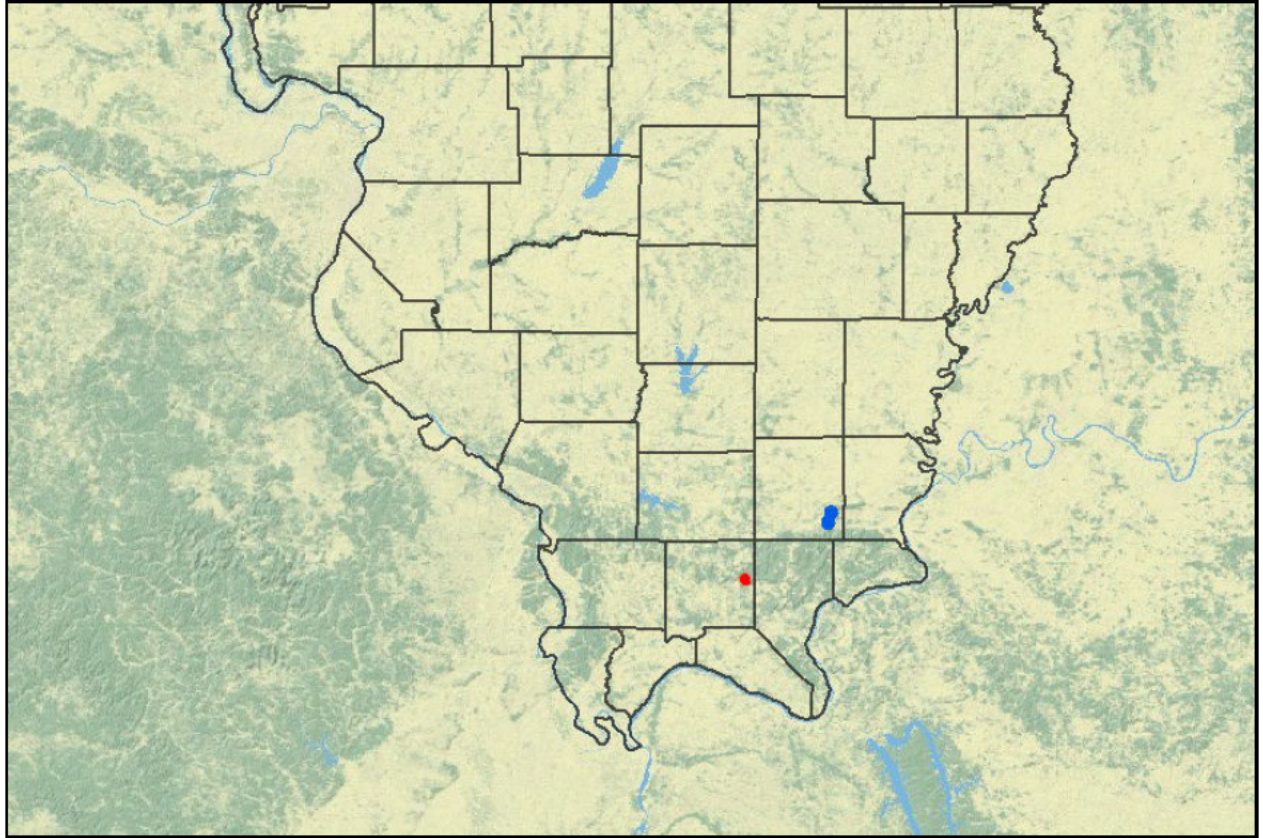




**Figure 2.** Distribution of counties in Illinois from which Mead's milkweed (*Asclepias meadii*) has been reported, either as historical populations that have become extirpated, historical populations that remain extant, or populations that have been introduced since 1990. Counties from which Mead's milkweed have been reported are shown in red.



**Figure 3a.** Distribution of Mead's milkweed (*Asclepias meadii*) in the northern half of Illinois. Populations at which plants have been observed in the last ten years (2012 and after) are shown by filled in circles; populations at which no such observations have been made are shown by hollow circles. Introduced populations are shown in red, populations containing only native extant plants are shown in green, and populations containing a mix of native extant and introduced plants are shown in blue. Data were obtained from the Illinois Natural Heritage Database and supplemented by additional monitoring reports.



**Figure 3b.** Distribution of Mead's milkweed (*Asclepias meadii*) in the southern half of Illinois. Populations at which plants have been observed in the last ten years (2012 and after) are shown by filled in circles; populations at which no such observations have been made are shown by hollow circles. Introduced populations are shown in red, populations containing only native extant plants are shown in green, and populations containing a mix of native extant and introduced plants are shown in blue. Data were obtained from the Illinois Natural Heritage Database and supplemented by additional monitoring reports.

**SECTION 8. TABLES**

**Table 1.** Description of Mead's milkweed (*Asclepias meadii*) sites, including information about monitoring year and population size for the most recent observation and the observation of the largest population size. Data are sorted by the year of the most recent observation. Data were obtained from the Illinois Natural Heritage Database and from other individual monitoring reports.

Site	County	Natural Division	Last Survey Year	Most Recent Observation		Largest Population Size		EO Rank <sup>g</sup>
				Year	# of Stems	Year	# of Stems	
██████ <sup>a</sup>	Saline	██████	2022	2022	Unknown	1988	9	D
████████████████████	Saline	██████	2021	2021	Unknown	2008	35	D
██████████████	Vermilion	██████	2021	2020	2	2002 <sup>f</sup>	7 <sup>f</sup>	D
████████████████████	Johnson	██████	2021	2015	5	2015	5	E
██████████████	Will	██████████████	2012	2012	4	2010 <sup>f</sup>	4 <sup>f</sup>	D
██████████████	DuPage	██████████████	2011	2011	2	2003 <sup>f</sup>	39 <sup>f</sup>	D
████████████████████	Will	██████	2011	2011	2	2005 <sup>f</sup>	25 <sup>f</sup>	D
██████████████	Hancock	██████████████	2015	2010	4	2006 <sup>f</sup>	10 <sup>f</sup>	D
██████████████	DuPage	██████████████	2010	2010	2	2004 <sup>f</sup>	7 <sup>f</sup>	D
████████████████████	Henry	██████	2015	2010 <sup>d</sup>	3 <sup>d</sup>	2006 <sup>f</sup>	7 <sup>f</sup>	D
██████████████	DuPage	██████████████	2013	2006	12	2006	12	D
████████████████████	Ford	██████	2004	1998 <sup>e</sup>	1	1989	4	X

<sup>a</sup> Population is made up of both naturally occurring and introduced plants. Population is made up of several subpopulations.

<sup>b</sup> Population is made up only of introduced plants.

<sup>c</sup> Population was made up only of naturally occurring plants.

<sup>d</sup> It is believed that plants were observed here more recently than what is recorded here.

<sup>e</sup> This population was extirpated in 2001 due to land conversion.

<sup>f</sup> The number of seedlings and juvenile plants counted in the years immediately following seeding and planting was often quite high. Therefore, the values presented here represent the year in which the largest population size was observed at least five years following introduction. This value is somewhat arbitrary, but provides an indication of population size that reflects a greater degree of plant establishment than that immediately following introduction.

<sup>g</sup> The EO Rank categories assigned to Mead's milkweed are as follows: D - Poor Viability; E - Verified Extant; X - Extirpated

## SECTION 9. REFERENCES

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